

## COMMUNITY BASED COOPERATIVE FISHERIES MANAGEMENT FOR LAKE VICTORIA FISHERIES IN TANZANIA.

**Magese Emmanuel Bulayi**

Ministry of Natural Resources and Tourism  
Fisheries Division  
P.O.BOX 2462, Dar-es-salaam  
Tanzania.  
Tel. +255-51-222 29 30  
Fax +255-51-211 03 52

E-mail: [fisheries@twiga.com](mailto:fisheries@twiga.com) or [marineparks@raha.com](mailto:marineparks@raha.com)

Supervisor: Prof. Ragnar Arnason, department of economics  
University of Iceland

### ABSTRACT

Although fisheries management is a complex task, many countries in the world have managed to develop fisheries management regimes that can improve the economic efficiency of the fisheries. Property rights-based fisheries management regimes have shown promising results in the management of fisheries resources since they reduce or eliminate the incentives for over-capitalisation in harvesting of the fisheries resources and thus contribute to economic efficiency.

Community-based cooperative fisheries management is one of the property rights-based fisheries management systems, which has received attention in recent years particularly in the developing countries.

In Tanzania, community-based cooperative fisheries management seems a feasible option because the current system is entirely based on common property and an open access approach. This approach has led to increased fishing effort, encouraged excessive fishing investment and thus, declining catch trends. A community-based cooperative fisheries management has proposed for Lake Victoria fisheries in Tanzania in order to improve fisheries management. This system recognises the sharing of management responsibilities between fishing communities through beach fisheries management units (BFMUs) and the Fisheries Division in the Ministry of Natural resources and Tourism. The community-based cooperative fisheries management is likely to reduce the problem of over-exploitation of fisheries resources in Lake Victoria by allocating exclusive fishing rights to the fishing communities through BFMUs in their respective villages. Legal mechanism should be developed as a basis of implementation of the community-based cooperative fisheries management in Lake Victoria.

## ACKNOWLEDGEMENTS

I'm most grateful to the people who have assisted me in developing this work. In particular, I would like to most sincerely thank Professor Ragnar Arnason of the University of Iceland who supervised this work, for his useful criticism, comments and proper guidance during the time I was developing and writing this report. His technical assistance is highly appreciated.

I am indebted to Dr Tumi Tomasson, the Director of the United Nations University-Fisheries Training Programme; and his deputy, Mr Thor Asgeirsson for their guidance and cooperation in helping me to come up with the proposal of this work. Their efforts in facilitating fellowship and training arrangements are highly appreciated. More thanks to the United Nations University for financial support which enable me to attend this course in Iceland.

Working environment was ideal for this work. I would like to extend my thanks to The Director of Marine Research Institute and members of the staff. Also, I would like to thank fellow participants in this course, in particular Messrs Boaz Keizire from Uganda and Friday Njaya from Malawi for their brotherhood cooperation for the whole period of my stay in Iceland.

Special thanks to Mr Thomas W. Maembe, the Director of Fisheries Division and his Assistant Directors in Tanzania, for allowing me to attend this course in Iceland.

## TABLE OF CONTENTS.

ACKNOWLEDGEMENTS .....	1
TABLE OF CONTENTS.....	2
LIST OF FIGURE.....	3
LIST OF TABLES .....	4
LIST OF ABBREVIATIONS.....	5
1. INTRODUCTION .....	6
2. THE TANZANIAN FISHERIES .....	8
2.1 Fishing potential and catch developments.....	9
2.2 The History of Fisheries Management .....	12
2.2.1 Socio-economic features of the Tanzanian fisheries. ....	13
2.3 Current fisheries policy and management regime. ....	14
2.3.1 Monitoring, control and surveillance.....	14
2.3.2 Fisheries judicial system. ....	15
2.4 Current fisheries management organisation structure. ....	15
2.4.1 Fishing community organisation structure.....	15
2.4.2 Government organisation structure for fisheries.....	16
3. THEORETICAL REVIEW .....	17
3.1 Theoretical considerations on fisheries management regimes. ....	18
3.1.1 Classification of Fisheries management systems.....	19
3.2 The concept of community based cooperative fisheries management. ....	23
4. A COMMUNITY BASED COOPERATIVE FISHERIES MANAGEMENT FOR LAKE VICTORIA FISHERIES. ....	26
4.1 Current situation of Lake Victoria fisheries. ....	27
4.1.1 Fish production trend in Lake Victoria fisheries .....	27
4.1.2 Types of Fishing gear used in Lake Victoria Fisheries.....	27
4.1.3 Evolution of fishing effort .....	28
4.1.4 Fishing groups in Lake Victoria. ....	28
4.1.5 Current management of Lake Victoria fisheries.....	29
4.2 A proposal for a community-based cooperative fisheries management system for Lake Victoria fisheries .....	30
4.2.1 A proposed scheme for community-based cooperative fisheries management system .....	31
4.2.2 Community-based cooperation fisheries management: proposed division of responsibilities .....	33
4.2.3 Working mechanism of the proposed fisheries management system .....	35
4.2.4 Requirements for the implementation of community-based cooperative fisheries management system.....	39
4.2.5 Estimated costs and time frames.....	39
5. CONCLUSION.....	41
LIST OF REFERENCE .....	43

## LIST OF FIGURE

- Figure 1 Map of united Republic of Tanzania  
Figure 2 Fish production in Tanzania .  
Figure 3 Fish production trend from individual fisheries in Tanzania  
Figure 4 Fishing effort from Tanzania fisheries  
Figure 5 Fish Export from Tanzania.  
Figure 6 A generalised fishing community organisation structure in Tanzania  
Figure 7 The position of fisheries management in the Institutional Organisation Structure and decision making in Tanzania  
Figure 8 The sustainable fisheries model  
Figure 9 Classification of Fisheries management systems  
Figure 10 Types of property rights regimes  
Figure 11 Spectrum of co-management arrangement.  
Figure 12 Evolution of catch rates from Lake Victoria  
Figure 13 Types of gillnet nets used in Lake Victoria.  
Figure 14 Fishing effort in Lake Victoria.  
Figure 15 A Proposed scheme for community based cooperative fisheries management in lake Victoria.

## LIST OF TABLES

Table 1	Estimated potential yields (MSY) from Tanzania Natural waters.
Table 2a	Proposed responsibilities/tasks of fishing community.
Table 2b	Proposed responsibilities/tasks of Fisheries Division.
Table 3	Estimated costs for community-based cooperative fisheries management for Lake Victoria.

## LIST OF ABBREVIATIONS

BFEC	Beach Fisheries Executive Committee.
BFMU	Beach Fisheries Management Unit.
CIFA	Committee for Inland Fisheries of Africa.
DED	District Executive Director.
EAFRO	East Africa Fisheries Research Organization.
EEZ	Exclusive Economic Zone.
FAO	Food and Agriculture Organisation of the United Nations.
FOB	Free On Board.
GMP	General Management Plan
ICLARM	International Centre for Living Aquatic Resources Management.
IFIP	Inland Fisheries planning and development in southern and Eastern Africa.
IQ	Individual quota.
ITQ	Individual transferable quota.
IUCN	International Union for Conservation of Nature.
LVEMP	Lake Victoria Environmental Management Programme.
LVFO	Lake Victoria Fisheries Organisation.
m	Metres.
MC	Management cost.
MCS	Monitoring, control and surveillance.
mm	Millimetres.
MNRT	Ministry of Natural Resources and Tourism.
MNRA & LG	Ministry of Regional Administration and Local Government.
MoA	Memorandum of Agreement.
MSY	Maximum Sustainable Yield.
NCCO	National Cold storage Corporation.
NGOs	Non- government Organisations.
SWIO	South West Indian Organisation.
TAC	Total allowable Catch.
TAFICO	Tanzania Fisheries Corporation.
TAFIRI	Tanzania Fisheries Research Institute.
TURFs	Territorial User Rights in Fisheries.
UNDP	United Nations Development Organisation.
USA	United States of America.
US\$	Dollar of the United States of America.

## 1. INTRODUCTION

Fisheries management aimed at developing appropriate fisheries management policies and strategies that can protect fish stocks from being over-exploited has been debated among resource managers for a long time. The FAO code of conduct for responsible fisheries sets principles for countries in the world on how they could develop appropriate fisheries management policies based on sustainable harvesting of fisheries resources (FAO 1995). Arnason (2001) argues that under fairly general conditions the best fisheries management system is one that induces the fishing industry to produce maximum sustainable net profits.

Property rights based fisheries management regimes have shown promise in the management of fisheries resources in developed countries (Arnason 2001). Common property problems are eliminated by establishing property rights over the fish stock (Arnason 2001). This reduces or eliminates the incentives for over-capitalisation in harvesting of fisheries resources and thus contributes to economic efficiency.

Recently, it has been argued that a community-based cooperative fisheries management, which is one of the property rights approaches in fisheries management seems to be a viable option in many of the artisanal fisheries in developing countries (Wilson 2001).

Community-based cooperative fisheries management is a system where authority and responsibility over local resources is shared between government and local resource users and/or their communities (Brown 1998). Brown pointed out that, community-based cooperative fisheries management is often used interchangeably with other terms, such as joint management, collaborative management and community-based management. These strategies have similarities in terms of approach, but may differ in relative participation of government and resource users (Pomeroy 1998). The community-based cooperative fisheries management shares responsibilities between government and communities. Under this system the government serves a number of important functions including providing support policies and legislation. According to Sajise (1995), community based management (in contrast to community-based cooperative fisheries management) is a process by which people themselves have opportunity and/or responsibility to manage their own resources, define their own needs, goals and aspirations, and make decisions affecting their socio-economic welfare. Under this system the government most often plays a minor role.

The community-based cooperative fisheries management has received increased attention in recent years, particularly in the developing countries (Brown 1998). It is being applied throughout Africa, particularly for inland fisheries (Wilson 2001).

Arnason (2001) noted that recently interest in community fishing rights has increased. Community management, where communities or otherwise defined groups are given certain exclusive rights, seems particularly attractive where other rights based approaches (such as individual transferable quota system (ITQs) ) cannot be applied for socio-political or enforcement reasons. Arnason (2001) argues that the great advantage of communal fishing rights is that they are often socially acceptable and facilitate effective law enforcement on the basis of social and physical proximity and social pressures.

Pomeroy (1995) argued that the underlying causes of the failure to manage fisheries are often of social, economic, institutional and/or political origins. Pomeroy pointed out, that fishing communities under certain conditions can regulate access and enforce rules through traditional or community institutions. Fisheries management authorities in many countries have recognised that a fishery often cannot be managed effectively without the cooperation of fishing communities.

In Tanzania, community-based cooperative fisheries management seems a feasible option for a number of reasons.

Firstly, fisheries management in Tanzania has been entirely operated and implemented by the government for many years. The management regime defines fisheries resources as common property. Anyone can gain access to the resource through the licensing system. This system has led to increased fishing effort (in terms of fishing vessels and number of fishermen) and declining catches particularly in Lake Victoria (Mkumbo *et al.* 2001). The management system has failed in controlling fishing effort. It has encouraged excessive fishing investment which has resulted in an oscillating downward trend in catches (Figures 2 and 3). It also provides for little or no effective cooperation with resource users. This general failure therefore constitutes a good reason for the government to involve fishing communities in the management of the resources.

Secondly, in Tanzania, the Fisheries Division has limited financial resources as well as trained human resources to conduct fisheries management activities such as monitoring, control and surveillance, data analysis and research. Under these circumstances community-based cooperative fisheries management could facilitate the monitoring, control and surveillance activities and thus improve fisheries management in the country.

Thirdly, the Fisheries Division has developed a new fisheries policy which recognises community participation in fisheries management. According to the Ministry of Natural Resources and Tourism (MNRT 1997), private sector, community, non-governmental organisations and other non-state actors could play a very useful role in the development and management of the fisheries resources. They possess diverse experience, expertise and capacity in various fields relevant to the fisheries sector. This shows that the government is willing to cooperate with communities and to support community based initiatives in fisheries management.

This study deals with the introduction of a community based cooperative fisheries management system in Tanzania fisheries. More precisely, it focuses on designing such a system for Tanzania's most important fisheries in Lake Victoria.

Report of this study presents a general introduction on the subject studied in section one. Section two gives an overview of Tanzania fisheries. It describes historical perspective of socio-economic attributes of the fishing industry as well as institutional framework. Theoretical review of various fisheries management systems, including the theories and concept of community-based cooperative fisheries management systems is presented in section three. Section four describes the community-based cooperative fisheries management in Lake Victoria fisheries. Conclusion on a

designed community-based cooperative fisheries management system is presented in section five. It is recommended that, this study should be used as a baseline for further studies aimed at developing appropriate fisheries management system for Lake Victoria fisheries for the three riparian states; Tanzania, Uganda and Kenya and elsewhere.

## 2. THE TANZANIAN FISHERIES

Tanzania is a coastal state with a total land area of 945,087 km<sup>2</sup> and population of about 32.7 million (Government of Tanzania 2000). The country is well endowed with both marine and inland fishery resources. The marine waters covers 64,000 km<sup>2</sup> as inshore waters and the offshore waters (EEZ) cover 223,000 km<sup>2</sup> (MNRT 1997). The biological potential of offshore (EEZ) waters is not yet known but it is believed that it has not been fully exploited. The inshore waters are important for the shrimp/prawn commercial fishery and other species exploited by local fishermen for local market (MNRT 1997). The inland waters in the country include the riparian-shared waters of African great lakes namely Lakes Victoria, Tanganyika and Nyasa (Figure 1). Inland waters cover 6.5% of the total area of the country (Government of Tanzania 2000).



Figure 1: Map of United republic of Tanzania showing major waters (Government of Tanzania 2000)

Lake Tanganyika covers some 32,900 km<sup>2</sup>. It is shared by Tanzania (41%), Democratic Republic of Congo (45%), Republic of Burundi (8%) and Zambia (6%). The lake is the second deepest in the world, with maximum depth of 1435 m and mean depth of 570 m (Government of Tanzania 2000). Lake Nyasa has a total surface area of 30,800 km<sup>2</sup> which is shared by Tanzania, Malawi and Mozambique. It has maximum depth of 758 m and mean depth of 426 m.

Lake Victoria is the second largest freshwater lake in the world, with an area of 68,000 km<sup>2</sup>. The lake is relatively shallow, with a maximum depth of 84m and mean depth of 40 m. The lake is divided into the national waters of the bordering countries, with Kenya owning 6%, Uganda 45% and Tanzania 49% of the total area (IUCN 2000). The lake is known for its abundance of fish species (about 250 species), which are exploited by local small-scale fishermen (Bathondi 1990). It has been estimated that 200,000 metric tons of fish can be harvested annually from Tanzania waters of Lake Victoria (Table 1). In the 1970s, a trawling fishery was introduced to catch the haplochromine species for fishmeal production. In recent years the commercial fishery in the Lake has been dominated by Nile perch fishery which is over 60% of the total fish production (Gibbon 1997). Trawling in Lake Victoria was banned in 1995.

## 2.1 Fishing potential and catch developments.

In general the present potential yield (MSY) estimates, suggest that about 730,000 metric tons of fish can be harvested in Tanzania annually (MNRT 1997, Table 1).

Table 1: Estimated potential yields (MSY) from Tanzania natural waters (MNRT 1997)<sup>1</sup>

<b>Name of water body</b>	<b>Estimated potential yield (MSY) in metric tons</b>
Lake Victoria	200,000
Lake Tanganyika	300,000
Lake Nyasa	100,000
Minor waters	30,000
Marine waters (Territorial)	100,000
<b>Total</b>	<b>730,000</b>

Fishing in Tanzania is dominated by artisanal fisheries. The artisanal fishermen produce about 90% of the total fish landings in the country; while only 10% is derived from an industrial prawn fishery in the Indian Ocean. In most cases the size of the artisanal fishing vessels range from 4-10 m, a few prawn fishing vessels are 12-25 m

<sup>1</sup> Data presented in Table 1 are obtained from a Government source. However uncertainties on potential yields for some water bodies are likely since stock assessment has not been done regularly. Currently stock assessment in Lake Victoria financed by the European Union is underway. It is also important to note that, some Fisheries like Lake Tanganyika, Nyasa are under-exploited since most of fish stocks are not commercially valuable as compared to fish stocks in Lake Victoria. In addition to that, Lake Nyasa and Tanganyika have deeper fish stocks which are not fully exploited.

long (MNRT 1996). In recent years the average annual fish catch in Tanzania has been estimated around 350,000 metric tons, 19% is marine catch and 81% is freshwater catch (MNRT 1996). Catches from Tanzanian waters have fluctuated around a declining trend from 1988-1998 (Figure 2).

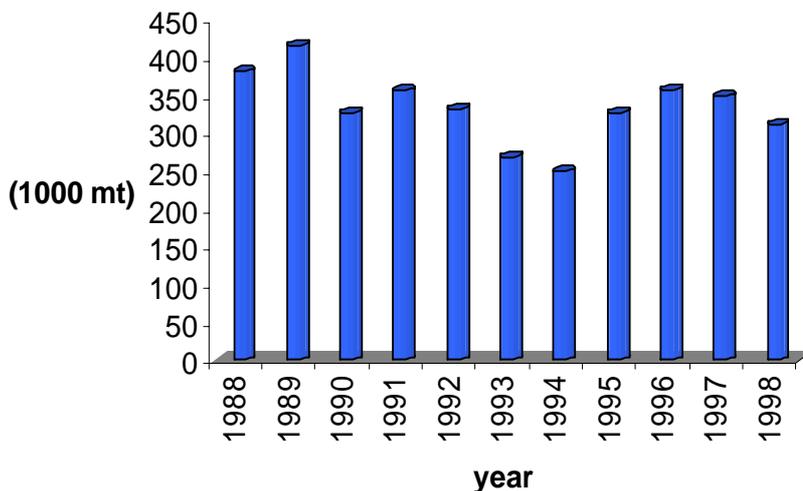


Figure 2: Fish production in Tanzania (MNRT 1999).

However, recent declines in catches suggest that certain traditional fisheries are either fully or over-exploited (Figure 3). This situation needs to be addressed.

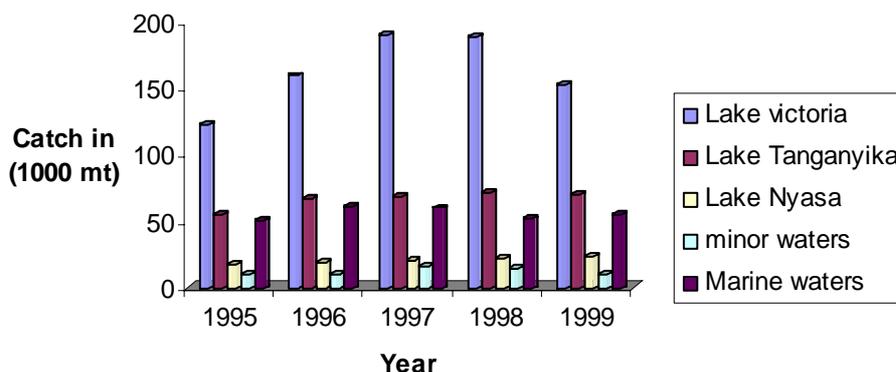


Figure 3: Evolution of fish production trend from individual fisheries in Tanzania (MNRT 1999).

Fishing effort in Tanzania has been increasing slightly in recent years, with around 60,000 fulltime fishermen (Figure 4).

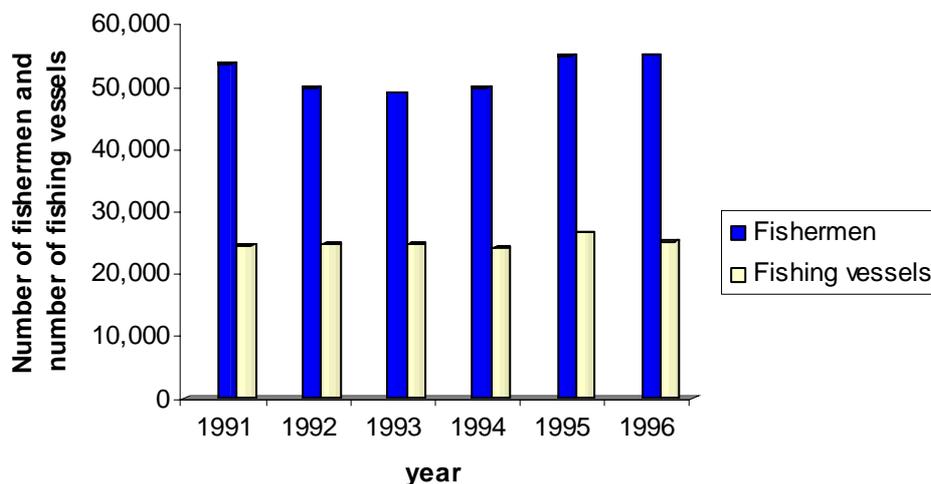


Figure 4: Evolution of fishing effort from Tanzania fisheries (MNRT 1996).

Although fish production has declined in recent years, the export of fisheries products for foreign market has increased rapidly (Figure 5). This indicates that there is a demand of fish for export which may encourage excessive investment in the fisheries sector.

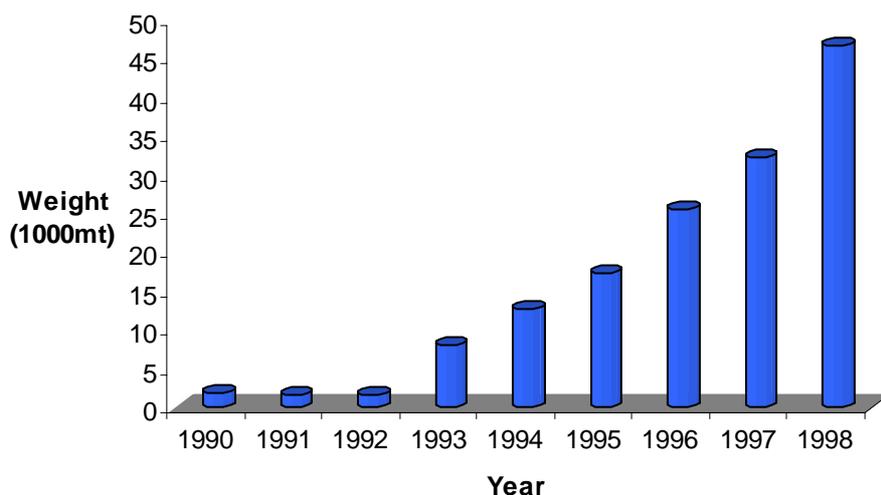


Figure 5: Fish export from Tanzania (MNRT 1999)

The contribution of fisheries sector to the economy of the country has increased for the past two decades through export of commercial fish products. It contributes

around 10% of the national Gross Domestic Product. It has been reported that fish contributes nearly 30% of the total animal protein intake in the country and millions of people derive their economic livelihood from fisheries (MNRT 1997).

## 2.2 The History of Fisheries Management

During pre-colonial times in the 18<sup>th</sup> century, fishing was an activity closely integrated with the culture and traditions of fishing communities. Fishing activities and traditional fisheries management systems were linked with traditional ownership of resources (Owino 1999). Local leaders were vested with powers to control exploitation of fish resources.

Fishing was limited to inshore areas of lakes, ocean and the river mouths. The catch was sufficient for food and subsistence barter trade. The traditional fisheries management system was based on community ownership whereby responsibility for the management of the fisheries resources was in the hands of the communities themselves (Owino 1999).

During the colonial period (1888-1960), the traditional fisheries management system based on community ownership was replaced by a centralised management system. The centralised system which consisted of restrictions (legislation) on the exploitation of the resources was imposed on the local users (Owino 1999). During this period, improved fishing gear such as gillnets, trawl nets and long lines were introduced (Owino 1999). This development was limited to few communities who were living near to the modern towns established by the colonial administration. The rest of communities did not have access to these improved fishing inputs. The introduced regulations however were applicable to all fishing communities. An important development during this period was the establishment of Fisheries Service Institute in 1947. This institute was later named East Africa Fisheries organisation (EAFRO). It played a major role in providing services such as, training and scientific research. EAFRO collapsed in 1977 (Owino 1999).

After independence in 1961, the new government established the Fisheries Division under the Ministry of Agriculture and Livestock in 1966. The national policy was based on a socialist ideology and a state run economy. According to this policy, people were mobilised from their traditional scattered villages to live and work together in large villages planned by the central government, called *ujamaa* villages. The government had the responsibility to provide social services such as education, health and other infrastructure (Nyerere 1968).

Under the socialist economy, a top-down approach was maintained to the fisheries management, where decisions and plans were made by the central government and later sent to communities and lower levels of government for implementation. In 1970 Fisheries Act No 6 of 1970 was enacted by the parliament of Tanzania to replace the colonial legislation. Under this Act, which is still in force, the minister responsible for fisheries is empowered to develop subsidiary regulations (MNRT 1970). In general terms, the Government enforces these regulations through a top-down approach.

Under the socialist economy, commercial fishing was operated by government agencies. Tanzania Fisheries Corporation (TAFICO) established in 1974, was the

main state owned company mandated to carry out commercial fishing in both marine and fresh waters. The government had powers to hire and fire TAFICO staff. Later on the company experienced a lot of losses and inefficiencies in its operation.

Other development initiatives and services which were established during this period include the establishment of support services institutions such the National Cold Storage Corporation (NCCO) and national fisheries training institutes. Regional and international programmes, such as South West Indian Organisation (SWIO), Inland Fisheries Planning and Development in Southern and Eastern Africa (IFIP) were also implemented. Others include the Committee for Inland Fisheries of Africa (CIFA) and the (UNDP/FAO). The CIFA has facilitated the establishment of the current regional body for Lake Victoria known as Lake Victoria Fisheries Organisation (LVFO).

The Tanzania Fisheries Research Institute (TAFIRI) was established in 1981. TAFIRI carries out research in both fresh and marine waters. The institute conducts research on fishery resources and has a role to play in the dissemination of research findings to the government and other stakeholders. The institute also conducts research on fish technology. The government runs three fisheries training institutes (Tanzania Government 2000). All these initiatives played a great role in advising the government to adopt appropriate measure on managing fisheries resources.

In the mid 1980s, the government embarked on a major economic and political reform programmes. The economic reform programmes have transformed the command-based economy into a market oriented one. A corresponding new fisheries policy was developed in 1997. A major component of this policy is the devolution of fisheries management obligations from centralised control to communities (Government of Tanzania 2000).

### *2.2.1 Socio-economic features of the Tanzanian fisheries.*

As mentioned earlier, in pre-colonial and much of colonial time fishing was an activity controlled by customs and traditional ownership of the resources (Owino 1999). The traditional fisheries management system was based on communal rights. These rights were vested in community or clan leaders. The traditional ownership over the fisheries resources also extended to the landing beaches, which were owned by the clan.

In Lake Victoria such landing beaches were referred to as *mwalo* which literally means landing beach (Gibbon 1997), while at the coast such sites were referred to as *dago*, *bandari*, *ufukwe*, etc. depending on the ethnic group who owned the beach. These landing sites were named after communities or the heads of the communities/clans or any other names that signified the importance of such landing sites in term of culture or socio-economic values (Owino 1999). These names of landing sites are still maintained today and have an important meaning in the management of the fisheries resources in some areas.

Access was restricted to only few fishermen who were respected by the communities. These fishermen could harvest selected species in certain areas. No fishing at all was allowed during certain periods of the year, especially during the rainy season which was believed to be the spawning season (Owino 1999).

Outsiders (non-clan/community members) who wanted to exploit resources from the communities who owned a landing site had to seek permission from the head of the clan or other elder leaders in the community. Application was judged based on availability of resources and the social status of the applicant such as marital status and age (Owino 1999). The clan-based regulations on fisheries were part of a wider system of socio-cultural relationships existing between clan members as well as other clans/communities. The regulatory system was thus very much an integral part of the communities. All decisions were made within the traditional legislative framework.

### **2.3 Current fisheries policy and management regime.**

The current national fisheries policy was adopted by the government in 1997. The strategies of this policy are based on the overall government objectives which aim at poverty reduction, creation of employment opportunities, increased food security, increased economic growth and environmental conservation. The need for a new fisheries policy was already felt back in the mid 1980s. This was the time when the country had embarked on socio-economic reforms in order to revamp the national economy and facilitate economic growth. There are five main objectives of the current fisheries policy:

- Enhanced resource management and control mechanism
- Efficient resources utilisation and marketing of products
- Enhanced applied research and improved knowledge
- Aquaculture development
- Community participation.
- Inter-sector collaboration, regional and international co-operation.

Under the current fisheries management system, the right to harvest fisheries resources is granted to individual fishermen on an annual basis through a licensing system. Harvesting rights are defined in the Fisheries Act No 6 of 1970 and its subsidiary regulations. These regulations include fisheries (inland waters) regulation of 1981 which is concerned with gear restrictions and closed seasons, the general fisheries regulations of 1994 which deal with restrictions on size of engines and fishing vessels. Others are the fisheries prohibition of use of specified vessels or tools of 1994, the fisheries principal regulations of 1989 and other related regulations. Other components of fisheries management system stipulated in the fisheries Act are monitoring, control and surveillance (MCS).

#### *2.3.1 Monitoring, control and surveillance*

There are number of landing sites both in marine waters and freshwaters. The exact number of landing sites for each water body is not known, but their numbers range from 1500-2000 sites in total, while in Lake Victoria alone, the number of landing sites range from 300-500. Currently, the government is conducting a survey to collect data on fisheries and landing sites. The objective is to identify potential landing sites suitable for catch monitoring.

There is also a national MCS programme which involves law enforcement agencies and other stakeholders including communities in monitoring fisheries activities. The core functions of MCS as stipulated in the law include issuing fishing licenses,

prevention of illegal fishing and the enforcement of fishing gears and other restrictions, particularly in inland waters.

However the costs associated with implementation of this system are too high to be met by the government alone. Therefore in recent years the government has considered developing a system which would involve fishing communities in implementing MCS, e.g. involvement of beach management units<sup>2</sup> in law enforcement in Lake Victoria fisheries and elsewhere.

### 2.3.2 *Fisheries judicial system.*

The judicial system doesn't provide for a special fisheries court. Violations in fisheries are treated as civil cases. The normal legal process takes from 3-6 months, sometimes a year. In addition, penalties for fisheries violation are lenient. For example, under fisheries Act No 6 of 1970 section 8, any person guilty of a fisheries offence, shall, upon conviction, be liable to a fine not exceeding one hundred thousand Tanzania shillings ( equivalent to US\$ 100) or to imprisonment for a term not exceeding two years or both (MNRT 1970). Although attempts have been made to revise the fisheries legislation, proposed penalties are still low.

## 2.4 **Current fisheries management organisation structure.**

Current fisheries management organisation structure in Tanzania is described in two different levels. These are fishing community and government organisation structure levels.

### 2.4.1 *Fishing community organisation structure*

There are approximately 120 ethnic groups in the country. As mentioned earlier, (section 2.3), the traditional scattered village system was transformed into ordered village system called *ujamaa* village system after independence (Nyerere 1968). A *ujamaa* village is consisted of several ethnic groups with different cultures and ethnic backgrounds. *Swahili* which is now the second national language is used for communication in *ujamaa* villages in Tanzania. Under the *ujamaa* village system different ethnic communities were mobilised to work together and form a uniform communal system based on equal distribution of social services (education, health services) and collective ownership of the main means of production (Nyerere 1968). For the past three decades, the *ujamaa* village system has remained as the standard and is by now considered a traditional way of living for all local communities in rural areas.

Traditional fishing communities in Tanzania are organised in well defined social groups based on the type of fishing activities they perform. The major groups which are found in almost all fishing communities include absentee boat owners, boat owners and fishermen, small fish processors (mostly women) and fish traders (Figure 6). Others include boat builders, businessmen, ice makers, net makers etc. (Gibbon 1997). Each fisher group has a defined function and responsibility. In some villages

---

<sup>2</sup> Introduction of beach management units in Lake Victoria was done through Lake Victoria environmental management programme (LVEMP).

one group is stronger and better represented than others. In some cases, fisher groups are organised in large legal entities such as fishing co-operative, association, etc.

In Lake Victoria, fishing communities have been involved in a campaign to curb illegal fishing through beach management units which are integrated into the village governments. In coastal areas such groups are known as environmental conservation groups and have an important role in law enforcement. Informally, the social organisation structure of fishing communities varies from one village to another depending on the level of fishing activities at that particular place/fishing community. Its complexity ranges from simple to very complex structure, but a general structure is indicated in Figure 6.

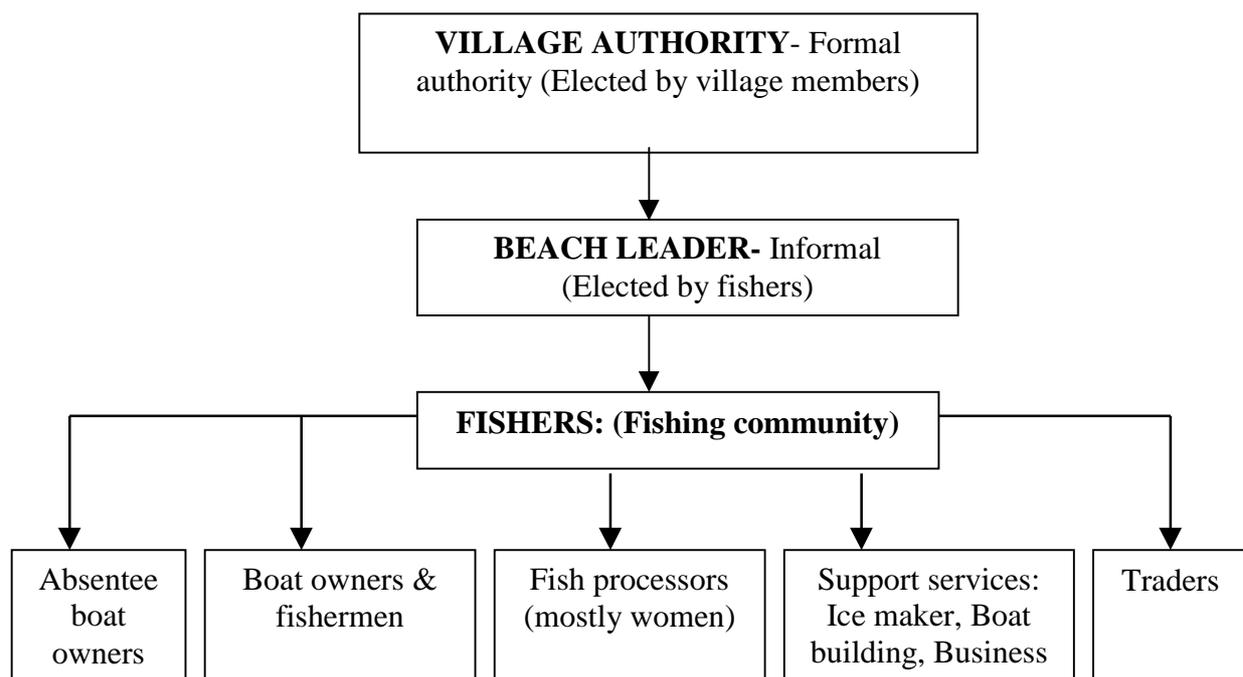


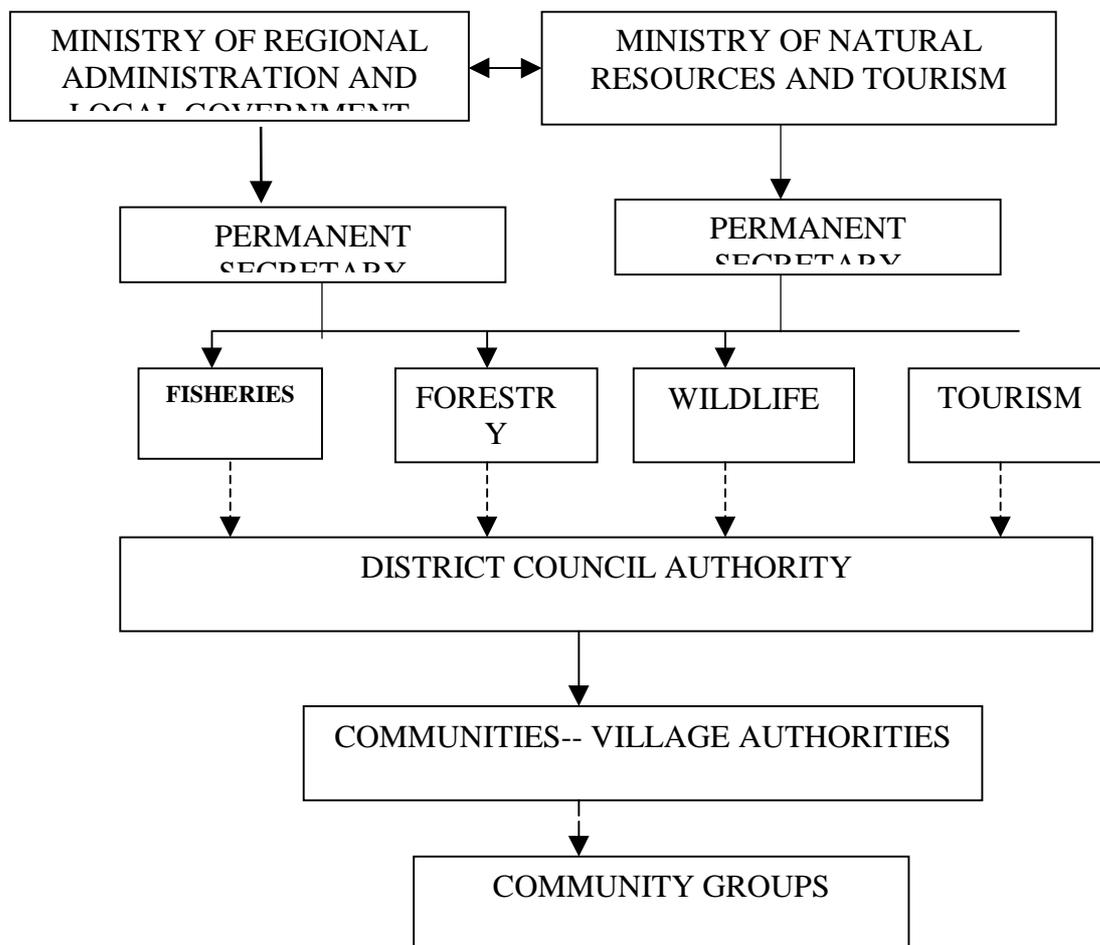
Figure 6: A generalised social organisation structure of the typical fishing community in Tanzania.

Village government has a mandate to implement government regulations. The village government authority is composed of elected members and government employees such as executive village officers, who are hired by the district council authority. Fishing communities are supposed to implement the imposed regulations.

#### 2.4.2 Government organisation structure for fisheries

The formal government institutional set-up and decision-making mechanism for Tanzania fisheries is shown in Figure 7. Under the current government structure, the Ministry of Natural Resources and Tourism formulates policies, laws and revises fisheries legislation. It has the role to ensure that the resources are managed in a sustainable way and optimally utilised for the benefit of the people. However this system involves long lines of communication and it is complex (Figure 7). This has led to a delay in implementation of fisheries management activities. Other

government departments which provide support services to fisheries management include Tourism, Forestry and Wildlife.



Note:

- ▶ Direct linkage and fully functional from top down.
- .....▶ Indirect fully linkage and not functional from top down.

Figure 7: The position of fisheries management in the institutional structure and chain of decision making in Tanzania.

### 3. THEORETICAL REVIEW

Fisheries exploit stocks of wild animals (fish) which live in their aquatic natural environment. In order to exploit these stocks in a manner, which is both sustainable, and biologically and economically optimal, it is essential to develop an appropriate fisheries management regime. Until recently, fisheries management in most countries has been organised on the principles of common property and open access. This has led to severe over-exploitation and poor economic outcomes (FAO 1995).

Therefore it has become clear that fisheries resources can no longer sustain competitive fishing based on common property and open access. Arnason (2001) noted that common property resources are subject to fundamental economic problems

of over-exploitation and economic waste. According to Arnason (2001), the extreme economic waste associated with the common property problem is the reason why management of fisheries resources is needed.

Although fisheries management is a complex task, many countries in the world have managed to develop fisheries management regimes that have improved the economic efficiency and utilisation of fisheries resources on sustainable basis (Hartwick and Olewiler 1998).

### 3.1 Theoretical considerations on fisheries management regimes.

When the fishery is being developed, the resource stock (virgin stock) is big enough to generate good catches and the fishermen earn a high return on their investment and effort (Arnason 1993). Under a common property management regime, this encourages more investment and fishing effort. It also attracts new fishermen to the fishery. This will reduce the fish stock and consequently the net profits gained by fishermen. However while profits are positive fishermen will continue to invest in fisheries. As fishing effort rises stocks are further depleted, catch per unit effort declines and economic benefits from the fishery are reduced (Arnason 1993).

The expansion of fishing capacity continues as long as the fishermen can hope to get a positive rate of return from the fishery. Long before equilibrium is reached, the fish stock has been reduced far below the level corresponding to a maximum sustainable yield, and total catch has been reduced in spite of greatly increased fishing effort. As long as harvesting revenues exceed cost there will be an incentive to increase fishing effort to the level where total fishing costs equal to the total revenue (equilibrium point) (Arnason 1993). At this stage, there are no incentives for expanding investment in fisheries. This basic model is described and illustrated in Figure 8.

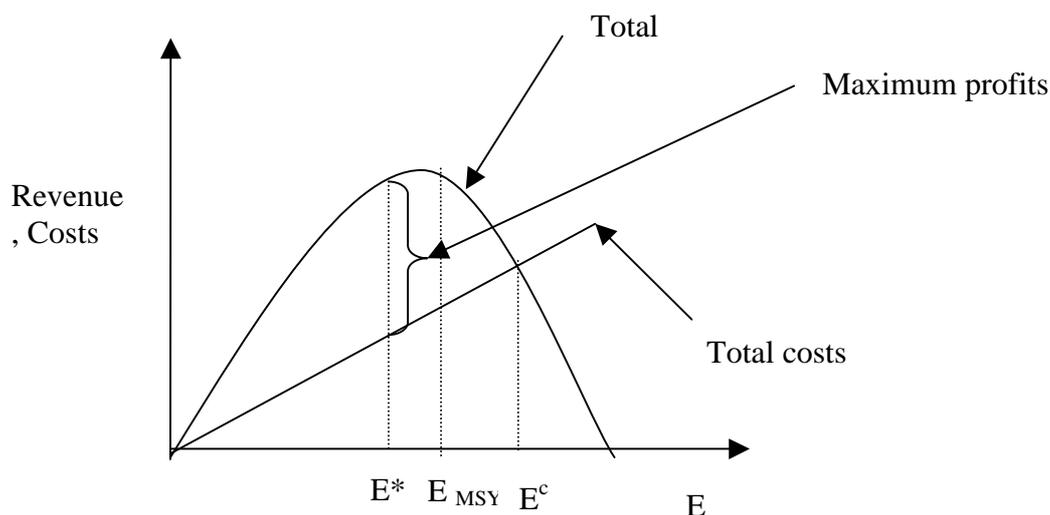


Figure 8: The sustainable fisheries model (Arnason 1993, 2001).

Note  $E^*$  is optimal fishing effort,  $E_{MSY}$  is maximum sustainable fishing effort where as  $E^c$  is fishing effort at competitive equilibrium where total revenues equal to total harvesting costs.

In Figure 8, fishing effort, denoted by  $E$ , is measured along the horizontal axis while costs and revenues are measured along the vertical axis. The curve labelled “Total Revenues” represents total sustainable gains from a fishery at different fishing effort levels while the curve labelled “Total costs” represents total costs of fishing effort. All values are supposed to reflect true social costs and revenues, which may or may not coincide with market values (Arnason 1993).

The maximum sustainable yield (MSY) can be identified at the fishing effort level  $E_{MSY}$ . Stocks that have been reduced below MSY are usually considered over-exploited (National Research Council 1999). As described above, under a common property competitive fisheries regime, fishermen tend to increase fishing effort up to  $E^c$  level, where total revenue is equal to total costs of harvesting (equilibrium point). At this point there are no more incentives for fishermen to expand the investment and fishing effort.

Maximum net benefits from the fishery can be generated by controlling fishing effort at level  $E^*$  where the difference between total revenues and total costs is the greatest. The problem, however, is that a reduction of fishing effort to the  $E^*$  level will never be supported by free access, competitive fisheries (Arnason 1993). This situation has been described as the tragedy of the commons (Hardin 1968).

### 3.1.1 Classification of Fisheries management systems.

A great number of different fisheries management regimes have been developed and adopted to address the problem of common property in fisheries. Arnason (1993) described several fisheries management systems, which have been suggested and tried. He points out, that most of these, may be conveniently grouped into two broad classes: (1) biological fisheries management, and (2) economic fisheries management measures. The latter may be further divided into (a) direct restrictions and (b) indirect economic management. This classification is illustrated in Figure 9 and will be discussed in more detail.

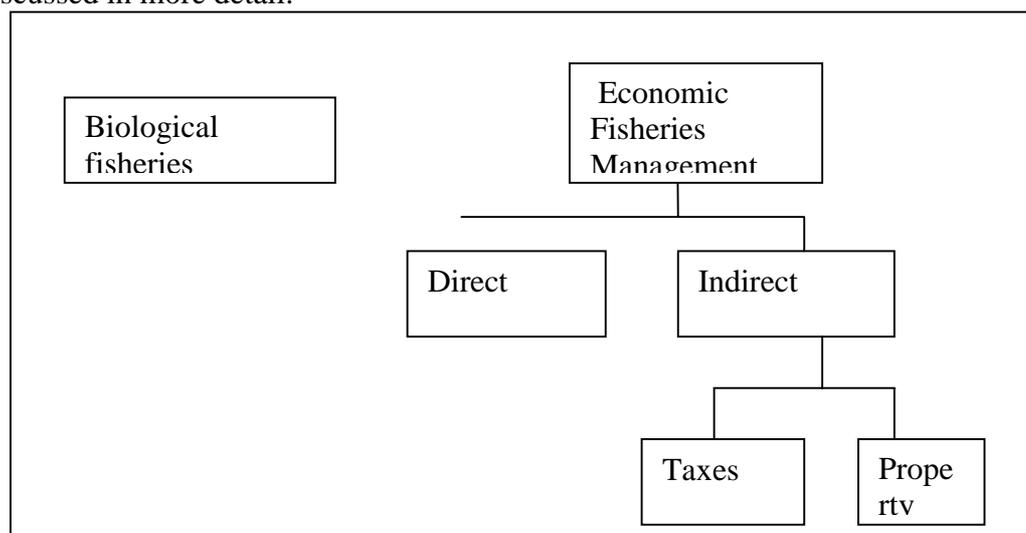


Figure 9: Classification of fisheries management systems (Arnason 1993)

## **Biological fisheries management**

Arnason (2001) noted that biological fisheries management, such as mesh size regulations, total allowable catch, area closures, nursery ground protection etc. may conserve and even enhance fish stocks. These regulations however, fail to generate net economic benefits because they do not remove the common property.

In addition, it has been argued that formulating and enforcing biological fisheries restrictions is always costly. Therefore, fisheries management systems based entirely on biological conservation measures generate negative economic return (Arnason 1993).

### **Economic fisheries management: direct restrictions.**

Economic fisheries management systems are concerned with controlling fishing effort and capital investment in fishing. These are meant to bring fishing variables such as fishing effort down to the optimal level  $E^*$  (Figure 8). Examples of these restrictions include limitation of vessel size, engine capacity (sizes), fishing time etc. These restrictions, however, do not eliminate the basic common property nature of the fisheries resources and are consequently ineffective (Arnason 1993).

Fishermen can always find ways to invest in uncontrolled fishing effort variables (e.g. invest in more efficient mechanisms which are in accordance with the restrictions/laws). Therefore economic management through direct restrictions are unlikely to generate long term benefits to the fishery (Arnason 1993).

### **Economic fisheries management: indirect measures**

According to Arnason (1993), indirect economic fisheries management methods include taxes and property rights based fisheries management systems such as access licences and individual quotas. Both are theoretically capable of achieving economic efficiency of the fishery. However in practice these systems especially taxes are faced with socio-political problems.

#### ***Taxes***

The idea of taxes as a fisheries management tool is to alter the economic condition of the fishing firms so as to induce them to behave in a socially optimal fashion (Arnason 1993). Taxes on fisheries inputs will generally lead to substitution away from taxed inputs to those not taxed. Tax on catch is a more effective way to realise the potential economic benefits of a fishery. The immediate effect of tax on catch is to make the fishery less profitable (Arnason 1993). Thus depending on the tax rate, the fishing effort in the fishery can in principle be brought down to the economically most rewarding one. However in practice this system is faced with considerable socio-political problems and is often politically infeasible.

#### ***Property rights fisheries management systems.***

Property based rights management systems attempt to eliminate the common property problem by establishing private property rights over the fish stock. Property based

rights management systems limit the scope of the open access externality (Arnason 1999). Property rights management regimes have been developed following the failure of other traditional fisheries management systems (described above) to improve the socio-economic benefits flowing from the fisheries.

Hannesson (1994) noted that property rights of fish resources have taken long time to develop world-wide. Indeed, in most developing countries such rights are neither common nor well developed. Property rights are productive in the sense that they minimise conflicts over access to resources and provide incentives for owners of the resources to make them as productive as possible. Since the source of the economic problem in fisheries is the absence of property rights, property-rights management systems should, in principle, be successful in securing maximum economic gains from the fishery (Arnason 1993).

There are many types of property rights systems. According to Arnason (2001), several types of property rights have been employed to alleviate the fisheries problem. The most common of these are territorial user rights (TURFs), individual catch quotas and community fishing rights. Others include licences and sole ownership (Figure 10).

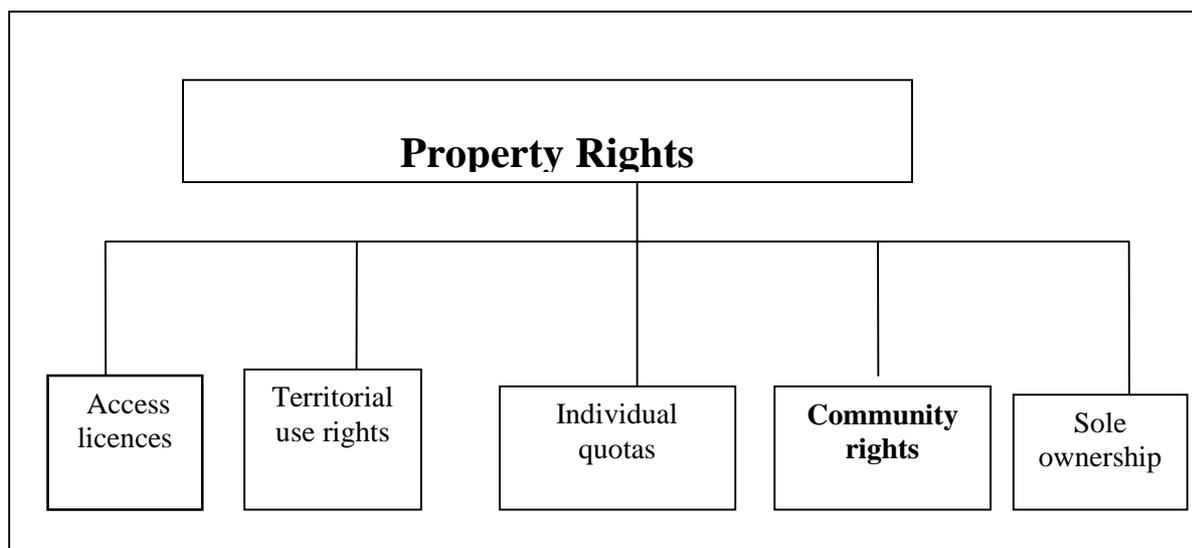


Figure 10: Different types of property rights regimes in fisheries management according to (Arnason 2001)

### **Licences**

In practice, fishing or access licences do not eliminate the problem of common property among the licence holders. It may alleviate the problem especially in the situation when the number of licence holders is low and held for some years (Arnason 2001).

### **Sole ownership**

According to Scott (1955), sole ownership is not monopoly but merely complete appropriation of natural resources in a particular location. Putting a resource into sole ownership is sometimes called making a resource “specific” to one owner. A sole owner could either plan to economise on the use of fishing effort by adopting labour-saving techniques. However, if a sole owner expected to have permanent tenure, then in short time the fishery would probably be quite different from competitive fishery. The sole ownership keeps the future return from the fishery as high as possible while maximising current income (Scott 1955). This is true only if the other enterprises in the economy are run by a purely free market economy. However, most of socio-political policies in many countries do not support sole ownership of the fisheries resources.

### **Individual quota**

Arnason (2001) pointed out, that the Individual Quota system (IQs) offers the most promising general approach to the management of fisheries resources. From an economic point of view, IQ systems appear to be far better than other systems, provided they can be adequately monitored and enforced. What is needed is the means of allocating the quota among the fishing firms or units which creates a sense of establishing a private property right to a particular level of harvesting (Total Allowable Catch). A quota allows a firm to manage its fishing in an efficient way, but not in competition with other firms.

In the long run individual quotas (IQs) create incentives to invest in fishing operation and maximise profits. Innovations in technology would be channelled to cost savings and enhance revenues (Hannesson 1994). In recent years, IQs have been tried in several fishing nations and results are promising (Arnason 2001). The first IQs were implemented in the 1970s. Currently, countries which have implemented Individual Transferable Quota (ITQ) in most of their fisheries include Iceland, New Zealand, Australia, Canada, Holland, Greenland and Namibia. Others, which use ITQs in their fisheries, include USA, Portugal, Mexico and Mozambique. Other nations such as Peru, Argentina and Morocco, are preparing the introduction of ITQs in some or all of their fisheries (Arnason 2001).

### **Territorial user rights**

According to Charles (2000), Territorial User Rights in Fisheries (TURFs) is the exclusive right to engage in fishing within a certain specified geographical location. It is obviously a system most applicable for sedentary species. The system gives incentives to the TURF holders to control and conserve the environment. Examples of TURF systems which have been employed in several countries include the lobster fishery in north-eastern USA, coastal fisheries of Japan and ocean quahog in Iceland (Arnason 2001).

### **Community rights**

Community rights is another form of property rights based fisheries management system. According to Arnason (2001), interest in community fishing rights has increased where communities or groups of fishermen are given exclusive rights. This

is an attractive alternative in situations where other rights based approaches such as ITQs cannot be implemented for socio-political reasons. The theory on the efficiency of community-based rights is poorly developed, but preliminary results are encouraging (Arnason 2001).

According to Sajise (1995), community based fisheries system is a process by which, people themselves have the opportunity and/or responsibility to manage their own resources, define their own needs, goals and aspirations, and make decisions affecting their socio-economic welfare.

A community of fishers, under such arrangement can regulate access and enforce rules through its own community institution framework and social-cultural practices to use fisheries resources in a sustainable manner. This management system is also referred to as traditional fisheries resources management. Traditional or local community based management has a long history of existence in many countries in the world. Pomeroy (1995) noted, that the majority of these traditional fisheries management systems have been weakened or disappeared, due to government restructuring during the colonial era, technological development and modernisation, the rise of national-state owned economy, socio-economic change and unequal distribution of benefits within fishing communities.

Pomeroy (1995) reported, that only few localised long enduring community based fisheries management still exist in some countries in the developing world such as Asia and Africa. In these continents, many fishing communities still maintain some level of informal or traditional fisheries management as a government function. Empirical evidence has shown that community-based fisheries management and associated traditional fisheries rights could provide an efficient and equitable system for extracting and distributing resource rents. The system is characterised by equity in resource allocation, sharing costs and a decision-making system that optimises economic benefits (Oddsson 2001).

Pomeroy (1995) pointed out that if community based fisheries management is to be successful governments must establish supportive rights mechanisms and legal framework. Otherwise the incentives for local stewardship would be weak. Also it has been argued that the size of the area that will be managed by a community should be defined in relation to the costs and benefits involved (Pomeroy 1995).

However community management is generally problematic since most fisheries resources are transboundary. Furthermore, fisheries management is embedded in a broader network of laws and administrative procedure, and consequently it is difficult to accommodate community-based management. It is therefore, the responsibility of the governments to provide a legal framework to manage the fish stocks under appropriate management regimes depending on socio-political situation of the individual country.

### **3.2 The concept of community based cooperative fisheries management.**

Brown (1998) defined community-based cooperative fisheries management as a system where authority and responsibility over local resources is shared between government and local resource users and/or their communities. In the context of

community-based cooperative fisheries management, individual fishers or group of fishers and other agencies through various forms of social structures are actively involved in the management of the resources (Wilson 2001).

According to Pomeroy (1998), community-based cooperative fisheries management emphasises the community responsibility and accountability for managing the resources. It takes into account the local situation where a group of people with common interests control and manage productive resources.

Ferrer and Nozawa (1997) described how community-based cooperative fisheries management systems could develop. It starts from the basic principle that people already know and understand their problems. They develop strategies to overcome the problems and set mechanisms of control and accountability.

Fellizar (1994) discussed reasons as to why such systems may work in some countries. Firstly, the system gives people the opportunity to manage their own resources and define their needs and goals in partnership with the government authorities. It is consensus-driven and geared towards achieving a balance of interests. Questions of resource allocation, distribution of fishing rights and management arrangements among fishing communities will always have to be agreed upon.

Secondly, a legal mechanism should be developed in accordance to the basic rules of the country. Pomeroy (1995) described that governments transfer property rights over fish stocks to the fishing communities through legal mechanisms. This may lead to better management because it involves the communities themselves, reduces conflicts as issues are easily resolved and prevents competition over resources. It contributes toward building a sense of community rights. In general terms, for community-based cooperative fisheries management systems to work, a supportive legal rights and authority framework should be established both at government and community levels.

Community-based cooperative fisheries management has emerged as a viable management to most artisanal fisheries, especially in developing countries where central government lacks funding and technical capabilities to implement and enforce fisheries regulations (Pomeroy 1995). Limited funding for fisheries management is a major problem in these countries. Therefore, they cannot meet fisheries management costs.

Arnason (2002) pointed out that management costs include all expenditures on activities for developing, operating and enforcing the fisheries management systems. These are all expenditure on research, design and implementation of fisheries management rules and enforcement.

It is believed that a community-based cooperative fisheries management would keep management costs down because fishing communities would assist in the implementation of fisheries management activities such as monitoring, surveillance and enforcement.

Also, it has been argued that community based cooperative fisheries management reduces the burden of the government through power sharing mechanisms (Pomeroy

1995). Community based cooperative fisheries management, thus appears to be viable for artisanal fisheries.

For community based cooperative fisheries management to succeed, fishers have to support management efforts. That support will be realised if they have evidence that regulations are working in their best interest. However, as observed by many scholars including Donda (2000), the viability of this system, as well as the degree of user groups involvement, may differ from one country to another depending on socio-economic set ups and political situations.

Brown (1998) pointed out that there is a hierarchy of community-based cooperative fisheries management arrangements, from those in which fishers are consulted by the government before regulations are introduced, to those in which fishers actually design, implement and enforce laws and regulations with the advice and consent of government (Figure 11).

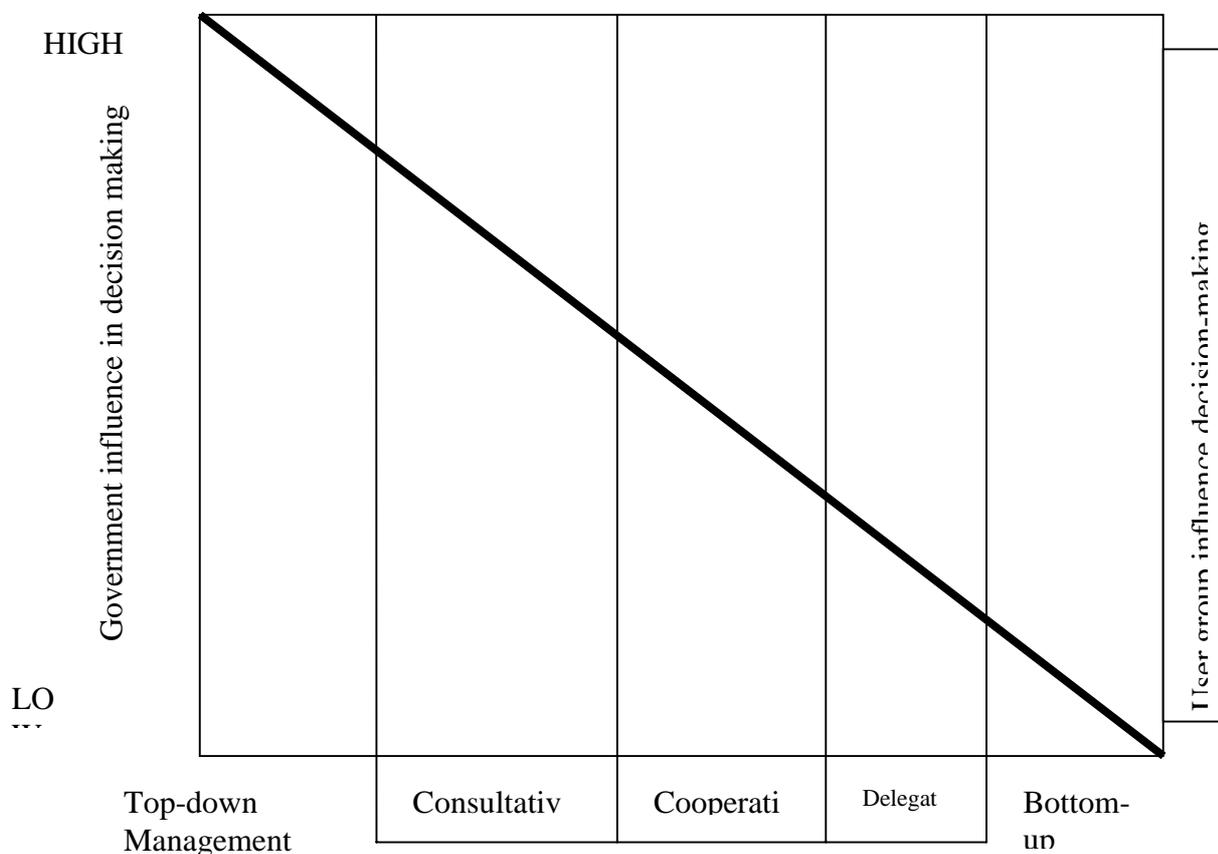


Figure 11: Spectrum of Community-based cooperative management arrangement (ICLARM/ IFM 1998)

Brown (1998), however, reported that community-based cooperative fisheries management may not be appropriate for all fisheries. Brown outlined a number of factors which are pre-requisites for successful community-based cooperative fisheries management. Some of these are overlapping, but all fall into the following categories.

*a) Clear boundaries and well-defined level of cooperation.*

It is absolutely necessary to define boundaries that will increase the sense of community ownership and personal responsibility. Both communities and governments should agree upon the level of cooperation. They should agree on the problems or situations that need to be addressed. The size of management units should be discussed and agreed upon. Other issues to be defined include nature and behaviour of fish stocks and type of information that would be shared between the government and fishing communities.

*b) Well-defined institutional structure and organisational framework.*

Given the difference in the government institution framework and social set-up of the fishing communities, it is important to define the institutional organisation structure that will be appropriate for fisheries management. This will create greater trust between the fishing communities and government. It also creates a commitment for both fishers and government to share management responsibilities.

*c) Sharing of responsibilities and legal mechanism.*

The amount of responsibility and authority of government and communities to be shared depends upon the government structure and social organisation structure of the fishing communities. Both fishers and government will define a shared responsibility and legal mechanism. This mechanism would create a legal framework for the implementation of community-based cooperative fisheries management. The mechanism should be comprehensive enough to satisfy local resources users. It should also be part of a larger management system that takes into account national, regional and international concerns.

Several countries in the world are implementing community-based cooperative management systems. Each country has taken a different approach. In the Philippines, community based management has a long history of traditional fisheries rights and resources allocation. This system has been included in a fisheries Act. Other developing countries, including Taiwan, Bangladesh, India, Malawi and Zambia, have also tried to implement community-based cooperative fisheries management (Pomeroy 1995).

#### **4. A COMMUNITY BASED COOPERATIVE FISHERIES MANAGEMENT FOR LAKE VICTORIA FISHERIES.**

This section deals with designing a community-based cooperative fisheries management system for Lake Victoria in Tanzania. In the design of this system several aspects including the current situation of Lake Victoria fisheries, the management system and institutional organisation structure are considered. These aspects form a basis to set a framework for a proposed community-based cooperative fisheries management. Reasons as to why the proposed community-based cooperative fisheries management is appropriate in Tanzania are also given in this section. Finally,

proposed strategies for the implementation of community-based cooperative fisheries management are outlined.

#### 4.1 Current situation of Lake Victoria fisheries.

##### 4.1.1 Fish production trend in Lake Victoria fisheries

The fishery in Lake Victoria has changed considerably during the last two decades from a multi-species fishery to only three commercial species: Nile perch (*Lates niloticus*), the pelagic cyprinids (*Rastrineobola argentea* locally known as *dagaa*) and exotic tilapiine sp. (*Oreochromis niloticus*) (Mkumbo *et al.* 2001). Most importantly over-exploitation of some commercial species has become more pronounced (Mkumbo *et al.* 2001). Recently, research findings have shown that mean catch rates in the trawl survey have decreased from 287.7 kg hour<sup>-1</sup> in December 1997 to 80.0 kg hour<sup>-1</sup> in March 2000 (Figure 12) (Mkumbo *et al.* 2001). Other fish species found in the Lake Victoria include *O. eduardinus*, *Clarias mossambicus*, *Bagrus docmac*, several hundred haplochromine species and two endemic tilapiine cichlids which are exploited by small scale fishermen for the local market (MNRT 1996).

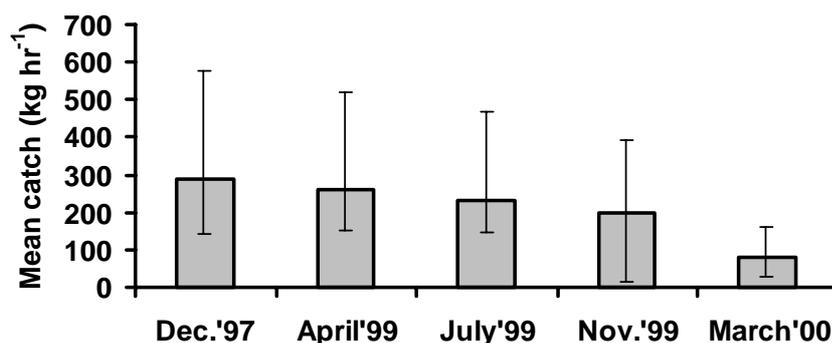


Figure 12: Evolution of catch rates from Lake Victoria fisheries over time (Mkumbo *et al.* 2001).

##### 4.1.2 Types of Fishing gear used in Lake Victoria Fisheries

Four types of fishing gear are primarily used in Lake Victoria. These are gillnets, long lines and traps used for large fish species and seine nets for *dagaa* (MNRT 1996). Currently, gillnets are the most important fishing gear for the commercial fishery, with mesh sizes range from 2" to 8" (Figure 13). According to MNRT (1994), no person shall be allowed to use gillnets or fishing gear of mesh size of less than 5" (127 mm). Nevertheless gillnet of mesh sizes from 2" to 4" are still being used in Lake Victoria by some local fishermen (MNRT 1996). This shows that there are some indications of the use of small mesh size fishing gear in Lake Victoria.

**Size of gillnets used in Lake Victoria expressed in %**

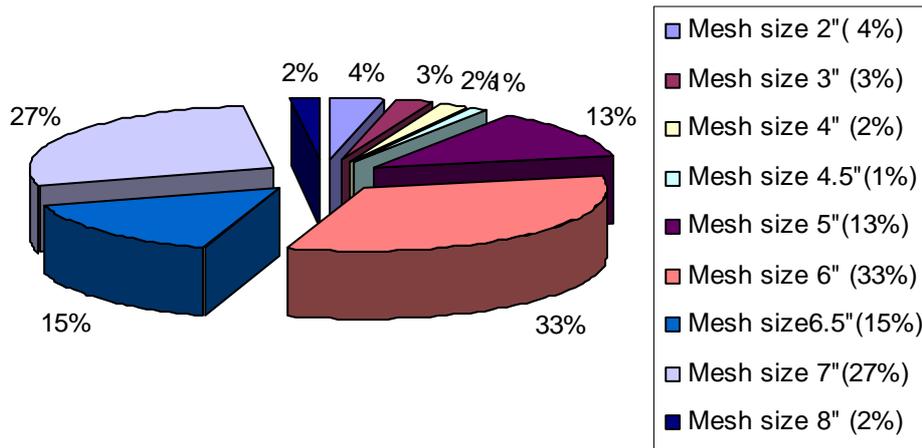


Figure 13: Types of gill net mesh sizes used in Lake Victoria ( MNRT 1996)

In general terms, 71% of fishing boats are gill net operators, while 23% use *dagaa* seine nets, 5% long lines only 1% of boats use traditional traps (MNRT 1996).

**4.1.3 Evolution of fishing effort**

The number of fishermen and fishing vessels has increased considerably in Lake Victoria, Tanzania (Figure 14), while catch trends and rates have been declining as indicated in Figure 3 and 12 respectively. This is in accordance with the prediction of the common property fisheries theory. It also shows that there is an increasing fishing pressure in Lake Victoria fisheries (MNRT 1996).

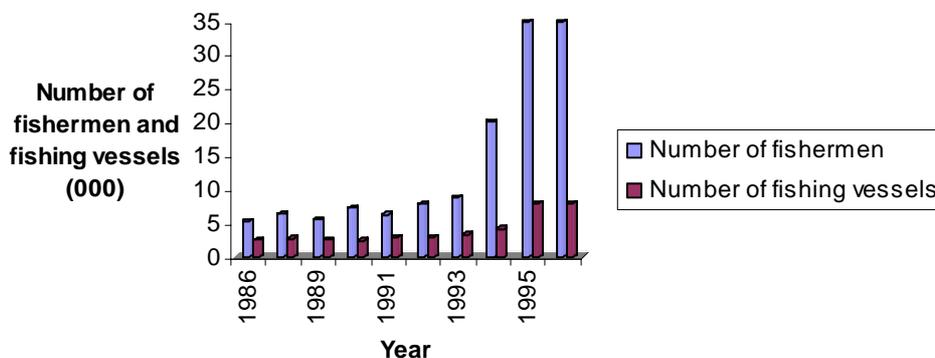


Figure 14: Number of fishermen and fishing vessels in Lake Victoria fishery (MNRT 1996).

**4.1.4 Fishing groups in Lake Victoria.**

Fishers in Lake Victoria may be divided into various groups based on the type of fishing activities they engage in. Major fishing groups include boat owners, hired crews and on-shore labourers. Another categorisation is according to fishing gear; there are gillnet operators, longliners and *dagaa* beach seine operators. Other groups, associated with fishing, include boat builders, engine mechanics, small-scale fish processors (mainly women) and fish traders (fish collectors/agents). Others who are

indirectly linked to the fishing communities but have administrative and cultural role to play in fishing communities include village leaders (formal leaders) and traditional leaders (informal leaders). All these groups are important in the design of a community-based cooperative fisheries management since all share common fishery resources but each has different interests and attitudes towards these resources.

Commercial fish processing plant owners form another group, which is not directly linked to the fishing communities. There are twelve commercial fish processing plants in the Tanzanian part of Lake Victoria mainly processing Nile perch fillets for the export market. Foreigners own most of these processing companies. According to MNRT (1994), owners of fish processing companies are not allowed to fish in Lake Victoria. Local middlemen, known as fish collectors/agents collect catches from small-scale fishermen for fish processing plants. They also supply fishing gear such as gillnets, long lines and outboard engines to the fishing communities. This arrangement has probably resulted in increasing both fishing effort and the number of people who are engaged in fishing as labourer fishermen (Figure 14).

#### *4.1.5 Current management of Lake Victoria fisheries*

In Tanzania, the government operates fisheries management. Fisheries research as one of the fisheries management activities is done by the government through the Tanzania Fisheries Research Institute (TAFIRI). This research institute provides mainly biological information to the management authority and the stakeholders in the fisheries sector.

The Fisheries Division of the Ministry of Natural Resources and Tourism is responsible for all fisheries management activities such as the formulation of national fisheries policy and rules, conservation of fisheries resources, monitoring, control and surveillance and quality assurance management (The Government of Tanzania 2000).

Fisheries management activities are carried out by the Fisheries Division through the Ministry of Regional Administration and Local Government (MRA&LG) which is currently under the president's office. The role of MRA&LG is to co-ordinate and supervise regional (provincial) and district councils, development activities and administration. The President's Office nominates heads of district councils (District Executive Directors - DEDs) who are supposed to ensure good governance and deliver quality public services to communities in accordance with decentralisation procedures and rules. The decentralisation system in Tanzania was introduced in 1984. Local fisheries officers in the district councils have a dual role to play. They are responsible for technical support and fisheries extension services to the fishing communities through village/local authorities. They are also responsible for the implementation of fisheries regulations at the community level. Law enforcement is conducted jointly by fisheries officers from the Fisheries Division and the District Council through patrolling and policing campaigns. In most cases, district council authorities do not have enough fisheries staff to conduct law enforcement. This has led to difficulties in implementation of monitoring, control and surveillance programmes.

Local fisheries officers report to the District Fisheries Officer who reports to DED. The DED reports to the Director of fisheries (head of Fisheries Division) through the

Ministry of Regional Administration and Local Government. Hiring and firing of fisheries management personnel follows the same line as that of administrative responsibility (Figure 7).

This system is cumbersome. It is characterised by long lines of communication, complex institutional structure and overlapping responsibilities as indicated in section two (Figure 7). This has led to delays in the implementation of regulations and decision taken. This system probably significantly reduces the effectiveness of fisheries management activities.

#### **4.2 A proposal for a community-based cooperative fisheries management system for Lake Victoria fisheries**

In the design of community-based cooperative fisheries management for Lake Victoria fisheries in Tanzania, the current management system was considered as a starting point. The current approach described in 4.1.5 has failed to implement effectively fisheries management activities such as monitoring, control of fishing effort and surveillance programmes.

To improve fisheries management, a community-based cooperative fisheries management is proposed. Community-based cooperative fisheries management is a system where authority and responsibility over local resources is shared between government and local resource users and/or their communities. In the context of community-based cooperative fisheries management, individual fishers or groups of fishers through various forms of social structures are actively involved in the management of the resources. There are a number of reasons as to why a community-based cooperative fisheries management is proposed for Lake Victoria fisheries.

Firstly, Tanzania is a developing country, characterised by poor infrastructure, poor communication facilities and lack of technical support services. These characteristics hinder effective implementation of fisheries management through the current top-down approach. This suggests the alternative of a decentralised management approach.

Secondly, the government has developed a national fisheries policy, which recognises community involvement in fisheries management. Under Lake Victoria environmental management programme (LVEMP) funded by Global Environmental Facility (GEF) and the World Bank, local communities have been involved in surveillance and law enforcement campaigns to curb illegal fishing practices (Geheb 2000). This initiative shows that there is a political willingness to involve communities in managing the fisheries resources.

Thirdly, historically, the fishing communities in Lake Victoria have managed their fisheries resources through a traditional arrangement. This system has been ignored by the government since the colonial era. However after independence in 1961 fishing communities were organised collectively in line village scheme, locally known as *ujamaa* villages, to work together as one community unit. Since then these communities have formed group cohesiveness and have built a spirit of collective decision making in their respective villages. Furthermore communities in Lake Victoria are concerned about detrimental changes taking place in the fisheries like

decline in catches and environmental problems which have been observed in recent years (Wilson 2001). Therefore introduction of a management system that formally recognises shared responsibility between communities and the government is likely to be welcomed by the communities.

Fourthly, and most importantly, fisheries economic theory as described by Arnason (1993) indicates that poorly managed fisheries will yield little or no economic benefits to those involved in fisheries. Benefits are essentially the difference between harvesting revenues and harvesting costs. If catches (harvests) decline as in case of Lake Victoria it means that fishermen will realise reduced benefits. Maximum net benefits from the fishery can be generated by controlling fishing effort at an optimal level where the difference between total revenues and total costs is the greatest. This is illustrated in Figure 8. A prerequisite for achieving this is an effective system of monitoring, control and surveillance.

So far, the Tanzanian fisheries management system has failed both to set good fisheries regulations and to enforce the ones it has set. By contrast the community-based cooperative fisheries management system is likely to substantially improve fisheries management and monitoring, control and surveillance by generating better incentives. When the fishing communities are given exclusive rights to the resources and the opportunity to manage the resources themselves, they will have incentives to manage the resources in sustainable way.

Therefore, an appropriately designed community-based cooperative fisheries management system, which is basically a sharing of responsibility between resource users and government, is likely to work better than the current top-down management system.

#### *4.2.1 A proposed scheme for community-based cooperative fisheries management system*

Basically the proposed community-based cooperative fisheries management system consists of two major partners: the government (Fisheries Division) and the fishing communities. The fishing communities will be given certain rights, such as a share in total allowable catches (TAC) and the obligation to conduct fisheries management in their areas. The Government will set TACs and other general management rules.

Fishing communities will be organised in groups according to the fishing activities they perform (section 4.1.4). These groups will participate in fisheries management activities in their respective fishing areas/village through a community management organisation known as Beach Fisheries Management Unit (BFMU). This organisation will be the basic unit of fisheries management at the community level. According to Wilson (2001), a beach in Lake Victoria usually has 20-30 fishing boats. In this case it is expected that a BFMU would have up to 30 fishing boats<sup>3</sup>.

---

<sup>3</sup> In Lake Victoria most of landing beaches in rural areas have maximum 30 fishing boats. Therefore a maximum number of boats per BFMU will be 30 boats. More than 30 boats in one village will lead to the formation of another unit.

The BFMU will be given responsibility for managing fisheries resources at the village level subject to the basic fisheries law, rules and conditions which are set by the Fisheries Division. This will require a formal memorandum of agreement (MoA) between the Fisheries Division on behalf of the government and each BFMU on behalf of fishing community in a particular fishing village (see section 4.2.4).

It is proposed that all fishers (boat owners, hired crews, small scale fish processors and traders) will be members of the BFMU in a fishing village. They will elect a chairperson of the BFMU who will be responsible for leadership of the fishing community at the village level. Individual fishers will be required to contribute membership fees as stipulated in a community management guideline or local constitution<sup>4</sup>. Conditions and terms of membership will be described in the local constitution. Final decisions will be made by a BFMU through voting. Only members will be allowed to vote and majority vote will be considered as the final decision of the BFMU.

There will be certain external members of a BFMU who will have an advisory role. These members will not have power to vote in decision making. External members of BFMU will include the village chairman, ward executive officers and local fisheries officer.

Members (fishers) of BFMU will nominate/elect a Beach Fisheries Executive Committee (BFEC). The committee will be responsible for day to day fisheries management activities in the village. Other sub-committees may be formed as appropriate to suit the interest of the fishing communities. It is proposed that members of a BFEC should be elected for a specified period of time such as 2-3 years. The committee will meet twice or three times a month and report to the BFMU. It is also proposed that BFMU general meetings should be conducted periodically say monthly or once every 2-4 months. Approved proposals/decisions will be reported to the Fisheries Division.

The BFMU will develop a general management plan (GMP). The GMP will be regarded as a guideline for fisheries management activities at the village level. The GMP will describe strategies for implementation of fisheries management activities. It will also contain basic information on geographical parameters, demographic data, livelihood data (occupational structure), traditional knowledge and socio-economic status of the fishing village. The GMP becomes effective once it has been certified by the Fisheries Division.

In the interest of effective communication, the Fisheries Division should communicate directly with the fishing communities and vice-versa. Unfortunately, however, based on the current government structure, central government agencies such as the Fisheries Division is required to communicate with local communities through local government authorities (district and village).

Local government authorities have mandates to co-ordinate and supervise community development activities. In this respect the proposed community-based cooperative fisheries management system is possible under Tanzania's current administrative structure. The essential community-based cooperative fisheries management in Tanzania is depicted in Figure 15.

---

<sup>4</sup> The BFMU will formulate rules and guidelines.

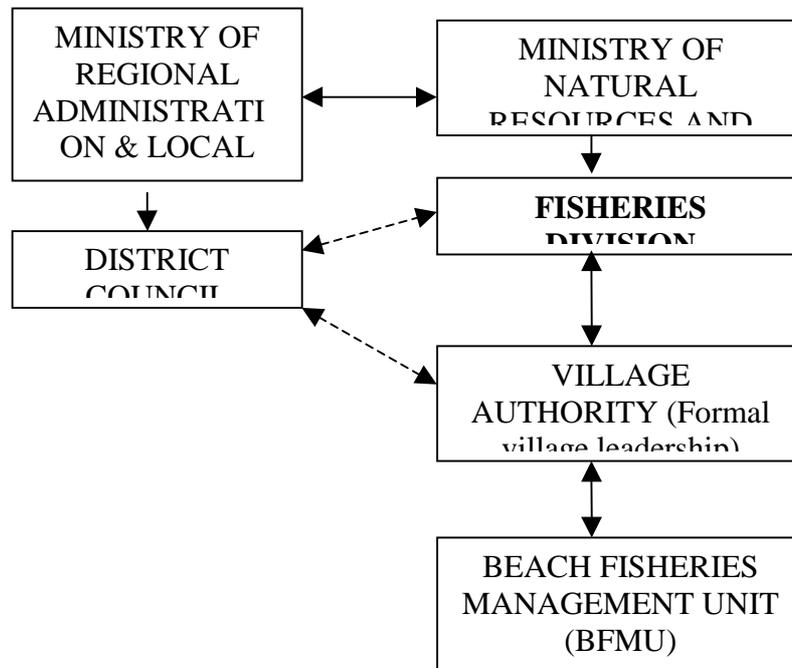


Figure 15: A schematic representation of a proposed community-based cooperative fisheries management in Lake Victoria, Tanzania. The broken lines indicate administrative support services, while solid lines indicate a two way fisheries management communication.

#### 4.2.2 *Community-based cooperation fisheries management: proposed division of responsibilities*

A key issue for community-based cooperative fisheries management is to identify which fisheries management activities can be delegated to the fishing communities, which have to be retained by the Fisheries Division and which responsibilities should be shared between the government and communities.

It is proposed that functions or tasks to be handled to fishing communities should include formulation of by-laws, data collection, law enforcement and monitoring activities at the village level as well as formulation of general management plans (GMPs) appropriate for fishing communities. It is believed that these fisheries management activities will be efficiently carried out by the fishing communities if they have the right incentives. Otherwise, this devolution of responsibilities will not work any better than the current arrangement.

In order to generate the proper incentives under the community-based cooperative management, it is further proposed that fishing communities will be given exclusive fishing rights. These rights may involve catch quantity and fishing areas. This would exclude other fishermen who are not members of the BFMU. Furthermore, communities will be allowed to formulate by-laws and include traditional rights and rules for fishing which are not included in the national fisheries act. As long as these do not contradict the national fisheries policy, the government will enact the proposed by-laws.

Theory and experience suggests that if given exclusive rights fishing communities can control and properly manage their own resources and avoid over-exploitation with minimal government intervention (Leal 1998). Ostrom (1990) suggested that if a community of fishers exhibit a high degree of social, cultural and economic homogeneity, then fishers would be well posed to successfully manage the resources. There is every reason to believe that this applies in the Tanzanian case.

Tasks which have national and international implications will be done by the Fisheries Division. These include formulation of national fisheries policy. Other tasks include setting rules on harvesting (determination of total allowable catch), determination of sizes and types of fishing gear appropriate in each particular fishery, research, providing training and ensuring implementation of regional and international obligations. The essentials of the proposed responsibility allocations for the communities and the government are given in tables 2a and 2b.

Table 2a: Proposed responsibilities/tasks of fishing community

Responsibility/task	Biological objectives	Socio-economic objectives
Formulation of by-laws	<ul style="list-style-type: none"> <li>• Protection of fish stocks</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce competition between fishermen</li> <li>• Reduce excessive capital investment</li> <li>• Provide legal harvesting rights to fishing communities</li> </ul>
Collection of data	<ul style="list-style-type: none"> <li>• Estimation of harvesting levels</li> </ul>	<ul style="list-style-type: none"> <li>• Assess profitability</li> <li>• Keep records for management purposes</li> <li>• Generate marketing information</li> <li>• Help formulate development plans</li> </ul>
Law enforcement	<ul style="list-style-type: none"> <li>• Conservation of habitat and environment</li> <li>• Conservation of fisheries resources</li> </ul>	<ul style="list-style-type: none"> <li>• Revert to good fishing methods and minimise conflicts between communities and government</li> <li>• Regulate behaviour of fishermen</li> <li>• Increase catch</li> <li>• Control effort</li> <li>• Control fishing gear and vessels</li> <li>• Improve socio-economic benefits</li> </ul>

Table 2b: Proposed responsibilities/tasks of Fisheries Division

Responsibility	Biological objectives	Socio-economic objectives
Formulation of national fisheries policy.	<ul style="list-style-type: none"> <li>• Protection of fish stocks</li> </ul>	<ul style="list-style-type: none"> <li>• Increase socio-economics benefits of the fisheries</li> <li>• Ensure good governance and efficiency in terms of fisheries management</li> <li>• Recognise exclusive rights of fishing communities</li> </ul>
Allocate Total allowable catches (TACs)	–	<ul style="list-style-type: none"> <li>• Reduction of management costs</li> <li>• Government burden reduction</li> <li>• Reduce non-compliance of fishing regulations</li> <li>• Sustain law enforcement and surveillance</li> <li>• Fair decision making</li> <li>• Simplify lines of communication</li> </ul>
Formulation and review of law/rules to legalise community-based cooperative fisheries management	–	<ul style="list-style-type: none"> <li>• Estimate maximum socio-economic benefits</li> </ul>
Conducting research through Tanzania Fisheries Research Institute (TAFIRI).	<ul style="list-style-type: none"> <li>• Estimation of sustainable yields, harvesting levels (TACs) and provide scientific information to all stakeholder</li> </ul>	<ul style="list-style-type: none"> <li>• Provide training and teaching facilities to the communities</li> </ul>
Supporting capacity and quality enhancing programmes	–	<ul style="list-style-type: none"> <li>• Sustain regional and global utilisation of fisheries resources.</li> </ul>
Participation in regional and international initiatives	<ul style="list-style-type: none"> <li>• Conservation and protection of natural resources under regional and international obligations</li> </ul>	

#### 4.2.3 Working mechanism of the proposed fisheries management system

It is important to set-up a mechanism which will ensure that the proposed community-based cooperative fisheries management will work effectively. As described earlier, the BFMUs will be responsible for fisheries management activities at the village level. The executive committees of the BFMUs will co-ordinate the day to day fisheries activities. The guiding principles to conduct fisheries management activities at the community level will be village by-laws, fisheries regulations and the basic fisheries rules set by the government, village authorities and the BFMUs. The

Fisheries Division and the BFMU will sign a memorandum of agreement (MoA). This agreement will stipulate the terms and conditions of sharing responsibilities between the two parties. In addition to this the government will enact a fisheries law, which gives the BFMUs powers to conduct fisheries management at the community level. All members of BFMUs must adhere to these rules and the BFMU is responsible for the enforcement. Therefore every member of the BFMUs<sup>5</sup> has to compromise his or her interest for the success of the BFMU. The legitimacy of rules developed by the fishing communities will be recognised by the Fisheries Division. Under this arrangement fishing communities will be able to conduct fisheries management activities as described below.

## Fishing communities

### *(a) Fisheries management*

The Fisheries Division would allocate exclusive fishing rights to the fishing communities. These rights would give BFMUs power of ownership and responsibility for management. Exclusive fishing rights would also provide opportunities to the fishing communities to generate economic rents from the fishery. The system is likely to substantially reduce non-compliance fishermen through implementation of rules and conditions by the communities themselves.

Therefore, the BFMUs will be able to raise the income of the fishing communities and improve fisheries management by controlling fishing effort in conformity with the allocated total allowable catch. If the BFMUs are well guided they would adopt rational ways of distributing given harvesting levels (local TACs) among themselves. For instance, Ching-Ta and Yao (2000) described, a way of determining optimal fishing effort at the community level based on fishing vessel efficiency. The model assumes that the historical harvesting data is available. Optimal fishing effort (number of vessels) in the fishing community can then be established within the given level of harvesting (local TAC). Based on the information on the efficiency of fishing vessels using different types of fishing gear, then total allowable catch would be distributed to fishing vessels according to efficiency (Ching-Ta and Yao 2000). This model is one way in which fishing communities can determine optimal fishing effort in the fishing village.

Strategically, the exclusive fishing rights or access rights are likely to be allocated to members of the fishing community with historical participation in the fisheries such as boat owners or others with proven ability of fishing. It is important for the BFMUs to observe that the combined catch should not exceed the given local TAC. It is believed that although the catches will not increase at the very beginning of the implementation of community-based cooperative fisheries management, in the long run, the fish stocks will recover and total revenues will be improved.

---

<sup>5</sup> BFMUs would set conditions; such that non-compliance individuals will not allowed to carry out fishing activities in that particular village.

### ***b) Monitoring, control and surveillance (MCS)***

Under a community-based cooperative fisheries management each fishing village will be partly responsible for monitoring, control and surveillance through their respective BFMUs. The control strategy will be on the participation of the beach fisheries executive committee (BFEC) which reports to the BFMU. This requires formulation of rules and regulations. This legal mechanism will create commitment of members of the BFMU to share both responsibilities and efforts towards monitoring, control and surveillance. Moreover each BFMU will be required to respect defined boundaries in order to avoid conflicts among BFMUs. This will create mutual understanding and further appropriate conflict resolution among fishing communities.

### ***c) User, access, membership fees and other charges***

Collection of charges or fees is another responsibility of the fishing communities under community cooperative fisheries management. Each BFMU will be responsible for collection of fees as is stipulated in the fisheries regulations. Fees that could be collected by BFMUs on behalf of fishing communities include landing charges, access fees and membership fees. A certain amount of fees on fish landings in terms of percentage can be charged by the BFMU in the respective village as a contribution to finance management activities at the village level. Fishing communities through their respective BFMUs will manage the funds.

However it should be pointed out that for technical reasons the Fisheries Division in collaboration with BFMU will collect fishing and vessel licence fees, fish processing and large scale fish business license fees. Part of these fees could be allocated to BFMUs as a contribution to management costs at the village level.

### ***d) Data collection and information***

Data collection contributes to the availability of information on the state of the fisheries resources and other important aspects of the fishery. Fisheries information is necessary for a successful fisheries management system. Fishing communities normally acquire little knowledge on fisheries resources. In this case, members of fishing communities who are literate could be given the responsibility of data collection such as recording catches, level of fishing effort (number of fishing vessels, number of fishermen) and other data related to fishing activities. The Fisheries Division on the other hand will provide support services such as training and teaching facilities for data collectors. BFMUs would use catch data for developing their own plans in their respective fishing villages. Other scientific information and biological data should be collected and analysed by scientists through research programmes.

### ***e) Social and economic aspects***

Based on the fact that the infrastructure is poor in rural areas, fishing communities would integrate other fisheries economic activities in their general management plans (GMPs). These will include marketing, development of income-generating activities, supply of fishing inputs such as gear, spare parts and other related inputs. Fishing communities would be able to access support services such as business services, goods and other services delivered by non-governmental organisations and other

stakeholders through their BFMUs. A community-based cooperative fisheries management system will in the long run enhance incomes of fishing communities. This could lead to improvement of infrastructure such as landing facilities, fishing harbour facilities, communication and transport network.

### **Fisheries Division**

The Fisheries Division would facilitate the establishment of the community-based cooperative fisheries management. Establishment of this system is a difficult process that should be done through a process of informing communities (awareness programmes). By consulting communities (key partners) they become aware of the system. Otherwise they may not support the introduction of the system. During the consultation process the following factors should be considered and discussed: motives for cooperation, identification of problems facing the fishery, strategies to deal with the problems, definition of the tasks and functions that will be shared between the fishing communities and the Fisheries Division. In this respect the parties; the communities and the government should agree on the sharing of responsibilities (Table 2). Both the Fisheries Division and the communities are likely to appreciate a community-based cooperative fisheries management system as a means of responding to fisheries management problems and it provides opportunities for communities to participate in fisheries management.

Moreover, the Fisheries Division will ensure effective cooperation in fisheries management activities between the government and resource users. It will formulate operational rules which regulate fisheries resource use. Explicitly it grants *de jure* rights (formal and legally recognised) to resource users. Rights, which originate from community *de facto* rights, would be recognised by the Fisheries Division when they are formally legitimised. The legitimised *de facto* rights would be included in the memorandum of agreement (MoA).

The Fisheries Division will also set total allowable catches (TACs) and allocate to fishing communities through their respective BFMUs. The Fisheries Division will be responsible for overall implementation of monitoring, control and surveillance mechanism. It will take measures against any violation of rules observed in a fishing village. Such measures will include withdrawal of given exclusive fishing rights and allocated total allowable catches and other legal penalties.

Another role of the Fisheries Division would be on fisheries research. Scientific information on the resource and biomass growth as well as socio-economic aspects and relationships are of great importance for fisheries management systems. These can be obtained through research activities conducted by TAFIRI. The fishing communities would demand more research on resources as they come to realise its benefits. This will lead to redefinition of research objectives to address issues, which are more relevant to community-based cooperative fisheries management activities.

The Fisheries Division will need to review its Lake Victoria fisheries regulations and redefine its tasks. It will also facilitate review of other legislation including the local government Act 1984 in order to promote and support implementation of community-based cooperative fisheries management system.

Participatory planning and implementation of fisheries management will be supported by other government agencies (judiciary, police, etc.) as well as local government authorities.

#### *4.2.4 Requirements for the implementation of community-based cooperative fisheries management system*

Implementation of a community-based cooperative fisheries management requires a multidisciplinary approach. Capacity building for the fishing communities in Lake Victoria is the key factor in the implementation of the system. Illiteracy in Tanzania is about 20% (Mungongó 2000). Given this, it may be assumed that illiteracy is well over 20% in rural areas. Under these circumstances, the Fisheries Division as a key partner will be responsible for fostering community awareness, sensitising community leaders and other political leaders to the concept of community-based cooperative fisheries management. It will also conduct training programmes for BFMU leaders and fisheries officials who will work with the communities. Other stakeholders such as fisheries training institutes, non-governmental organisations and donor agencies could provide training, technical and financial support services.

Another requirement will be the harmonisation of fishing communities through their respective BFMUs. This can be done through meetings and workshops. Regular meetings could be conducted between fisheries officials and communities in order to discuss various aspects of management. This will create a mutual understanding between the Fisheries Division and fishing communities. Linking fishing communities to service and marketing delivery agencies is another requirement which can be done through non-governmental organisations (NGOs), fish processing plant owners and other business associations.

Co-ordination of the management system is yet another requirement. The various management units and their constituent fishing groups will have interests and activities which may interact each other and therefore need some co-ordination. Although it can be argued that much of this work could be done by the fishing communities themselves, some outside co-ordination may still be needed. A co-ordination mechanism should be developed by the Fisheries Division in order to resolve conflicts.

#### *4.2.5 Estimated costs and time frames*

Implementation of community-based cooperative fisheries management is of course costly. The estimated costs for implementation for community-based cooperative fisheries management in Tanzania are indicated in Table 3. It should be noted that the criteria for estimated costs are based on current market prices and civil service policy.

Table 3: Estimated costs of introducing community-based cooperative fisheries management in Lake Victoria

Activity/ programme	Time scale	Cost at community level (US\$)	Costs for Fisheries Division (US\$)	Total costs (US\$)
<b>1: Preparatory phase (One-off costs)</b>	10-15 months			
• Informing stage		5,000	20,000	25,000
• Consultation		20,000	46,000	66,000
• Consultancy		30,000	20,000	50,000
<b>2: Implementation</b>	2-5 years			
• Training and awareness programmes	Twice per year per village	25,000	10,000	35,000
• Community meetings and harmonisation programmes	several meetings	4,000	3,500	7,500
• Management costs (logistics)	Annual	4,500	5,500	10,000
• Conduct monitoring, control and surveillance		-	3,500	3,500
<b>3. Monitoring and Evaluation</b>		10,000	20,000	30,000
<b>Total</b>		<b>98,500</b>	<b>128,500</b>	<b>227,500</b>

As outlined in Table 3, the total costs for establishing community-based cooperative fisheries management in Tanzania are estimated at approximately US\$ 227,500. These estimated costs do not include purchasing of physical facilities. As indicated in Figure 2, the current fish production from Lake Victoria is over 150,000 metric tons. The current FOB price per kilogram of fish in Tanzania is about US\$ 1. In this case the annual value of Lake Victoria fishery is approximately US\$ 150 million. Based on this, the costs of introduction of community-based cooperative fisheries management, which is likely to substantially improve the fishery, represent less than 1% of the annual value of the fishery. Moreover, this is an investment that will reap fruit over long time (Mishan 1971). Hence the annual investment cost represents a much lower

fraction of the annual value of the fishery. Thus, this seems a potentially very good investment opportunity.

It is estimated that the preparatory phase for community-based cooperative in Tanzania will take ten to fifteen months. Considerable time is needed for consulting local leaders and the government authorities such as the president's office, district authorities (Figure 7) and the Ministry of Justice and Constitution. On the other hand the Lake Victoria Environmental Management Project (LVEMP) has already involved communities in environmental management activities such as water hyacinth control and law enforcement to curb illegal fishing. Hence, the time required for consultation with communities will be corresponding less because they are already aware on the problems facing the fishery of Lake Victoria. Taking this into account, ten to fifteen months duration would be enough to set up and start the implementation of community-based cooperative fisheries management for Lake Victoria. It will require 1 to 2 years for a community-based cooperative fisheries management to become operational. The implementation phase covering the communities will probably take anywhere from one to five years. Time scale for the implementation could be in stages (stepwise). The first stage could involve few pilot-fishing villages; followed by second stage which will involve more villages. The last stage will be introduction of the full-scale community-based cooperative system in all-fishing villages.

## 5. CONCLUSION

A community-based cooperative fisheries management system shares authority and responsibilities over the resource between the fishing communities and the government. It is likely that as proposed above the system would reduce the problem of common property by allocating exclusive fishing rights to the fishing communities in their respective areas or villages. Both theoretical and empirical evidence indicates that the tragedy of the commons (where all rents are dissipated) can be avoided through community property rights, whereby a fishing community controls both access rights to the resource and admission into the group (Arnason 2001, Ostrom 1990). This would encourage both the employment of the appropriate fishing effort and monitoring control of the fishery. In the long run the fish stocks will recover, consequently catch per unit effort will increase and the social economic benefits of the fishery will be improved.

Community-based cooperative fisheries management shares fisheries management responsibilities between fishing communities and government. The system would be multipurpose. For example, the proposed beach fisheries management units responsible for fisheries management activities at the community level can also be involved in negotiating with businesses on marketing and supply of fishing inputs such as fishing gear, boats, fish handling and processing facilities. The beach fisheries management units could play a role in co-ordinating fishing and marketing activities.

In general terms community-based cooperative fisheries management is essentially a regulation-enforcement mechanism which is attractive to both the fishing communities and the Fisheries Division. The Fisheries Division currently sees the monitoring, control and surveillance as an almost overwhelming problem which it is unable to deal with effectively. Under these circumstances, community-based

cooperative fisheries management, where communities participate in fisheries management activities, would constitute a potential solution.

would constitute a potential solution to their problem, It is important to develop a legal system to serve as a basis for implementation of the system. Without such a tool in place, there is a risk that the system will be implemented on an *ad hoc* basis and is likely to fail. The community-based cooperative fisheries management is not panacea for sustainable fisheries management but it is a strategy for fisheries management. It is recommended, therefore that further studies on the development of an appropriate management system for Lake Victoria should be done for all three riparian states; Tanzania, Kenya, and Uganda.

## LIST OF REFERENCE

- Arnason R. 1993. Ocean fisheries management: recent international developments. *Marine policy*. Butterworth-Heinemann, 1993, pp 334 vol .22, No.4-5,1995
- Arnason R. 1999. Property Rights as a Means of Economic Organization: The Paper presented for the Mini-course on rights-based fisheries management. Fish Rights 99 Conference. Use of Property Rights in Fisheries Management, Fremantle 11-19 November 1999.
- Arnason R. 2001. Alternative Fisheries Management System: The Icelandic Experience. Paper presented at the seminar on The future of Commons Fishery Policy: The Voice of Europe's Fishing Regions. European Centre for the Regions, Santiago de Compostela, November 29-30, 2001.
- Arnason R. 2002. Fisheries Management Costs: Some Theoretical Implications. In Schrank, W.E, Arnason, R. and Hanneson, R (eds.) Costs of fisheries Management. Asugate publishers (*forthcoming*).
- Bathondi P.O.J 1990. The state of Lake Victoria, Tanzania sector. *CIFA* (Report of the fifth session of the sub-committee for the development and management of the fisheries in Lake Victoria, Mwanza, Tanzania, 12-14 sept 1989). *FAO Fishery Reports* 430, pp. 24-34. FAO, Rome.
- Brown R.C. 1998. Community-based cooperative management: renewed interest in an old paradigm. In Pitcher T.J, Hart P.J.B & Pauly D: *Reinvesting Fisheries Management*, pp 184-219. Kluwer Academic Publisher, Great Britain, 1998, Fish and Fisheries series 23.
- Charles T.A.2000. Use Rights in Fishery Systems. *IIFET 2000 proceedings*.
- Ching-Ta and Yao-Hsien Lee 2000. Co-management and labor Stickiness in Fishing Communities: Determination of the Optimal Number of Vessels: *IIFET 2000 Proceedings*, volume I.
- Donda S. 2000. Journey to sustainable fisheries management. Organisation and Institutional limitations in fisheries co-management, the case of lakes Malombe and Chiuta in Malawi.*IIFET 2000 proceedings*, Volume 1.
- FAO 1995. Code of conduct for Responsible Fisheries, pp 1-2. Rome, Italy.
- Fellizar, F. 1994. Achieving sustainable development through community-based management. In I:Siason and R.Subalde (eds.). *Community-based management of coastal resources* pp 71-79. University of the Philippines-Visayas, Iloilo City, Philippines.

- Ferrer, E. and C.Nozawa. 1997. Community-based coastal resources management in the Philippines: Key concepts, methods and lessons learned. A paper presented at the International Development Research Centre Planning Workshop on Community-based Natural Resources Management, 12-16 May, Hue, Vietnam.
- Geheb, K.2000. Fisheries legislation on Lake Victoria: present legislation and new developments. In Geheb, K, and K. Creans (eds) *The co-management Survey* pp 173-183.
- Gibbon P. 1997. Market survey on Nile perch in Lake Victoria.  
<[http://www.fao.org/waicent/faoinfo/fishery/statist/fisoft/dias/pape\\_nil.htm](http://www.fao.org/waicent/faoinfo/fishery/statist/fisoft/dias/pape_nil.htm)>
- Government of Tanzania 2000. Tanzania government report (10 /12/2001).  
< <http://www.tanzania.go.tz/>>.
- Hannesson, R. 1994. Rights based Fishing: The role of property rights in the fisheries management. Paper presented at the 82nd Statutory Meeting of ICES, St. John's Newfoundland, Canada, september 22-30, 1994.
- Hardin, G. 1968. The Tragedy of the commons. *Science* Vol.162: pp 1243-47
- Hartwick, J.M and Olewiler, N.D. 1998.Regulation of the fishery. *The Economic of natural resources use* pp 230. Addison-Wesley Education publishers, Inc. USA.
- ICLARM/IFM. 1998. Analysis of co-management arrangements in fisheries and related coastal resources: a research framework for the Coastal Resources management Research (unpublished).
- IUCN 2000. Socio-economics of the Lake Victoria Fisheries, Report no 4  
Leal C. 1998. Fishing cooperation and organisation in united Kingdom [12/12/2001].<[http://www.gorp.com/gorp/activity/saltfaq/saltf\\_08.htm](http://www.gorp.com/gorp/activity/saltfaq/saltf_08.htm)>
- MNRT 1970, Fisheries Act no 6 Laws of United republic of Tanzania pp 1-42. Government printer ,Dar-Es-Salaam, Tanzania.
- MNRT 1994, Fisheries regulations pp 1-10. Government printer, Dar-Es-Salaam, Tanzania.
- MNRT 1996, Fisheries statistical annual report pp 1-37. Dar-es-Salaam, Tanzania .
- MNRT 1997, National Fisheries policy, pp 1-24. Government printer ,Dar-Es-Salaam, Tanzania.
- MNRT 1999, Fisheries statistical provisional annual report. Dar-Es-Salaam, Tanzania.

- Mkumbo OC, Ezekiel C, Budeba Y & Cowx G.I 2001. The fishery of Lake Victoria, Tanzania: Pre-post Nile perch era and the future. Paper presented at Intentional Lake Victoria Conference pp 1-11. Jinja. Uganda, may 2000.
- Mungongó S. 2000. Decentralisation process in Tanzania (10 /12/2001) < <http://www.tanzania.go.tz/>>.
- Mishan. E.J. 1971. *Cost-benefit Analysis: An informal introduction* pp 215. Biddles Ltd Guildford and king's Lynn, UK. fourth edition 1988.
- National Research Council, 1999. *Sharing the fish, Towards a National policy on individual fishing quotas*. Washington D.C. National academy.
- Nyerere. J.K. 1968. *Ujamaa essays*. Government printer, Dar-Es-Salaam, Tanzania ( 9/12/2001) < <http://www.encyclopedia.com/articles/09429.html>>.
- Oddsson G.2001. Policy and planning pp 1-10. (unpublished).
- Ostrom E. 1990. *Governing the Commons: The evolution of Institutions for collective actions* pp 141-159. Cambridge University press. Cambridge 1990.
- Owino J.P. 1999. Socio-economics of the Lake Victoria Fisheries: traditional and Centralised Management systems of the Lake Victoria Fisheries in Kenya. IUCN Eastern Africa Programme Report no 4 pp 1-19.
- Pomeroy. R.S 1995. Community based and co-management institutions for sustainable coastal fisheries management in Southeast ASIA. *Ocean & Coastal Management*, Vol 27, NO3. pp143-162.1995.
- Pomeroy. R.S 1998. A process for Community based and co-management. Fisheries Social Science Research Network. ICLARM contribution NO 1448 pp 71-76.
- Sajise,P. 1995. Community-based resource management in the Phillipines: perspective and experiences. A paper presented at the Fisheries co-management Workshop at North sea center, 29-31 may, Hirtshals, Denmark.
- Scott. A 1955. The fishery: The objectives of sole ownership. *Journal of political economy* pp 116-124.
- Sen, S.and Nielsen J.R. 1996. Fisheries co-management: A comparative analysis. *Marine policy* 20(5) pp 405-418.
- Tanzania Government 2000. Tanzania Economy ( 9/12/2001) <<http://www.tanzania.go.tz/index2E.html>>.
- Wilson C. Douglas 2001. *Lake Victoria Fishers' attitudes towards management and co-management*, forthcoming in Geheb Kim and Terri Sarch (Eds), *Broaching from the inland waters of Africa the management impasse: Perspectives on Fisheries and their management*.