

Property rights and regimes: implications of managing capacity through co-management on Lake Victoria, East Africa

F. Nunan¹, C. T. Kirema-Mukasa²

With concern rising about the declining stock levels of one of the three commercial fisheries of Lake Victoria, East Africa, in the 2000s, the Lake Victoria Fisheries Organization (LVFO) embarked on the process of developing the world's first Regional Plan of Action for the Management of Fishing Capacity. This plan commits the three Contracting Parties of LVFO, Kenya, Tanzania and Uganda, to keeping Nile perch fishing capacity to 2006 levels and harmonizing licensing in relation to target species and capacity variables. The move to greater management of fishing capacity has taken place within the context of the lakewide introduction of a co-management approach, with community-based fisheries organizations playing a role in improving compliance with fisheries rules and regulations and in efforts to manage capacity. Both the introduction of new approaches to the management of fishing capacity and the co-management approach have potential implications for access to the fisheries and the nature of the property regime and its governance. The paper analyses how moves to manage capacity are being developed and designed within the co-management framework and scope for strengthening co-management through measures to manage and monitor capacity.

Keywords: property rights, property regimes, fishing capacity, co-management, Lake Victoria

INTRODUCTION

The crisis of the state of global fish stocks is widely acknowledged, with the FAO reporting in 2008 that 80% of the world's marine fisheries are either overexploited or depleted (28%) or fully exploited (50%) (FAO 2009). Whilst the same report suggests that there are few examples of collapsing inland fisheries, these fisheries should learn from the experience of marine fisheries and from debates about how to address the lack of sustainability manifested. As 70% of inland capture fishery production comes from developing countries other than China, with China alone producing an additional 25%, there are critical links between inland fisheries and food and livelihood security, employment and national economies.

The World Bank attributes the prevalent full and overexploitation of fish stocks to weak governance, "leading to open access and poorly defined property rights" which have "allowed this expansion, and competition and conflict have marred management" (2004, 1). The 2004 *Saving Fish and Fishers* report goes further to identify challenges to governance that many institutions, at all levels, have not been able to meet. These include the common access nature of fishery resources, with a lack of clarity about who the stocks belong to, whether the nation, community or individual fisher; difficulties in controlling the level of catch, both in technical terms

¹ International Development Department, University of Birmingham, Edgbaston, Birmingham, B15 2TT, UK

² Lake Victoria Fisheries Organization, PO Box 1625, Jinja, Uganda

and in enforcement of legislation; and the migratory character of fish resources, which leads to the need for supranational institutional arrangements.

Fisheries are generally characterised as common pool resources, with very often either open or common property access. There is, however, a significant movement advocating the establishment of private property rights within fisheries as a way of controlling access and providing incentives for those with rights to comply with rules and regulations and recognise the need for sustainable management (Ward et al. 2004). Such an approach is fraught with challenges in a developing country setting, where small-scale fisheries provide an essential component of millions of livelihoods, contribute to food security, poverty alleviation and government revenue (Béné et al. 2007). Closely related to advocacy for more established and recognised rights, is the push for a wealth-based fisheries management approach that is informed by the objective of capturing resource rent to increase the contribution of fisheries to national economies (Cunningham et al. 2009; World Bank and FAO 2009). Such an approach has been questioned by those advocating a more welfare-based model for fisheries management in developing countries, where the primary objective should be concerned with employment and food security (Béné et al. 2010). There is then, debate, about how developing countries should respond to the perceived challenge of overexploitation and overcapacity within their fisheries.

Many developing countries have signed up to international agreements to tackle overfishing, illegal fishing and overcapacity, including the 1995 Code of Conduct for Responsible Fisheries (CCRF), the 1999 International Plan of Action for the Management of Fishing Capacity and the 2001 International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing. Whilst such agreements have informed policies, strategies and the design of management measures, implementation is often constrained by resources and capacity.

At the same time, much effort to improve governance of fisheries worldwide has been made through the adoption of co-management approaches, bringing users of the resource into management structures and processes with government. Many forms and approaches to co-management exist (Berkes 2009), although whilst the potential role of co-management structures in managing capacity and in allocating rights is recognised, there is no one approach to establishing property rights within a co-management system.

This paper analyses the emerging approach to managing fishing capacity on the large freshwater fisheries of Lake Victoria, which provide and support the livelihoods of millions within Kenya, Tanzania and Uganda. In 2007, the three states, through the Regional Fisheries Organization, the Lake Victoria Fisheries Organization, approved the Regional Plan of Action for the Management of Fishing Capacity (RPOA-Capacity) on Lake Victoria, which committed the three countries to limiting access and manage fishing effort of the major commercial fisheries. The paper sets out the nature of the commitments to manage capacity within Lake Victoria fisheries, the challenges in implementation and the potential for further building on co-management structures and processes in managing capacity.

PROPERTY RIGHTS: PROBLEM OR SOLUTION?

Recognition of the need for action on fishing capacity was realised in the 1995 Code of Conduct for Responsible Fisheries, requiring that “states should prevent over fishing and excess fishing capacity and should implement management measures to ensure that fishing effort is commensurate with the productive capacity of the fishery resources and their sustainable utilization” (FAO 1995, 5). This entails governments to institute measures to monitor and even limit fishing capacity. In 1999, this was followed by the International Plan of Action for the Management of Fishing Capacity, which further recognised growing concern about excess fishing capacity and requires states and Regional Fisheries Organisations (RFOs) to “achieve world-wide preferably by 2003, but not later than 2005, an efficient, equitable and transparent management of fishing capacity” (FAO 1999, 19-20), although it is noted that the plan is voluntary. The IPOA Capacity lists actions to be taken as including the measurement of fishing capacity, the identification of priority fisheries and fleets, where urgent action is required, the establishment of records of fishing vessels and the development of national and regional plans and policies to address excess capacity (FAO 1999). Socio-economic implications and interventions are recognised as essential components of plans to manage fishing capacity and to this end the IPOA Capacity urges for “the consideration of alternative sources of employment and livelihood to fishing communities which must bear the burden of reductions in fishing capacity” (FAO 1999, 23).

Fishing capacity has been carefully defined and debated, with multiple guidance produced by the FAO on how to define, measure, monitor and manage capacity. The FAO defines fishing capacity as “the amount of fish (or fishing effort) that can be produced over a period of time (e.g. a year or a fishing season) by a vessel or a fleet if fully utilized and for a given resource condition” (2000, 6), with excess capacity referring to when “the potential catch or effort level exceeds the actual catch or effort level in a given period” (Ward et al. 2004, 4). Overcapacity is seen as a generic term for excessive capacity in the longer term, where there is a recognized desirable level of capacity (Ward et al. 2004). The FAO advises that the existence of excess capacity indicates that capacity is underutilized and could also indicate overcapitalization, where “the fleet size is greater than that required to harvest a particular yield” (Ward et al. 2004, 4-5).

In discussions about the reasons for the existence of overcapacity and overfishing, the FAO and other commentators attribute this phenomenon squarely to inadequate, or ill-defined, property rights. The 2004 Technical Paper on Measuring and Assessing Capacity in Fisheries attributed overfishing and overcapacity to be symptoms of “the same underlying management problem – the absence of well-defined property or user rights” (Ward et al., 2004, p. 1), reflecting Hardin’s Tragedy of the Commons where perceived open access provides disincentives for limiting resource extraction. Whilst suggesting that establishing property rights would bring benefits in terms of improvements in fish stock abundance as capacity levels decline, Ward et al. (2004, p.1) also recognise that managing capacity is far from easy for “a variety of technical, political and social reasons”, where food security, employment and income, especially, may be adversely affected by new property rights regimes or new management measures that restrict access. The document, however, clearly

identifies the establishment of property rights as being key to managing capacity. Limited entry schemes have been found to be inadequate for controlling expanding capacity, as fishers may respond to the limiting of the number of vessels and/or gear by using larger engines or more efficient, and in some cases illegal, gear (Pascoe and Gréboval 2003). Buyback programmes have been introduced in many developed countries as a way of reducing capacity, but as the FAO notes, this offers only temporary respite and the FAO goes on to suggest that “as the underlying problem of inadequate property rights was not addressed, capacity would again increase through increased capital investment” (Pascoe and Gréboval 2003, 1).

Managing capacity to within agreed capacity levels is largely associated with ending open access regimes, though there is widespread recognition of the social and political costs associated with such a move (World Bank 2004). Rights-based fisheries management covers a wide range of approaches to defining, providing and enforcing rights to fish, through measures such as group fishing rights, territorial use rights of fishing (TURFs), individual transferable quotas (ITQs), taxes and royalties. Whilst a fishing license provides a right to fish, this cannot be effective on its own in terms of managing capacity, unless it comes with some other measure to allocate quota or limit effort (Ward et al. 2004). Cunningham et al. (2009, 275) argue that “most current rights-based systems provide only a partial solution to stopping the destruction of wealth in fisheries...The rights need to be properly specified and supported by appropriate fiscal, legal, and other institutions that legitimise and protect their operation”. They argue that a more integrated approach incorporating rights and fiscal measures to more effectively capture resource rent through what they refer to as ‘wealth-based fisheries management’ is the only way forward to address the widespread overexploitation of fisheries.

The World Bank (2004, 45) identifies four characteristics of property rights that are needed to create incentives for fishers to appreciate resource conservation objectives. These are security of title, exclusivity, permanence and transferability. These properties are difficult to realise in a developing country setting, where enforcement may be difficult, potentially enabling corruption to contribute to greater exploitation than planned, and thousands of livelihoods could be adversely affected.

Bromley (2009) questions conventional economic wisdom that overfishing is a result of the lack of property rights and argues instead for bringing management back in, with clear limits on total annual catch and permits of fixed time, so that aspiring entrants may have an opportunity of gaining access. He also suggests that a royalty is paid by fishers for the privilege of being able to make a living from a nation’s natural resources.

Others have argued against the limitation of access to the fisheries for other reasons, for example in southern African freshwater lakes, where, it has been argued, the fisheries should continue to serve to alleviate poverty and provide a safety valve in times of need, rather than be managed to capture wealth through limiting access (Béné et al. 2010; Jul-Larsen et al. 2003). As noted by Pomeroy and Rivera-Guieb (2006, 217) management tools such as individual quotas and individual transferable quotas “seem better suited to temperate regions with discrete single-species fisheries, and therefore calculable TAC, than to the multi-species,

multi-gear fisheries of many tropical countries. These models have limited applicability to tropical fisheries because of the large amount of information that managers need to implement them, the wider variety of fishing gears used in the tropics, and managers' limited ability to control access of fishers, both full- and part-time, to the tropical fishery". They argue that measures in developing world should focus on access to fishing areas or gear rather than the amount of catch. The lack of alternative employment is a key factor in reducing the potential for adoption of restricted access measures.

The level and nature of capacity within fisheries is clearly strongly linked to concerns about overexploited and fully exploited fisheries, which in turn has been linked to weak governance and a lack of clearly defined and effective property rights. Managing fishing capacity suggests that understanding of an optimal level of capacity and yield is achievable, although this is not always possible given the complexity of fisheries and the need for considerable data. Political and social implications of limiting access to fisheries are clearly recognised, though not easy to address. A counterargument to advocating rights-based and resource rent maximisation management approaches is one that advocates keeping access open, or within a common property regime, so that fisheries acts as a 'labour buffer', recognising that there are few alternative income-generating activities to turn to. Ultimately, objectives for fisheries management will determine their role and the approaches adopted for achieving those objectives, whether those objectives are concerned with employment, food security or revenue and foreign exchange earnings, and over what period of time.

PROPERTY REGIMES AND CO-MANAGEMENT

Fisheries are widely characterised as either open access or common pool resources, which exist within often either open access regimes, i.e. no defined group of users or "owners", common property or state/government property. As common pool resources managed within a common property regime, two characteristics are key: subtractability, as one person harvests fish, the ability of others to do the same is reduced, and the existence of costs resulting from excluding potential beneficiaries from accessing a resource (Dolsak and Ostrom, 2003). Ostrom (1990) and others have established that common property regimes can manage common pool resources and have identified key enabling conditions for successful common property resource management. However, it is not always easy in practice to identify which regime operates. German and Keeler argue that many contemporary natural resource management challenges "do not fall within neatly inscribed units or categories of resource ownership or governance, but are characterized rather by their interdependencies" (2010, 572).

In relation to common pool resources, Schlager and Ostrom (1992) identify access and withdrawal rights as being the most relevant operational-level rights, though note that holding such rights within a common pool resource does not imply that more extensive rights will be held. Rights at a collective-choice level provide individuals with authority to participate in defining future rights and include management, exclusion and alienation (Schlager and Ostrom 1992). These are defined by Schlager and Ostrom (1992, 250-251) as set out in Table 1.

Table 1 Operational and collective-choice level rights

Right	Definition
Access	The right to enter a defined physical property
Withdrawal	The right to obtain the “products” of a resource
Management	The right to regulate internal use patterns and transform the resource by making improvements
Exclusion	The right to determine who will have an access right, and how that right may be transferred
Alienation	The right to sell or lease either or both of the above collective-choice rights

Holders of such rights are identified as including authorized users, claimants, proprietors and owners, which are each defined in relation to the types of rights in Table 2, drawing on Schlager and Ostrom (1992, 252-253).

Table 2 Definition of types of CPR rights holders

Position in relation to resource	Definition with respect to rights
Authorized user	Individuals holding operational-level rights of access and withdrawal. Lack the authority to participate in collective action to change operational rules.
Claimant	Individuals who possess the same rights as authorized users plus collective-choice right of management.
Proprietor	Individuals who possess collective-choice rights to participation in management and exclusion.
Owner	Individuals who also possess the right of alienation as well as rights of management and exclusion

Schlager and Ostrom (1992) also note that “for every right an individual holds, rules exist that authorize or require particular actions in exercising that property right”. Rights do not, therefore, operate without reference to rules. Schlager and Ostrom (1992, 260) conclude by identifying three areas where greater understanding was needed, including of the conditions that enhance or detract from more efficient property-rights regimes; how stable or unstable such systems are when challenged by change; and, of the costs involved in enforcing regulations that are not agreed upon by those involved.

Many fisheries, particularly small-scale, worldwide are now managed through a co-management arrangement, which has been broadly defined as “an arrangement where responsibility for resource management is shared between the government and user groups” and “is considered to be one solution to the growing problems of resource over-exploitation” (Sen and Raakjær Nielsen 1996, 406). Motivation for the adoption of fisheries co-management often springs from concern about “fisheries crises that result from overfishing, extensive use of illegal and destructive fishing methods and gears, and catch of juvenile fish”, though may actually result in practice

from conflict, competition over space and access, and increasing numbers of new entrants (Chuenpagdee and Jentoft 2007, 660). Hara and Raakjær Nielsen (2003) also note that the perceived failure of government management of fisheries contributed to the shift towards co-management, with the establishment of property rights also an incentive, to address concerns about existing or potential overcapacity. They assert that “granting property rights has been one of the major reasons for adopting co-management for many fishing communities” (Hara and Raakjær Nielsen 2003, 88). The World Bank (2004, 43) suggests that a key feature of co-management is the “power to restrict access”. Co-management has, then, been associated with establishing property rights with a view to controlling, or limiting, access to fisheries. There is little evidence, however, that this has been the case in developing country fisheries.

Implementation of co-management has often involved the creation of new structures and organisations, designed to bring users together with government in managing the resource. It is through such co-management bodies that access rights could be regulated. As Allison and Badjeck observe “granting co-management bodies the rights to regulate access and other forms of input control and to collect revenues from licence fees is perhaps the most promising means of transferring rights along with management responsibilities” (2004, 24). They go on to suggest that “property rights need to be built iteratively within the context of consultation, trust- and institutional capacity-building and they must remain sufficiently flexible to respond to future change” (Allison and Badjeck 2004, 25).

The design and principles of co-management are informed by common property theory, as co-management provides for collective governance of common pool resources (Pomeroy and Rivera-Guieb 2006). Plummer and Fitzgibbon (2004, 878) suggest that co-management can be seen as “a type of management system or rights regime” and “should be understood as a type of property rights regime”. Pomeroy and Rivera-Guieb also see co-management as “a governance arrangement located between pure state property and pure communal property regimes” (2006, 13). Co-management literature does not, however, set out how access should be regulated, although in a review of conditions associated with greater potential for success of fisheries co-management, Pomeroy et al. (2001) suggest that legally supported rights are essential for motivating users to support conservation approaches, though do not specify whether such rights would more appropriately be private or collective.

Fisheries co-management is widely seen as providing an opportunity for developing and implementing new measures to manage capacity and effort largely through the allocation of private or collective fishing rights. There is little written however on how this may happen in practice, particularly in developing countries. It is unclear as to whether co-management can enable the establishment of new, or reinforcement of existing, collective rights, or whether co-management structures and processes can play a role in limiting access and managing capacity through more individual measures. This appears to be an area for further research and innovation. How can co-management initiatives in developing countries support measures and processes to manage capacity in an equitable, transparent way, that limits adverse social impacts and is broadly accepted?

LAKE VICTORIA FISHERIES

Lake Victoria is the second largest freshwater lake in the world and is a major fisheries resource in East Africa, with three commercial fisheries dominating the sector: Nile perch, tilapia and the smaller sardine-like *Rastrienobola argentea* (known in the region as dagaa). The commercialisation of Lake Victoria fisheries began with the introduction of the gillnet fishery in 1905 in Kisumu and by the 1920s, gillnet usage had spread around the entire lake (Ford 1955). Commercialisation further escalated in the 1970s/80s after the introduction of the piscivorous Nile Perch in the 1950s/60s, which led to the destruction of native fish species and to the creation of a lucrative commercial fishery, with fish processing plants established around the lake to enable the international export of fish (Pringle 2005). Nile tilapia were also introduced around the same time and a more domestic and regional trade has built up around this fishery. The intensification of commercialisation since the 1970s/80s led to massive increases in the numbers of boats and fishers on the lake, and transformed lifestyles, societies and economies. The total catch from Lake Victoria inevitably increased on an incredible scale, with an annual catch of 100,000 tonnes in 1979 compared to over 1 million tonnes in 2007. As shown in Table 3, even in the last decade, twenty years after the initial boom in Lake Victoria fisheries, there has been significant expansion in fishing capacity, putting more pressure on the resource. With the dramatic increase in the number of fishers, catch and income has had to be shared between increasing numbers of boat owners and fishers (Geheb and Binns 1997), leading to increasing effort through the use of more gears, increasing use of engines and more time spent on the water (LVFO 2008a, 2009a).

Table 3 Indicators of fishing capacity, 2000-2008

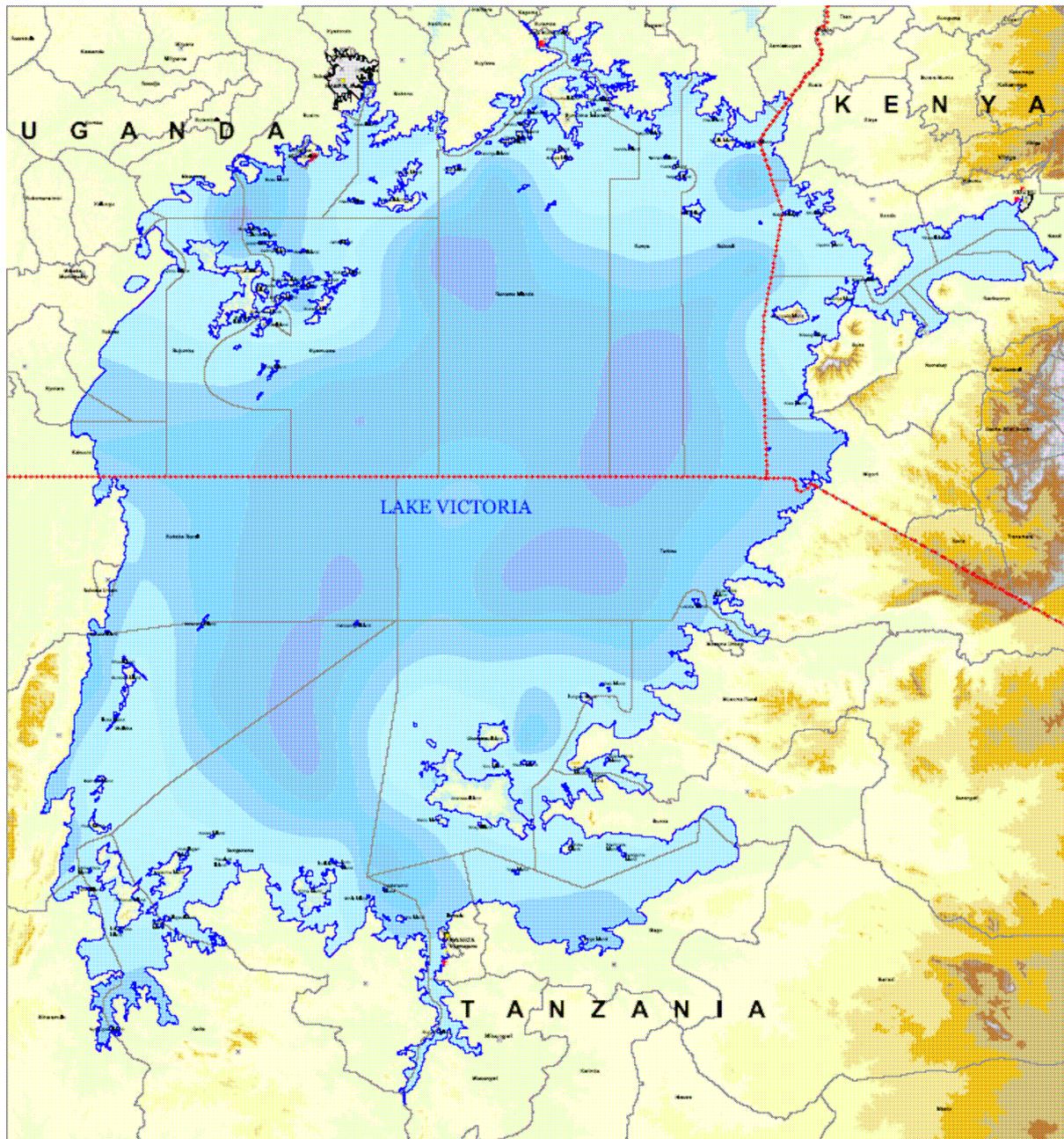
	2000	2002	2004	2006	2008	% change 2000-2008
Number of fishers	129,305	175,890	153,066	196,426	199,242	54
Number of vessels	42,519	52,476	51,592	68,836	67,513	59
Number of outboard engines	4,108	6,552	9,609	12,765	13,721	234
Number of gillnets <5" (illegal)	113,177	178,205	142,618	215,049	207,954	84
Number of gillnets ≥5" (targeting Nile perch and tilapia)	537,475	724,879	1,090,434	1,007,258	805,678	50
Number of longlines (targeting Nile perch)	3,496,247	8,098,023	6,096,338	9,044,550	11,267,606	222

Source: LVFO 2008a

Kayanda et al. (2009) report on the status of Lake Victoria's fish stocks, noting that Nile perch stocks have declined substantially over at least the last ten years. In August 1999, the biomass of Nile perch was estimated to be 1.9 million tonnes and was down to an estimated 227,000 tonnes in August 2008. The biomass of dagaa rose over the same period, from 245,000 tonnes in 1999 to 1.5 million tonnes in February 2008. Biomass data for Nile tilapia is not available due to its habitat and the inability to use acoustic methods within shallow water. In 1999/2001, Nile perch provided about 59% of the lake's catch, which dropped to 37% in 2005/06. The decrease in the biomass of Nile perch reflects increased effort to catch the fish, particularly through an increase in the number of hooks used, with the number of small hooks increasing by 77% from 2006 to 2008, reflecting a decrease in the average size of Nile perch.

The fisheries of Lake Victoria remain artisanal and are estimated to provide the household income source for around 2 million people, and generate around \$600 million a year in wealth, at the beach level and through exports (MRAG et al. 2008). The fisheries are therefore an important source of employment, food security and government revenue in Kenya, Tanzania and Uganda. Figure 1 provides a map of the lake, showing international and local boundaries.

Figure 1 Map of Lake Victoria, with international and local boundaries



MANAGING LAKE VICTORIA'S FISHERIES: REGIONAL COOPERATION AND CO-MANAGEMENT

Responsibility for Lake Victoria's fisheries rests with the governments of Kenya, Tanzania and Uganda, which together formed a Regional Fisheries Organization in 1997. The Lake Victoria Fisheries Organization (LVFO) has a complex structure (see Figure 2) of a Council of Ministers and Executive, Fisheries Management and Scientific Committees, made up of directors, or their delegated representatives, of the national fisheries departments and national research institutes. From 2010, representatives of fishing communities and the private processing industry joined the structures, as part of the adoption of co-management.

Since the late 1990s, the governments of Kenya, Tanzania and Uganda have supported the implementation of co-management, though this has taken time to be implemented in a more systematic, lake-wide manner, with a harmonised approach to co-management only really agreed in 2004. The design and implementation of co-management on Lake Victoria was supported by two externally-funded projects: the Lake Victoria Environmental Management Project, Phase 1 (LVEMP) (1997-2005), which was funded by the World Bank, with funds disbursed to national governments, with different priorities and slightly different approaches to forming community-based organisations, and the Implementation of a Fisheries Management Plan (IFMP), funded by the EU between 2003 and 2010. The process of implementation involved the formation of community-based organisations to enable fisherfolk to get involved in fisheries management, which are known in the region as Beach Management Units (BMUs). There are around 1069 BMUs on the lake, within 34 districts, covering around 1,400 landing sites, as some landing sites are too small to form a BMU on their own and so join with a neighbouring site or sites. At levels above the beach level, representatives of BMUs meet together within BMU Networks and with fisheries officers and potentially other government officers, NGOs, processing factories and traders in Co-management Committees. These have been formed at sub-district, district, national and regional levels to support the coordination and coherence of decision-making and implementation between and within levels. Certainly, scale is a major issue for the lake. Whilst these structures exist on paper and many have formed in terms of electing chairs and other officers, it is not clear how often they are meeting or how effective they are. One of the key challenges is, of course, resources to enable the structures to meet, even though the required composition was agreed in a way as to keep costs to a minimum. Each stakeholder group is required to fund its own transport and other costs, with pooling of BMU funds to encourage equity between BMUs and because not all BMUs will have a member at higher levels, though is represented (LVFO 2007b).

Everyone working at a beach in fisheries is required to be registered with a BMU, together forming a BMU Assembly, and, where there are fewer than 30 boats at one landing site, several sites may form a BMU. By 2006, 1,069 BMUs had been formed around the lake, with 281 in Kenya, 433 in Tanzania and 355 in Uganda. Each BMU is required to democratically elect a committee, whilst complying with guidance on composition to ensure there is equitable representation from all major stakeholder groups within the beach-level fisheries. Each committee is required to have a membership made up of 30% boat owners, 30% boat crew, 30% 'others' (including fish processors, boat builders and net repairers) and 10% fishmongers. In addition,

the national BMU Guidelines for each country require that at least 3 of the 9-12 committee members are women.

The formation of BMUs was guided by a set of regionally harmonised guidelines (LVFO 2007a), with associated national guidelines reflecting different legal frameworks and government structures. The regional guidelines set out a number of roles of BMUs in relation to managing capacity, including:

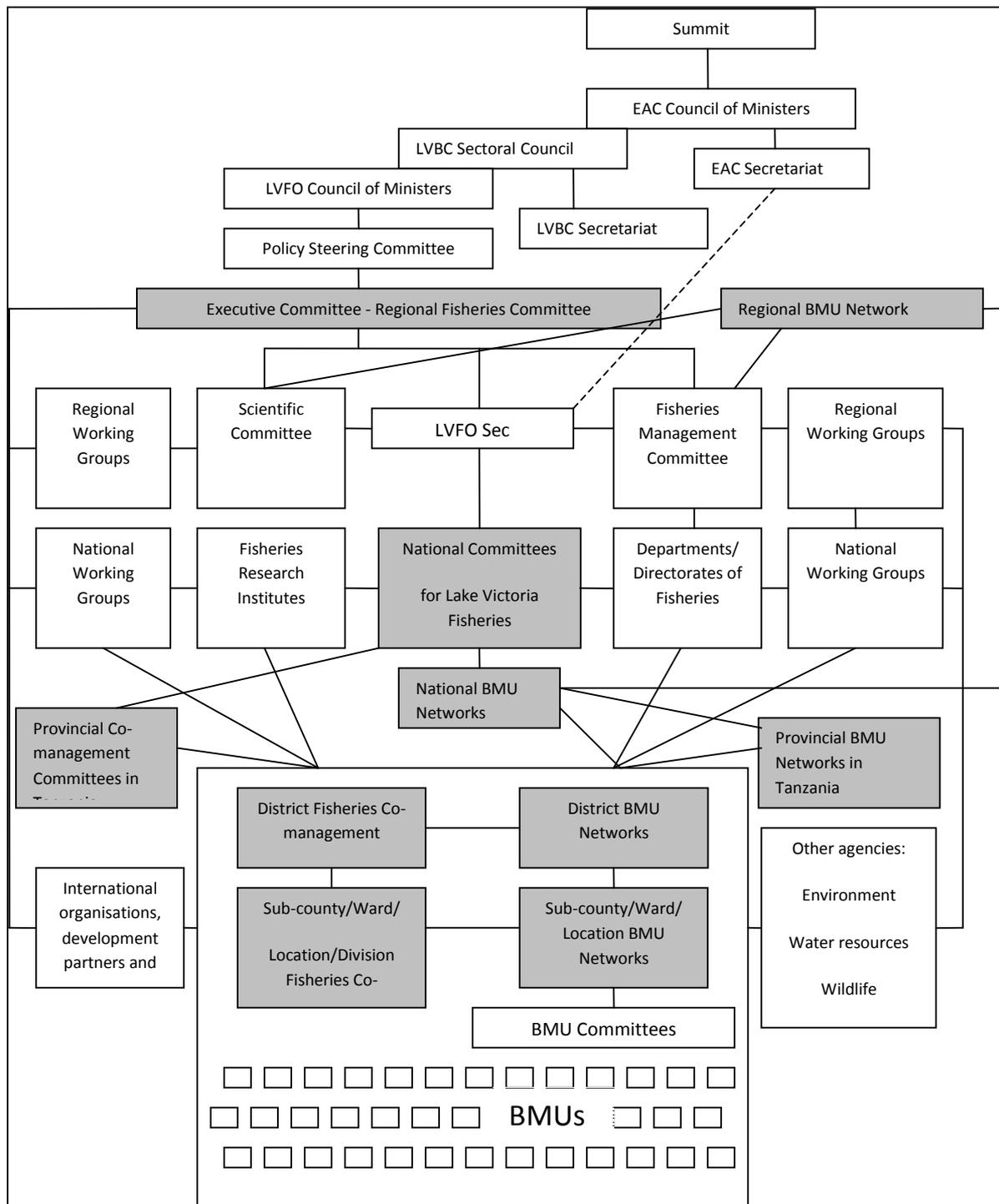
1. In collaboration with central government or local government, maintain and keep a register of all boat owners and their fishing equipment, fishers and BMU members operating from the beach.
2. Participate in vetting of boat owners and fishers for licensing and, in collaboration with government officials, ensure licenses are granted to those registered with a BMU (LVFO 2007a, 11).

In addition, the 2007 Co-management Guidelines include the following function of BMU Networks at national and regional levels and all levels of Co-management Committees:

- (a) Review and harmonize actions to reduce illegal fishing practices in line with RPOA-IUU and RPOA-Capacity (LVFO 2007b).

Clearly, roles for co-management structures in managing capacity are recognised in the official guidelines, although implementation of these roles is taking time. Fishers regularly move from landing site to landing site, in response to the movement of fish and better prices (Nunan 2010). Community leaders within fishing communities have long played a role in facilitating access to the fisheries. From a survey of attitudes and practice towards access to the Lake Victoria fisheries, Geheb and Crean (2003) reported that whilst fishermen argued that outsiders must seek permission to fish from a community, at the same time they expect to be able to fish unchallenged anywhere in the lake. Permission to fish from a landing site consists of producing a recommendation letter from another BMU, paying a fee or part of each catch or just asking beach leaders for permission to reside at and fish from the landing site. This is one role that BMUs can, and do, play in facilitating, or controlling access to fisheries that could be built on in managing capacity.

Figure 2 LVFO Institutional Structure



Source: LVFO 2007b

In 2008, LVFO produced the current Fisheries Management Plan for Lake Victoria, in effect from 2009 to 2014. The plan has an overarching vision of “sustainable utilization of fisheries resources, managed through good governance to create prosperous fishing communities”, with a goal of contributing to “the sustainable economic growth and reduction of poverty in East Africa” and purpose, which is “to effectively co-manage fisheries resources of Lake Victoria for sustainable fish production and socio-economic benefit” (LVFO 2008b, 36). These are ambitious and potentially create conflicting objectives, as managing a fishery to contribute to economic growth could be quite different to managing a fishery for poverty alleviation, which could imply high employment and a focus on local food security rather than supporting an export industry. The plan recognises that not all of the objectives can be met by each fishery all the time, reflecting the emphasis within the plan of fishery-specific sub-plans. The Nile perch fishery is recognised as largely contributing to economic growth through the generation of foreign exchange and income for participating fishers, whilst the tilapia and dagaa fisheries are seen as being managed with the objectives of contributing to national and regional food security and income (LVFO 2008b).

MANAGING CAPACITY ON LAKE VICTORIA

Prior to the adoption of RPOA-Capacity, Lake Victoria already had a range of measures in place that contribute to the management of capacity, as set out in Box 1. The RPOA IUU (Illegal, Unreported and Unregulated fishing) was adopted in 2004 and is closely associated with RPOA Capacity as the extent of illegal fishing on the lake is believed to be substantial. The management measures do not, however, address the full range of measures that may be needed to manage capacity, particularly when they are not fully implemented. Licensing has not always taken place in every district and the extent of illegal fishing, using undersized nets for example, is believed to be significant.

Box 1 Main management measures on Lake Victoria

Registration and Licensing:	the system of registering vessels and fishers and of issuing licenses varies between the countries, but there is no limit to the number of vessel licenses or individual fisher permits
Slot size of Nile perch and minimum mesh size:	Nile perch should be within 50-85cm and Nile tilapia not less than 25cm, caught by a minimum mesh size of 5” and 7” since 2009
RPOA Illegal, Unreported and Unregulated fishing:	Monitoring, control and surveillance and other measures

The impetus for the development of the RPOA-Capacity was the declining stock and catch of Nile perch fishery (FAO 2006), although as signatories to the CCRF, the Partner States were also encouraged to develop the RPOA in accordance with the IPOA. The RPOA was produced with financial and technical support from the FAO over several years and the development was led by a regional working group from the fisheries management departments with national and regional consultation workshops, both before the draft document and in response to the draft document. The RPOA was approved by the LVFO Council of Ministers in March 2007 and subsequent meetings of the Council have reinforced the urgency of implementing the RPOA (LVFO 2008c, 2009). The RPOA has a vision, mission and purpose as set out in Box 2, which prioritise socio-economic benefits and makes clear links between overcapacity and the potential for overfishing. These reflect the vision, goal and purpose of the 2009-2014 Fisheries Management Plan, with a similarly ambitious purpose and potentially conflicting objectives, as achieving optimal poverty reduction, food security and foreign exchange earnings could require careful consideration of trade-offs. The strategy for achieving the mission and vision involves managing capacity within specific species' fisheries, i.e. Nile perch, tilapia and dagaa, with Nile perch being the priority.

Box 2	The vision, mission and purpose of the Lake Victoria RPOA Capacity
Vision:	sustainably exploited fisheries accruing optimal socio-economic benefits
Mission:	to manage fishing capacity so as to prevent, deter and eliminate overfishing on Lake Victoria
Purpose:	to sustain the fisheries resource base for optimal economic growth, poverty reduction, food security, foreign exchange earnings, employment, and gender equity and improved standards of living among fisheries dependent communities
Strategy:	to set guidelines to determine and manage capacity at optimal levels for individual commercial species taking into consideration the endangered species

The RPOA-Capacity follows the IPOA-Capacity and associated guidelines in terms of what is involved in implementation, including assessment of the resource base and capacity, adoption of management measures and monitoring and review. The document recognises the importance of political commitment for managing capacity, with plans to raise awareness and engage Members of Parliament and councillors around the lake in the implementation process. The RPOA is further in keeping with IPOA spirit in that it is suggested that there is the ability and scope to “determine, set and manage optimal species-specific capacity levels” (LVFO 2007c, 8). Even if this can be done, whether the levels are acceptable or implementable could be contested. Further, the document commits the implementation of RPOA-Capacity to include “limitation of fishing access” (LVFO 2007c, 13) with no further details about how this may be done, apart from under the section on Nile perch, where the

document commits the Partner States to “initially limit fishing effort on Nile perch at the Frame Survey 2006 levels as a precautionary measure” (LVFO 2007c, 14).

Management of fishing capacity on a multispecies small-scale fisheries like that of Lake Victoria must be a challenge due to the number of fishers, estimated at around 200,000 in 2008, the vast expanse of water (68,000 km²) and shoreline to be monitored and the likely adverse effects of control measures on the dependent fishing communities. Inevitably, as in many discussions of managing fishing capacity in developing countries, the identification and promotion of alternative livelihoods is referred to in the RPOA, as a way of lessening the adverse effects of limiting access or managing capacity. It is very often difficult though to promote alternative livelihoods as if these existed and were attractive, at least some fishers would make the move.

The implementation of RPOA-Capacity is further supported by the 2009-2014 Fisheries Management Plan of Lake Victoria through the following:

1. Implement priority actions in accordance with the RPOA-Capacity including agreement on effective mechanisms for limiting fishing capacity and controlling effort;
2. Support the use and development of alternative livelihood opportunities for fishers to go into ventures other than fishing;
3. Regulate the number and capacity of fish processing plants, ensuring equitable share of commercial benefits;
4. Establish fishing vessel licensing as a management tool to control fishing effort and access to the fishery, involving BMUs in the licensing process; ensure all boats are registered and licenced (LVFO 2008b, 91).

Again, there is mention of encouraging fishers to seek alternative livelihoods as a way lessening the impact of managing capacity, although this is no easy solution. The recognition of the limitation of the licensing system as a management tool is important and reflected ongoing review of the licensing systems in each Partner State.

The move towards licensing as a management tool

In 2006 the LVFO Regional Working Group (RWG) on Fisheries Policy, legislation, Institution and Processes (FPLIP) developed a harmonised licensing system which is species-specific and includes registration of fishers and fishing inputs (boats, engines and gears), with the intention of controlling access and limiting capacity of the commercial fisheries of Nile perch, tilapia and dagaa. The system was tested in Tanzania in February 2008 and amendments made before reporting to the LVFO Fisheries Management Committee in the same year, which then agreed to the species-specific licensing. In February 2009 the LVFO Council of Ministers approved the new licensing system and directed the Competent Authorities to enact legislation for the new licensing and registration system. The Partner States were also given six months to harmonise with the new system.

To date, the changes made by the Partner States to their licensing systems have concerned restricting entry to the fisheries and have not completely embraced

species-specific licensing nor conformed to the 2006 limit of boats as set in the RPOA-Capacity for Lake Victoria due to inadequate information on the capacities of the various fisheries and the extent of the illegal, unreported and unregulated fishing. In Kenya, the registration for the vessel of a national is equivalent to licensing. The fishing license refers to the area for fishing and the port of landing but is not species-specific and does not mention the role of BMUs in licensing. In Tanzania, the Fisheries Regulations 2005 have been amended through the Fisheries Regulations of 2009 to include the type and quantity of fishing gear carried by the vessel, with a pre-license inspection of an artisanal fishing vessel to identify the type and quantity of fishing gears on board. The license indicates the home port and the BMUs' verification role in licensing but does not specify the geographical area for fishing and the species to be fished. In Uganda, the licensing system has been recentralised, removing the role from local government to the Department of Fisheries Resources. The Statutory Instrument No. 42 of the Fishing (Amendment) Rules 2009 of Uganda provides for issuing of a fishing vessel identification number plate, only licensing persons registered with respective BMUs, the verification role of BMUs in licensing and limiting licensing to the month of January every year, but does not specify that licenses will be species-specific. In practice, the BMUs in the Partner States are playing an active role in verifying who should fish but there is no limit set on the number of fishers to recommend so long as they are members of their respective BMU. Implementation of species-specific licences has been hindered by the lack of adequate information on the details of the different fisheries for each species.

The use of licensing as a limited-entry management tool is supported by all stakeholder groups on the lake, though it is recognised that this would not be easy to implement and so an incremental movement is recommended, with a five year moratorium on new licenses (Ikwaput-Nyeko et al. 2009). Priority was also given by all stakeholder groups to the need for greater enforcement of existing rules and regulations, as the illegal regional trade in undersized fish continues to thrive and encourages fishers to use illegal gears to catch immature fish.

REVENUE COLLECTION AND PLANS FOR SUSTAINABLE FINANCING

Advocacy for a wealth-based fishery management approach is closely aligned to the push for more clearly defined property rights and the management of fishing capacity. Such an approach advocates for greater capture of the resource rent to improve management and the contribution of fisheries to government revenue. On Lake Victoria, there is an array of fees and licenses paid, with ongoing consideration of how to move towards more sustainable financing for fisheries management as a whole, including for the LVFO. Donor support through projects remains a key source of financing for fisheries management and research in the region, though studies have shown that there is scope for greater capture of revenue from within the system.

Revenue is collected at many points in the value chain, by the BMUs themselves and by, or for, local and central government. Fisheries are very much seen as an important source of local and national revenue and the revenue system is not designed to incentivise sustainable fisheries behaviour. The main source of revenue

at the district level from fisheries in Tanzania and Uganda are fees charged for the landing and sale of fish, the collection of which, in most cases, is contracted out. The private sector and BMUs are invited to bid to collect revenue at markets and landing sites for district local government and must remit at least the minimum price, with no limit to the level of profit that can be accrued by the winning tenderer. In Tanzania, revenue collection is put out to tender for 80% of landing sites, with 45% of tenders held by BMUs in 2008 (Acworth et al. 2008). It has been estimated that about one third of revenue collected by the tender holder is remitted to local government in Tanzania, compared to around 6% in Uganda, indicating large profits for the Ugandan tender holders (Acworth et al. 2008). This results in potentially significant funds being taken out of the fisheries and not even used for wider development purposes (Ellis and Bahigwa 2003). As the collection of many local revenue sources are obliged to be contracted out, challenging the collection of revenue from fisheries requires challenging a much bigger system of revenue raising.

Revenue is also generated from the Fish Movement Permit (FMP), which is issued to allow people to transport fish within the countries and is used as a way of tracing fish to where it was landed. In Uganda the FMP is issued by BMUs and is paid on a per kg basis, whereas the FMP is incorporated into fees paid to tender holders in Tanzania. In Kenya, the FMP is paid once a year by traders. The revenue from the FMP in Uganda is divided between the district and sub-district local government and BMUs, with the BMUs being eligible for 25% of the FMP revenue, though they do not always receive this amount.

Legislation in each country allows BMUs to raise revenue for their own activities and running costs, although sources of revenue should be agreed by the BMU Assembly before being implemented by the BMU Committee. Revenue raised is used for paying for transport to attend meetings, go to the bank or to see a Fisheries Officer in another location, pay for stationery, fuel for the use of a motorised boat for surveillance operations and for development within the beach area, for example.

It has been estimated that revenue collected in 2008 for the entire lake was around \$23 million, compared to \$37.4 million that could have been collected if all licenses, fees and other charges were collected (Acworth et al. 2008). A study on financing of LVFO and the implementation of the Fisheries Management Plan (FMP) estimates that the annual cost would be between \$7.5 and \$8 million. The FMP for 2009-2014 sets out a wide range of activities, from resource monitoring to training and awareness raising (LVFO 2008). The estimate for the financing of the LVFO structure, including the Secretariat and all committee meeting costs, and the plan implementation appears to be well within the amount of revenue that is already collected, though most of this does not come back to the fisheries. Certainly, these figures illustrate the potential for the fisheries to provide greater support to management, although not every component of co-management activity was included in the costings. Macfadyen (2008) recommends that the costs for LVFO and the FMP should largely be met through the export levy, though noted that government funding should continue for the lake fisheries, given its importance for the national economies, employment and food security.

Both LVEMP and IFMP contributed significantly to the debate about how fisheries management and research on the lake could be funded through revenue from within the fisheries, rather than relying on donor and/or government funding. LVEMP began this endeavour with a series of studies on how a fish levy trust fund could be developed. These studies in the early 2000s made recommendations on the types of institutional arrangements needed, who could contribute, levy rates, methods of collection of levies and how the resulting funds should be used (Macfadyen 2008). Although the recommendations from the studies were harmonised in 2004, there is no fish levy trust fund yet in place in any of the three countries. Discussions are, however, still ongoing as to how the fish levy trust will be put in place and enable the management and research activities of the lake fisheries to continue in the absence of donor support and adequate funds from central government.

Tanzania does however have an export levy, which is the most important source of revenue from fisheries for the country, and to a lesser extent, Kenya also benefits from an export levy. In Tanzania, the export levy is charged at around 3% and represents 50-60% of revenue from Lake Victoria fisheries (Macfadyen 2008). Between 30-50% of the revenue generated from the export levy is given back to the Fisheries Department by the Ministry of Finance through a retention scheme, which enables revenue from fisheries to be reinvested in the sector, with some of the revenue sent to regional and district levels for direct use in fisheries management. This is in stark contrast to Kenya and Uganda. In Kenya the levy is charged at 0.5% and raises much less revenue and in Uganda there is currently no export levy, though the introduction of such a levy is included within the 2004 Fisheries Bill. For 2007/08, it was estimated that the export levy raised \$5.3 million for national government in Tanzania (Macfadyen 2008). A fish levy trust fund, would, however, ensure that more of the revenue raised from the fisheries is reinvested into fisheries. At the May 2010 meeting of the LVFO Council of Ministers, the Partner States were urged again to put in place the fish levy trust fund (LVFO 2010).

In Uganda, the 2004 draft Fisheries Bill (yet to be enacted) commits the government to the introduction of a Landing Site User Fee, payable by each BMU through charging its members and non-members for use of the landing site. Each BMU would then be entitled to a share to the LSUF, yet to be determined. It is possible that the LSUF could be an important source of funding for co-management.

Studies and discussions indicate that the potential to finance management from within fisheries largely exists, though options for new funding mechanisms assume that government funding will continue, limited though this is. Moving from the current situation where most of the revenue leaves the fisheries sector altogether to one where there is substantial reinvestment is not easy and could be challenged by other sectors within government. However, it is imperative that the issue of financing is debated alongside discussions of managing capacity and limiting access so that policies and measures are integrated, coherent and effective.

ANALYSIS OF THE LAKE VICTORIA PROPERTY REGIME

Whilst Lake Victoria fisheries are largely seen as managed within a common property regime, there is a strong degree of state control, with government leading

the design and implementation of policy and legislation, and keeping control over the issuing of licenses to fish. The governments, then, are the ‘owners’ of the resource, as shown in Table 4, whilst the BMUs have characteristics of claimants and proprietors as they have a role in the licensing process and in other measures to manage capacity, but do not have the capacity to ultimately determine who may access the fisheries and whether or how rights may be transferred.

Table 4 The Government and BMUs as rights holders

Stakeholder	Position in relation to resource	Definition with respect to rights
Government	Owner	Government acts as the owner of the fisheries as they have the right to sell or lease rights of exclusion and management.
BMU	Claimant and proprietor	BMUs have a role in vetting applicants for licenses and in other measures involved in managing capacity (such as keeping registers of vessels and fishers). They can have their own rules, recommend by-laws to government and participate in policy processes. However, they cannot fully determine who has access rights and how those access rights may be transferred.

In terms of translating the nature of the rights holders into an analysis of the property regime, Table 5 indicates a confused picture of the resource regime, with elements of state, common and open access regime characteristics apparent within Lake Victoria fisheries.

Table 5 Analysis of the property regime of Lake Victoria fisheries

Regime	Characteristics*	Lake Victoria
State	Ownership and control rests with the state; individuals and groups may use the NRs but only at the behest of the state.	Development of legislation rests with the state, although there is consultation on policy and legislation.
Common	Private property for the group of co-owners; individuals have rights in a common property regime; exclusion of non-owners; membership and boundaries	Local regulations (by-laws) may be proposed by BMUs but have to be approved by sub-district or district level government. BMUs are beginning to participate in licensing processes.
Open access	No defined group of users or “owners” and benefit stream is available to anyone.	Whilst fishing communities are identifiable at landing sites, there is movement within and out of and into the fisheries, with no limit on the number of licenses or permits.

* From Bromley, 1991

The state continues to have the major say over policy, legislation and regulations, although does consult with resource users, and leads on the enforcement of legislation. The situation is, though, clearly going through a period of change, reflecting the complex challenge of responding to the commitment to managing fishing capacity. As co-management has only relatively recently been fully implemented across the lake and resources supporting capacity building have been limited, the potential of BMUs and other co-management structures in managing capacity is not yet determined. Over time, as co-management evolves and support for managing capacity grows, the share of rights and responsibilities and the nature of the property regime is also likely to change.

MANAGING CAPACITY THROUGH CO-MANAGEMENT?

The stakeholders of Lake Victoria have clearly committed themselves to the challenge of managing fishing capacity with the aim of managing the fisheries in a more sustainable way. The challenges are, though, considerable. They include:

- a) Tackling illegalities so that undersized fish are no longer caught, at least not at the rate they are assumed to be at present. This is a challenging and complex task and so managing capacity cannot wait for the end of illegal fishing.
- b) The lack of feasible alternative employment or income-generating activities within the lake zone or even beyond. The fisheries remain an attractive income earning sector, with relatively easy access as employment as a boat crew in the absence of capital to buy a boat and gears.
- c) The inadequate ongoing support for co-management structures and processes beyond external project support. The design and introduction of co-management was supported by two donor-funded projects and substitute funding to support ongoing capacity building has not yet been secured through revenue raising or budget allocation.
- d) The need for significant political will to commit to limiting access through licensing and other means.

Despite these considerable challenges, there is already much support within the stakeholders of Lake Victoria for managing capacity through limits on access and greater enforcement of legislation (Ikwaput-Nyeko et al. 2009). In addition, the establishment of the BMUs followed by BMU networks up to regional level in 2010 is a breakthrough to the management of fishing capacity (LVFO 2010). The power to participate in capacity management is vested in the BMUs through legislation and in their legal status as fisheries management institutions. The BMUs have a role to play in vetting fishers before they can be issued with a licence, though how effective this will be is unclear, as there would be scope for collusion and corruption. The new licensing system, adopted in 2008, has scope to achieve more than has been adopted by the Partner States at present, though as experience accumulates in more rigorous licensing, support and capacity should grow to enable more effective, species-specific licensing to be implemented lake-wide.

The scale and complexity of Lake Victoria fisheries present constraints on the development of more efficient property-rights regimes. At present, the nature of property regime of Lake Victoria fisheries is complex, with elements of state, common property and open access regimes. Certainly there is scope for strengthening co-management through increasing the rights and responsibilities of BMUs in allocating and regulating rights to fish. This will inevitably take time as BMUs take on the initial role of vetting applicants and government officers accept the participation of BMUs in the licensing process. If further allocation of individual or collective rights are to be considered, the role of co-management structures in such systems must shape the design and implementation. National quotas distributed to BMUs and licences with individual transferable rights issued to fishers vetted by their respective BMU could be considered. BMUs would be charged with the responsibility of managing the BMU quota and supervising the licensed fishers, with the support of other co-management structures and partners.

There is a commitment to capturing more of the wealth of the fisheries for management purposes, but this is proving difficult as the revenue system for fisheries cannot be separated from broader national and local revenue systems. It appears that there are already instruments in place that could generate significant revenue but much of this is taken out of fisheries and the systems are not yet in place to capture more of the resource rent. The urgency of capturing more of the resource rent is recognised, though, particularly as donor funds to the management of Lake Victoria have drastically reduced since 2010.

The commercial, yet artisanal, nature of Lake Victoria fisheries and the importance of the fisheries for employment, food security, government revenue and foreign exchange generate considerable complexities for policy and management, reflecting the wider debate on wealth versus welfare. It appears that Lake Victoria is treading a careful path between these approaches, reflecting the nature of the three major fisheries of the lake, but facing considerable challenges in doing so. Co-management presents an important opportunity to build an approach to managing capacity that is owned by all stakeholder groups, is equitable and effective, but time and resources are needed in enabling this opportunity to be harnessed.

References

Acworth, J., D. Malleret-King, R. Advani, and P. Namisi. 2008. *Sustainable Financing of Beach Management Units on Lake Victoria, Consultancy Report No. 11*. Kampala: Green Solutions (Unique Forestry Consultants – East Africa Ltd.).

Allison, E. H., and M-C. Badjeck. 2004. *Fisheries Co-management in Inland Waters: A Review of International Experience*. Rome: Sustainable Fisheries Livelihoods Programme, FAO.

Béné, C., G. Macfadyen, and E. H. Allison. 2007. Increasing the contribution of small-scale fisheries to poverty alleviation and food security. *FAO Fisheries Technical Paper*. No. 481. Rome: FAO.

Béné, C, B. Hersoug, and E. H. Allison. 2010. Not by Rent Alone: Analysing the Pro-Poor Functions of Small-Scale Fisheries in Developing Countries. *Development Policy Review* 28(3):325-358.

Berkes, F. 2009. Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management* 90:1692-1702.

Bromley, D. W. 1991. *Environment and Economy: property rights and public policy*. Oxford: Blackwell.

Bromley, D. W. 2009. Abdicating Responsibility: The Deceits of Fisheries Policy. *Fisheries* 34(6):280-290.

Chuenpagdee, R., and S. Jentoft. 2007. Step zero for fisheries co-management: What precedes implementation. *Marine Policy* 31(6):657-668.

Cunningham, S., A. E. Neiland, M. Arbuckle, and T. Bostock (2009) Wealth-based Fisheries Management: Using Fisheries Wealth to Orchestrate Sound Fisheries Policy in Practice. *Marine Resource Economics*, 24, 271-287.

Dolsák, N., and E. Ostrom. 2003. The Challenges of the Commons. In *The Commons in the New Millennium* eds. N. Dolsák, and E. Ostrom, 3-34. Cambridge, Massachusetts: Massachusetts Institute of Technology.

Ellis, F., and G. Bahiigwa. 2003. Livelihoods and Rural Poverty Reduction in Uganda. *World Development* 31(6):997-1013.

FAO. 1995. *Code of Conduct for Responsible Fisheries*. Rome: FAO.

FAO. 1999. *International Plan of Action for reducing incidental catch of seabirds in longline fisheries. International Plan of Action for the conservation and management of sharks. International Plan of Action for the management of fishing capacity*. Rome: FAO.

FAO. 2000. Report of the Technical Consultation on the Measurement of Fishing Capacity. Mexico City, Mexico, 29 November - 3 December 1999. *FAO Fisheries Report*. No. 615, FAO, Rome.

FAO. 2006. Report of the First Lake Victoria Fisheries Organization and FAO Regional Technical Workshop on Fishing Effort and Capacity on Lake Victoria. Dar es Salaam, United Republic of Tanzania, 12–14 December 2005. Fisheries Department, FAO Subregional Office for Southern and East Africa. *FAO Fisheries Report*. No. 796. Rome: FAO.

FAO. 2009. *The State of the World Fisheries and Aquaculture 2008*. Rome: FAO.

FAO (2010) Fishing capacity, <http://www.fao.org/fishery/topic/2898/en> Accessed 30/11/10.

Ford, V.C.R. 1955. *The Trade of Lake Victoria; a geographical study*, *East African Studies* No. 3. Kampala: East African Institute of Social Research.

Geheb, K., and T. Binns. 1997. 'Fishing Farmers' or 'Farming Fishermen'? The Quest for Household Income and Nutritional Security on the Kenyan Shores of Lake Victoria. *African Affairs* 96(382):73-93.

Geheb, K., and K. Crean. 2003. Community-level access and control in the management of Lake Victoria's fisheries, *Journal of Environmental Management*, 67, 99-106.

German, L. A. and A. Keeler. 2010. "Hybrid institutions": applications of common property theory beyond discrete property regimes. *International Journal of the Commons* 4(1):571-596.

Hara, M., and J. Raakjær Nielsen. 2003. Experiences with fisheries co-management in Africa. In *The Fisheries Co-management Experience: Accomplishments, Challenges and Prospects*, eds. D. C. Wilson, J. Raakjær Nielsen, and P. Degnbol, 81-97. Dordrecht: Kluwer Academic Press.

Ikwaput Nyeko J. Carol.T. Kirema-Mukasa, Timothy Odende and Angelous T. Mahatane . 2009. Management of Fishing Capacity in the Nile Perch Fishery of Lake Victoria. *African Journal of Tropical Hydrobiology and Fisheries* 12:67-73

Jul-Larsen, E., J. Kolding, R. Overå, J. Raakjær Nielsen, and P. A. M. van Zwieten. 2003. Management, co-management or no management? Major dilemmas in southern African freshwater fisheries. 1. Synthesis report. *FAO Fisheries Technical Paper*. No. 426/1. Rome: FAO.

Kayanda, R., A. M. Taabu, R. Tumwebaze, L. Muhoozi, T. Jembe, E. Mlaponi, and P. Nzungi. 2009. Status of the Major Commercial Fish Stocks and Proposed Species-specific Management Plans for Lake Victoria. *African Journal of Tropical Hydrobiology and Fisheries* 12:15-21.

LVFO. 2007a. *Guidelines for Beach Management Units (BMUs) on Lake Victoria*. Jinja: LVFO.

LVFO. 2007b. *Guidelines for Fisheries Co-management on Lake Victoria*. Jinja: LVFO.

LVFO. 2007c. *Regional Plan of Action for the Management of Fishing Capacity in Lake Victoria (RPOA-Capacity)*. Jinja: LVFO.

LVFO. 2008a. *Regional Status Report on Lake Victoria Bi-Annual Frame Surveys Between 2000 and 2008. Kenya, Tanzania and Uganda*. Jinja: LVFO.

LVFO. 2008b. *The Fisheries Management for Lake Victoria 2009-2014*. Jinja: LVFO.

LVFO. 2008c. *The Joint Communiqué of the Council of Ministers of the Lake Victoria Fisheries Organization issued in Kampala, Uganda on 29th October 2008*. Jinja: LVFO.

LVFO. 2009. *Report of the 7th Regular Session LVFO Council Of Ministers, Sea Cliff Hotel, Dar-Es-Salaam, Tanzania, 27th February 2009*. Jinja: LVFO.

LVFO. 2010. *Report of the 5th Special Session of the LVFO Council of Ministers Speke Resort, Munyonyo, Kampala, Uganda 28th May 2010*. Jinja: LVFO.

Macfadyen, G. 2008. Sustainable financing of LVFO institutions and development of a Business Plan for the Organisation. *IFMP Consultancy Report No. 41*. London: MRAG Ltd.

Marine Resources Assessment Group (MRAG), PMTC, and Lamans. 2008. *Provision of Technical Services for the Implementation of a Fisheries Management Plan for Lake Victoria: Final Report*. London: MRAG.

Nunan, F. 2010. Mobility and fisherfolk livelihoods on Lake Victoria: Implications for vulnerability and risk. *Geoforum* 41(5):776-785.

Ostrom, E. 1990. *Governing the commons: The evolution of institutions for collective action*. Cambridge: Cambridge University Press.

Pascoe, S. and D. Gréboval, eds. 2003. Measuring capacity in fisheries. *FAO Fisheries Technical Paper*. No. 445. Rome: FAO.

Plummer, R., and J. Fitzgibbon. 2004. Co-Management of Natural Resources: A Proposed Framework. *Environmental Management*, 33(6):876-885.

Pomeroy, R. S., B. M. Katon, and I. Harkes. 2001. Conditions affecting the success of fisheries co-management: lessons from Asia. *Marine Policy* 25:197-208.

Pomeroy, R. S., and R. Rivera-Guieb. 2006. *Fishery Co-management: A Practical Handbook*. Ottawa: International Development Research Centre.

Pringle, R. M. 2005. The Nile Perch in Lake Victoria: Local Responses and Adaptations. *Africa: Journal of the International African Institute* 75(4):510-538.

Schlager, E., and E. Ostrom. 1992. Property-Rights Regimes and Natural Resources: A Conceptual Analysis. *Land Economics* 68(3):249-262.

Sen, S., and J. Raakjær Nielsen (1996) Fisheries co-management: a comparative analysis. *Marine Policy* 20(5):405-418.

van Laerhoven, F. and E. Ostrom (2007) Traditions and Trends in the Study of the Commons. *International Journal of the Commons* 1(1):3-28.

Ward, J.M., J. E. Kirkley, R. Metzner, and S. Pascoe. 2004. Measuring and assessing capacity in fisheries. 1. Basic concepts and management options, *FAO Fisheries Technical Paper*. No. 433/1. Rome: FAO.

World Bank. 2004. *Saving Fish and Fishers*. Washington, D. C.: World Bank.

World Bank, and FAO. 2009. *The Sunken Billions: The Economic Justification for Fisheries Reform*. Washington, D. C.: World Bank.