

Capacity Development in the Lake Victoria Basin, East Africa

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1.0 Introductory Context

1.1 Region and Water Resources

Lake Victoria, the second largest fresh water lake in the world, is also the largest lake in Africa, with a surface area of some 68,000 km². However, unlike other Great Lakes of East Africa, it is comparatively shallow. The lake's main physical parameters, as summarized by Balirwa (1998), are given in Table 1.

1.2 Land Use and Basic Human Demography

Agriculture is the major activity around the Lake, but there are also significant industrial developments within large urban areas. The comparatively good fertility of the basin, with the added attraction of income generation from fishing, has resulted in significant population pressure. The Lake Victoria 2000 Conference (LVFO, 2001) noted that current

Table 1. Morphoedaphic Characteristics of Lake Victoria

Characteristic	Measure
Position: Latitude Longitude	00° 20' N to 03° 00' S 31° 39' E to 34° 53' E
Altitude [m above mean sea level]	1134
Catchment area [km ²]	184,000
Lake Surface Area [km ²]	68,800
Lake area as %age of catchment	37
Shoreline [km]	3,440
Maximum length, North–South [km]	400
Maximum width, East–West [km]	240
Mean width [km]	172
Maximum depth [m]	84
Mean depth [m]	40
Volume [km ³]	2,760
Inflow [km ³ yr ⁻¹]	20
Outflow [km ³ yr ⁻¹]	20
Precipitation [km ³ yr ⁻¹]	114
Annual fluctuations in level [m]	0.4–1.5
Flushing time [yrs]	138
Residence time [yrs]	21

population stands at some 30 million, but with expected population growth rates of 3–6% (including immigration); this may increase by 55% in the next decade. Overall, the lake catchment provides a livelihood for close to one third of the East African Community's population, and this proportion may rise. Per capita incomes lie between US\$90 and US\$270 (World Bank, 1996).

1.3 Economic Development

Although the degree of industrialisation and of urban and rural development show no great differences from other areas of East Africa, significant differences can be seen in the rapid commercialisation of the fishery, especially in the export-oriented activity for Nile Perch (*Lates niloticus*), a species introduced in the 1950s (Ogutu-Ohwayo, 1990). Such commercialisation has had a profound effect on the ecology of the lake, including displacement or extinction of many endemic species (Greenwood, 1951, 1974; Goldschmidt & Witte, 1992; Ogutu-Ohwayo, 1992, Witte et al., 1992). It has also affected the social fabric of traditional fishing communities and, of course, the foreign currency earnings of the riparian states. The gross economic product of the lake is estimated at US\$3–4 billion annually, with combined annual fish export earnings at US\$600 million, of which US\$240–480 million is paid directly to fishers.

1.4 Jurisdiction and the Political Environment

In terms of surface area, Kenya, Tanzania and Uganda, now partner states in the East African Community (EAC), respectively have control over 6%, 49% and 45% of the total lake area.

Overwhelmingly, the politics of management and ownership of the lake fall into the larger context of the establishment and development of the East African Community (EAC, 2000). Within the Community, two institutions on Lake Victoria have been established. These are the Lake Victoria Fisheries Organisation (which is specific for fisheries) and the Lake Victoria Development Programme (covering general development matters of the Basin).

The EAC Partner States recognise three important and convergent issues relating to management of shared waters. These are, firstly, that they share an interest in the well being of the lake and its living resources and in the rational management and sustainability of these resources. Secondly, they recognize the need to develop Lake Victoria region as an Economic Growth Zone. Thirdly, they agree that management decisions relating to any portion of the lake, within the territorial limits of any one of the Partner States, will affect the others, and hence there is the concomitant necessity that management decisions take such into account.

1.5 Water Management and Shared Water Issues

Whereas geographic sovereignty and political ownership of land is clear, the ownership and management jurisdiction of the highly mobile aquatic resources is less so. The Lake Victoria basin is not just a water body shared among the three East African Community states, but its geographical location has international legal implications, especially with Sudan and Egypt, within the River Nile Basin, and with Rwanda and Burundi, due to its connection with the Kagera River Basin. The mechanisms governing the utilization of water and living aquatic resources shared by two or more states raises many concerns, partly because of the value of the resource for national policy and partly because states often invoke legislative or diplomatic interests (Okedi, 1980). Given the immense value of the export-oriented fishery and its nutritional importance domestically, it is understandable that protection of national interests may sometimes take precedence over the spirit of the EAC Treaty and LVFO Convention (LVFO, 2001).

Principally, three categories of issues arise concerning the shared fishery resource of the lake. The first of these is traditional practice, where artisanal fishers encroach on the jurisdiction of others, given that the target species can be highly migratory. The second relates to the rights of fishers to land fish in another country where price/tariff structures

and access to commodities may be more conducive to business. The last issue concerns trade, especially the purchasing of fish by commercial processors in one country and their processing and export from another.

2.0 Current State of the Coastal Environment

The key water issues, from the point of view of East Africans, are manifold and revolve around the competitive requirements for water for irrigation, domestic use, industrial purposes and hydropower generation

Another issue is the conservation and management of the substantial wetlands ecosystems surrounding the open lake. Population growth threatens these areas in many ways,¹ including their important functions as natural filters of effluent into the lake and as a refuge for a great number of aquatic and terrestrial species.

Agricultural land-use together with deforestation, with its consequent soil erosion, nutrient release and inflow of physical materials into the lake, are also contributing greatly to eutrophication of Lake Victoria. Compounding this is a significant degree of organic and inorganic pollution. Some areas also suffer from rapid rates of siltation.

The transboundary nature of Lake Victoria presents the main challenge to regional management of water and other aquatic resources. Thus, more often than not, disputes arise over access to fisheries grounds, smuggling of fish and other goods across borders, piracy and theft. Attempts to resolve problems of this nature are complex and compounded by lack of joint boundary patrols and coordination of law enforcement in such a huge lake. The latter is understandable

¹ Land for housing, land for cultivation, land for industrial development and ponds for aquaculture.

considering the limited resources available to the three states compared with the lengths of coastline, length of boundaries within the lake and the population density.

The potential for oil spillage in the lake is considerable, but the investment and development of infrastructure to respond to a situation is minimal and the capacity to remedy such an occurrence, dismally insufficient. Safety in water transport is also an ever increasing problem facing regional management. Poor seaworthiness of vessels, lack of coordinated coastguard systems, and poor capacity to respond to disasters, such as shipwrecks, all contribute to the real dangers on the lake. However, some effort has been made through the East African Community to conduct bathymetric charting of the lake to improve shipping security.

Many other issues, however, are being managed quite effectively. The establishment of regional inter-government institutions, as part of the larger political entity of the EAC, is providing a basis for harmonisation of legislation and establishment of uniform standards. Creation of databases and dissemination of information is continuing. Regional integrated programmes have been initiated to address such issues as human resources development, GIS water resource mapping, and regional planning for fisheries management. Private sector fish processors, targeting common markets, are employing internationally accepted standards for quality and sanitation. Water laboratory standards have now been streamlined and harmonised. In the commercial private sector, the three national Fish Processors and Exporters Associations are considering nongovernmental interventions for sustainable fisheries management.

Some issues still remain unresolved. There are problems in mobilising and empowering citizens, which means that community responses to issues remain low and largely unfocussed. Part of the reason for this is the lack of ownership of natural resources, difficulties in cross-border trade and an

imbalance in the ownership of the means of production. Additionally, even where resolutions and decisions have been made, the speed of implementation is worrying. Partly this delay is political. Short-term microeconomics, investments in health and education, issues of food security, maximised employment, and highly visible development projects are often more attractive to politicians than the long-term management of a viable fishery.

Human and ecological health problems still remain critical issues. Water-borne and water-related diseases, such as dysentery, malaria, bilharzias, typhoid, etc, are still common. Social habits, lack of education, and lack of ready cash (or vice versa) have contributed synergistically to the HIV/AIDS epidemic; migration of fishermen has made epidemiological control very difficult. Whilst high protein foods, such as fish, are common, often they are sold rather than consumed. This situation has greatest impact on those with a high protein demand, such as the young, pregnant women, and lactating mothers.

3.0 Assessment of Capacity Needs

3.1 *The Capacity to Educate, Train and Raise Awareness*

Community Awareness Raising: Principally due to a lack of facilitation and empowerment, the impact of major development initiatives at the community level has been minimal. Awareness of programme opportunities amongst community members and their leaders remains low. Fieldwork carried out in the fisheries sector, for example, indicates that contact, collaboration and development through community programmes has been limited to “accessible, high profile” landing sites, while the vast majority of the 1600 such sites on the lake remain marginalized.

Apart from a lack of facilitation, attempts to raise awareness and participation have often suffered from design flaws in community initiatives. Specifically, programmes have not addressed causative constraints to community

development, nor placed emphasis on ownership and sustainability. Instead, for example, they have invested in infrastructure such as school buildings and dispensaries, but with no recognition of the issues of ownership, running costs, staffing, maintenance, etc. In short, programmes have concentrated on “what communities do not have” rather than “why communities do not have them.”

Capacity in the public sector, whether at the national or district level, to promote community awareness, to assist in mobilisation and organization and to develop management skills, suffers from the lack of inter-departmental coordination and cross-fertilisation of ideas. This is a pity because the strengths already in place have not been utilized; cost effectiveness has been poor and the impacts of community efforts low. As a result, community understanding of issues concerning management, legislation, and sustainability remain weak.

To address this situation, programmes employing integrated approaches have been designed to build capacity in the public sector, to address training needs at the community level and to develop human resources at the institutional level. This programme will be integrated throughout the ecosystem, and has been designed over a two-year period (LVFO, 2002).

Capacity to effect awareness raising in academia needs to be enhanced, while capacity in the private sector, already limited, needs to be redirected. For example, an anomaly exists where current NGO/donor philosophy demands that initiatives should spring from the grass roots. This is an idealised way of thinking, with two major flaws. Firstly, the communities are often unaware of the existence of potential assistance programmes, so it is difficult for them to prioritise, modify, evaluate and decide on allocation of resources. This is due, in part, to logistics, and to reluctance amongst disseminators to be seen as promoting their own ideas. Secondly, and again partly due to logistics, it is often local leaders, rather than the community at large, who are delegated responsibility to set

priorities. Due to tradition, status and often vested interest, this results in the selection of livestock and agricultural development as the priority issue for action. Objective assessment of the potential from investment in water and fisheries development seldom occurs, since most decision makers consider these as communal, God-given, or wild assets. A further complication is that NGOs and donor agencies remain relatively unaware of the local management situation, including problems and potential. It would be beneficial if these agencies also received awareness training about community situations and scenarios, to effectively target and deliver assistance.

Regarding the Lake Victoria fishery, there is currently a great disparity between the sophistication of the export-driven, private sector and the artisanal fish catchers. There is opportunity and great potential for these mutually dependent sectors to interact and hence create awareness of managerial, regulatory and sustainability issues. Rapid feedback could be achieved, community training needs analysed and effective responses designed, without an over reliance on limited public service resources. Both sectors have everything to gain by strengthening this two-way information flow.

Formal Education: Education opportunities in the aquatic disciplines must be viewed in the context of the availability of formal education to all. The education sector is underfunded, as in all developing countries. Human resources to deliver education are limited, with salaries and facilities within the sector unattractive to most potential entrants. Thus teaching itself is not seen as an attractive career. Population and social pressures have led parents, in many instances, to take children from school and involve them in family work. This is especially true in fishing and herding communities, and applies equally to boys and girls.

Additionally there has been no perception of a need for formal education related to lake activities. Even now, the vast majority of graduates working in lake activities are

qualified in marine biology or similar. In schools there is a need to develop broader curricula with water-related disciplines interspersed throughout the entire education process. By doing so, career paths could be offered which ensure that relevant and necessary human resources are developed and maintained to address water-related issues.

Throughout, capacity to educate on a broad front is limited by a rigid compartmentalisation of activities. Education is seen as an academic process with little practical application. Technology transfer among sectors of the community and throughout the education process is negligible. At the tertiary level, universities have little contact with practical programmes or initiatives, instead focusing (understandably, due to lack of funds) on classroom oriented education. Historically, educators have remained aloof from the practical and commercial realities. The translation of academic products into private enterprise and programmes is therefore lacking. There is a need to stress that academic research findings must be evaluated for their application in solving water problems in East Africa.

There is an undoubted need for education to develop practical linkages with the private sector, and to become more demand driven. It is not clear if the education sector is capable of so evolving, but assistance from a vibrant fisheries industry, for example, could be a catalyst for change. If private funds were to be perceived as an investment in people, rather than as an open ended donation, it is quite possible that the relevance and applicability of the education process could be enhanced. Research, even community based or involving junior schools, could be developed and prioritised by the private sector and riparian communities.

Technical Education: Technical education of direct relevance to the Lake Victoria system has traditionally been a national concern. The delivery of such education (or training) has rested entirely in the public sector domain, through vocational training in specific

institutions. There is a great need to strengthen this system and to do so within the context of taking technical education and skills upgrading to the people, rather than vice versa. Although the degree of development differs from state to state, the concept of village polytechnics and their role in technical education requires revival and strengthening.

Adult Training: Within the region, the level of adult literacy is very low. As a result, the population is largely unable to engage in adult training or retraining programmes. This is problematic, since initiatives to put co-management schemes in place (i.e., the sharing of responsibility for water resources² management between government and riparian user groups (Sen & Nielsen, 1996; Hara et. al., 2002; Malasha, 2002; Njaya, 2002; Wilson, 2002)) would be both more effective and legitimate if adult literacy levels amongst the riparian resource user groups were increased.

Needs assessments in the fisheries sector have been conducted for the whole of the Great Lake region. Public sector involvement in adult education, particularly in rural communities, is almost non-existent. The little that does exist is largely donor dependent. Given the current stress on the formal education sector, there is no immediate possibility that formal adult education could become a universal reality. On the other hand, vocational training, or specific adult training to achieve specific objectives, remains one of the principal goals of human resources development programmes in the region. It is recognized that if communities are to take up the responsibilities of co-managing water resources, they must be equipped with the requisite tools.

Drawing an example from the fisheries sector, a comparison was made of the training needs as perceived by communities and the managers

of the fishery. This study showed a number of discrepancies in the perceptions of the two groups (Table 2). Firstly, of the 24 training needs identified by the communities and the fisheries staff who work alongside them, there was only 58% agreement on the key training issues. Secondly, however, there was a convergence of opinion on the need for community capacity to be increased in the fields of business management, financial management, and bookkeeping. Overall, priorities differ between communities and fisheries managers as to what training is required and at what level.

This is perhaps understandable. A cursory inspection of training needs as identified by communities will show emphasis on the training of individuals in business matters, while the fisheries staff emphasized the need for training on matters relating to the management of the entire resource. This is extremely important since the whole concept of co-managing resources is based on the assumption that there will be a convergence of views on future needs.

As argued earlier, these results challenge the belief that all development should be initiated at the grass roots level. Although applicable in many other areas, this concept cannot be applied when dealing with free access to a limited resource, as is the case with the fishery in Lake Victoria. Such grassroots-driven training will be aimed, as shown in this case, at maximum exploitation in the short-term. “Grab what you can before someone else grabs it” will be the guiding philosophy. We suggest from this analysis that the views of resource managers probably should take precedence over the views of resource users. The implementation of community training must reflect this. Finally, it is stressed that adult education is an extremely important issue in any attempt to close the open access policy in Lake Victoria fishery; it will require training and redirecting labour into other sectors of the economy.

² “Water resources” are defined as water itself and its living and non-living natural resources.

Table 2. Comparison of Perceived Adult Training Needs in Fishing Communities

Identified Training Need	Ranking	
	Community	Managers
Financial management	1	3
Bookkeeping	1	3
Leadership skills	3	13
Business management	4	3
Conservation and fisheries management	5	1
Group management	6	0
Community mobilization	7	0
Co-operative development	8	2
Quality control	8	9
Entrepreneurship	10	0
Co-operative management	11	9
Marketing	11	12
Fish handling	11	6
PRA	14	15
Aquaculture	14	11
Credit management	14	7
Survival on the Lake	14	17
Water treatment	14	0
Project planning	0	15
Health and sanitation	0	5
Diversification	0	14
Co-management education	0	8
Law	0	13
Artisanal fish processing	0	10

Information Sharing: An assessment of information flow within the public sector would indicate that fragmentation and institutional tradition have hindered the development of this essential process. The national research institutions and, to a degree, the resource management departments have sufficient human resources to facilitate effective dissemination. For example, in the fisheries sector, tri-state fisheries programmes exist to effect this dissemination. These include the development of the Lake Victoria Fisheries Database, and the East African Statistical Database. Furthermore, at the community level, radio programmes have been established to effect dissemination.

However, as in many academic fields, protection and personalisation of information is still the norm. Compounding this is the belief that publication of information, results, etc., will deliver greater prestige to the individual and Institution, if done through external international journals. There is, in part, a sensible reason for this. Regional institutions and management organisations suffer from a chronic shortage of funds. By co-opting international agencies into information generating programmes (or often having those agencies set the agenda), local bodies can help sustain themselves through resource injections from outside the region.

Additionally, there is still a lack of close networking between research organisations and resource management departments. The former defend their academic right to pursue research programmes, which they design to exploit their strengths and to attract support. The latter promote the concept that research should be demand-driven and the results applicable to decision making for long-term management of the water resource.

Information management within the public sector is therefore characterised by a large human capacity. The objective now, however, is to build capacity to prioritise data and information needs, to strengthen analysis and interpretation and to repackage and target dissemination and communication programmes.

A worrying aspect, which threatens these goals, is the general erosion of capacity to collect, process and analyse data in the East African countries. Recent government policy to maintain a lean, but efficient and better-remunerated civil service has resulted in a shortage of personnel to collect, analyse and process data. The other reasons are the lack of community facilitation by staff and the lack of involvement of communities in the information management process. Overall, there is the perception that the gathering, analysis and management of information are inexpensive. This, of course, is simply not the case. For example, conducting a regional fisheries survey for Lake Victoria involved a great deal of planning, coordination and financial and physical resources.

3.2 *The Capacity to Measure and Understand Coastal Ecosystems*

Human Resource Capacity: Clearly, trained personnel are an essential prerequisite for the development of the Lake Victoria region. In the thirty years since independence of the East African States, a critical mass of fairly well trained people in the water sciences and related disciplines has been developed. Water engineers, soil scientists, veterinary and medical doctors, sociologists, zoologists, mycologists and botanists of international caliber have been

trained from the existing 11 public and 23 private universities (Inter-University Council of East Africa). Many of these scientists normally receive their first degree in East Africa and proceed abroad to pursue Masters and other postgraduate studies. This blending of local and international education is very important in terms of sharing knowledge, technology and experience on water-related issues and avoiding inbreeding of knowledge and technology. Additionally, there are well-trained technicians in water-related technologies produced either at regional universities or the myriad of regional and village polytechnics. Regrettably, even though technical support for scientists both in the field and the laboratory is essential for programmes to measure and understand coastal ecosystems, the training of technicians is no longer given priority by governments due to economic constraints. Furthermore, most of the village polytechnics have been abandoned and the few remaining ones are essentially private enterprises.

Institutional Capacity: In each of the East African countries there is a Ministry for water development, together with other departments that deal with related issues such as fisheries, forestry, agriculture and health. Most have reasonably strong technical divisions and personnel. A number of research laboratories also exist in the region, including universities that have their own teaching and research laboratories as well as several government-owned research institutes. These include Agriculture, Fisheries, Forestry, Medical and Meteorological Research Institutes, each of which has a number of specialized laboratories. These represent vital capacity for water and coastal research in the Lake Victoria region.

However, it must be pointed out that some laboratories and research institutes are just physical facilities at which no real research and generation of new knowledge, applicable to resolving coastal problems, takes place. Laboratories must have up-to-date equipment and tools. Many of the laboratories in the region have old, dilapidated and out-of-date scientific instruments and this, coupled with

poorly remunerated personnel, means that little or no research goes on. Fortunately, the laboratories in the Fisheries Research Institutes and Directorates of Water have been fairly well equipped since 1997 through the World Bank funded Lake Victoria Environment Management Project (LVEMP) and the European Commission financed Lake Victoria Fisheries Research Project (LVFRP). These programmes have also added trained human resources at the scientific and technical levels in fisheries and aquatic science, including at the Ph.D. level.

Information: Recent investments in human resources training and laboratory revitalization have focused on ensuring that there is sufficient accurate and reliable information to enable good decision-making in the management of water and coastal ecosystem issues in Lake Victoria. Scientists in the region are now better equipped to collect, collate and analyze data as a basis for sound decision-making. However, a major problem for Lake Victoria, as with the other great lakes of Africa, is its multi-jurisdictional nature, which has significantly affected the comparability of the available data. Thus, in recent years, much effort has been dedicated to standardization and harmonization of methodologies for data collection, analysis and presentation. As a result, for example, GIS water resource maps and a fisheries database system are now available for Lake Victoria.

Communication and dissemination of information in such a shared water system are extremely important. But here again the transboundary nature of the lake leads, inevitably, to problems of scientific mistrust related to information piracy and ownership. This is a problem not only between and among countries, but also within the same institution in one country. One approach to addressing this problem is publication in regional journals such as the *African Journal of Tropical Hydrobiology and Fisheries*. This is an important development because the information in the regional journal is easily and cheaply available to young researchers, whereas it has become increasingly difficult for the scientists in the region to publish in international

journals. However, this journal still faces major problems with financing, publishing and circulation.

There remains a great need to repackaging scientific research findings into a language that is easily understood by communities, managers and policy makers. It is also recognized that networking fora are of immense value in measuring and understanding a shared water resource such as Lake Victoria. Seminars, stakeholder fora and data working groups are an effective and credible tool to draw stakeholders together to interact and share information. Similarly, a high level of electronic networking is rapidly developing in the region, due in part to private sector investment as well as improvement of the telecommunication infrastructure. While email, Internet and telefax communications are increasing in use in the region, these remain prohibitively expensive for citizens at the community and beach level. Some way of reducing communications costs would be invaluable to the peoples of East Africa.

Filling the Gaps: There is an ongoing need for training to ensure that required staff are always available. Technology is also changing rapidly worldwide and awareness of this reality is needed within our training programmes. There is also the need to continue replacing obsolete equipment and tools. These requirements are extremely expensive and we call upon our development partners to assist in meeting this challenge. Furthermore, there is need to encourage public and private sector partnerships to enhance our capacity to measure and understand coastal ecosystems. Similarly, universities and the private sector must be encouraged to forge partnerships so as to enhance relevant training in water-related issues and to develop new and appropriate technologies. Recently, the East African Fish Processors and Exporters Association entered into partnership with the fisheries departments and the Lake Victoria Fisheries Organization to work together in support of fisheries management and scientific research in Lake Victoria. Finally, it is essential that we create strong national, regional and institutional

linkages to enable sharing of information and ideas and to cooperate in harmonization, standardization and joint monitoring ventures.

3.3 The Capacity to Legislate, Regulate and Achieve Compliance

Local, National and Transboundary

Frameworks: Within the Lake Victoria basin, formal management frameworks exist at local (district), national and East African Community levels. Decentralization has led to the empowerment of the districts, including executive power, legislative mandate (to a lesser extent), and implementation responsibilities. However, the agencies and organs with these new responsibilities significantly lack capacity, experience and the means of implementation to function effectively. Furthermore, individual districts tend to operate as isolated political units. Exchange of information amongst districts is minimal and institutions for development of district-based policies and activities are often ineffective. Having relied so long on centralized legislation and centrally funded monitoring and regulation, individual districts simply cannot fulfill these mandates. The previous centralized management structures encouraged and ensured compliance through established channels. This too has largely disappeared, with district councils setting their own agendas.

In the area of community participation, Beach Management Units (BMUs) (locally elected resource managers) have been established but are not yet fully functional. The potential for these BMUs to take up many of the previous government functions is considerable, but current capacity is underdeveloped. Furthermore, BMUs could be good vehicles for resolving conflicts amongst water resource users. These conflicts should perhaps be viewed as constructive changes and indicators of growth in society and thus will require constant study and thorough analysis. Community-based

training has been recognized as a priority need within regional human resources development programmes, but is yet to be implemented due to lack of funds.

The East African Community has a number of specialised institutions on Lake Victoria, including the Lake Victoria Fisheries Organisation (fisheries oriented) and the Lake Victoria Development Programme (covering all water related issues). Capacity to legislate, within EAC, is thus well defined and the existing capacity to regulate is sufficient, but the utilisation of such capacity depends upon the commitment of individual Partner states. Similarly, agencies involved with compliance programmes are well developed, but the effectiveness of implementation depends upon the political will of each state.

Participatory Frameworks: Such frameworks are poorly developed and thus have little input to the processes for legislation, regulation and compliance. This is due, firstly, to poor communication, including constraints of language, geographic limits of operation, etc.; secondly, to acute stratification amongst stakeholders and poor perception of commonality of purpose; and, lastly, to highly competitive marketing strategies. The potential for contribution, cooperation and exchange is, however, very great.

Legal and Economic Instruments: Again, within the East African Community, legal instruments have been researched, defined and introduced; they cover many aspects. Their use is also well defined, with objectives and expected outcomes clearly illustrated. Indeed, one of the objectives for establishing the LVFO was to “harmonize national measures” to ensure sustainable utilization of the Lake Victoria fisheries. The capacity to redefine, modify or design new instruments is high. Where capacity is greatly lacking is in the process of dissemination of such information to end users and local managers.

3.4 The Capacity to Provide Appropriate, Affordable Water Services, Infrastructure and Products

As noted earlier, the population density in the catchment of the Lake Victoria is very high (Ntiba et al, 2000). The estimated population currently is well over 30 million people.

Urban Areas: For a large proportion of urban dwellers, affordable water services are still far from their reach. The existing water supply system, more than 30 years old, was designed for a much smaller population base, and is therefore, grossly insufficient. Most of the water supply and sewage treatment systems are archaic and have not been maintained for years. Losses within the delivery systems are now significant and there is little room for their expansion. However, there is a great potential for investing in boreholes and harvesting of rainwater at the household and family levels. The private sector, NGOs and individuals should be encouraged to invest in the supply of water.

Traditionally, there was no grasp of the need to treat effluent, as administrators were confident in the capacity of the lake itself to assimilate such effluents. However, rapid urbanization and industrialization have led to serious water problems in such cities as Kampala, Jinja, Kisumu and Mwanza and has contributed to the eutrophication of the entire lake (Hecky, 1993).

Rural Areas: Although isolated examples do exist, in general, no reticulated water systems are to be found in rural areas. Wells, which could contribute significantly to water supplies, are not developed to the extent expected, given the high water table. A high proportion of the population in lakeside communities rely on untreated lake water, others on river and stream water. However, if financing could be arranged, the capacity to dig wells is high. Government and donors could facilitate and coordinate this effort. For example, governments and local authorities in the region could reinvest taxes and revenues collected from fisheries and from water and sewage treatment into sustaining these same services, as well as into other sectors such as catchment afforestation, training in general, research, new technology and equipment. An effort in this direction is being made by a “Fish Levy Trust Fund study” through Lake Victoria Environmental Management Project. There is also the need to curb corruption and increase transparency in decision-making and implementation to avoid wastage and inefficient use of resources.

4.0 Integrating the Story

Based on this assessment, the overall picture regarding the capacities to respond to water-related issues within the region is summarised in the Table 3.

Community awareness and education programmes are generally under-funded. There is need to build capacity to prioritize data information needs, analysis and interpretation, appropriate repackaging, targeted dissemination

and communication. A long-term approach and support is needed towards building capacity to sustain decentralized management systems and political structures. Provision of affordable water services is far from the reach of many riparian peoples in Lake Victoria region. Over all, it is argued that whereas there is reasonable capacity to detect, understand, control and regulate in areas of water related issues in the Lake Victoria region, there is a lack of capacity to remedy, restore and stabilize for long-term stability in water related problems.

Table 3. Summary of the Assessment and Evaluation of the Capacity in Lake Victoria

Need	Capacity to Respond			
	Detect and Understand	Control and Regulation	Remediate and Restore	Stabilize and Sustain
Education, training and raising awareness	GOOD	GOOD	POOR	POOR
Measurement and understanding of lake ecosystems	FAIR	GOOD	POOR	POOR
Legislation and regulation to achieve compliance	GOOD	GOOD	POOR	POOR
Provision of appropriate services, infrastructure and products	FAIR	FAIR	POOR	POOR

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