

*Full Length Research Paper*

# Environmental laws and policies related to periodic flooding and sedimentation in the Lake Victoria Basin (LVB) of East Africa

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**What should a community of three states with diverse historical profiles of legal and regulatory frameworks do when a common ecological resource is threatened any yet is critical in the sustenance of communities around it? This is the challenge that East African States faced with dealing with Lake Victoria Basin (LVB) in East Africa (Uganda, Kenya, Tanzania, Rwanda and Burundi). Given the various ecological, land and demographic changes in the LVB, various institutions have attempted to address the negative changes and contribute towards poverty reduction and environmental restoration. This paper analyzed the existing laws and policies on periodic flooding and sedimentation of wetlands, rivers and flood plains, which is timely and important for improved management and utilisation of resources of LVB. The paper argues that the lack of community level policy models relating to land and water use affects soil management and ultimately affects the water used in the LVB. These area-specific policies and models all over the LVB will go a long way in dealing with the negative effects of periodic flooding and sedimentation.**

**Key words:** Lake Victoria, Basin, East Africa, sedimentation, periodic flooding, environment, law.

## INTRODUCTION

Attention to environmental law in many countries, with a particular thrust on regulation of common environmental resources in various regional political entities such as the East African Community, has been increasing for two decades or so. While arguing in support of environmental concerns beyond specific boundaries of nation-states,

Environmental Law of especially in East Africa, though relatively new, has been growing in popularity and in tandem with the improvement of environmental management at regional, national and local levels (Wabunoha, 2007). While at a regional and national level, environmental laws and policies have grown through leaps and bounds, there has been the need and concern about specific issues such as environmental management, and as to whether they are addressed in one way or another by the legal and policy framework.

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**Abbreviations:** EIAs, Environmental impact assessments; IUCEA, Inter-university Council of East Africa; LVB, Lake Victoria Basin; LVEMP, Lake Victoria Environment Management Programme; ECOVIC; LVFO, Lake Victoria Fisheries Organisation; MWLE, Ministry of Water Lands and Environment; NEMA, National Environmental Management Authority; NGOs, Non-governmental Organisations; SFI, soil fertility initiative/index; SIDA, Swedish International Development agency.

The overall objective of this paper is to analyse laws and policies in Kenya, Tanzania and Uganda that relate to the management of periodic floods and sedimentation in the Lake Victoria Basin. This analysis stems from a wider study that examined the socio-economic and ecological impacts of periodic sedimentation on the livelihoods of flood plain communities in the Lake Victoria Basin.

Protocols and treaties, constitutions, framework of

environmental laws, various sector-related environmental laws and regulations provide a framework for environmental regulation in East Africa. Over the last twenty-five years, countries within the Lake Victoria Basin (LVB) have undertaken numerous programmes such as the Lake Victoria Environment Management Programme (LVEMP), Lake Victoria Fisheries Organisation (LVFO) and the Lake Victoria Research Initiative (VicRes) to support the sustainable use of its resources. In spite of the significance and extensiveness of the subject, it is neither possible nor necessary to discuss all aspects of environmental laws and policies in East Africa. Some of the fundamentals have been addressed elsewhere by others. Rather, the purpose is to focus policy considerations that informed the law and discuss some of the provisions in the environmental framework and the related sector-based laws as to whether they address sedimentation and periodic flooding. The paper will focus on Kenya, Tanzania and Uganda due to common historical and legislative aspects spanning over ninety years. The paper will conclude and make recommendations based on sectors affected by the policies and laws.

## Background

The ecological situation prevailing in the East African region (specifically Kenya, Tanzania and Uganda and lately Rwanda and Burundi) has always determined the legal and policy frameworks developed for the management of LVB resources even during the colonial phase preceding 1963 in the three countries. Lake Victoria is the largest fresh-water lake in Africa and the second largest in the world with a surface area of 69,000 km<sup>2</sup>. The Basin (catchment) of the Lake covers a surface area of 251,000 sq.km, 44% of which is in Tanzania, 22% in Kenya, 16% in Uganda, 11% in Rwanda and 7% in Burundi and with an estimated population of 40 million (Makalle et al., 2008).

The Lake is a major trans-boundary natural resource that is heavily utilised by its bordering countries for fisheries, transportation, tourism, water supply and waste disposal.

However, the region has experienced a process of rapid urbanisation over the recent past with the towns, many of which are concentrated along the lake edge, growing at rates far in excess of the regional average of 3% per year. The urbanisation process has been accelerating under the impact of several factors, including rural poverty, land pressures and lack of job opportunities in the rural areas.

The economy of the region is characterised by a heavy dependence on the fisheries resources of Lake Victoria, which accounts for over 25% of the Region's GDP. Other important sectors include agriculture, agro-processing, tourism, and small scale manufacturing. The LVB

supports one of the most densest and poorest populations in the world with population densities of over 100 persons per square kilometre. Average per capita annual income is estimated to be less than US\$270, which is about 40% of the average per capita income in Sub-Saharan Africa. The problems of human poverty and unemployment are widespread, and are compounded by the rapid increase in population, the ongoing public health challenges posed by the high incidence of HIV/AIDS and malaria, unplanned urbanization and environmental degradation (EAC, 2008).

For the past 30 years, Lake Victoria has been under considerable environmental pressure from a variety of interlinked human activities, including over-fishing, destructive fishing practices, pollution from human and industrial activities, siltation from the erosion of deforested watersheds and enhanced urban runoff with high sediment loads and large volumes of waste products. The sources of pollution are many, and include, untreated sewage, human and animal waste discharged into rivers and drainage channels, maritime transport waste and direct contamination of lake water by human activities on the shore line. The cumulative impact of these activities are now clearly in evidence with Lake Victoria showing various signs of severe environmental distress, including depleted oxygen levels, eutrophication, and reduced transparency and increasing levels of microbiological and chemical pollution.

The critical and multi-faceted role of the Lake as the most important economic resource, the source of much of the region's water supplies, and the ultimate sink for the increasing volumes of waste and erosion material that are generated in the catchments, has created a close linkage between environmental conditions in the Lake basin and issues of human poverty and socio-economic development in the region. In recognition of this linkage, the East African Community (EAC) has taken steps to establish the necessary framework to reverse the deteriorating conditions in the Lake, promote a more sustainable approach to the management and development of the resources in the basin and enhance the socio-economic development of the people living in the Lake Victoria Region.

As a result of the need to balance the limited lake resources and unlimited needs of the communities, legislative, policy and regulatory frameworks have been developed to address these concerns in Tanzania, Uganda, Kenya and lately Rwanda and Burundi. The aim is to compare how the policy frameworks have addressed sedimentation of soils and flood water that find their way into the LVB. The LVB, like many other catchment areas in eastern Africa, has experienced changes resulting from natural processes (such as topographical features), anthropogenic activities (such as encroachment of flood retention zones and deforestation), and other accentuating phenomenon (such as sedimentation resulting from deforestation and changes in climate change).

Among the rivers draining into Lake Victoria, Sondu-Miriu, Simiyu/Duma and Katonga are the largest in Kenya, Tanzania and Uganda, respectively. The three river basins represent some of the changes that have taken place in the LVB. The Sondu-Miriu catchment, for example, covers an area of approximately 3,487 km<sup>2</sup> with an annual rainfall of 1,497 mm and an annual runoff of 500 mm (Ndemere et al., 2005). Such high runoff carries with it substantial amount of sediments from catchment areas that are not properly conserved. Increased sedimentation in the flood plains provides high amounts of fine-textured soils that are rich in organic matter and other nutrients needed for crop growth. In addition, flood plains are the most effective ecosystems for carbon storage, thereby reducing global warming (Government of Kenya, 2005).

Other ecological functions of floodplains include water discharge and recharge, water purification, nutrient and toxic retention, and reservoirs/ centres of biodiversity. While socio-economic values include water source, fish production, soil and mineral products, grazing, energy production, research and education, and religious and cultural significance. Most of the listed benefits accrue from the accumulated sedimentation and the array of plant species dominating the floodplains and wetlands (GOK, 2005).

Floods to contribute to economic distress as in the case of Kenya. The 1997/98 El Nino floods had widespread impacts in key sectors of the economy across the country. A post El Nino rehabilitation programme was initiated by the government of Kenya at cost of approximately Ksh 8.7 billion or US\$108 million. A majority of the projects focused on rehabilitating roads and water infrastructure and provision of health services at a cost of Ksh 4.85 billion in 22 districts of the country (Otiende, 2009). The government spends approximately Ksh 37 million is spent annually for dyke rehabilitation in the western Kenya floodplains. During the short rain season of 2009, a total of Ksh. 40 million has been earmarked for the rehabilitation of dykes in Budalang'i in anticipation of the short rains that might be accompanied with El Nino. Sedimentation is the process in which particulate matter carried from its point of origin by either natural or human-enhanced processes is deposited elsewhere on land surfaces or in water bodies (Water Encyclopaedia, 2010). Sediment is a natural product of stream erosion; however, the sediment load may be increased by human practices. Such enhanced sources of sediment in a watershed include unvegetated stream banks and uncovered soil regions, including construction sites, deforested areas, and croplands.

Excessive sedimentation can have negative consequences on the wetland ecosystem such as increased flooding, which can lead to increased damages to human, crops and other infrastructure; reduced lake depth, and eutrophication or pollution of lake water.

Sediments are a natural phenomenon that create and

sustain the biological life support system. The ecological systems found in floodplains, wetlands and estuaries contribute to the support of all forms of life. Fertile alluvial soils deposits are associated with food production around the world (Burdy, 1995). The deposits in the entry zone of the reservoir (inner delta or river mouth) provide highly diversified habitats for wildlife. On the other hand, too much sediment can cause problems. Rivers and streams are threatened by soil erosion and sedimentation leading to accelerated accumulation of sediments in aquatic ecosystems. This ultimately contributes to a decline in surface water quality and biodiversity (Waters, 1995). Under this study, it is important to establish the relationship between flooding and sedimentation/flooding. Li and Deng (2002) note that soil erosion leads to flooding and ultimately to sedimentation and also induces the secondary disasters and new changes of ecological environment.

Analysis of existing laws and policies concerning flooding and sedimentation of wetlands and floodplains is timely and important for improved management and utilisation of resources of LVB by addressing the issue of policies/ regulations and benefits.

Wabunoha (2007) argues that environment management has become an East African community matter transcending country borders and leading to a common environmental policy. Looked at from a regional angle, policies and laws relating to sedimentation and flooding of the LVB have to be treated with the same respects as they serve a common pool of communities and animals, plant and aquatic life that knows no geographical boundaries. Wabunoha (2007) further domesticates the definition of environment law, based on which this paper shall be premised, as:

“Those laws that facilitate environmental protection or management within the community with either a regional scope or where the law can be commonly applied or practiced in all the partner States.”

There are several Acts of Parliament in East Africa such as the National Environmental Act of Uganda (1995), Environmental Act of Tanzania (2004) and the Environmental Management and Coordination Act of Kenya (1999), and other Acts such as those relating to water, pollution control, wetlands, hilly and mountainous areas (mention some), which relate to the environment in general and management of LVB-related resources as sedimentation and flooding goes beyond the framework laws. Some other Acts are more direct than others in the sense that some generalise environmental management issues while others specify the issues to be dealt with by the lead agencies (Angwenyi, 2004). Some of the indirect acts include the Poisonous Substance Act and the Pesticide control Act. Also important to note is that laws and policies on the environment in East Africa vary according to country as to when they were enacted even

when addressing the same aspects.

The ever increasing population coupled with environmental degradation has meant a delicate balance within the LVB ecosystem. Without dealing with the balance between limited resources and unlimited needs, there will be an enigma. In the past decades, a few of the effects have included dwindling water reserves, low fish catches, and vulnerability to climatic and flooding. Vulnerability has presented itself in the form of extensive climate change, which has increased the frequency and intensity of extreme weather events such as droughts, floods, landslides and heat waves (Makwaro et al., 2004) in the LVB.

According to Makwaro et al. (2004), there is an increase in human settlements, particularly by the urban poor, in marginal land areas that were previously catchments for floods. Waste disposal infrastructure is almost non-existent in these settlements. Heavy rains coupled with poor land use planning lead to flush floods, resulting in pollution of water sources with serious consequences for human health. Communities living in such areas are vulnerable to outbreaks of waterborne diseases. The areas that are commonly affected by flooding in Kenya are Busia, Kisumu, Nyando/Ahero, Bondo, Migori and Siaya Districts. In Uganda areas such as Kampala district in the central region and Butaleja district in the East part of the country are prone to flooding. In Tanzania, places such as Shinyanga, Mara and Mwanza in the LVB prone to flooding when heavy rains ensue.

According to the world agro forestry centre (2006) the accelerated soil erosion and nutrient run-off into the lake has led to a rapid rise in nutrient levels and changes in the ecology and growth of aquatic weeds such as water hyacinth. This has affected areas such as Kisumu, Jinja and Entebbe (in Kenya and Uganda respectively) where decreased water levels on the lake banks have ensued and industrial discharge leading to water contamination. The case in point is the contamination of the water around Ggaba landing site in Kampala. This means that enhanced siltation though not very serious, was standing at 4, 000, 000 [t yr<sup>-1</sup>] from 47,000 km<sup>2</sup> of catchment (an estimate); 0.5-1.0 [mm yr<sup>-1</sup>] as lake sediment (ILEC, 2009). The Nzoia River draining into the lake is contaminated with pesticide residues; DDT 0.3 ppm, DDE 0.3 ppm, BHC 0.2 ppm, Toxaphene 0.2 ppm in 1982. The need to develop mitigation measures for these problems provides the impetus to analyse laws and policies related to sedimentation and periodic flooding with a view to inform policy makers about prospects and gaps within the policy framework.

### Conceptual framework

Environmental law is a body of law, which is a system of complex and interlocking statutes, common law, treaties, conventions, regulations and policies which seek to

protect the natural environment which may be affected, impacted or endangered by human activities. Some environmental laws regulate the quantity and nature of impacts of human activities: for example, setting allowable levels of pollution. Other environmental laws are preventive in nature and seek to assess the possible impacts before the human activities can occur (Wikipedia, 2010).

The principles of environmental law should be understood in the context of land utilisation based on the principles of sustainability, intergenerational equity, principle of prevention, the precautionary principle; the polluter pays principle, and public participation (Hunter et al., 2002). These principles directly relate to land use and the effects bore upon it by periodic flooding and sedimentation.

The interface between environmental law, sedimentation and periodic flooding can be premised on the above principles from a river basin [or catchment] perspective. This perspective involves understanding the interaction between land uses, natural resource degradation and livelihood options with the enabling legal and policy framework, sometimes that is silent or even absent. All these have to be balanced, the reason for analysis of laws and policies.

## MATERIALS AND METHODS

### Study area

The study was conducted within the legal and policy framework of Kenya, Uganda and Tanzania within the context of a wider study on periodic flooding and sedimentation along the Sondu-Miriu, the Simiyu-Duma and Katonga Rivers draining into Lake Victoria (Figure 1 attached hereto in the appendices).

### Kenya

Kenya had an environment framework even before the act only that it was not as coordinated as after the act. Kenya did a NEAP process leading to the Environmental Management and Coordination Act (EMCA) of 1999 [the processes in Kenya also went beyond EMCA. Previously, it is the common law principles that played a role in regulating environmental issues within specific sectors such as agriculture, water and health.

### Uganda

The government of Uganda established the Ministry of Environment Protection in 1986 with the aim of developing a national wetlands policy. Between 1991 and 1994, the country was in the process of developing a National Environment Action Plan (NEAP). This culminated into the National Environmental Act (1995) that saw the establishment of the governance framework as there was more than NEMA that was established through the NEAP such as the forest institutions, water, district level institutions.

### Tanzania

The country had by 1983 attempted to create a comprehensive law



Figure 1. Map of study areas showing Kenya, Uganda and Tanzania.

on environment management. This can be seen through the National Environment Management Act (1983) and the National Environment Policy (1997). The policy seeks to provide guidelines and plans and gives guidance to the determination of priority actions, for monitoring and regular review of policies, plans, and programmes. The corresponding disaster management policy (2004) has not been fully implemented partly due to limited capacity.

## RESULTS AND DISCUSSION

### East African treaties and protocols environment

Some of the factors that give rise to the country-specific and regional treaties and protocols have been the environmental problems of an aquatic nature (such affecting the water bodies such as siltation) and terrestrial (such as land use practices that negatively affect the environment) (Wabunoha, 2007). Wabunoha further states the evolution of environmental protocols and treaties in East Africa has grown in tandem with the evolution of the East African community from the colonial times till 1999. The basic premise of a clear environmental policy for East Africa was the protocol on Environment and Natural Resources

(EAC, 2010). The protocol provides that the environmental laws of the Community shall consist of:

- (a) Relevant provisions of the treaty;
- (b) The protocol for sustainable development of LVB;
- (c) This protocol, (*sic*) on environment and natural resources management;
- (d) Regulations and directives made by the Council;
- (e) Applicable decisions made by the East Africa court of justice;
- (f) Acts of the Community enacted by the legislative assembly; and
- (g) Relevant principles of international environmental law.

The protocol spells out clearly spells out in article 111 to 114 environmental issues and natural resources, management of the environment, prevention of illegal trade in and movement of toxic chemicals, substances and hazardous wastes, and management of natural resources respectively. Specific to the management of floods and flood-related disasters such as sedimentation, the protocol in article 112 (c) of the management of the environment take necessary disaster preparedness, management, protection and mitigation measures

especially for the control of natural and manmade disasters. These include oil spills, bio-hazards, floods, earthquakes, marine accidents, and drought and bush fires. For purposes of paragraph 1 of this Article, the Partner States under take to: (e) adopt environmentally sound management techniques for the control of land degradation, such as soil erosion, desertification and forest encroachment. These directly relate to sound management of land practices that reduce incidents of soil erosion that leads to flooding and sedimentation.

For the case of the LVB, the challenge is to ensure uniformity of application of this protocol in line with existing national and by-laws in each country. Some of the specific conventions and protocols of the east African community that have a bearing on sound environmental management leading to proper management of flooding and sedimentation include: The treaty establishing the East African Community, 1999; protocol on environment and natural resources management, 2003; East African Community, 2006 (protocol for sustainable development of LVB); East African Community, 2004 (Convention for the Establishment of the Lake Victoria Fisheries Organization).

### **Components of environmental laws and policies per country**

#### ***Constitutions***

The constitution of the Republic of Tanzania (1977) gives the right to receive information and this includes also the right to receive information on the environment more so Articles 18 and 27. The Tanzanian National Environmental Policy (NEP) of 1997 requires public participation in decision-making and provides another basis for public access to environmental information. It further calls for the sustainable management of environmental resources and emphasizes the need to continuously anticipate emerging challenges (Environmental Law Action Team, 2009). Pallangyo (2007) notes that environmental issues are complex and given less attention even in the country's Constitution. This is further complicated by the lack of implementation regulations and enforcement capacity. In the case of Zanzibar, a unitary part of Tanzania, the island enacted the environmental management for sustainable development act (1996). This has been considered progressive and elaborate in dealing with mainly flooding on the island.

The constitution of the Republic of Uganda (1995) also enshrines a constitutional right to a clean and healthy environment in its article 39 as it provides a basis for a comprehensive environmental legal framework under the National Environment Act (1995). The content and scope of this doctrine is being tested in the Government efforts to study possible change of land use for parts of the Central Forest Reserves comprised in Mabira Forest and

Bugala Island in Kalangala district (Akello, 2007). As argued elsewhere in this paper that Kenya had a less coordinated framework but no comprehensive law on environment till the enactment of the Environment Management and Coordination Act (1999). However, before 1999, the country based on common law principles to address environmental concerns coupled with specific laws on water act (Cap. 372), Factories Act (1989), Wildlife (Conservation and Management) Act, Chapter 376. These and others were use to regulate broad environmental concerns.

### ***National environment Acts and Policies***

The environmental policy and legal frameworks in the three East African Countries has moved in tandem with the global trends in quest of environmental sustainability since the 1970s. Bi-lateral support from countries such as Norway and Denmark and action from multilateral agencies such as the World Bank have been key players in this evolution.

The National Environment Management Acts of Tanzania, Kenya and Uganda constitute a framework law for the environment in the three basin countries. They provide for sustainable management of the environment and established the National Environment Management Authority (hereafter referred to as NEMA) as the principal government agency for the management of the environment. NEMA is mandated to coordinate, monitor and supervise all activities in the field of the environment (Akello, 2007).

Given the challenges of managing ecological and biodiversity issues in Uganda, including sedimentation and flooding, the National Environment Act (1995) was passed. The National Environment Act (1995) of Uganda gives powers to the minister in-charge of water and the environment to issue guidelines and prescribe measures for protecting the environment (chap. 35 (C)). The act further states in chap. 42 (2) that the lead agency (National Environmental Management Agency Uganda) should determine the appropriate farming methods, regulate animal husbandry near water bodies, curb soil erosion and ensure disaster preparedness in areas prone to landslides such as those in the Eastern Uganda Elgon Areas and Butaleja district. Indeed progress has been made in the area of flood control in places like Kampala but with limited inroads due to heavy political interference and problematic urban planning. The act, like many others, does not have to specify the amount of sedimentation yield that is acceptable within the limits and given its broad nature, but by-laws specific to a geographical location.

The Environment Act of Tanzania (2004) is explicit on environmental management and is congruent with the Ugandan statute. The Act identifies areas or land that is considered to be environmentally sensitive. Chap. 52 (a), (c), and (d) denotes these areas as swamps, areas prone

to soil erosion, and those vulnerable to landslides. Chap. 55 (i) and (ii) of the same act gives the minister powers to issue guides aimed to protect riverbanks, lakes, lakeshores and shorelines. The same act prohibits the introduction of any plant foreign to the water bodies to be introduced near the water bodies. Chap. 57 (i) prohibit any human activities near the water bodies. This goes a long way in harnessing environmental protection around the shoreline of the lake. However, one notes that the same law is not specific on issues to do with sedimentation and period flooding especially in the upper catchment areas (such as in the Sotik and Kericho in Kenya) where there is often the run-off towards the lake. The Environment Management and Coordination Act of Kenya (1999) part V provides the legal tools for sustainable management of the environment. Protection and management of wetlands is exemplified in Section 42 of the said Act.

From the foregoing description of the laws and policies, all the three countries have laws relating to the environment and attempt to generically address issues around the LVB but how comprehensively do they address sedimentation in specificity? One notices that the laws are silent on issues related to sedimentation and run-off and measures to be taken to address them in areas such as Sondu-Miriu, Simiyu-Duma and Katonga. This may be helped by by-laws specific to an area rather than broad laws in a country. Rational criteria can be established for determining acceptable sediment yield from reclaimed land. The criteria should be based on natural rates of erosion, and could be used to provide guidelines for determining landscape characteristics. The criteria should take account of downstream impacts on aquatic habitat, sediment carrying capacity of receiving streams, sustainability of reclaimed landscapes, and channel regime (Bender et al., 1997).

Suspended sediment criteria based on this methodology should result in morphologically sustainable landscape, negligible impacts on the channel regime of receiving streams and suitable aquatic habitat. Such criteria are believed to be superior to arbitrary sediment concentration limits which are not necessarily related directly to quantifiable goals of sustainable landscape and productive aquatic habitat.

### **Land Act and Policies**

The land tenure regimes in the three East African Countries have evolved distinctly right from the colonial phase to-date due to a variation between constitutional and actual political formation in the three countries (Okoth-Ogendo, 1999). This seems to have a bearing on environmental regulation in the three Countries. Objective 2.1 in the National Land Policy of Tanzania (1997) is to protect land resources from degradation for sustainable development. The policy emphasises the need to protect sensitive areas and this is further emphasized in the policy statements 4.2.10 (i) in which among other things water catchments areas and

ivers are protected as sensitive areas. On further examination in 7.6.0 it is assumed generally that wetlands are wastelands and are thought as being not useful for social and economic development.

However, the policy statement 7.6.1 corrects this noting that wetlands will be properly studied and proper land uses shall be determined such as allocation to appropriate users. In the case of Uganda activities such as bricklaying are allowed in wetlands but with express permission of authorities. What is important to note in Tanzania is that land is public and vested in the president as trustee on behalf of all citizens (4.1.1. [a]). The Land Policy of Kenya under the Agricultural Basic Land Usage rules (1965) prohibits certain land use practices such as cultivation; cutting down on vegetation or de-pasturing livelihood land within 2 m of a water body is only permissible with written instruction from a responsible officer. This seems to be overtaken by events prevailing in a specific area such as waters receding or rebounding more than the required metres.

In Uganda, the Land Act (1998) article 71 and 72 clearly spell out the way water rights and rights of way should be handled. It notifies landowners near such water bodies that they are in the control of government but in case of usage that alters natural trends, there should be express permission from the government or its duly assigned official. The Land Act (1998) of Uganda decentralizes the responsibility of wetland management to the district authorities. There is however limited awareness about its provisions and therefore local communities still lay claim on wetland areas as merely public land and has open access to all.

Whereas the Land in Kenya and Tanzania is first and foremost public land, article 237 of the 1995 constitution of the Republic of Uganda spells that land is in the hands of Ugandan Citizens. The reinforcement of the land act clarifies the rights of common ownership of water resources. However, the challenge remains in cases where individuals control land especially the “*mailo*”<sup>1</sup> land system of tenure. Yet this is a problem of perception by locals as *mailo* or private land ownership does not prohibit government controls especially in the area of environmental controls. In the case where public land has been encroached especially in Katonga Wetland in Uganda, this has led to floods movement into areas not previously prone to flooding.

### **Disaster management Acts and Policies**

With flooding and sedimentation, there is a case for disasters if measures are not taken to safeguard communities and places. A number of regions in Kenya

<sup>1</sup> “*Mailo*” land: Under this system, land is held in perpetuity and a certificate of title is issued. The principal advantage of this system is that it provides security of tenure, thus allowing long-term investments including those related to conservation. Absentee landlordism and lack of access by regulatory agencies are disadvantages that limit sound environmental management.

have suffered the devastating effects of floods but this study focuses the devastating effects of floods as in the case of Budalang'i division in Busia, Kenya (Makwarro et al., 2004) and the recent flooding in parts of Butaleja district in Eastern Uganda (Wikipedia, 2010). Given that floods account for up to 40% of the world disasters (Burton et al., 1968) and yet they are a common occurrence in the Lake Victoria Basin, some interventions such as disaster management strategies have been given attention. In relation to Disaster management in Tanzania, the earlier framework is the Disaster Relief Coordination Act (1990). It is noteworthy that this document is more responsive than strategic in approach. The subsequent document, the National Disaster Management Policy (2004) is more comprehensive as it addresses issues of flooding by identifying zones ranging from very little to very severe. The area of Simiyu-Duma in Tanzania is located in an area of very little flooding. The Policy takes note of the fact that dealing with some of the disasters requires sector-wide and multi-disciplinary teams such as special groups. These special groups are clearly affected by environmental disasters such as floods. The policy notes that there seem to be no clear measures taken by the community to prevent environmental degradation to curb disasters such as flooding. The policy outlines strategies of how to deal with such disaster such as setting up of regulations, carrying out EIAs, and awareness on environmental conservation. The policy mentions of flooding as seen elsewhere in the Kenya and Ugandan policy frameworks.

The Uganda Disaster Management Policy Framework on Flooding stems earlier from the NES (1995) which quests for disaster preparedness as highlighted in article 67. It is noted that a disaster is a disruption of the human ecology that exceeded the capacity of the community to function normally (Kaitilla and Yawubu, 1996). The more recent Disaster Management Policy Framework (2003) gives principles for effective disaster management as ensuring proper land use and planning, disaster management information and water resource conservation and management. Disasters related to the environment are echoed in 1.1.6 and 1.1.7 as Landslides and Floods. Landslides are however, not so common around Katonga River though the latter were very common in 1997/8 El Nino rains. To stem the problem of land use, the act in 4.1 guides on land use planning as a way of preventing disaster of a biophysical nature (Vulnerability to degradation and wetland values) and socio-economic criteria. The policy in section 4.2 calls for timely information to be generated and utilised in a timely manner to manage disasters.

In Kenya, laws and policies concerning flooding were historically not concerted. It was not until the 1997/8 El Nino floods that the National Disaster Operation Centre was established (Makwaro et al., 2004). Flooding in Kenya compared to Uganda is more severe and takes times for the floods to settle. The new approach is to look at flooding from a multi-sectoral point of view in which local, district and

national levels are meant to realize synergies. It is further noted that the Kenyan law is also comprehensive in linking with other national policies and legislations. The disaster policy is linked to a number of other Act of parliament such as EMCA (1999), the Kenya Red Cross Society Act (Cap 256), the Water Act (cap 372), the St. John's Ambulance of Kenya Act (Cap 259) and the Local Authority Act (265) among others (Makwaro et al., 2004). Other relevant Acts include the Public Health Act, the Forest Act, and the Chief's Act. The policy on Disaster Management in Kenya includes: settlement in flood prone areas, improvement on catchments conservation and protection, and developing infrastructure to sustain flooding. One notices that the policy is comprehensive in focusing on how to handle disasters.

The Kenyan policy considers flooding as not an existing negative state without a solution but a phenomenon that needs to be harnessed for social and economic uses. The Water Act, 2002 of Kenya takes legislative recognition of flood management; however, the said policy is also under review to take charge of Lake Victoria Interests (ref). The flood management policy in Kenya is linked with the Disaster Operations Centre (DOC) and the Kenya Meteorological Centre, so as to prepare and respond to flooding comprehensively. The Kenyan policy seems not to be very clear on the coping mechanisms used by all stakeholders in the event of a disaster arising from flooding. Tanzania is prone to natural and human-made hazards including floods that affected especially Northern Tanzania in 2006-07. Persistent and emerging disaster risks have highlighted the need to strengthen national structures on all levels of administration in Tanzania to minimize these risks, prepare for potential disasters and support the building of sustainable capacities to manage a response in case a disaster occur. National legislation for Tanzania Mainland was passed in 1990 and there is a national disaster management policy and operational guidelines both of which have yet to be enacted fully. It should be noted that while disaster management capacities in Tanzania are well developed at least at the national level, recent events such as the floods in Northern Tanzania seem to indicate that these capacities are not transformed into a capability to respond to a disaster efficiently and effectively on the ground. This ultimately leads to adverse effects of flooding and high levels of sedimentation.

Uganda has experienced a wide range of disasters directly affecting most of the country (Department of Disaster Management, 2005). Some of the disasters includes flooding and landslides as a result of heavy rains and injudicious environmental management. In response, Uganda put in place a national Disaster Preparedness Policy and Institutional Framework approved by Cabinet in 1999 and revised in 2003, though the National Disaster Management Bill has been in the offing for over five years. In the absence of an implementation framework for disaster management, this puts flood prone areas subject



to erosion and sedimentation that ultimately affect the Lake Victoria Basin. Such a policy would have even coping mechanisms after disasters such as flooding.

However, a recent non-commissioned study from Uganda (Climate Change (Ministry of Water and Environment), 2006) indicates a number of strategies developed by the population to deal with such eventualities. These include: coping strategies category (A) and (B). Under coping strategies (A) that are applicable include: exploitation of aquatic resources, herbal medicines, Alternative livelihood systems, water harvesting, soil conservation, indigenous approaches to rainmaking and thunderstorm prevention, increased law enforcement and district disaster management committee. Category B strategies on coping mechanisms during disasters and flooding include: migrations, encroachment on wetlands, exploitation of forest and wildlife resources. In Kenya, a report denoted as integrated flood management (2004) identifies two coping mechanisms: the conventional and the traditional. Some of the conventional coping mechanisms include: setting up of dykes, establishment of displacement camps; relief assistance; formation of disaster management committees and provision of public health education. The traditional approaches include: relocation; traditional warning systems; adjusting the planting and harvesting cycle; establishment of seed banks; and setting up multiple fields.

### **Water Acts and Policies**

The Kenya Water Act (2002) introduced comprehensive and, in many instances, radical, changes to the legal framework for the management of the water sector in Kenya (Mumma, 2005). Under this act, all water resources belong to the state regulated by the Water Resources Management Authority. It develops principles, guidelines and procedures for the allocation of water resources, assess and re-assess water resources potential, receive and determine applications for permits for water use, monitor and enforce conditions attached to the permits for water use, regulate and protect water resources quality from adverse impacts, manage and protect catchments areas, determine charges and fees to be imposed for the use of water from any water source, gather and maintain information on water resources from time to time to publish forecasts, projections and information on water resources and also liaise with other bodies for the better regulations and management of water resources (Ochieng, 2003). Mumma (2005) asserts that whereas the Water Act decentralizes water management, it does not devolve power down to the local units to involve them in the decision making process especially in areas adjacent to water bodies where there are land disturbing activities such as agriculture and use of pesticides. The run-off of water from upper catchment areas leads to sedimentation transportation and with it

some chemical residues that affect the quality of water.

The Water Act was enacted in 1995 to provide the legal basis for the water resources management in Uganda (Badaza and Kabirizi, 2005). Among others, objectives of the statute were to (a) to promote the rational management and use of the waters of Uganda; (b) to allow for orderly development and use of water resources for purposes other than domestic use, such as the watering of stock, irrigation, agriculture, industrial, commercial and mining purposes, energy, navigation, fishing, preservation of flora and fauna and recreation in ways which minimizes harmful effects to the environment; (c) to control pollution and promote safe disposal of wastewater. The Act is not sufficient when looked at in isolation. Other enabling frameworks are the Constitution of the Republic of Uganda (1995) that devolves and decentralizes power with the accompanying Local Government Act (1997), the National Environmental Action Plan (1995) and National Environmental Act (1995), and the water resources regulations (1998). Under the National Environmental Act, NEMA and Directorate of Water Development to set water quality standards establish standards for discharge of effluent into water, set limits on the use of lakes and rivers, establish regulation for environmental impact assessments, manage riverbanks and lakeshores, restrict use of wetlands, and manage wetlands.

Mainland Tanzania is in a process of preparing new pieces of legislation that will govern and regulate the water sector. The drafting of the new laws is in line with the implementation of the National Water Policy (NAWAPO) which among other things calls for review of the existing institutional and legal framework and proposes legislative instruments according to the policy directives (Kabudi, 2005). The basic premise of the law is that all water resources belong to government and it will sanction any use for such resources. Given that in all the three country sedimentation occurs, there is need to utilise these laws as well as others to control sediment run-off into water especially or harmful residues that affect the water quality.

### **Soil conservation**

In Kenya, the earliest post-independence legislation on soil management is the Agriculture Act (Cap 318), which addresses soil conservation in general (Angwenyi, 2004). Part IV entitled "the preservation of the soil and its fertility" addresses the issue of soil conservation and mitigation of soil erosion in especially catchments areas such as wetlands. The act addresses also the type of agricultural activities that can be undertaken in such places, the distances from (2 m from the water) the areas in which crops should be cultivated and the use of pesticides. Angwenyi (2004) argues that the wetlands law in Kenya is silent on the way fertilizers are used near the wetland

areas. In the event of periodic flooding and sedimentation, there is a possible run-off of harmful pesticides into the water bodies which not only endangers the human consumers but aquatic life as was the case with Lake Naivasha in 2010 (Gitonga, 2010).

This may ultimately cause harmful sediment load and pollution. The Act, it's noted, does not also regulate the use of expired or obsolete pesticides that may be harmful to the catchments areas.

In Uganda, there was no land use policy even though a land use policy working group has existed since the year 2000 (Ogutu et al., 2005). However, in April, 2008, the Land Use Policy was adopted though with steady opposition in crux of the land bill 2007 that has generated immense debate among traditional "mailo" land owners. The policy should lead to optimal and sustainable use of land based on analysis of soil types, topographic factors, agro-ecological considerations, and socio-economic and demographic factors (MWLE, 2001). The Local Government Act Chapter 243 of 1997, part 4 (i) states among the functions and services that the district council can delegates to lower local government councils is "the provision and control of soil erosion and protection of wetlands".

In Uganda, some of the policies used to manage soil fertility have been indirect in nature and which are deemed to maintain soil fertility through control of soil loss and subsequent sedimentation during rains and flooding as may occur. These include: National Policy for the Conservation and Management of Wetland Resources (1995) which aims to maintain ecological and socio-economic functions of wetlands for present and future generations; optimal use of resources, minimize unsustainable practices, partial exploitation for economic development. The Wetlands, River Banks and Lake Shores Management, National Environment Regulations (2006) wise and sustainable use for catchments conservation and flood control. The National Land-use Policy is still a draft and aims to achieve sustainable socio-economic development through optimal land use; addresses a gap in integrated, harmonized land-use planning/ management across sectors and among land users/ stakeholders. The strategy for National Soils Policy (draft) is to maintain productivity of land /agro ecosystems through sound soil management and use; soil research/ extension; awareness of impacts of soil erosion. This policy as already argued earlier has a direct bearing on causes of sedimentation in hilly and mountainous areas such as Elgon and Kabale regions in Uganda where excessive abuse of the environment has led to massive soil depletion and sedimentation in rivers such as Manafwa in Eastern Uganda. All these rivers act as feeders into Lake Victoria. In response, the Action Plan arising from the Soil Fertility Initiative (SFI) (2000) was developed out of the National Environment Policy so as to integrate, sustainable use and management of Natural Resources (soil, water and vegetation).

### ***Wetland policies***

The coordination and regulation of wetlands in Kenya and Uganda are the responsibility of the National Environmental Management Authorities (NEMAs), which are parastatals within the ministries supervising issues of environment (Okedi et al., 2005). These agencies, as explained else where in this text are premised on Acts of parliament (Uganda, 1995 and Kenya, 1999). It is further noted that the work of these agencies is decentralised in nature in both countries giving the provincial and district authorities a mandate to manage and regulate wetlands in their jurisdictions.

In Uganda, the government ratified the Ramsar convention of 1971, paving way for the establishment of the National Wetlands Programme in 1989 that finally culminated in the National Wetlands Policy (1995). In 2000, the National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2000 were developed and enforced. These Regulations recognize the ecological relationship among wetlands, rivers and the lakes. This provides integrated approach in the management of these ecosystems. These Regulations prohibit central government or local governments from leasing out or otherwise alienate any wetland. This has however, been abused. For example, the Ex-Army Officers (Veterans) in 2006 established a market in a wetland located in Wandegeya, a Kampala city suburb without carrying out Environmental Impact Assessment (Apunyo, 2006), encroachment on the Katonga Wetland by army backed farmers in 2007. This was a politically sensitive issue, which seems to have deterred intervention from the institutions implementing the wetland legislation. Thus opening conservation areas to land use deters the movement of water resulting into flooding in other areas.

### ***Decentralisation and public participation***

Decentralisation as policy and strategy aims at creating democratic local institutions with significant discretionary powers. Democratic institutions are being chosen and given discretionary powers. The case in point is the use of natural resources at local levels and the extent to which local authorities can control them. Environmental agencies in Uganda, Ghana, Indonesia, Nicaragua, and elsewhere have argued that too much decentralisation has caused damage or overexploitation (Bazaara, 2002; Resosudarmo, 2002; De Grasi, 2002; Latif 2002). To them it seems to look like a failure of decentralization both as a policy and strategy. A careful examination of the laws and policies on public participation in the use of natural resources in the three East-African countries is necessary especially in controlling sedimentation and soil erosion and also capacity to address flooding and its effects by local governments. As a case for deepened

decentralisation, the 1997 Local Government Act was sensitive to the issue of environmental management. The Act devolved wetlands management to district authorities for effective management purposes. They cannot however, sell, lease or alienate wetlands under their jurisdiction. Districts manage wetlands according to all other relevant laws and legislation including the Constitution 1995, the National Environment Statute 1995, and Wetland Policy 1995. Technical officers mandated to implement wetland management activities have been appointed by the districts as provided for in the Local Governments Act, 1997. However, their capacity to effectively deliver is constrained by inadequate funds and political interference (Apunyo, 2006).

Ogutu et al. (2005), note that decentralisation in Uganda has led to land resources being privatised or decentralized such as management of some forest reserves. However, several areas along shorelines of LVB have been privatised. The policy also allows for co-management of some of the resources with the local population. Researchers fear that decentralising such services will lead to erosion of resources at a higher rate than usual as has been the abuse of land resources in the allocation of sensitive land sites for flower growing and soil mining, where effluents such as pesticides and galleyes respectively, have led to soil erosion and sedimentation leading to water siltation.

In Tanzania, it is noted that decentralisation is not new and has been evolving over time and space with differing objectives. In 1997, the government passed the regional administration act, which notes that, "it shall be the objective of the local authorities in performing their functions to provide for the protection and proper utilisation of the environment for sustainable development".

In the three East African Countries, there is legislation about the level of involvement and participation of the public matters related to the environment. The environment management and coordination Act of Kenya, Section 31 establishes a public complaints committee, an ombudsman committee to adjudicate where the public feels that NEMA has overlooked or overstressed its operations. This has a direct bearing on activities of a land-disturbing nature close to rivers and lakes, which due to political lack of control, has led to sedimentation of sometimes toxic effluents into the lake.

### ***A comparative study on erosion and sediment control laws – the case of the United States and United Kingdom***

Given the lacuna in the legal and policy framework, it is important to state the point of departure is to borrow elsewhere the approaches used and have been found to be working. The case in point is the United States thorough the State Model soil erosion and sediment control Act (1972). This is beside the hilly and

mountainous legislation of Uganda. Note that some districts such as Mbale, Iganga and Kabale have by laws to address erosion and sediment control. The requirement in the US model is:

- (a) State conservation agencies prepare a comprehensive programme to control soil erosion and sedimentation resulting from land disturbing activities;
- (b) All conservation districts are delegated to do the same at district level;
- (c) Applicants for permits concerning land-disturbing activities are required to submit a district-approved erosion and sediment control plan with the application;
- (d) Permit-issuing authorities and conservation districts should inspect land-disturbing activities for violation of conservation standards and recourse or remedial action undertaken;
- (e) District attorneys should bring enforcement actions on request of permit-issuing authorities agent violators, for which violations are subject to injunctions and/or criminal penalties;

### ***The model Act authorises necessary appropriations***

Unwin (1999) considers soil erosion as a serious problem in areas where certain soil and slope conditions coincides with changes in management practices. He however, notes that farmers usually dismiss soil erosion as a result of exceptional rainfall events and are only concerned with crop losses and risk of financial penalties for clearing sediment from roads or drainage channels than long-term sustainability. By the stated period, there was no legal requirement especially by farmers to prevent erosion. However, to existing provisions: Section 151 of the Highways Act (1980) and Section 85 of the Water Resources Act (1991) address erosion concerns. These could be utilised by all the East African countries.

## **CONCLUSIONS, GAPS AND RECOMMENDATIONS**

### **Conclusions**

It can be concluded from this paper that issues having to do with sustainable environment management in the LVB is a regional matter based on policies, protocols and treaties related to environmental management as they may be specifically on the subject of sedimentation and periodic flooding. The study attempted to assess the following legal, policy and regulatory frameworks: the East African treaties and protocols on environment; Country constitutions acts and policies on national environment, land, disaster management, water, soil, and wetlands. A consideration of public participation in environmental from a decentralisation point-of-view is made.

### ***East African treaties and protocols on environment***

These treaties and protocols directly relate to sound management of land practices that reduce of incidents of soil erosion that leads to flooding and sedimentation. For the case of the Lake Victoria Basin, the challenge is to ensure uniformity of application of this protocol in line with existing national and by-laws in each country.

### ***Country constitutions***

Of all the country constitutions, it is the Ugandan and Zanzibar (part of mainland Tanzania) constitutions that specifically advocate for sound environmental management. This may be attributed to politically evolving factors and time when the constitutions were drafted rather than an oversight.

### ***National environmental Acts and Policies***

The National environment management Acts of Tanzania, Kenya and Uganda constitute a framework law for the environment in the three basin countries. One notices that the laws are silent on issues related to sedimentation and run-off and measures to be taken to address them in areas such as Sondu-Miriu, Simiyu-Duma and Katonga. This may be helped by, by-laws specific to an area rather than broad laws in a country.

### ***Land Acts and Policies***

Whereas the Land in Kenya and Tanzania is first and foremost public land, article 237 of the 1995 constitution of the Republic of Uganda spells that land is in the hands of Ugandan Citizens. The reinforcement of the land act clarifies the rights of common ownership of water resources. However, the challenge remains in cases where individuals control land especially the "mailo" land system of tenure. Yet this is a problem of perception by locals as mailo or private land ownership does not prohibit government controls especially in the area of environmental controls. In the case where public land has been encroached especially in Katonga wetland in Uganda, this has led to floods movement into areas not previously prone to flooding. Whereas the country policies and laws seem to address the issue of land use around the shorelines of the Lake, the differing distances from the shorelines seems to opaque clarity. This is made even worse in situations where the lake seems to recede and reclaim lands over space and time. The policies of land use seem to be unclear or more so in their infancy where they seem to exist. This further exacerbated by the lack of a concerted effort to harness soil conservation. This means that upstream areas that face soil erosion face a loss in soil fertility while the low stream

areas benefit from soil fertility. The policies are not clear on the coping mechanisms used by all stakeholders in the three countries.

### ***Disaster management Acts***

All countries have disaster management policies but the laws are still in their infancy. The policies and especially the disaster management policies seem unclear on the coping mechanisms used by all stakeholders in the three countries in response to especially flooding. A few studies have highlighted the nature and type of coping mechanisms and this may need to be put into policy consideration especially on how flooding affects. The policies and especially the disaster management policies seem unclear on the coping mechanisms used by all stakeholders in the three countries in response to especially flooding. A few studies have highlighted the nature and type of coping mechanisms and this may need to be put into policy consideration especially on how flooding affects.

### ***Water Acts and Policies***

The coordination and regulation of wetlands in Kenya and Uganda are the responsibility of the National Environmental Management Authorities (NEMAs), which are parastatals within the ministries supervising issues of environment (Okedi et al., 2005). These agencies, as explained elsewhere in this text are premised on Acts of parliament (Uganda, 1995 and Kenya, 1999). It is further noted that the work of these agencies is decentralised in nature in both countries giving the provincial and district authorities a mandate to manage and regulate wetlands in their jurisdictions.

### ***Soil conservation***

There are few areas by-laws related to soil and land use management in specific local areas such as Iganga and Mbale in Eastern Uganda. If applied across the LVB, specific acceptable soil sedimentation could be applied by local authorities to address the negative effects of flooding and sedimentation.

### ***Wetlands***

One of the most addressed environmental aspects is wetlands management in East Africa, in terms of resources and legislations. Encroachment on wetlands has been endemic in flood presence in and sedimentation of many flood plains in Eastern and Central Uganda, Western and Nyanza Province in Kenya and North-Eastern Tanzania.

### ***Decentralisation and public participation***

In the three East African Countries, there is legislation about the level of involvement and participation of the public matters related to the environment. Decentralisation can be both strategy and policy can go a long way in ensuring public participation. However, in some cases, the strategy has been abused by the governors and governed.

### ***Comparative model***

Given the lacuna in the legal and policy framework, it is important to state the point of departure is to borrow elsewhere the approaches used and have been found to be working. The case in point is the United States thorough the State model soil erosion and sediment control act (1972). This is beside the hilly and mountainous legislation of Uganda. Note that some districts such as Mbale, Iganga and Kabale have by laws to address erosion and sediment control.

In the sum total, crafting and implementing environmental policies and laws related floods and sedimentation is an eclectic strategy beyond the scope of countries and political regions. Okedi et al. (2005) noted that in order to enforce environmental standards, it would take multiple actors and institutions. Some of these stakeholders are the regional research bodies: LVEMP, LVFO, NGOs such as ECOVIC, Research institutions: VicRes, and the local population who are the most immediate users.

### **RECOMMENDATIONS**

This study recommended a number of essential measures, with an effort to address the status and gaps in policies relating to flooding and sedimentation on the LVB. Specifically, this study recommends that:

- (i) There should be harmonisation of area-specific local level policies and by-laws on soil and land use in the LVB.
- (ii) Some of the coping mechanisms that the communities have identified should be translated into policy issues. This will help in situations of emergencies and also lessen on abuse of the environment around the LVB.
- (iii) Involvement of the community, institutions and the technical professionals will be vital in enhancing awareness of policies and laws relating to the LVB and specifically to flooding and sedimentation.
- (iv) Land use policies are hastened so as to regiment the use of land around the LVB so as to avoid the catastrophe of negative soil use.

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