



Centre for Applied Social Sciences

**IN SEARCH OF A NEW
MANAGEMENT REGIME
ON THE NORTHERN SHORES
OF LAKE KARIBA****

by

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February 1996

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*A Member of IUCN - The World Conservation Union

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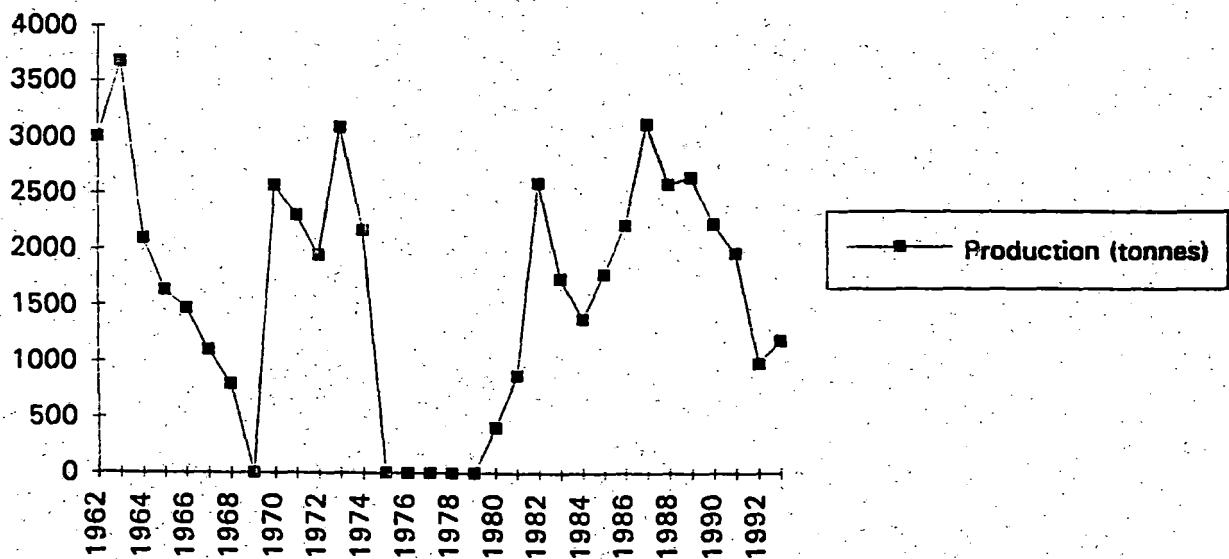
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Abstract

The Zambian side of the Lake Kariba fishery has been characterised by a near 'open access' regime. Fishers have set-up settlements anywhere on the fishery and in most cases did not observe fishing regulations in force. Policies are now being implemented to make fishing communities become part of the decision-making processes on the fishery. It is envisaged that through co-management, fishers will appreciate the need to utilise the fishery sustainably thereby improving their livelihoods. The paper looks at the reasons that gave rise to co-management on the fishery and problems and conflicts that are now arising in its implementation.

Table 2: Graph Showing Production Trends Between 1962-1993



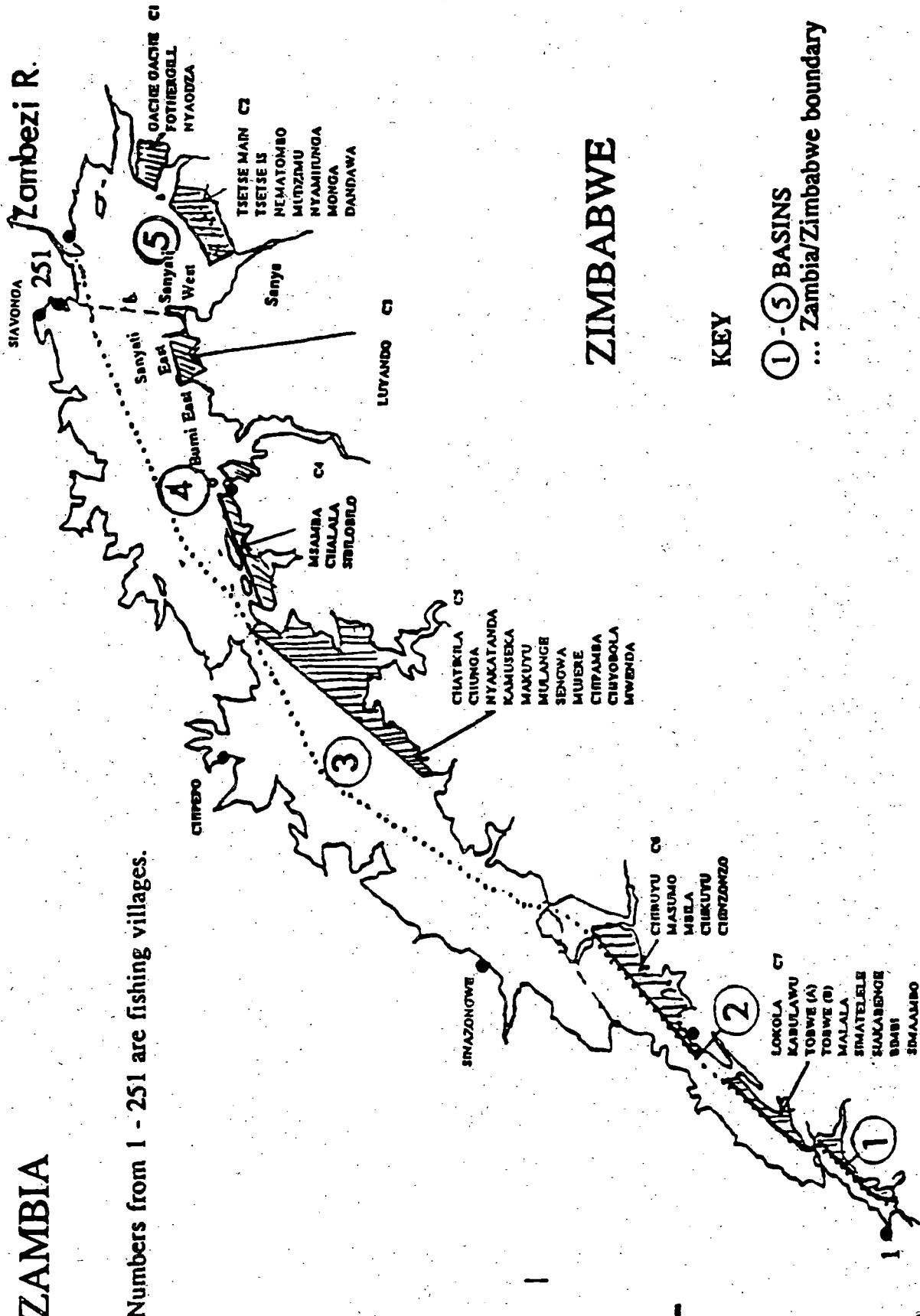
Notes:

- a) Production Figures from 1964 to 1968 are from Bourdillon, et al. p. 153.
- b) There is no data available for the period 1975 to 1979 as the lake was officially 'closed' at the height of the war of liberation in Zimbabwe.
- c) The rest of the data is from Lupikisha, et al.

Figure 1: Map of Lake Kariba, Inshore Fishing Areas

ZAMBIA

Numbers from 1 - 251 are fishing villages.



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 23. Colson, ibid, p.149
 24. Colson, ibid, p. 148
 25. Colson, E., " Social Organisation of the Gwembe Tonga," Kariba Studies Vol.I, (Manchester University Press, 1975) p.193.
 26. Colson, op cit, p.149.
 27. It is important to also note that during the official opening of the Sinazongwe Fisheries Training Centre, the local Member of Parliament claimed that the lake was

benefitting 'outsiders' much more than the indigenous Tonga.

28. From random interviews conducted during data collection for a Socio-economic data-base, it was shown that most of the non-Tonga fishers had smaller households and largely invested their income from fish in their home areas where the rest of the household members lived.
29. Lupikisha J., "Report on a Conflict Resolution Meeting Held at Sinazongwe, 24th-26th July, 1995," (Department of Fisheries, 1995).
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Introduction¹

Lake Kariba is one of the largest in the world. It was created in the mid-1950's following the putting up of a barrier on the Zambezi River. It attained its maximum capacity in 1963. The project was primarily aimed at providing hydro-electric power to the copper mines in Northern Rhodesia (Zambia) and the emerging industrial sector in Southern Rhodesia (Zimbabwe). The formation of the lake, however, led to the displacement of a large number of Tonga people who, for generations, had relied on the alluvial soils deposited on the banks of the Zambezi River for their subsistence agriculture. Authorities behind the project were of the view that compensation for lost agricultural land would come in the form of high incomes from commercial fishing.

Thirty years later the Tonga and other fishing communities on the lake are still engaged in semi-commercial artisanal fishing. This sector is still characterised by very low investments in equipment, use of household labour and involvement in other productive activities such as agriculture. Fish markets are unregulated and fragmented and there has been a general lack of services and infrastructure to improve livelihoods. Commercial fishing which commenced in 1980, on the other hand, has been characterised by high investments in fishing gear and use of hired labour. The promised high incomes for the artisanal sector have clearly not been achieved. The electricity generated from Kariba Dam has not led to creation of industries which would absorb some of the local labour. Apart from a few locals who have been employed by the power company, the majority have not seen any positive contributions of the project. The few irrigation schemes in the area are mostly capital intensive and have only contributed to further land shortages for semi-commercial agriculture.

¹ An earlier version of this paper was presented and discussed at the Zambia/Zimbabwe SADC Fisheries Project Inshore Working Group workshop held at Lake Kariba Fisheries Research Institute, 11-12th December, 1995.

Communication within the valley and with the rest of the country is still rudimentary. Today, the fishery and surrounding areas remain one of the least developed regions in the country.

New policies are now being implemented to make the artisanal sector and other stake-holders on the lake become part of the decision-making process. It is envisaged that under the new regime of co-management, stake-holders will be able to participate in decision making on issues that directly affect their operations on the lake. This will eventually lead to sustainable use of the lake and its resources and reverse the decline in fish harvests as well as the living conditions of the stake-holders. This paper looks at the reasons that led to the implementation of co-management on the lake. It will try to show the role of fishing among the Tonga before and after the creation of the lake; the emergence of other ethnic groups on the fishery; and discusses some of the conflicts and problems that are now emerging as diverse user-groups expropriate or lose opportunities.

Methods

Two methods were used in collecting data for this paper. Firstly, extensive review of the literature was done to trace the role of the Tonga and other fishing households before and after creation of the lake. Secondly, some of the data comes from field notes obtained during the collection of information on a survey of the Socio-Economic Characteristics of Fishing Households on Lake Kariba during the months of May and August 1995. This data was collected through random interviews of fishers. It was augmented by open-ended interviews with chiefs and Department of Fisheries officials.

Unless stated, Lake Kariba in this paper will refer to the part of the lake found on the Zambian side only.

Concepts and Definitions

The noticeable characteristics of Common-Pool Resources (CPR) such as a fishery pertain to access to a commons and the rights conferred upon those who have access to withdraw or subtract resources from the common-pool. McKay¹ defines a Common-Pool Resource as a class of resources where it is difficult to draw boundaries or prevent others from partaking of those resources. This is particularly pertinent to a CPR with fugitive resources such as a fishery. In such CPR's the resource will not respect any boundaries that are artificially drawn-up. The relevant rights, therefore, are those related to access and withdrawal. Although Common-Pool Resources is sometimes used interchangeably with Common Property Resources, the latter refers to a class of property rights. The typical features of this class are rights not to be excluded from the use of something or the right to use something in common with others;

"Property rights define the uses which are legitimately viewed as being exclusive and who has these exclusive rights. Rights also have a temporal dimension comprising the present and the future. The institutional arrangements include mechanisms for defining and enforcing rights, consisting of not only formal procedures but also social custom and the legitimacy and recognition of rights."²

Being cultural and social constructs, the rights to access and withdraw can differ from one type of CPR to another. Indeed, one CPR can have different rights operating at one particular time. Rights to a commons can also change owing to socio-economic transformations occurring within a population with rights. Four types of institutional arrangements or management regimes have been identified in most of the CPR's: open access or laissez-

faire, communal, private or market and state. Some authors³ also identify international governance as a fifth management regime.

Under an open-access regime there is no authority or institutional arrangements that confer the rights to access and withdraw from a CPR. For such an arrangement, it is assumed that users will enter and withdraw from a CPR for as long as this adds to their personal gain. The users are assumed to possess selfish tendencies; pursue personal and private goals; and the rate of their withdraw does not give an opportunity to the CPR to naturally replenish itself. Left to their own, the users would eventually create a 'Tragedy of the Commons.'⁴ It is therefore suggested that to prevent a tragedy from taking place, there is need to either place the commons in private hands or allow the state to take over.

This 'tragic' view of the commons has, however, received a number of criticisms. Hardin has been accused of being culture-bound⁵; of not taking cognisance of the sense of belonging to a community which may over-ride individualistic tendencies⁶; and that over-exploitation cannot occur where inefficient technology is used. Most fisheries managers subscribe to Hardin's theory and their management culture focuses on preventing a tragedy from taking place. This is done by controlling access to a fishery through the use of licenses or by setting individual fish quotas. Withdraw on a fishery is normally contained by restricting certain type of gear, observing closed seasons or by allowing fishers to obtain a specified quantity of fish at a given time.

Whereas a lot of criticisms have been levelled against Hardin, he has been acclaimed for designing a model to illustrate the degradation of a commons rather than trying to explain reality;

"The unconscious embrace of Hardin's model is the reason that critiques of it have been of great value rather than methodologically misguided; decision maker's who base policy on Hardin's model may be trying to solve the wrong problem."⁷

Under communal management, local-level institutions are given prominence. Exclusive rights are conferred upon a distinguishable group of people. Under such a regime rights can be held in common, privately or a combination of both. State management, on the other hand, recognises the significance of the state in managing a CPR on behalf of all its citizens or a group of its citizens. The state will use its agents or ministries to oversee that particular CPR.

Fisheries Management Based on Hardin's Theory

As pointed out above, most fisheries managers feel that if fishers are left on their own, then a 'Tragedy of the Commons' is likely to occur. Regulations to limit access and withdrawal are therefore drawn up and implemented as a remedy to the problem. The issuing of licenses to permit entry into a fishery and the licensing of gear and boats is aimed at controlling access so as to avert an open-access regime. However, restricting access to a

fishery will only be effective if there exists a mobile and effective policing mechanism. In most developing countries where the state has centralised the management of a fishery, it is not uncommon for state agents to be insufficiently funded. This leads to licensing becoming arbitrary as there is no adequate data upon which to give licenses. It also contributes to the evasion of regulations by users.

Withdrawal is restricted by stipulating the quantity or type of fish to be harvested at a given time or the Total Allowance Catch (TAC). This is done by controlling the number and type of gear each user is allowed to own. Regulating type of gear leads to controlling effort as well as allowing breeding and immature fish to escape. Withdrawal can also be controlled by prohibiting fishing during a specific season. The drawback with relying on TAC as a mechanism for controlling withdrawal is the need for reliable data to determine how the harvest is to be distributed. Although selling points can provide information on distribution, this is not possible where a fishery is characterised by scattered, individual fishers who do not have a regulated market:

"Although cheap, estimates are often extremely inaccurate, because adoption of TAC is often accompanied by a deterioration of data quality and under reporting, since regulatory technique puts a premium on cheating, which enforcement fails to halt. Thus, expense and lack of locally available personnel put the TAC technique beyond the means of most third world countries."⁸

Restricting gear can also lead to conflicts and increase socio-economic differences on a fishery. Once restrictions are imposed, poor-resource households may not be able to invest in

other type of gear required. Where such fishers rely on fishing as a sole source of income, this can lead to destitution. Resource-endowed households will be able to invest in new gear thereby increasing socio-economic differences and conflicts. Restriction on type of mesh might not work for all species of fish and might be uneconomical in the long-run by allowing other species to remain largely unharvested.

It is also vital to note that all forms of regulations governing a CPR such as a fishery need not be at variance with the social, cultural, economic and political institutions operating within that particular society. The emphasis by most managers to enforce fishing regulations without taking cognisance of the socio-cultural situation may be misplaced. Instead, such policies may lead to frictions between and among diverse users of a fishery.

"... fisheries management is a highly controversial matter that divides rather than unites various user groups and which brings user groups at odds with government. Opinions differ as to what should be the specific aims of fisheries management and how various concerns should be ranked."⁹

Co-management of fisheries has been proposed as offering a solution to some of the conflicts that arise in management of such CPR's. Co-management entails power-sharing of rights and responsibilities between government agents and citizens with a stake in a fishery. The advantage of co-management is that government agents do not view users as bent on creating a 'tragedy' but become equal partners in decision-making. Equally, it becomes cost-effective for governments as regulations will be

agreed upon and implemented in liaison with the stake-holders. According to Mckay¹⁰ co-management will be very effective when all or some of these conditions have been met;

- a) The process leading to co-management should be bottom-up rather than top-down;
- b) Emphasis is placed on the active participation of all stake-holders;
- c) User-groups should be allowed to play an influential role in decision-making; and
- d) Government ministries or its agents are involved at various stages of regulating process but should not be the principal actors.

It is therefore essential that prior to implementing a co-management regime, local institutions which serve all the stakeholders are identified. These local institutions then become a vehicle through which co-management is implemented. Ideally, these local institutions need be as small as practicable. Large scale structures are more likely to be ineffective and commonly avoid responsibility.¹¹

Most of the successful co-management regimes have been recorded in coastal fisheries. The inshore fishery of Japan where fishermen are involved in management through cooperatives and the cod fishery of Norway are successful examples of co-management. In the co-management regimes of South East Asia a number of problems related to high expectations of immediate results by users; lack of integration between researchers and users and the lack of appreciation of research work by users have been encountered.¹² There are few examples of co-management regimes in fisheries sector in Africa. Most of the fisheries have been under

various forms of centralised state control and it is only now that co-management is being introduced.

The Lake Kariba Fishery

Lake Kariba formed following the constructing of a barrier on the Zambezi River at Kariba Gorge. The 300 kilometre long lake straddles the Zambia/Zimbabwe border. It is about 32 kilometres at its widest and has a carrying capacity of approximately 190,000 million cubic metres. The water body extends from Devil's Gorge just below Victoria Falls to the dam wall near Siavonga. At the time of its construction the lake was hailed as a marvel of modern engineering which could rank with the seven wonders of the world.

The lake is situated in the Luangwa/Zambezi Valley. The valley slopes about 100 kilometres over a distance of 20-30 kilometres. Unlike the steep escarpment which is sparsely populated the valley floor has the highest population density.

Until recently, the area bordering the lake was under one local administration, the Gwembe District Council. Between 1991/2 the council was divided into three separate councils namely Siavonga, Gwembe and Sinazongwe. Traditional authority is administered through chiefs and headmen who also sit on district council committees. In 1989 the population in all the three districts was estimated to be 116,375 with a population density of 2.9 persons per square kilometre.¹³ However, due to arable land

scarcity which is estimated to be at 10-15% of total land area, population density in some districts is as high as 70 persons per square kilometre.¹⁴

The most productive areas of the Gwembe Valley are about 100 kilometres from the main tarred road on the Zambian Plateau. These areas are connected by two tarred roads to Siavonga and Sinazese respectively. A third gravel road connects Chipepo on the shores of the lake to Gwembe which is on the plateau. Economically the region relies on agriculture, fish and the few industries located in the valley. These are the electric power company, a coal mine and a cotton ginnery. The region exports labour, fish, livestock, semi-processed cotton and power. In turn it imports almost all its household needs and agricultural implements. The region is one of the least developed in the country in spite of the fact that it produces about fifty percent of the country's electricity;

"There has been virtually no regional development in the proper sense i.e. fostering of intra-regional transfer or exchanges and a progressive division of labour. On the contrary, all developments which have taken place to date have been export-oriented."¹⁵

On the fishery the largest group of users belong to the artisanal sector. They number about 2,000 and use unseaworthy dug-out canoes. Fish is harvested by the use of nets which are normally set end to end in the evenings and checked the following morning. Although a number of fishers in this category own motorised vessels, they use these for transport rather than for fishing purposes. Very few operators in this sector use hired

labour. Most of them use household labour. The sector has also got a distinct division of labour. Whereas the actual setting and removal of nets is done by males, fish processing and marketing is usually done by women. Processing through smoking or sun-drying is done locally and the processed fish is later transported to urban markets for sale. Only fishers near to the main roads take advantage of their proximity to the urban markets to trade in fresh fish which fetches more money.

The other significant users of the lake are commercial fishers. Due to the high cost of purchasing equipment, they are not as numerous as the artisanal fishers. Commercial fishers primarily target the Tanganyika sardine (*kapenta*) which they harvest through the use of mechanised rigs and hired labour. All their harvest is sold to the urban markets as a cheap source of protein. Recently, some district councils have leased a number of islands on the lake to tour operators. These have introduced game-viewing safaris and cater for sport-fishing. A number of other users harvest fish for subsistence. These use hooks, baskets and other devices. Some of the surpluses obtained in this manner by fishers near the main road is usually sold to fresh-fish traders.

Studies done on the Zambezi river prior to the impoundment indicate that there were about 40 species of fish. The most abundant were *A. Lateralis*, *Cyphomyrus*, *Dischorhynchus*, *Malepterurus electricus* and White Bream (*Tilapia mortimeri*). After impoundment the number of species increased to 50 and 90% of the fish caught by weight comprised of Tiger fish (*Hydrocynus vittatus*), Eastern

bottlenose (*Mormyrus longirostris*), and the Brown Squeaker (*Synodontis Zambezensis*). The majority of these species are limited to the shallow areas of the lake. The only pelagic fish in the lake is the Tanganyika sardine or 'Kapenta' (*Limnothrissa miodon*) which was introduced in the lake from Tanganyika in the 1960's.

It was estimated that after impoundment annual catches would be around 20,000 tonnes. These were, however, very optimistic estimates as they have never been attained (see table 2 below). In 1993, the most harvested species were Tiger fish, Red-breasted bream and Brown Squeaker in that order.¹⁶

Fishing on the Zambezi River

Until after 1900 when missionaries and settlers started making visits to the Gwembe Valley, the area was primarily populated by the Tonga people. It has not yet been determined when they came to the area but when David Livingstone passed through the region in 1860, he found them cultivating on the banks of the Zambezi River. The river was their main source of sustenance as it provided alluvial soils for agriculture in a region with low rainfall and high temperatures. They mostly cultivated bulrush millet, sorghum and maize. Produce from subsistence agriculture

was supplemented by gathering of wild fruits and roots, hunting and fishing. Prior to the establishment of colonial administrative structures, the Tonga had no centralised political authority. They were never structured as a group but were held together by inheritance rights to land and property and by the cult of the ancestral shades.¹⁷ Most of the chieftaincies currently found in the area are non-indigenous and were a creation of colonial authorities. Colson¹⁸ has further noted that the Tonga were so independent that when colonialists asked them to choose village headmen, they usually chose former slaves as they were the ones associated with outsiders.

More than seven fishing devices ranging from stone or cane barriers to fish baskets, spears, nets and poisons were known and used by the Tonga. Fishing was also done under a wide range of water conditions and rituals associated with fishing were also performed. For instance, it was not allowed to fish in areas associated with rain shrines (*Malende*) and ancestral spirits were called upon to bless new fishing devices such as baskets before they could be used.¹⁹

The Tonga did not however, develop an advanced trade in fish with other ethnic groups outside the valley. Most of the fish was traded locally under barter terms. Lack of trade in fish has principally been linked to the terrain which made it impossible for the Tonga to exploit markets elsewhere. Traders could easily obtain supplies from the Kafue flats or the Barotse plains than risk coming to the valley. Secondly, the prevalence of mosquitoes

and high temperatures discouraged fish traders from coming into the valley to buy fish. Thirdly, the Zambezi was such a fast flowing river that canoes were only used for crossing and not for setting nets. As such not a lot of surpluses could be obtained to sustain markets elsewhere.

The lack of a developed external fish market among the Tonga has been perceived as evidence of non-fishing traditions. It was argued that the Tonga were not fishermen and as such would not take advantage of the new opportunities to be created by the lake. Tobias, for instance, observed that:

"...the swift flow of the Zambezi river, the fear of crocodiles and the near absence of fishing techniques and traditions have ruled-out fish as a source of nutrition."²⁰

The wide range of fishing devices used by the Tonga not only indicate the knowledge of fishing but were also adequate in providing the Tonga enough proteins to supplement a largely carbohydrate diet. The devices used were also designed in such a way that fish stocks were sustainably harvested. Chirwa²¹ has noted that on Lake Malawi weirs and traps could only be used in shallow waters and during the rain season. When the rivers flooded the traps were removed for fear that they may be washed away. They were also constructed in such a way that fish-fry could easily pass through. Additionally, fish poison could only be used in still or slow moving waters and its effectiveness was limited to a short-period of time. The amount, depth and flow of water could easily reduce its strength.

The creation of a barrier on the Zambezi River to form Lake Kariba was to radically alter the subsistence economy of the Tonga. Firstly, they were going to lose their gardens on the banks of the river. Secondly, they would be forced to leave their ancestral homes, shrines and be relocated in areas where they were not familiar with the environment. Thirdly, they would lose contact with most of their kin across the Zambezi and see the disintegration of cohesive neighbourhoods. The chiefs, who had been grouped under a central authority known as the Gwembe Tonga Native Authority, negotiated and obtained compensation for the loss of gardens, maize crop, huts and other related structures. On the other hand, the federal authority was of the opinion that the Tonga would take advantage of new fishing opportunities to turn into commercial fishers. To this effect, a fisheries training school to teach the Tonga new fishing methods, boat building and net mending was opened at Sinazongwe on the shores of Lake Kariba. In addition, chiefs and some of their subjects were taken on study trips to the northern fisheries to see and learn fishing methods of other ethnic groups. It was also decreed that the Tonga would have exclusive fishing rights on the lake for the first ten-years after commencement of commercial fishing. Colson²² has noted that the ten-year exclusive rights were conferred upon the Tonga because:

- i) the lake-shore would cover their former homes and gardens hence they had the 'first in time, first in right' claims to the resource; and

ii) due to a shortage of fertile agricultural lands in the resettlement areas, most of the Tonga would have to rely on fishing for their livelihood.

It is estimated that in 1959 there were 407 Tonga fishers owning 748 gill-nets and 93 boats. In 1962 the number of fishermen had risen to 2 500 harvesting about 3 000 tonnes of fish. By 1964, however, a lot of Tonga people had stopped fishing and begun experimenting with semi-commercial agriculture.

"By 1964 fishing was no longer a major interest for the majority of the Gwembe men. They turned back to labour migration or local wage work, or begun to experiment hopefully with cotton farming or other forms of cash cropping."²³

As the bio-system of the lake became more stable, catches initially rose and this attracted more fishers to take up the trade. The increased number of fishers led to a depletion of stocks in nearby waters and fishers were then forced to migrate to islands or go further into the lake. The increased costs of catching the fish and bringing it to the shore for sale began to increase costs and make fishing an uneconomic investment. Secondly, the majority of the Tonga who became wealthy from fishing were viewed by their kin as using magic which required the sacrifice of their relatives. They were viewed as having "...invested in medicine which required the sacrifice of kinsmen through magical means."²⁴ As a way of avoiding such social pressures the majority of the Tonga quit fishing and re-invested their capital in agricultural implements and livestock. Thirdly, the Tonga mode of production relied on reciprocity rather than payment for services rendered. Those who employed their

relatives expected them not to get paid as they were presumed to be working for their relatives. This compelled most young men to became labour migrants.

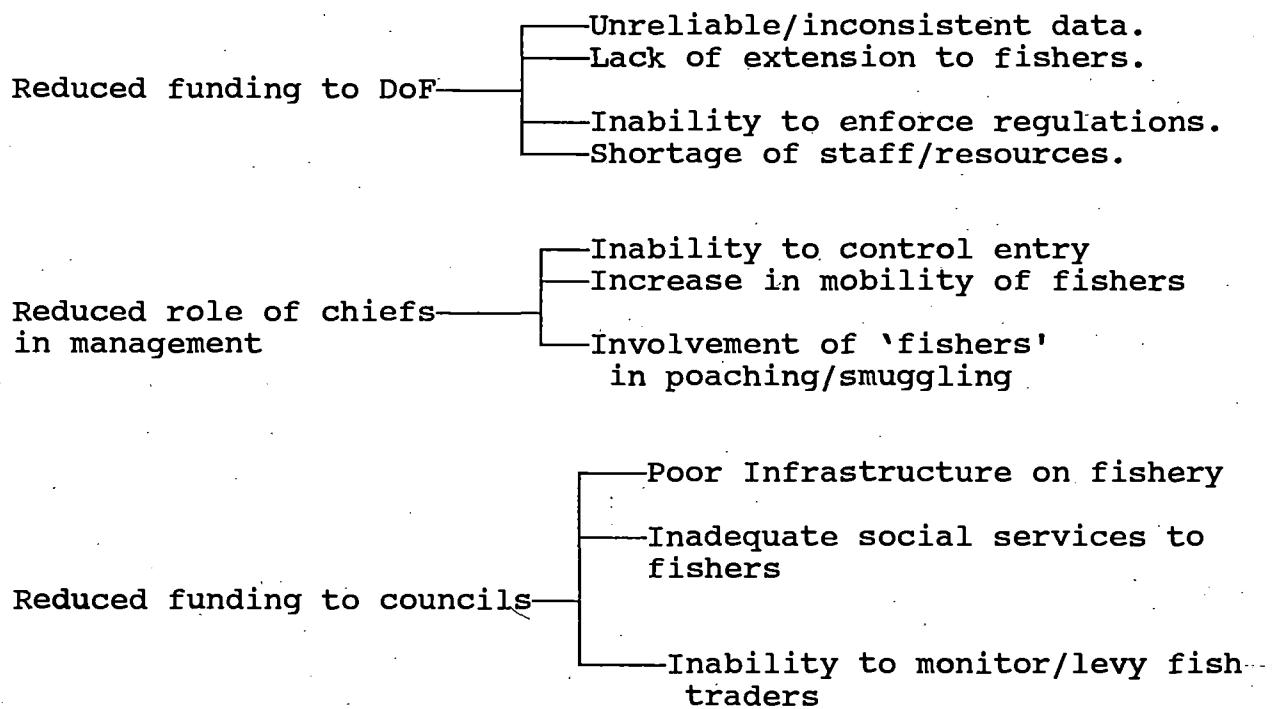
The exit of the majority of the Tonga from the fishery saw an influx of other ethnic groups. This in-migration became more pronounced during the mid-1970's. Factors attributed to this movement of fishers are that there was a decline in catches in northern Zambia fisheries. Encouraged by the post-colonial state policies which espoused national unity through 'One Zambia, One Nation,' the majority of these fishers moved to Lake Kariba. Secondly, the role of chiefs in the post-colonial era decreased at the expense of ruling party functionaries. The Tonga Chiefs Native Authority lost credibility among most of the Tonga. Its officials were blamed for not preventing the creation of the lake by siding with the federal authority.²⁵ The lack of a collective response to the immigrants encouraged more people from other regions to come to the area. The role of witchcraft within Tonga society played a part as well; according to Colson²⁶ the Tonga do not view outsiders as being capable of harming them in any way. The only threat is from their kin who might want to kill them through sorcery so as to inherit their wealth. Outsiders are considered to be incapable of having such ideas. The fishers who came into the fishery were, therefore, not viewed with hostility or suspicion by the Tonga. Incidences of violence towards these newcomers were few and isolated.

It should be noted that subsequent to the lifting of the communal management regime that had existed for the initial ten-year period, a centralised management regime through the Department of Fisheries took over. This was effective for as long as government funding to the department was adequate. As the country started experiencing an economic downturn from the mid-1970's, funding was gradually reduced and a 'de facto' open access regime began to emerge on the fishery. The reduction in funding to DoF led to the production of unreliable and inconsistent data on the fishery as there was insufficient personnel to record catches from scattered fishers. Shortage of personnel also led to an increase in the use of prohibited gear as monitoring and policing almost became non-existent. (See Table 1 below).

The down-grading of the role of chiefs and other traditional authority contributed to the setting up of fishing camps and villages anywhere on the shore-line (see Map below). These settlements were either temporal or permanent as fishers could set up camps wherever they felt they could maximise their harvest. These movements and settlements were done without permission from any authority, local or otherwise. As such, it was not possible to determine the exact number of fishermen operating on the lake at one particular time. Other criminal elements took advantage of this to engage in cross-border smuggling and poaching. Related to the above, is the lack of resources at the disposal of district councils. As state funding dwindled, councils were unable to make any meaningful investments into the fishery. Provision of social

services began to be neglected and councils were also unable to employ staff to collect levies from fishers and fish traders. In addition to these problems was the war of liberation in neighbouring Zimbabwe which forced DoF to officially 'close' the lake and also led to the destruction of infrastructure and disruption of settlements.

Table 1: Factors contributing to a near open-access regime



Adapted from: Chipungu, et al., "Management of the Lake Kariba Inshore Fisheries (Zambia): A Proposal," Project Report 32, (Zambia/Zimbabwe SADC Fisheries Project, Chilanga).

Among others, the problems mentioned above gave rise to a need to change the management of the lake as a way of reversing the declining living conditions of households dependent on the

fishery. It was also at a time of social political changes in the country such that traditional authority felt that they had to reassert their control over the fishery and those who used it. To achieve these objectives, the Department of Fisheries organised a workshop and invited most of the stake-holders. The workshop attracted about 60 participants. Of this number, eight represented the artisanal sector, ten were drawn from the traditional rulers and the rest represented government ministries, the council and Non-Governmental Organisations.

The problems in table 1 above were cited as the major hindrances to improved livelihoods by the various stakeholders at the workshop. It is worthy noting that of all the problems mentioned the status of the fish-stocks was not mentioned as a very urgent problem. It was only mentioned that the use of destructive gear would disrupt fishing. There was no reference to its present status and how it is to be re-allocated to the stakeholders. What it means therefore was that the introduction of co-management on the lake was driven more by a desire to reverse the breakdown in decision-making arrangements than the need to distribute the resource equitably to all stakeholders. It might be added that the grossing over of discussions on the stock has to do with the fact that reduction in catches is associated more with the biological nature of the lake and rainfall patterns in the catchment areas than use of illegal gear. (see table 2 in annex 1).

Co-management was suggested as being the effective management regime for the fishery. Local authorities, especially chiefs and their headmen were selected as the institutions through which co-management was to be achieved. Chiefs were asked to identify areas under their jurisdiction where permanent fishing villages were to be constructed. They were assisted by officials of the DoF who wanted to ascertain that the new settlements would not affect fish breeding areas. Commercial fishers also promised cash and material help in relocating the artisanal sector. It is important to note that commercial fishers gave the offer because they felt that the artisanal sector was responsible for most of their losses and if settled in permanent villages then it would be easy to control their movements.

The Process

The workshop resolved that for easy management, the lake-shore would have to be divided into four zones. Each zone falling under the jurisdiction of Chiefs' Mweemba, Sinazongwe, Chipepo and Simamba respectively. The zones were further subdivided into fishing villages. The zones are to be managed by the chief, representatives from the village committees, commercial fishermen, Non-governmental Organisations and people owning businesses within each particular zone. This is known as the Zonal

Fisheries Management Committees (ZFMC's). The ZFMC's are to be responsible for monitoring fishing practices and regulations as well as mobilising funds for development. They would also be responsible for arbitrating in issues brought up Fishing Village Management Committees (FVMC's) in their respective zones. The FVMC's which would comprise of a chiefs representative, in most cases a headman, and other elected members would be responsible for monitoring the day to day activities of the fishing village ranging from recommending new fishermen to be issued with licenses, assisting in enforcing fishing practices to sanitation. It was felt that involving fishers in day to day decision-making processes would make them appreciate the need to engage in good fishing practises thereby improving catches and subsequently their livelihoods.

All fishermen were told to move into new fishing villages and conduct their operations from there. Dual residency of fishing villages was abolished. In some instances, the new fishing villages were sited far from the old ones and fishing households were compelled to build new homes in the designated villages.

Discussion

With the introduction of co-management and the creation of new settlements on the lake a number of problems and conflicts between different users are emerging. Some of the problems arise out of ignorance of what the programme entails and others relate to differing views between different stake-holders.

Tonga vs Non-Tonga fishers

In some of the fishing villages in zones 3 and 4, most of those who have moved into the new camps at the time of the data-collection were non-Tonga fishers. Some of the Tonga interviewed claimed that they were not full-time fishers and as such saw no justification in moving from their permanent homes to go and live in fishing camps. However, the fishing village residents feel that the Tonga are fishermen as evidenced by their possession of fishing craft and gear. They contend that the Tonga do not want to move into the villages because they do not want to be bound by the new fishing regulations which will apply in the fishing villages and this is resented by some of the 'outsiders.'²⁷

It should be noted that the Tonga engage in more than one source of income as a guarantee against drought and famine which are prevalent in the area. Most of the non-Tonga fishermen have a hedge against such vagaries of nature as they invest most of their earnings in ventures located in urban or their home areas.²⁸ The Tonga should maintain their permanent homes where they can

continue to engage in agriculture and livestock- keeping. At the same time they should be allowed to set up structures in the new fishing villages from where they can be conducting their part-time fishing activities and observing the regulations related to the practice. Trying to create 'perfect full-time fishers' is impracticable without recourse to coercive mechanisms.

Island Owners vs Artisanal Fishers

As pointed out above, councils, in their bid to raise revenue, are now leasing islands on the lake as one way of earning additional funds. However, these islands were, before the introduction of co-management, temporal or permanent homes to most of the artisanal sector from which they conducted their operations. In some instances, ranchers have introduced game and opened up tourist ventures. However, there does not seem to be a well thought-out policy on the boundaries of these ranches and areas where artisanal fishers can conduct their activities. Incidences of artisanal fishers being shot at by the new 'owners' of these islands have been reported.²⁹ Artisanal sector feel betrayed that soon after moving from islands restrictions have been imposed on fishing. Some of the commercial fishers who also lease these islands contend that fishers steal their property and connive with traders and their (commercial operators) workers to steal Kapenta from the rigs.

There is consequently need to ban traders from buying their kapenta from islands as one way of reducing tension. The new

markets being created in the fishing camps should be used by traders to conduct their business. Additionally, the Fishing Village Management Committees should be able to monitor traders who come to their camp to buy fish or *kapenta*. Artisanal fishermen found with *kapenta* should be in possession of a licence to reduce suspicions that they steal it from operators.

As not all islands have been leased and given the claims of good catches by fishers, it should be possible to design a mechanism that would allow fishers to operate from these islands. This can be done by mandating the FVMC to keep a mutually agreed upon rotating roster which would allow fishers to operate from islands. This would eventually lead to accountability and reduce tensions between the two sectors.

The use of water surrounding islands should also be clearly defined. While artisanal fishermen are not allowed to operate about 50 meters from the leased islands,³⁰ tour operators are free to take their clients anywhere on the lake. This tends to go give an impression among the artisanal sector that the whole exercise is weighed heavily against them. This view is made more plausible by the fact that commercial fishers have assisted DoF in the form of fuel and other resources to resettle the artisanal fishers.

Artisanal vs Commercial

While commercial fishers maintain that they lose a lot of their property to artisanal sector, the converse is also true. Fishers lose their nets to rigs that drag them away. These nets are either torn apart, completely removed and in certain incidences sold by crews of kapenta rigs. Loss of nets is usually not compensated. A mechanism should be put in place to allow for speedy compensation where this is proved. Commercial fishers have also been accused of fishing in areas where the artisanal sector have been prohibited. Clearly defined areas of operation for each sector should be drawn up.

Department of Fisheries vs Artisanal Sector

One of the reasons for introducing co-management is to curb the rampant use of illegal methods of fishing. Artisanal fishers are not allowed to fish near the river estuaries and have also got to set their nets about 100 metres from the shore-line.³¹ Gill-nets of mesh size less than 76mm and monofilament nets of a mesh size of less than 120mm are banned.³² These regulations do not, however, address some of the problems faced by fishers and instead encourage non-compliance;

Firstly, during data collection most of the fishers said that fish go down rivers to breed in the rain season only. Using this knowledge they question the wisdom of banning them from fishing from estuaries all year round. The DoF should carry-out

research to exactly determine when fish breeds so that the rest of the period fishers can be allowed to fish.

Secondly, more than seventy percent of the craft on the lake are dug-out canoes. Those mounted with engines are largely used for transport. Given that lake Kariba is characterised by uncertain weather conditions, with storms starting suddenly and wind direction changing abruptly, it is risky to do one's fishing further from the shore in a dug-out canoe. A number of fishers have lost their lives on the lake through the use of such crafts. It is therefore prudent to relax this regulation until investments have been made into sea-worthy crafts.

Thirdly, the issue of mesh size needs to be addressed as well. Although it is recognised that the piece of legislation is aimed at protecting breeding and juvenile fish it, nevertheless, allows mature breeds of certain species to go unharvested. Small fish species such as Brown squeaker (*Synodontis zambezensis*) attract a good price on the market but under current legislation, they can go unharvested. The research department needs to come up with a mechanism that will allow for these species to be caught. Failure to do so can only lead to non-compliance of current regulations and increase conflicts.

Use of Fuel Wood

With the establishment of permanent villages, pressure on fuel-wood for domestic use, fish processing and agricultural land is bound to increase. The pressure will be increased by in-

migration and births. Although a re-afforestation programme was initiated under a GTZ project, the re-grouping exercise has meant that fishers moved to new villages and left their plantations in the old villages. Given the fragile nature of the soils in the valley, priority should also be given to an afforestation programme.

Broken Promises

In implementing a co-management regime it is essential to provide incentives that will convince stake-holders that in the long-run they stand to benefit from the new arrangement. As co-management initially involved the restructuring of settlement patterns, the incentives offered to the artisanal sector were related more to provision of social services than increased catches or improved fish prices. As social services are provided by other government agencies and not DoF, there has arisen a credibility gap between the artisanal sector and DoF. There is a feeling of disillusionment among the fishers as most of these social services have not been provided except in areas with effective Non-Governmental Organisations. Given the financial standing of the government and councils in particular, it would be far-fetched to suggest that schools and health care facilities would be provided in the near future. This frustration for broken promises is usually directed at the DoF as it is seen as the 'engine' behind the resettlement programme. It is recommended that institutions make clear their capability to provide the promised

services, otherwise the whole programme will be seen in negative light by the fishing communities.

Coordination

A number of institutions both government and quasi-government are currently engaged in a number of activities on the lake. These range from district councils, the police, Department of Wildlife, Ministry of Tourism, the DoF and Non-Governmental Organisations. With such a wide range of institutions there is need to create a Consultative Group through which different agendas can be harmonised. Such a group can meet to inform others of their activities and avoid duplication as well as confusion among the target group. Instances where the district councils invite police to evict fishers from islands and then the DoF is blamed for the affair can be avoided.

Zonal Committees vs Fishing Village Management Committees

The new co-management arrangement provides for the zonal committee to monitor the implementation of fishing regulations as well as mobilise funds for development. The FVMC are largely responsible for monitoring the day to day activities of the camps. However, membership of the zonal committees comprises of individuals who, in most cases, are not artisanal fishers but can pass policy that influences the activities of fishers. The FVMC's need to be strengthened and given powers to veto decisions passed

by the zonal committees. During data collection it was observed that most committee members at the FVMC level took arbitrary decisions, rarely held meetings and financial statements were not up to date indicating lack of management skills. Most members at this level perceive their role to be similar to that enjoyed by political officials during the one-party era. As it is at this level where the success or failure of co-management will be determined, more resources should be directed here. Members and non-members alike should be given managerial skills as well as teaching them their roles and responsibilities on co-management. The majority of Zonal Committee membership is composed of those with interests which are at variance with the artisanal sector.

Concluding Remarks

The paper has made an attempt to show the rationale behind the new concept of co-management on the northern shores of Lake Kariba. It showed that attempts by federal authorities to turn the Tonga into commercial fishers were largely unsuccessful. This was due to the fact that their mode of production was geared towards subsistence living rather than producing for profits. The departure of the Tonga, and the decline of traditional authority in the post colonial era led to a 'de facto' open-access regime emerging on the lake. This was made worse by reduced government

funding to its agents on the lake. However, there is a possibility that the Tonga will yet again take up fishing in a much more serious manner. This is because the soils are increasingly getting degraded and will not support increased cultivation. The decline in traditional beliefs as a result of churches and education might give an added impetus for them to take up fishing. This might add another dimension to the Tonga and 'outsiders' perception of who owns the resources on the lake.

The concept of co-management was initiated as a mechanism to involve users in the management of the lake. However, a number of issues still need to be addressed; Is the creation of permanent settlements going to reverse the decline in catches given the fact that fishermen originally left their permanent villages in search of better fishing grounds? Do non-Tonga fishers identify themselves with the new structures under the leadership of Tonga traditional authority? Does the current socio-political situation in the country favour decentralisation of authority to local and traditional institutions? Answers to these and other questions will be the focus of a forthcoming paper.



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