Fisheries co -management in the Tanzanian sector of Lake Victoria

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Abstract: For a long time, the Tanzanian Fisheries Department has managed Tanzanian fisheries without incorporating other stakeholders within its management framework. On Lake Victoria, the persistent use of illegal fishing gear and other fishing malpractices have led the government to realise that the traditional 'command and control' system of fisheries management may no longer be viable. Conflicts amongst resource users and declining catches have also contributed towards the realisation that changes to managerial attitudes and policy strategies are needed within the sector. One option to consider is the inclusion of fishing communities in the management of the lake's resources.

One possible vehicle for achieving this is through 'co-management', which, in part, involves giving responsibility and authority to local communities to manage their own resources. It is more a flexible means of management whereby communities tend to adjust and mature to changing situations, and allows these to be taken aboard for management consideration, enabling alternatives to be incorporated. It is a management system involving partnership between the state and communities, and hence will create legitimacy and respect between the stakeholders involved.

This paper sets out to consider some of these co-managerial concepts, drawing on the results of a survey carried out on the Tanzanian shores of Lake Victoria in mid-1999. 334 fishers, 6 factory owners and 7 Fisheries Department officials were interviewed. The analysis that follows uses accepted research criteria to examine the basis for the evolution and persistence of community-level managerial institutions within this fishery. In addition, the research explores ways in which co-management might be applied to Tanzania's Lake Victoria fishery.

Introduction

In Tanzania's Lake Victoria fishery in the early 1990s, nascent populations of the introduced Nile perch exploded. Catches of the fish grew from 15 tonnes in 1978 to 103,481 in 1995 (Unpublished Fisheries Division statistics). In 1992, responding to foreign market demand, industrial Nile perch filleting factories were established in Mwanza and elsewhere along the lake shore.

Soaring demand and plentiful supplies prompted considerable effort increases in the Tanzanian sector of the lake, and the number of boats in the fishery grew by 57 per cent, from 3,398 units in 1978, to 7,953 units in 1995 (Unpublished Fisheries Division statistics). Concomitant competition was intense, and as it grew, the level of net and boat theft on the lake also increased. Some fishing communities attempted to involve local vigilante groups *(sungusungu),* in an attempt to curb gear theft. Fish filleting factories were not unaffected by these theft increases as many had invested heavily in harvesting power, providing loans, equipment and boats to fishers.

The use of illegal gear also increased for a number of reasons, including market forces, poverty, falling incomes and corruption. The growing demand of the fish export markets encouraged local communities to adopt illegal gear and to catch juveniles which had ready markets both amongst fish filleting factories and local communities. High demand also fuelled intense fishing pressure, which caused the quality of catches to decline, and resulting in the intermittent closure of foreign markets to Tanzanian Lake Victoria fish.

As a result of both increasing theft and grave concerns over the quality of fish landed, efforts to reform the dominant, top-down managerial approach of the Tanzanian fisheries authorities were spearheaded by industrial processing plants who set about trying to develop a managerial system that would involve the Fisheries Department and fisher-folk in a co-managerial arrangement.

Fisheries management has traditionally sought to ensure that fish populations are sustained for the benefit of the fishing communities which rely on them or for the sake of biodiversity concerns. Many of the traditional systems designed to obtain this objective have not worked (cf. Crean and Symes, 1996), with the result that alternative management strategies have been considered. One of these is co-management.

Pomeroy, (1998:71) defined co-management as a partnership arrangement in which government agencies, the community of local resource users (fishers), non-governmental organisations (NGOs), and other stakeholders (fish traders, boat owners, business people) share responsibility and authority for the management of a fishery. Pomeroy noted that multiple tasks might be managed under the co-management arrangements at different stages in the management process. These may include adjusting and maturing to changing conditions over time and involving aspects such as democratisation, social empowerment, power sharing and decentralisation.

According to Pomeroy, co-management should be not be viewed as a single management strategy and there is no single model of co-management. Co-management is not a regulatory technique but should be seen as a flexible management structure in which action in participation, rule-making, conflict management, power-sharing, leadership, dialogue, decision-making, knowledge generation and sharing, learning, and development among resource users, and stakeholders and government is provided and maintained (Pomeroy, 1998:72).

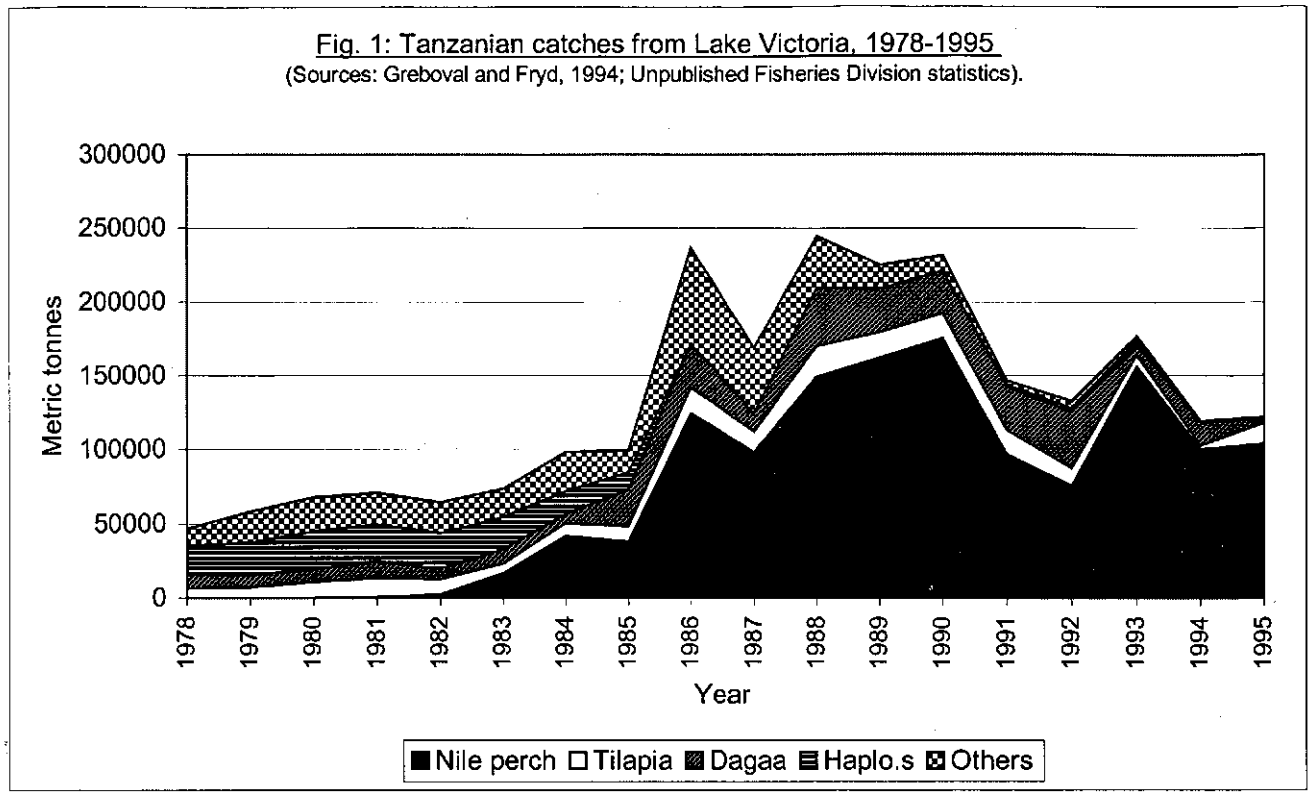
Co-management is often taken to be an arrangement in which fishing communities play an active and possibly dominant role in the regulation of the fisheries that they exploit, in conjunction with the state fisheries departments. Co-management may also include additional stakeholder groups, such as fish processing factories, NGOs, community based organisations, fishers and fish traders, youth groups, co-operative societies and other interested parties.

In recent years, there have been signs of declines in the volume of Tanzania's Lake Victorian fish landings (see Mkumbo, 2000 and Figure 1), and hence new management measures are necessary for the fishery. The Tanzanian Fisheries Department is aware of co-management, and has approached the restructuring of their regulatory systems through the establishment, in 1999, of Beach Management Units (BMUs), community elected committees who are mandated to implement and enforce Tanzanian fisheries legislation. This initiative is a far cry from Pomeroy's (1998) understanding of co-management in that it represents the imposition of fisheries management measures by the state upon fishing communities, and is by no means a negotiated outcome.

This paper presents recently collected data on Tanzania's Lake Victoria fishery and examines these using criteria for 'institutional robustness' as presented by Ostrom (1990). The paper cautions that although the data meet these criteria to greater or lesser degrees, it does not necessarily follow that convergence with the criteria automatically translates into the management of the fishery. The paper draws on recent experiences within the fishery - particularly the creation of BMUs and the activities of *sungusungu* groups - to argue this point, and concludes that the failure to create horizontal managerial linkages, combined with a devolution of managerial powers to local levels, may contribute to the inefficiency of the BMUs to combat declining fish yields.

The data on which this paper is based were collected between July and September 1999 from 28 fishing communities along the Tanzanian coastline of Lake Victoria,[1] selected using a stratified sampling format. A total of 334 structured interviews were administered to fishers directly involved in fish harvesting.

[1] **Mwisenge, Bwai, Kome and Nyarusulya (Musoma Rural District), Jua Kali and Kinesi (Tarime District), Kisorya and Kibara (Bunda District), Malelema Island and Bugolala (Ukerewe District), Lamadi and Ihale (Magu District), Igombe and Butuji (Mwanza Urban District), Chole and Mitego (Misungwi District), Buyagu and Chimfufu (Sengerema District),**



This data base is published in SEDAWOG, 2000a. Additional data is drawn from secondary sources, subsequent Participatory Rural Appraisals (SEDAWOG, 2000b), and observations. The paper commences by discussing fishers' perspectives on the state of their resource, and then goes on to discuss the remaining data with reference to criteria for institutional 'robustness' (durability) laid down by Ostrom (1990).

Community perceptions of resource status and awareness of laws and regulations

There is a fairly high degree of unanimity amongst Tanzanian fishers over a series of indicators used to gauge their impressions concerning the well-being of the resource base on which they rely (Table 1). Generally, there was strong support for the view that there was less fish now in 1999 than there was in 1994 (84%), that fishing trips were longer because fishers had to go further to catch fish (81%), that fish diversity had declined (82%) that the number of boats had increased during the period (65%) and that fishing incomes had declined (77%). There were only small majorities for the notions that the average size of fish had declined (54%) and that there was more illegal gear use in 1999 than there was in 1994 (54%: SEDAWOG 2000a).

Fishers were divided over the reasons for these resource declines. The largest proportion (31%) agreed that it was because excessive effort levels, followed by those who attributed them to either water hyacinth infestation[2] or pollution (24%) and the disobedience of regulations (21%).

[2] **Water hyacinth invaded this lake via the Kagera River in the 1980s. It forms large, dense mats that cover inland fishing areas and impedes access to landing sites. It has only recently been brought under control with the use of introduced weevils that interfere with the plant's ability to breed.**

Resource condition	Agree	Disagree	Not sure	Totals
There is less fish now than 5 yrs. ago	280 (84%)	43 (13%)	9 (3%)	332
Fishing trips are longer now than 5 yrs. ago	268 (81%)	54 (16%)	10 (3%)	332
There is less fish diversity now than 5 yrs. ago	271 (82%)	54 (16%)	7 (2%)	332
There are more boats now than 5 yrs. ago	215 (65%)	104 (31%)	13 (4%)	332
Average size of fish landed now smaller than 5 yrs. ago	179 (54%)	128 (38%)	26 (8%)	333
More illegal fishing techniques now than 5 yrs. ago	178 (54%)	128 (38%)	26 (8%)	332
Fishing pays less now than it did 5 yrs. ago	254 (77%)	67 (20%)	8 (2%)	329

Table 1: **Respondents' level of agreement to statements concerning fisheries resource change** by **target fish species** **(Percentages provided are out of response totals: source: SEDAWOG, 2000a).**

As for why the use of illegal fishing gear should have spread, 61% of Tanzanian fishers agreed that no fish would be caught unless small mesh-sizes were used, 61% said that small mesh-sizes were cheaper than those stipulated in the regulations, while 84% of respondents *disagreed* that illegal gear use had escalated because of the Fisheries Department's failure to enforce regulations.

The belief that the role of the state in Tanzania's Lake Victorian fisheries management is essentially a good thing was reiterated elsewhere in questioning. 53% of respondents *disagreed* that state regulations were 'no good', 68% said that people obeyed these regulations, 57% of respondents characterised their relationship with the Fisheries Department as 'good', and, finally, 61% *disagreed* that the Fisheries Department was not doing well protecting fish stocks.

What the above figures suggest is that while Tanzanian fishers by and large agree that fundamental deleterious trends have affected the fish stocks on which they rely, there is not necessarily a causal relationship between these trends and Fisheries Department shortcomings.

86% (n=333) of respondents knew what the minimum mesh size for gill nets was, and the majority were aware of all of the main regulations in force in the Tanzanian sector of the lake (Table 2). Typically, they considered these regulations to be effective. Again, this implies that respondents do not necessarily see a causal relationship between the failure of Tanzania's fisheries regulations and a declining resource base. There is indeed, some doubt that the detrimental trends indicated in Table 1 are necessarily viewed as serious problems. When asked what the single worst problem on the lake was, respondents were divided, and there was no majority for any of the problems mentioned. Only 11% of respondents felt that excessive effort was a problem, just 12% ranked declining catches as the main problem, while the largest proportion of respondents (29%) rated illegal gear use as the worst problem on the lake.

Regulation	Unaware	Effective	Useless	Totals
Mesh-size controls	12 (4%)	295 (88%)	26 (8%)	333
Closed seasons	80 (24%)	231 (69%)	23 (7%)	334
Poison ban	20 (6%)	307 (92%)	7 (2%)	334
Trawling ban	61 (18%)	262 (79%)	9 (3%)	332
Minimum fish size	31 (9%)	291 (87%)	11 (4%)	333
Licensing	14 (4%)	308 (92%)	12 (4%)	334
Boat registration	18 (5%)	308 (92%)	8 (2%)	334
Closed areas	102 (31%)	215 (64%)	16 (5%)	333

How fishers view their resource base and, by extension, how they use it is, in many respects, determined by the institutions in which they are a component. In the remainder of this paper, we consider Tanzania's Lake Victoria fishery from the perspective of a series of criteria proposed by Ostrom (1990), and consider the ways in which these may help us to understand how this resource base is managed, and how these factors impinge on the future success of the recently introduced BMUs.

The Ostrom criteria and their application to Tanzania's Lake Victoria fishery

The criteria identified by Ostrom (1990: 90; Dustin Becker and Ostrom, 1995) are as follows:

(a) clearly defined boundaries: individuals or households who have rights to withdraw resource units from the Common Property Resource (CPR) must be clearly defined, as must the boundaries of the resource itself.
(b) Congruence between appropriation and provision rules and local conditions: appropriation rules restricting time, place, technology and/or quantity of resource units are related to local conditions and to provision rules requiring labour, material and/or money.
(c) Collective-choice arrangements: most of those affected by the rules of protection and harvesting are included in the group that has the authority to alter these rules.
(d) Monitoring: designated monitors who keep an eye on both what the physical system is up to as well as its users, are, at least in part, accountable to the users of the CPR, or are the users themselves.
(e) Graduated sanctions: those users that violate the rules will have sanctions imposed on them, that graduate with the severity of the infringement, by either other users or else officials who are accountable to the users.
(f) Conflict-resolution mechanisms: users and their officials have rapid access to low-cost, local arenas to resolve conflicts between users or between officials and users.
(g) Minimal recognition of rights to organise: the rights of users to organise must be recognised by central government, as well as the long-term rights of the users to the resource.
(h) Nested enterprises: all activities associated with the regulation of the resource are nested in 'multi-layered nested enterprises'. In other words, local institutions ought to be nested in a broader framework of medium- and larger-scale institutions - such as Fisheries Departments - so that the system as a whole can deal with both local problems as well as larger ones.

Each of the above are considered in turn.

Clearly defined boundaries

There is no wide-spread tradition in Tanzania for the demarcation of fishing areas associated with particular groups of fishing communities; nor are there strong identifiable local institutions that control access or exploitation strategies other than Fisheries Department. It is apparent that community-based controls do not exert a strong influence over the management of the fishery. In recent years, 'Beach Management Units' (BMUs) have been established at Tanzanian Lake Victoria landing sites. These are staffed by beach committees elected from the local community, and have the express aim of implementing and enforcing government fisheries regulations (Hoza and Mahatane, 1997). The Tanzanian Fisheries Department believes that this approach will lead to an appropriate government-local community apparatus to enhance user-centred management.

Ostrom (1990: 91), however, notes that "[s]o long as the boundaries of the resource and/or the specification of individuals who can use the resource remain uncertain, no one knows what is being managed or for whom" (Ostrom, 1990: 91). In the absence of boundaries, furthermore, enables 'foreign' interests to exploit the fisheries

The use of boundaries in the formal management of Tanzania's Lake Victoria fisheries, however, is not entirely new. Before the ban on commercial trawling in Tanzania, fisheries agencies identified areas for trawling. This, to some extent, lessened the conflict between artisanal fishers and commercial fishers over gear entanglement. Negotiations were undertaken to plan a specific time for trawler departure so as to minimise the potential for conflict, and allowed alternative marketing schedules to evolve. Here, artisanal fishers, who were vulnerable and prone to fish spoilage, sold their catch early in the morning, while the trawlers sold their catch in the evening. This arrangement helped, to some extent, to reduce many conflicts, which could have resulted in substantial losses to artisanal fishers.

Boundaries are also used elsewhere in Tanzania's fisheries legislation, which stipulate that 23 bays and inlets are closed to fishing for half the year in order to protect spawning fish (United Republic of Tanzania, 1981). Fishing and farming communities feel that this period is too long, and not compatible with alternative economic opportunities such as trading. During the closed season (January 1st to June 30th) farming activities peak, trading activities are minimal because the farming harvest has yet to be reaped, and fishing is the only dependable economic activity for immediate income generation. While our respondents rated the efficacy of Tanzanian fisheries regulations fairly high, closed seasons and areas, however, were considered the least effective regulations (possibly because they are not applied uniformly across the fishery). 48% and 42% of respondents respectively said that closed areas and seasons did not operate in their areas.

Following the ban on trawler fishing, conflicts remain, such as those between users of different gear types (e.g. gill nets and beach seines), and between artisanal fishers and those sponsored by industrial fish processing factories. These areas of friction between user groups could provide a focus on which to build boundary-based regulations. Another possible foundation for such types of regulation might fish nurseries. Wilson (1993) indicates that Tanzanian fishers, while keen to promote the notion that they would never fish in a fish nursery, were often unable to identify where these were located. In this survey, fishers were asked if there were places on the lake where they would not fish, and of the 190 who said there were, 48% identified fish nurseries, followed by 40% who identified closed areas (which were often regarded as synonymous with fish breeding areas). The fact that fishers may well not know where such areas are located, but still announce their reluctance to fish in them, may be an expression of their moral belief that such places should not be fished, irrespective of whether or not they know where these are (Geheb and Crean, 2000). In view of this moral expression, the designation of areas as fish breeding areas may be a route by which boundary-based regulations can be introduced into this fishery.

The political boundaries that currently exist in Tanzania are national boundaries traversing the lake, regional, district, divisional, ward, village and village-cell boundaries. In many respects, respondents interviewed for this survey did not view these boundaries as anything but administrative. 90% of respondents said that they would fish in same place as fishers from other communities (n=333); 86% said that the water adjacent to their communities belonged to the government, followed by 11% who said that it belonged either to everyone on no one (n=334); 97% said that anyone could fish the water adjacent to their communities (n=334), while 80% said that their beaches were owned by the government (n=333).

In some respects, these latter perspectives may have arisen because resources are regarded as shared, a concept promulgated in Tanzania's *'ujamaa'* philosophies. 76% of our respondents felt that restricting the number of fishers, boats and/or nets on the lake was not a viable way forward for fisheries management (n=333). Wilson *et al.* (1996: 13) suggest that this is because "[o]ne strong belief is that any Tanzanian has a right to fish in Lake Victoria...This commitment to open access stems from their own desire to freely follow the fish, prices, and security". Therefore, although fishers may agree that there is a relationship between effort levels and catch declines, in their minds this is not sufficient grounds to establish boundaries that restrict their movements nor

The ethnic groups that share Tanzania's Lake Victoria fishery were not always unanimous when it came to territorial claims over water. The majority of Kuria, Haya, Karewe and Munyita respondents interviewed felt that their fishing communities should be allowed to claim water territories, while 48% of Sukuma respondents did not agree that fishing communities should have this right. This may be because of the concentration of fish processing factories in Sukuma dominated areas of the shoreline, and a reflection of Sukuma concerns that communities holding rights over water might in some way hinder their fishing activities. 62% of Sukuma respondents also disagreed that fishing communities should be allowed to determine who could or could not fish, while Munyita, Karewe and Haya respondents, less affected by the Nile perch trade, agreed that fishing communities should have this right.

These data, however, did indicate that in other ways, fishers do perceive that boundaries occur on Lake Victoria. When asked what would happen if they fished in another community's waters without first obtaining permission, 31% believed that they would be chased away, while 19% believed that they would be seized and punished. An almost equal proportion (46%) said that nothing would happen (n=333). When questioned about future directions for management, just over half of our respondents said that they thought that fishing communities should be allowed to claim water territories (57%; n=333), and that fishing communities should be allowed to say who could or could not fish (51%; n=333). Only 8% of respondents said that an outsider would not need permission to fish from their landing sites.

These latter perspectives, along with the discussion above on a reluctance to see regulations that limits effort or movement, are not without recent controversy, however, which voice concerns about 'foreigners' being allowed to fish on the lake. This worry has grown as a result of the view that the Nile perch fishery and its attendant wealth, in some cases, denies local communities to share in the benefits equally. At many landing sites, Nile perch filleting factories have established camps of fishers, for whom they pay license fees and provide gear. This results in a skewed distribution of wealth at these landings, which many of the original inhabitants resent. In addition, outsiders are often perceived as ruining local culture and values, and, typically, the use of illegal fishing gear and poison is attributed only to outsiders. Conversely, however, Medard (1999) reports that fishing communities may also welcome outsiders as sources of knowledge and experience from beyond the community.

Ostrom's (1990) call for clearly defined boundaries containing clearly defined actors, is ambiguous in the case of Tanzania's Lake Victoria fisheries. The degree and desire for boundary applications appears to depend on social-political and economic variables, all of which contribute to multi-layered perspectives on how boundaries should be applied and whom they should affect (Geheb and Crean, 2000).

There exists, nonetheless, a basis upon which boundary-based regulations may be applied to Tanzania's Lake Victoria fisheries. These may be founded upon physical manifestations, such as fish nurseries, or on social premises, such as fishers' prescriptions that permission must be sought before fishing from a beach, or the desire to claim water territories. These directions must, however, also have definition based upon membership and, indeed, the size of the groups to be involved.

Congruence between appropriation and provision rules and local conditions

Respondents interviewed for this survey were questioned about the presence, at their landing sites, of fishing rules that were designed by the community itself and not the state. Respondents were allowed two answers, and a total of 345 responses were generated (Table 3).

District	When to fish	Methods/gear	Others	No rules	Totals
Tarime	-	5	2	15	22
Musoma Urban	1	1	3	17	22
Musoma Rural	-	6	6	14	26
Bunda	1	5	3	18	27
Mwanza	-	-	3	17	20
Mwisungwi	2	8	7	10	27
Geita	-	9	8	8	25
Sengerema	-	7	5	12	24
Magu	1	4	7	13	25
Ukerewe	1	4	6	13	24
Bukoba Urban	-	3	5	15	23
Bukoba Rural	-	5	7	11	23
Muleba	3	3	6	13	25
Biharamolo	9	10	7	6	32
Totals	18 (5%)	70 (20%)	76 (22%)	182 (53%)	345

Table 3: Presence of community-developed fishing rules per lake-side district (Source: Sedawog, 2000a)

Just over half of those interviewed (53%) said that they had no rules of these varieties on their landing sites. Such kinds of rules were least common in Bunda, Mwanza and Musoma Urban Districts, while they were most common in Biharamolo, Mwisungwi and Geita Districts. Where these rules were said to exist, the largest proportion were restrictions on fishing methods and/or gear, probably poison restrictions given that this survey occurred during a ban of fish exports as a result of the high incidence of fish poisoning on the lake.

This 'patchy' distribution of community rules is indicative of the variety of cultural backgrounds in the fishery, and probably also linked to whether or not the district is urban or rural in character. Other factors such as the presence of Fisheries Department staff at the landing, and access to the landing, probably also determines whether or not such rules are present.

An additional, and important, factor that probably contributes to the presence or absence of community-based rules at landing sites is the degree of government influence at the landing site. The assumption here is that the greater the prevalence of state-based rules at the landing sites, the less likely there will be community-derived rules. The history of *'ujamaa'* policies in Tanzania and their concomitant grouping of populations into villages, and the presence of attendant government organisation at the lowest possible level, means that Ward and Village Executive Officers exist at virtually every landing site in Tanzania. At the time of this survey, the establishment of Beach Management Units (BMUs) at every Tanzanian landing site was not complete. The latter follow the same format as other government instigated village-level organisation in Tanzania in that there is the expectation that community members will enforce government legislation *irrespective of whether or not these are congruent with community perceptions and ideas.*

It is likely that this is the case at Tanzanian landing sites, and, if so, this presents a series of problems. In Tanzania, those communities that are excessively reliant on fishing, with few alternative livelihood sources, will be unlikely to diversify into other livelihood sectors. Shortage of rains, persistent drought, unpredictable markets for cash crops, such as coffee and cotton, have all served to attract people into the fishery and not *vice versa*. The attraction of the fishery remains high, particularly given that domestic and foreign markets for fish

The needs and requirements of fishing communities as defined by these kinds of environmental conditions are probably not congruent with state regulations that necessarily demand some measure of conservationism. There are other ways in which the state rules diverge from local livelihood conditions. Restrictions setting the minimum mesh-size for gill nets at 127 mm. ensure that, at a stroke, fishers targeting Haplochromis species are illegal fishers. *Dagaa* nets, in Tanzania's fisheries legislation, may not be smaller than 10-mm. mesh-size. Fishers at Kibuye beach, however, complain that this mesh-size is too large for *dagaa.* The fish can either escape the net; or else they get stuck in it. Given that a haul of *dagaa* comprises several thousand fish, removing each and every one of them is extremely tedious. Market conditions can also ensure that fishers are criminalised: at Ihale Beach in Magu District, for example, fishers claimed that the trucks from the fish filleting factories typically wanted Nile perch caught in nets of between 63-114 mm. (SEDAWOG, 2000b).

Therefore, rules restricting gear must also consider provisions for materials and money to enable fishers to change to legally endorsed gear. If certain expensive gears are banned, and fishers are not adequately compensated, then they will be unlikely to obey the regulations.

Co-management should be a middle course between state level concerns for the efficient and equitable management of fisheries and local level concerns for self-governance, self-regulation and active participation. (Pomeroy, 1998). Such systems need to be sufficiently dynamic if they are to cope with the changing socio-economic environment in which community's face. As Watson (1989: 55) comments, "[environmental and social problems may be created if the development of resource management systems does not keep pace with environmental and economic conditions in less developed countries". As a result, a degree of congruence between state managerial objectives and community livelihood objectives, if managerial institutions are to be established and maintained. The inclusion of communities of resource users in the management of their resources may, to some extent, ameliorate the divergence of the state and communities. The Tanzanian fisheries administration must begin to focus more explicitly on this transition towards making resources-users partners in its agenda. This is not easy, as there are many who support a centralised system of fisheries administration, and find demands for partnerships with fishing communities a threat to this power base.

Collective choice arrangements

Fisheries managers increasingly recognise that a fishery cannot be managed effectively without the co-operation and participation of fishers to make laws and regulations work (Geheb 1999; Ikiara, 1999; Pomeroy and Berkes 1997; Wilson and Medard, 1998). Co-management systems have emerged as a partnership arrangement using the capacities and interests of local fishers and communities, complemented by the ability of the government to provide enabling legislation, enforcement and conflict resolution and other assistance.

Ostrom (1990) reasons that insofar as community participation in these types of arrangements are concerned, it is necessary that that those affected by resource management rules are amongst those who have the power to alter these same rules. Of necessity, this section overlaps with the previous one is many respects, and it is sufficient here to say that Tanzanian fishing communities hold no jurisdiction over fisheries legislation beyond that granted them by the BMU system. Nor do they the right to change it.

In some respects, however, Tanzanian fishing communities may not be ready for such radical changes to the structure of fisheries legislation. Table 4 summarises responses to six questions posed on scenarios that may be suitable avenues for regulatory change. Those that involve the state typically obtain strong support, such as having Fisheries Department personnel stationed on every beach, or having the government take fishing regulations more seriously. Those suggestions which involve greater community participation are treated cautiously, such as communities being allowed to say who can and who cannot fish, or being allowed to claim

Action to be taken	Agree	Disagree	Not sure	Totals
The government and the fishing communities should take the regulations more seriously	311 (93%)	19 (6%)	3 (1%)	333
No more fishers/boats/nets should be allowed on the lake	73 (22%)	255 (76%)	5 (2%)	333
Fishing communities should be allowed to say who can or cannot fish	171 (51%)	152 (46%)	10 (3%)	333
Fishing communities should be allowed to claim water territories	189 (57%)	143 (43%)	1 (-)	333
Fishing communities should be allowed to punish offenders	302 (91%)	27 (8%)	3 (1%)	332
Fisheries Department personnel should be stationed on each and every beach	297 (89%)	35 (11%)	1 (-)	333

Table 4: Respondent's reactions to proposed managerial directions (Source: SEDAWOG, 2000a).

Interestingly, the suggestion that communities should be allowed to punish offenders received considerable support, possibly because of communities' experience with *'sungusungu'* vigilante groups, which have powers of arrest and punishment. These findings would appear to support those of Wilson *et al's* (1999: 567) who comment that, in Tanzania, "[f]ormal state participation is seen as necessary for any fisheries management even at the most local level".

There is little doubt that Nile perch filleting factories in Tanzania enjoy a good relationship with the state. Their powerful producer's organisation is well placed to negotiate for favourable treatment from the state and, as Medford (2000) noted, fishers dealing with species other than the Nile perch blame the government for favouring Nile perch fishers at the behest of the filleting factories which, they say, can override the state.

The Nile perch filleting factories, therefore, are critically placed at the junction between the state's demands for foreign exchange earnings and the sustainability of Lake Victoria's Nile perch stocks. While fishing communities on the lake may well envy this pivotal role within the fishery, and lament their inability to plan for long-term futures, there is a need for caution. It is by no means clear that a strong bargaining position vis a vis the state will necessarily result in a sustainable outcome. As mentioned earlier, many of the factories in Tanzania serve clients who demand fish captured in nets below the 127 mm. minimum gill-net mesh-size. For management partnerships to be viable managerial tools for the lake, it is necessary that the state's role include that of moderation, minimising the excesses of both industrial and artisanal fishers for the sake of the sustained productivity of the lake.

There is nothing 'collective' about present managerial structures in Tanzania. At the same time, however, it must be borne in mind that Tanzanian fishing communities view the state as an integral component in fisheries management, and data reported above, and elsewhere in this paper, suggest that fishing communities do not have, at present, any desire to embark upon the management of their fisheries by themselves. This very characteristic should provide a fruitful basis upon which co-management can be established. In some respects, the discussion in this section indicates that the role of the state within co-management could be defined as a moderating influence, ensuring that there is a balance between the most liberal of community livelihood demands and the most conservative of fisheries management objectives.

Monitoring

respondents said that when they went fishing, it was always with the same fishers (n=333). The places Tanzanian Lake Victoria fishers fish are typically shared: 91% of respondents said that they would fish in areas alongside fishers from other communities. Whether the latter are known or not is unknown.

The above results suggest that there is often a sufficiently high degree of familiarity between fishers that the presence of outsiders can be noted, as could the infringement of fishing regulations. As indicated above, however, the question of whether or not fishers are prepared to accept the task of monitoring is by no means clear.

Respondents were asked to whom they would first complain in the event that they had a fisheries-related problem. The largest proportion (41%) said that they would first complain to the Fisheries Department representative, followed by 27% who would complain to their beach leaders (n=333). Fishers were then asked: if one fisher were to accuse another of stealing nets, who would solve the conflict? 35% said that a government representative (including the Fisheries Department) would solve it, followed by 34% who thought the police could deal with it (n=334). In the event that one community were to accuse another of stealing its nets, 45% said that the police would be looked to provide a solution, followed by 32% who said that government help would be sought (n=334).

The above data suggest, again, a certain reticence amongst respondents for assuming, wholesale, conflict resolution responsibilities, and, by extension, monitoring responsibilities. It is possible that respondents did not see any real distinction between the state and their communities, and therefore they feel that talking about state responsibilities does not contradict talking about community-level responsibility. With government representatives present at local levels, social and administrative intercourse occurs at a similarly intimate level. The presence of Village Executive Officers and the recently formed Beach Management Units (BMUs) at Tanzanian landing sites also imply that that which is observed and monitored by the village is also monitored by the state.

Because the line between the community and the state is blurred, therefore, it is difficult to differentiate responsibilities between either, and one may expect that notions of the community assuming state monitoring responsibilities may be greeted with some confusion by Tanzanian fishing communities who believe that they already perform this role.

The intimacy that Tanzanian fishers share with their resource base and their own communities suggests a basis upon which a monitoring system can be implemented. Fishers know of new arrivals to their communities, about others who pass through the waters that they fish, and of variations within the resource base which may compel them to migrate. The this body of knowledge could imply that there is every reason to expect the BMU system to work, given its emphasis on monitoring the activities of fishers, which the BMUs are supposed to log (Hoza and Mahatane, 1998). Like much political power, that wielded by the BMUs is discretionary. As we shall argue below, many of the externally sourced administration systems introduced to communities in Tanzania become socialised, and probably deviate from the objectives they were intended. The BMUs will be subject to the normal stresses and strains that any administrative system within a tight knit community may be subjected to, implorations for leniency, patronage relationships between fishers and boat or gear owners, and the social network that defines social relationships and the acceptable extent of administrative action. Herein lies the potential for the BMUs to fail, for while they may well be successful in the sense that they become socialised and accepted by fishing communities, they may well end up serving community livelihood objectives, paying lip service to the Fisheries Department as need be, and deviating away from fisheries management objectives.

Graduated sanctions

Environmental problems cannot be solved through cooperation if the coercive power inherent in the cooperative pact is overwhelming (Ostrom, 1990). In such a situation, voluntary compliance is non-existent. In Tanzania, the government, through the Fisheries Department, assumes monitoring and sanctioning responsibilities over fishing activities. So far, the activities of Beach Management Units (BMUs) are directed by the Fisheries Department and do not reflect local conditions. Anything to do with the possession of under-sized mesh nets, beach seines, and other illegal fishing gear is normally referred to the Fisheries Department. The curbing of fishing with poisons, maintaining hygiene for fish quality control, supervising the use of legal gear, and the control of fishing in fish breeding grounds, are all activities undertaken by the BMUs in their capacity as representatives of the Fisheries Department (SEDAWOG, 2000b).

During a recent study at Ihale, when asked about local institutions and responsibilities, the BMU explained that the main way of enforcing compliance at this landing was through the imposition of fines. Fines are not levied against those that surrender their illegal gear voluntarily (SEDAWOG, 2000b). Presumably such fines are graduated, with minor offences being minimally fined, and graver offences being heavily fined or referred to authorities beyond Ihale.

At Shadi village, a Sukuma community, extreme offences, such as the use of fish poison, result in offenders being socially excommunicated by the communities (Medard, 2000). Following discovery of the offence, the village Chairman calls a village meeting and announces the name of offender and the offence. This action is known as *'kuturijiwa'*. After being condemned, the offender can no longer speak with villagers, and looking to borrow matches, salt or sugar from neighbours will no longer occur. The offender can no longer shop from village stores, nor use village facilities such as the health clinic. If there is a burial at the offender's home, the village will gather to witness the burial itself, but will not stay to mourn, and will make no contributions towards funeral expenses, as is common. If the offender dies, s/he will not be mourned by the village, this being left to his/her relatives (Medard, 2000).

At another village, Chimfufu, elders explained that this type of 'excommunication' from the village is the most drastic form of punishment that can be brought to bear on an offender (Medard, 2000). In Chimfufu, it was explained, offenders are liable to receive such a punishment, but, depending on the severity of the offence, the offender can seek a re-trial. A village meeting will then be announced, and the village will dictate to him/her a fine that must be paid. The fine is largely symbolic of the offender's reconciliation with the community and a public admission by the offender that a wrong has been committed. The fine is paid to the *'mtemi',* the chairperson of a village vigilante group, the *'sungusungu'* that will be explored further below.

The above type of 'informally' imposed sanctions will vary in format and from community to community. They are typically pliable and capable of changing to match the severity and frequency of offences. The degree to which such styles of sanctioning are applied will depend on the strength and policies of the village leadership. In some cases, village leaders relax this style of sanctioning preferring to refer offences to government courts of law. Elders at Chimfufu noted that as village members interacted more and more with outsiders, then so too their own internal systems of justice have become weakened and criticised for not recognising the authority of government sanctioning systems (Medard, 2000).

As the BMUs become established within Tanzanian fishing communities, the fishing regulations of the state have assumed a considerable presence at landing sites. The extent to which these are actually rigidly interpreted and applied is, however, uncertain. As argued earlier, it is probable that as these rules become absorbed into fishing communities and, in effect, socialised, each offence will be judged along the lines of community

Conflict resolution mechanisms

Above, we presented data on to whom fishers would complain given certain problems. To recap: in the event of a fisheries-related problem, 41% said that they would first complain to the Fisheries Department representative, followed by 27% who would complain to their beach leaders. If one fisher were to accuse another of stealing his/her nets, 35% respondents said that a government representative (including the Fisheries Department) would solve the dispute, followed by 34% who thought the police could deal with it (n=334). In the event that one community were to accuse another of stealing its nets, 45% said that the police would be looked to provide a solution, followed by 32% who said that government help would be sought (n=334) (Table 5).

Source of conflict solution	Frequency
If you had problems in the fishery, to whom would you complain first?	
Fellow fishers	26 (8%)
Fisheries Dept. representative	136 (41%)
Beach leader	90 (27%)
Other	79 (24%)
Total	331
If one fisher were to accuse another of stealing his/her nets, how would the problem be solved?	
They sort it out between themselves	22 (7%)
Community elders/meeting	42 (13%)
Police	115 (34%)
Government representative	117 (35%)
Other	36 (11%)
Total	332
If another community were to accuse yours of stealing its nets, how would the problem be solved?	
Community leaders meet	53 (16%)
Government help sought	108 (33%)
Police help sought	152 (46%)
Other	17 (5%)
Total	330

Table 5: Individuals or institutions to whom respondents will first complain given certain problem scenarios (Source: SEDAWOG, 2000a).

These data suggest that official, government-sanctioned solutions to conflict resolution are popular amongst Lake Victoria's fishers. Other possible solutions are intra-community meetings, beach leaders or recourse to elders. This implies that, to some extent, fishing communities have community-based mechanisms of conflict resolution just like they have for other social problems. Where communities seek outside solutions to conflict problems will depend on, firstly, the sense that they *should* seek external solution; and secondly, on whether or not community-level institutions exist that are capable of providing such solution. The results in Table 5 suggest that, in most cases, the external option is favoured. It must also be remembered that, in many cases, Tanzanian fishing communities feel government administration is, in any case, internal. How these views will change following the imposition of BMUs on fishing communities, remains to be seen.

Minimum recognition of right to organise

If the rights of appropriators to devise their own institutions are not to be challenged by external governmental authorities, then communities must be encouraged to define their members' relationship to their resources

seriously consider how changes within it affect their lives. To begin with, fishing communities must have the right and willingness to hold meetings to discuss problems and solutions themselves. This will enable them to plan on how to proceed and, finally, to develop organisations and institutional arrangements (rights and rules) for fisheries management.

Public forums must be freed of heavy government presence and fishers must not feel threatened if they criticise existing government policies and management methods and they must be listened to by both community members and the authorities. This will lead to the decentralisation of government operations, which may result in the deployment of power and resources to the community, hence enhancing community and economic development. In many cases, fishers devise their own rules without creating formal governmental jurisdiction for this purpose. For example 51% of fishers interviewed for this study felt that fishing communities should be allowed to determine who could or could not fish, and 91% of respondents thought that fishing communities should have the right to punish offenders (Table 4). The advancement of such objectives requires an organisational framework, which will need the willingness of the state to enable it, and the desire of the communities to carry it through.

The Tanzanian state has, in the past, recognised the right of communities to establish their own arrangements for crime detection and punishment. '*Sungusungu'* vigilante groups developed amongst Sukuma and Nyamwezi population in 1981, ostensibly to counter government failure to stem widespread cattle rustling in the region (Bukurara, 1991). Their development Abrahams (1989: 367) comments was "...an indication that people were not satisfied with fundamental aspects of the supply side of their relationship with the state". Their roles are to "...hear and determine disputes, impose traditional fines known as *masamule,* and control funds arising from these fines. It can safely be said that the committee makes substantial decisions about what action should or should not be taken, and when and how it is taken" (Bukara, 1991: 260). These groups have since been, legally endorsed by the sate.

In becoming legitimately sanctioned by the state, *sungusungu* have become accountable to the state and not, necessarily, to the Sukuma nor the Nyawezi. Reported harassment, torture and murder by *sungusungu* groups (Abrahams, 1989; Africa News, 1997) may, in fact, be indicative of the shift from local control to national control. Lying within the realm of under-regulated government control, local controls no longer provide a counterbalance to *sungusungu* excesses.

An additional point of concern, here, is one raised in the introduction. Although the Tanzanian state may be able to announce that fishing communities now exercise local rights to organisation through their implementation of Tanzania's national fisheries legislation, Onyango (2000) makes the point that while this means communities may well own regulatory implementation, they have no ownership - and no say - in what it is that they are implementing. In this way, what might be perfectly good local alternatives to state originated regulations become criminalised while, at the same time, a lack of community belief in the state's regulations may render them, at the local level, meaningless.

If this imbalance is to be addressed, then new laws and policies may need to be developed and/or existing laws and policies amended or reinterpreted to authorise and legitimise these functions of co-management. Issues of coordination, communication between the various stakeholders and roles must be addressed. In addition, a comprehensive national environmental assessment document must be in place to enhance the recognition of the indigenous knowledge for the betterment of fisheries management.

A series of enabling management legislation in support of decentralisation was passed in 1970s and 1980s. This enabled Tanzania to experience self-reliance and local democracy but did not live up to its potential (Chambers,

institutional arrangements at the local level. One example has been the creation of co-management strategies for the Mafia Island Marine Park, which enables districts and villages to manage their own affairs.

Insofar as Lake Victoria is concerned, enabling legislation allowing communities the right to organise does not exist. Fishing communities may, however, feel that the government structures that presently exist are an adequate basis for them to organise themselves around. In the purest sense of the term, therefore, the right to 'organise' independently of the state may well not exist in Tanzania's Lake Victoria fishery, but the right to 'bend' externally source administrative structures to suit local livelihood demands does, at least informally.

Nested enterprises

The 'nesting' of community-level organisations within a wider district, region and lake-wide framework is crucial for the success of institutions at the local level. There are various actors in the fisheries sector and yet, in some cases, they operate independently though they may have the same goals. The establishment of rules and byelaws at one level without corresponding action at other levels will produce an incomplete system of administration that may not endure in the long run. Nesting also enables interrelated activities and interests to be linked so as to achieve different goals at a wider scale with minimum resources. For example, in the Nile river system, "... some of the environmental externalities associated with water and soil management...can be accommodated at the level of the micro-watershed; others can only be accommodated through the coordinated efforts of nation states" (Swallow 1997: 23). What 'nesting' implies is that local level management institutions have a place within a far broader management structure that encompasses Lake Victoria at the regional level. If co-management is to succeed on this lake, it is necessary that the relationship between the landing site and the nation state is clearly defined and it is understood that each extreme is mutually interdependent.

As has been argued above, BMUs are nested within Village Government, which in turn are nested within ward, district, regional and finally, national administration. This should ensure that that problems of varying degrees of scope and scale can be dealt with at commensurate levels of administration. What is of concern, however, is that this is a spectacularly vertical administration, with very little room for horizontal linkages with other informal activities at various levels. Co-management necessarily implies that hierarchies are sufficiently pliable to embrace organisations and institutions that may, on the surface, appear to lie beyond conventional administrative order (Noble, 2000). In addition, although the creation of BMUs may well have decentralised the administration of Tanzania's Lake Victoria fishery, they have not resulted in any kind of delegation of decision-making powers nor, for that matter, the right to formulate, implement and enforce community level regulations (Noble, 2000). What this means is that BMUs are only really accountable to Dar es Salaam, and not necessarily subject to the scrutiny and censure of their own communities. This is a problem in so far as nesting is concerned, for it directly impinges on the efficacy and success of fisheries management regulations at the local level.

Conclusions: socio-political economy and its influence on management of Lake Victoria's resources

The findings of this paper, as they relate to Ostrom's (1990) criteria for institutional robustness, may be summarised as follows:

(a) clearly defined boundaries: there exist state-based boundaries (closed areas) to control fishing, and community upheld varieties, such as the need to seek permission before one can fish from a landing site. There is limited support for the idea that fish breeding areas should be closed to fishing and that fishing communities should have the right to say who can or cannot fish.

(b) Congruence between appropriation and provision rules and local conditions: we found no grounds for supposing that state rules were congruent with community perceptions nor the conditions in which they operate.
(c) Collective-choice arrangements: the regulation of the fishery is not collective, but we find that fishers are cautious about the possibility of assuming too many managerial responsibilities.
(d) Monitoring: the familiarity that fishers share with one another in their communities and those with whom they fish is a basis for monitoring.
(e) Graduated sanctions: communities typically have a sense that, as the gravity of an offence increases, so does the severity of the punishments. There exist both internal and external punishment systems to deal with offences, and in some cases, these appear to clash.
(f) Conflict-resolution mechanisms: fishers typically seek recourse to external agencies to resolve their conflicts.
(g) Minimal recognition of rights to organise: while fishers may have the right to organise, their organisation has no legally endorsed bearing on the fishery and its management.
(h) Nested enterprises: local level state administration is well nested within a hierarchy that reaches out to the national level. This arrangement has very little scope for horizontal organisation.

The founding father of Tanzanian, the late Mwalimu Julius Nyerere, has had a profound influence on the socio-political economy of Tanzania. His *'Ujamaa'* policy of 'self-governance and self-reliance', sought to enable the communities share what resources they had and to plan for their sustainable use. In the implementation of this vision, however, rural Tanzanian communities were perhaps not prepared for the responsibilities they were expected to assume. As a result, the government at the top ended up wielding too much power, and the communities ended up obeying various resolutions from the top. . . . . .

Despite this skewed distribution of power, the face-to-face community interaction that arose through *Ujamaa* settlement schemes was the stepping stone towards the development of strong - if government defined - community-level institutions. The *Ujamaa* policy encouraged people to stay together and utilise available resources jointly, and village resources, such as cash crop farms, were owned jointly. Co-operative societies from the village to the regional level were formed to boost the Tanzanian economy through the same spirit. The marketing, distribution and profits accrued from jointly owned resources were also meant to serve the interests and purposes of the majority in the villages. Specified village committees were set to enhance decision-making. For the purposes of this discussion, the most important outcome of the *Ujamaa* policy was the manner in which it generated a sense of collective awareness, and, importantly, created a sense of trust amongst villagers for the state.

In the discussion above, we have described how the influence of the state exists at the local level in the form of Village Committees and, in the case of fisheries management, Beach Management Units (BMUs). It is our contention that these government structures, manned by elected representatives from the villages, have become 'socialised' into daily patterns of community life. As such, it seems probable that the outcome of these administrative structures is the product of negotiation between those staffing the village administration and the communities from which they are drawn.

The implications of this are important in two ways: firstly, that the same administrative structures will vary from place to place, depending on culture, history and economy; and secondly, these structures may reflect very well the wants and desires of the communities of which they are a part, and cope well with heterogeneity, but may fail to converge with management objectives. Externally introduced regulations, in other words, become subject to village institutions in such a way that they come to mirror community objectives, which may not replicate those, they were initially intended to achieve. This is all the more likely given that these institutions are

designs. It is unlikely that such regulations will have legitimacy in the eyes of local-level resource users (Jentoft, 1989).

Tanzania's Lake Victoria fisheries management system is of considerable interest because the relationship between fishers and the state is good. This may, however, be *because* of the limited interference by the state in community affairs: there exists no point at which poor relationships can occur. Above, we commented on the transfer of monitoring of *sungusungu* away from the local community to the state. In the absence of government resources and staff, this transfer is tantamount to no scrutiny at all, leaving room for the considerable abuse of powers by some *sungusungu* groups.

Today, the government and intergovernmental organisations are trying to come to terms with modern democratic principles, such as co-management and community participation, where power is supposed to rest with resource users. Fishers themselves prefer government agencies in enforcement, but it is not going to be long before the apparent weakness in a strictly centralised system are realised by the fishers and fishing communities as a whole.

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