

Effective lake basin management institutions: lessons from African lakes

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Abstract Weak or non-existent institutions are often cited as a major constraint facing management of many lake basins in Africa. By their nature lake basins cut across many sectoral and jurisdictional interests and therefore it is always the case that management of the basins is affected by actions within the various sectors and jurisdictions. Because of the complex nature of issues within lake basins, authority over management of lake basins is dispersed among several institutions, with no single institution having overall authority. Under these circumstances, a major challenge in lake basin management is how to ensure effective coordination among the various players. This paper reviews the situation of lake basin management at eight African lake basins and draws important lessons about lake basin management institutions. It is noted that fragmented approaches, lack of coordination across sectors, and lack of monitoring and enforcement are major institutional weaknesses. Also, it is observed that political will and commitment are essential for the management of African lake basins.

Keywords African lakes; institution; institutional coordination; lake basin management; policy

Introduction

The African continent is home to many lakes ranging from the very large lakes to the very small ones. The lakes are of great importance to the riparian countries and populations who depend on them for water, food (fisheries), transportation, hydroelectric power generation, recreation and many other uses. Lakes Malawi/Nyasa, Tanganyika and Victoria are also home to many endemic species of great global biodiversity significance. Despite their importance, many African lake basins are faced with multiple problems that threaten their sustainable use (Ballatore and Muhandiki, 2002; UNEP, 2004a,b; ILEC, 2005; Ndeti and Muhandiki, 2005). While problems are common to many lakes around the world, they are of particular concern in African lakes because many people in Africa depend directly on the lakes for their livelihoods. The management of African lakes is particularly complicated by the fact that many of the lake basins are international.

The root causes of lake degradation can to a large extent be attributed to socio-economic factors within the drainage basins of the lakes. Rapid population growth, poverty, urbanization and industrialization put a lot of pressure on lakes due to increased demands for developing and using lake basin resources. Limited awareness and understanding on the part of the general public and decision makers of how human activities impact lakes also contributes to degradation. Another contributing factor is institutional weakness. In recent years, institutional issues have received particular attention by many funding agencies for lake basin management because of the critical role institutions play in lake management (GEF, 1996; World Bank, 2001). In Africa many funding agencies have increasingly placed more emphasis on institutional capacity development.

This paper reviews lake management at selected African lake basins to draw lessons on the requirements for effective lake basin management institutions. In this paper institutions are broadly defined to include policies, laws and regulations, and the organizations that administer these. The paper draws on lake briefs prepared for eight African lakes in a recently completed Global Environment Facility (GEF) project called Lake Basin Management Initiative (LBMI) (ILEC, 2005).

Case study lake basins

The eight African lakes included in this review are depicted in Figure 1. The lakes represent a wide range of bio-physical characteristics, problems, political jurisdictions, and management challenges (ILEC, 2005). Table 1 summarizes the important characteristics. Institutions involved in the management of the lake basins are listed in Table 2.

Lake Baringo

Lake Baringo is a shallow freshwater lake located in the Kenyan Rift Valley (Figure 1). It provides water for humans and livestock as well as fishing, biodiversity and tourism. Soil erosion and the associated siltation of the lake is a major problem that is attributed to overgrazing, deforestation and poor agricultural practices. Other concerns include loss of biodiversity and decline of fisheries (Odada *et al.*, 2005a). Several governmental and non-governmental institutions are involved in the management of the lake. Efforts by the various players tend to be sectoral or narrowly focused.

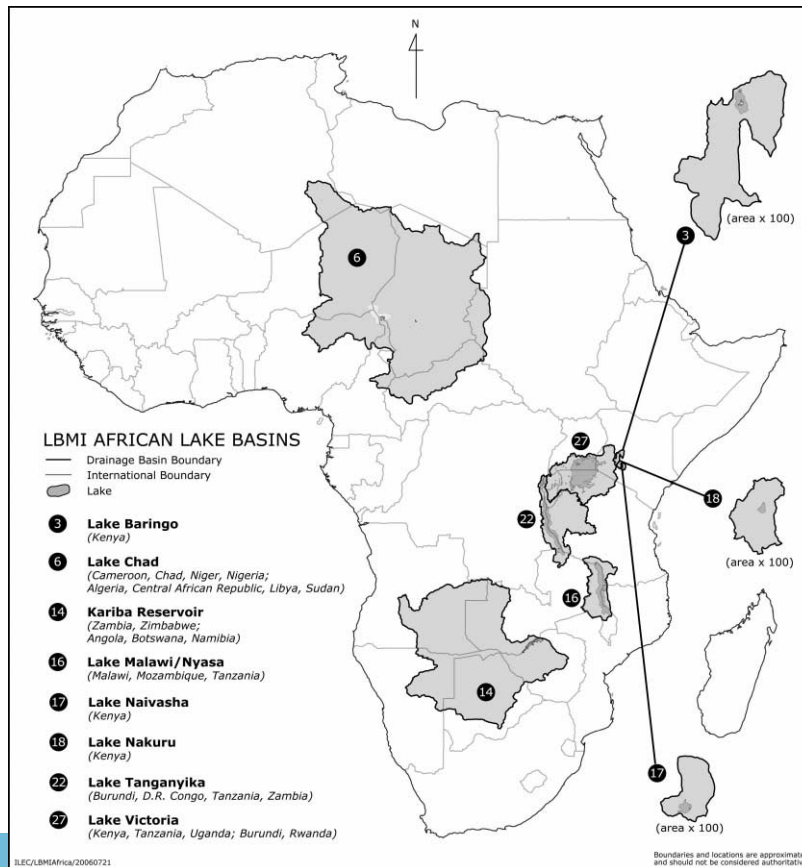


Figure 1 LBMI African Lake Basins (ILEC, 2005)

Table 1 Characteristics of case study lake basins

Lake	Baringo	Chad	Kariba	Malawi/ Nyasa	Naivasha	Nakuru	Tanganyika	Victoria
Basin countries								
Riparian	Kenya	Cameroon, Chad, Niger, Nigeria	Zambia, Zimbabwe	Malawi, Mozambique, Tanzania	Kenya	Kenya	Burundi, DRC, Tanzania, Zambia	Kenya, Tanzania, Uganda
Non-riparian		Algeria, CAR, Libya, Sudan	Angola, Botswana, Namibia				Rwanda	Burundi, Rwanda
Area (km ²)								
Lake	108	1,350	5,580	29,500	140	30	32,600	68,800
Basin	6,820	2,400,000	687,049	100,500	2,240	1,800	223,000	193,000
Pop. density (per km ²)		9	20	68	76	222	45	155
GNI ^a (USD per capita)	400	355	430	223	400	400	218	317

Source: ILEC (2005)

Note: GNI values are arithmetic average for riparian countries for 2003, based on GNI data available at <http://www.worldbank.org>

Table 2 Major lake basin management institutions at case study lakes

	International?	Major institutions	Legal mechanism	Function
Baringo	No	No specific lake basin institution		
Chad	Yes	Lake Chad Basin Commission	International Treaty	Coordination
Kariba	Yes	Zambezi River Authority	International Agreement	Resource Dev., Coordination
		Zambezi Watercourse Commission	International Agreement	Advisory
Malawi/Nyasa	Yes	Lake Malawi/Nyasa Basin Commission (proposed)	International Convention	Coordination
		Lake Nyasa Basin Water Office - Tanzania	National Law	Regulation
Naivasha	No	Lake Naivasha Riparian Association	No legal status	Protection
		Lake Naivasha Growers Group	No legal status	Resource Development
Nakuru	No	No specific lake basin institution		
Tanganyika	Yes	Lake Tanganyika Management Authority (proposed)	International Convention	Coordination
		Lake Tanganyika Basin Water Office - Tanzania	National	Regulation
Victoria	Yes	Lake Victoria Fisheries Organizations	International Agreement	Regulation
		Lake Victoria Basin Water Office - Tanzania	National Law	Regulation
		Lake Basin Development Authority – Kenya	National Law	Resource Development
		Lake Victoria Basin Organization (proposed)	International Agreement	Coordination

Source: ILEC (2005)

Note: Sectoral and local institutions involved in lake basin management but whose primary function is not lake basin management are not listed

The lake was designated as a Ramsar site in 2001. The United Nations Environment Program (UNEP)/GEF Lake Baringo Community-Based (LBCB) Land and Water Management Project (2000–2004) is a major initiative implemented in the basin. The project aimed at promoting integrated lake basin management through building capacity and creating awareness among local communities and coordinating and facilitating among stakeholders.

Lake Chad

Lake Chad (Figure 1) is one of the largest African Great Lakes, although it has shrunk dramatically over the past 40 years to about one-tenth of its normal size. The lake is a vital source of water for humans, livestock and wildlife. It is also important for its fisheries and biodiversity and is a designated Ramsar site. The shrinkage of the lake is attributed to both natural (climate variability) and human (water abstraction) causes. There have been severe droughts in the region over the past years. Serious conflicts exist in the lake basin over use of limited water resources. Other concerns in the lake include unsustainable fishing and siltation.

There are various governmental and non-governmental institutions at the national level responsible for managing the lake. The Lake Chad Basin Commission (LCBC) is an inter-governmental agency established in 1964 by the Fort Lamy (N'Djamena) Convention to coordinate resource utilization in the basin. Of the eight basin countries, only six (Cameroon, Central African Republic (CAR), Chad, Niger, Nigeria and Sudan) are members of the Convention (UNEP, 2004b, Odada *et al.*, 2005b). LCBC is the oldest inter-governmental lake basin management authority among the eight lake cases reviewed here. With funding from the GEF, a Strategic Action Plan (SAP) with a 20-year long-term vision for the Lake Chad Basin was prepared and adopted by LCBC Member States in 1998. Odada *et al.* (2005b) note the following shortcomings regarding the Convention: failure to prescribe water allocation rules; lack of monitoring and enforcement of agreements; uncoordinated water resources development; and absence of integrated drainage basin management strategy.

Kariba Reservoir

Lake Kariba (Figure 1) is a man-made reservoir constructed mainly for generating hydroelectricity. Lake Kariba is also important for fisheries and tourism. The fishing industry in the lake is dominated by a few Zimbabwean entrepreneurs, leading to the problem of lack of equitable access between Zambia and Zimbabwe on the one hand, and between local artisan fishermen and entrepreneurs on the other hand (Magadza, 2005). Major problems in the lake are weed infestation, effluent discharge, nutrient input, and climate change. During the construction of the lake, the Tonga people (an indigenous minority) were displaced by the then colonial British Government without adequate compensation.

The Zambezi River Authority (ZRA), formed by bilateral agreement between Zambia and Zimbabwe, is responsible for managing the lake. However, the functions of ZRA are mainly related to hydroelectric power generation and not lake basin management *per se*. The Zimbabwean side of the lake is managed as a protected National Park with various government agencies actively involved in regulation of land use, unlike the Zambian side (Magadza, 2005). The lake also falls under the Southern African Development Council (SADC) Protocol on Shared Water Courses, but this protocol has limited authority. In general, there is lack of inter-agency coordination in the lake basin at both national and international levels. Furthermore, there is no framework for NGOs and citizens to participate in the management of the lake. A basin-wide commission, the Zambezi River Commission (ZAMCOM), has been proposed to be formed to overcome these shortcomings.

Lake Malawi/Nyasa

Lake Malawi (Figure 1) has the third largest volume and the ninth largest surface area of all freshwater lakes in the world. It is also the third deepest freshwater lake in the world. A border dispute within the lake exists between Malawi and Tanzania. The lake is estimated to be about ten million years old and is the most species-rich lake in the world, with an estimated 500–800 species of fish most of which are endemic (UNEP, 2004a; Bootsma and Jorgensen, 2005). The lake is also important as a water source, for transportation and hydropower generation. Unsustainable fishing, siltation, nutrient input and climate change are major problems facing the lake.

The lake is managed by various government institutions. Like the other two East African Great Lakes (Tanganyika and Victoria), the fisheries sector dominates over other sectors. Management of the lake basin in the riparian countries is sectoral with minimal stakeholder involvement (Bootsma and Jorgensen 2005). However, all the three countries have recently put in place legislative and institutional frameworks for management of environment and water resources. At the transboundary level, the three riparian countries in 2003 developed a draft convention on the sustainable development of the lake and its basin with support from Food and Agriculture Organization (FAO). A Lake Malawi/Nyasa Basin Commission has been proposed to be established under the draft convention.

Lake Naivasha

Lake Naivasha (Figure 1) is a small shallow freshwater lake located in the Kenyan Rift Valley. The lake supports a rich ecosystem comprising hundreds of bird species, wildlife and grassland savannah. Over the years, the lake has been transformed from its traditional use as a watering point for livestock to a source of water for irrigation. Starting from 1980s, commercial horticulture dominated by cut flowers for export has become the major industry in the lake basin (Becht *et al.*, 2005). Lake Naivasha is also important for fisheries. Change in lake water levels due to natural reasons and over-abstraction of water for agriculture are major problems.

The Lake Naivasha Riparian Association (LNRA), a stakeholder organization established in 1929 has since the late 1980s been taking a leading role in coordinating conservation activities in the lake basin. Major achievements of LNRA are the designation of Lake Naivasha as a Ramsar site in 1995 and the development of the Lake Naivasha Management Plan which was approved and gazetted by the Kenyan Government in 2004 under the Environmental Management and Co-ordination Act (1999). As Becht *et al.* (2005) note, the major challenge in the basin is how a profitable multimillion-dollar horticultural economy can co-exist within a Ramsar site.

Lake Nakuru

Lake Nakuru is a shallow alkaline-saline lake in the Kenyan Rift Valley (Figure 1). The lake is renowned for its low species diversity and huge congregations of lesser flamingos. The lesser flamingos are a major tourist attraction, contributing significantly to the regional and national economy. In recent years, there has been concern over sporadic lesser flamingo mortalities in Lake Nakuru. The flamingo deaths have been attributed to poisoning by heavy metals, pesticides, and algal toxins, bacterial infection, and malnutrition (Ndeti and Muhandiki, 2005). Major concerns in the lake basin include water abstractions, deforestation, cultivation and urbanization.

Lake Nakuru National Park (LNNP), which comprises the lake and the area surrounding it, is a protected National Park under the Wildlife Act. The park is the second most important National Park in Kenya in terms of earnings from tourism. LNNP is a UNESCO designated World Heritage site, Kenya's first Ramsar site, and also Africa's

first bird sanctuary (Odada *et al.*, 2005b). LNNP is managed by Kenya Wildlife Service (KWS), a government agency. Several other governmental and non-governmental institutions are also involved in the management of the lake basin. A Lake Nakuru Ecosystem Integrated Management Plan (LNEIMP) has been developed. A sensitive issue regarding the management of the lake is the distribution of revenues from the park fees between the central and local governments.

Lake Tanganyika

Lake Tanganyika (Figure 1) is the largest of the African Rift Valley lakes by volume. It is also the second largest freshwater lake and the second deepest lake in the world. The lake is very old (about 10 million years) and has about 600 endemic species out of the total of 2,000 species in the lake. The lake is important as a source of water, for transportation, fisheries, and biodiversity. Because of the enormous size of the lake, it receives relatively less pollution compared to other sub-Saharan African lakes. However, rapid population growth in the basin should be a cause for alarm. Threats in the lake include unsustainable fishing, effluent discharge, siltation, and climate change (UNEP, 2004a; Jorgensen *et al.*, 2005).

Various government institutions are responsible for management of the lake in the riparian countries. However, the focus is mainly on the fisheries sector. Major weaknesses identified with the institutions are lack of resources, lack of appropriate policy and legislative frameworks, non-enforcement of existing regulations, and lack of coordination across sectors. There is lack of harmonization of fisheries-related laws and regulations among the riparian countries. The United Nations Development Program (UNDP)/GEF Lake Tanganyika Biodiversity Project (LTBP) implemented from 1995–2000 resulted in a Transboundary Diagnostic Analysis (TDA), a Strategic Action Program (SAP) and The Convention for the Sustainable Management of Lake Tanganyika.

Lake Victoria

Lake Victoria (Figure 1) is the second largest freshwater lake in the world and the largest in Africa in terms of surface area. Lake Victoria is the source of the Nile River, the longest river in world with ten countries in its basin. The lake has the world's largest freshwater fishery that is dominated by the Nile perch, an introduced species. The export fishery of the lake is a major source of income for the riparian countries. In some cases fishing has been transformed from subsistence to a largely commercial activity. Other uses of the lake are as a source of water, transportation, and hydroelectric power generation. Threats in the lake include eutrophication, over-exploitation of fisheries, exotic species, and climate change (UNEP, 2004a; Kayombo and Jorgensen, 2005). There is controversy over the relative contribution of atmospheric deposition to the nutrient load (Kayombo and Jorgensen, 2005).

The East African Community (EAC) is the main regional forum for discussing management issues for Lake Victoria. The other relevant regional organization is the Lake Victoria Fisheries Organization (LVFO). Management efforts are centered mainly on fisheries because of the economic importance of the sector. A ban on fish import by the European Union (EU) due to poor hygiene led to improvement in fisheries management because the riparian countries could not afford to lose the export earnings. Other aspects of lake management are nationally based and uncoordinated, with no common lake management protocol, no common water quality standards or discharge standards (Kayombo and Jorgensen, 2005). Several donor-funded projects have generated much knowledge in the basin. The Nile Basin Initiative (NBI) is a regional initiative by the ten Nile Basin riparian countries aimed at promoting mutually beneficial use of the basin resources.

Lessons learned

Building political will and commitment is essential

For lake basin management to be successful, it is important to cultivate political will, support, and commitment at the highest political level. Many African countries are still young democracies with centralized decision making where politics plays a big role in the allocation of scarce resources. To foster political will and commitment among politicians, they need to understand the range of socio-economic values that lakes offer. In particular, since poverty is a key issue in Africa, it is important to make clear the link between lake basin management and poverty reduction. This requires comprehensive assessment of the values of lakes in terms that can be easily understood by decision makers. None of the cases reviewed here has made such a comprehensive assessment.

Building an enabling environment at the national level is essential

Establishment of appropriate legislative frameworks at the national level provides an enabling environment for implementation of lake basin management. Most of the riparian countries in this review have recently put in place relevant legislation. For instance, in Kenya, Lakes Naivasha and Nakuru have already taken advantage of the newly enacted Environmental Management and Coordination Act to establish a lake basin management plan. However, while establishment of such institutional arrangements is essential, it is in itself not a sufficient condition for effective lake basin management. All the eight cases reviewed showed fragmented approaches, lack of coordination across sectors, and lack of monitoring and enforcement as major institutional weaknesses.

Outside pressure and recognition can be important drivers for reform

Stricter standards and requirements especially by major non-basin consumers of lake basin resources can be important drivers for institutional reform. This is clearly demonstrated in the case of Lake Victoria where an EU ban on import of fish due to poor hygiene led to improvements. Likewise, international recognitions such as Ramsar sites or UNESCO World Heritage sites can provide impetus for lake basin conservation. However, in the absence of strong external motivations, it is important to build a strong logical case to catalyze action as discussed in the preceding lesson.

Capacity building and training are essential

Capacity building should be a long-term process capable of sustaining lake basin management. The lakes reviewed here have benefited greatly from various scientific and technical staff training programs through donor-funded projects. Such programs should be designed to feed into the relevant long-term lake basin management institutions when the projects terminate. Lack of long-term retention of highly trained professionals is an issue that should be addressed.

Multidisciplinary research should be enhanced

Proper understanding of the physical, chemical and biological processes and socio-economic factors is critical to decision making for lake basin management. This calls for multi-disciplinary research as opposed to the traditional focus on fisheries research on many African lakes. Priority should be given to research that is of direct relevance to critical lake management issues. For example, in Lake Victoria, the controversy regarding the contribution of atmospheric deposition to the nutrient load should be a priority research issue. Much data and information have been collected through many research projects on African lakes. Assembling these data and information into appropriate packages for sharing and dissemination is important.

Involvement of stakeholders is essential

Participation of all stakeholders is essential for effective lake basin management. Involving stakeholders in all stages of lake management programs fosters their understanding and awareness of lake problems and how they can contribute to solving the problems. The case of the displaced Tonga people in Lake Kariba shows the need for dialogue between developers and those likely to be affected by development. In many African countries, public participation is a new idea that is slowly being incorporated in decision making and still has a long way to go.

NGOs and CBOs play an important role as facilitators

Many of the case studies reviewed showed that NGOs and CBOs played a central role as facilitators through activities such as sensitization, information collection and sharing, networking, advocacy, and fund raising. This role is well illustrated by Lake Nakuru Riparian Association (LNRA), a stakeholder organization that has been at the forefront in the management of Lake Naivasha. However, consensus building efforts take time to yield fruit and therefore require patience.

Sustained financing is essential

Donor funding has played an important role in the management at all the lakes reviewed. However, many externally funded initiatives often terminate once donor funding ends. Long-term financial sustainability should be addressed when designing such programs. Self-financing mechanisms such as user fees and levies should be explored. Appropriate measures should be instituted to ensure that part of the revenues generated from use of lake basin resources are ploughed back into the basins.

For international lakes, developing mechanisms for cooperation is essential

The development of cooperative arrangements and a shared vision is important not only for lake management but also for fostering regional trade and cooperation. While it may be desirable, even in the absence of lake basin specific inter-governmental institutional arrangements, issues can still be addressed through existing non-lake specific regional institutions. The success of these initiatives depends on the political will of the member states to abide by agreements.

Conclusions

Institutions play a central role in lake basin management. In fact, it may be argued that institutions are the key issue in the management of African lake basins. This review has looked at eight case studies and drawn lessons on lake basin management institutions. Various ongoing initiatives within the lake basins indicate that there is room for optimism regarding improved lake basin management. The lessons compiled here provide useful guidance towards this optimism.

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