

# Lake Victoria Climate Change Readiness Brief No.2

JULY, 2013



## *Progress and level of implementation of the East African Community Climate Change Policy commitments in the Lake Victoria Basin with respect to water and sanitation*

*Prepared by the East African Sustainability Watch Network*



Uganda Coalition for Sustainable Development



Sustainable Environment Development Watch  
(SUSWATCH KENYA)



Tanzania National Focal Point

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This *Lake Victoria Climate Change Readiness Brief* is produced by the East African Sustainability Watch for the purpose of highlighting progress in implementation of the East African Climate Change Policy commitment related to mitigating the effects of Green House Gas emissions and for adaptation to climate change in relation to rural energy supply for the poor communities within the Lake Victoria Basin. The objective of this Brief is to influence prioritization, better investments and policy actions by the relevant actors at the International, regional and national levels.

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On behalf of the East African SusWatch Network

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Cover Page

*Toilets in Permanent Stream (Lukaya)*

### *Disclaimer*

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## Abbreviations

ADB	African Development Bank
CAN	Climate Adaptation Network
CBOs	Civil Society Organizations
CSOs	Civil Society Organizations
CC	Climate Change
CW	Constructed Wetland
EA	East Africa
EAC	East African Community
EACCCP	East African Community Climate Change Policy
ICESCR	International Covenant on Economics, Social and Cultural Rights
JWESSP	Joint water and environment sector support programme
WSDP	Water Sector Development Programme
ECA	(United Nations) Economic Commission for Africa
ECO	Ecological Christian Organization
ECOSAN	Ecological Sanitation
EMEDO	Environmental Management and Economic Development Organization
GDP	Gross Domestic Product
GHGs	Green House Gases (GHGs)
IPCC	Intergovernmental Panel on Climate Change
KCCWG	Kenya Climate Change Working Group
LANESO	Lake Nyanza Environmental and Sanitation Organization
LDCs	Least Developed Countries
LV	Lake Victoria
LVB	Lake Victoria Basin Lake Victoria Basin Commission
LVBC	Lake Victoria Basin Water Office
LVBWO	Lake Victoria Environmental Management Programme II
LVEMPII	
Ltd	Limited
LVWATSANII	Lake Victoria Water and Sanitation
MDGs	Millennium Development Goals
MERECAP	Mount Elgon Regional Ecosystem Conservation Programme

NAPA	National Adaptation Programme Action
NAPE	National Association of Professional Environmentalists
NCCAP	National Climate Change Action Plan (Kenya)
NCF	National Climate Change Fund
USD	Unites States Dollar
NEMA	National Environmental Management Authority
NEMC	National Environment Management Council (Tanzania)
NGOs	Non-Government Organizations
OHCHR	Office of the High Commissioner for Human Rights
PVC	Poly Vinyl Chlorophyll
REDD	Reducing Emissions from Deforestation and Forest Degradation
RUDMEC	Rural Development Media and Communications
SANA	Sustainable Aid in Africa International
SEI	Stockholm Environment Institute
SIDO	Small Industries Development Organization
SODIS	Solar Disinfection System
TCCS	Tanzania Climate Change Strategy
TCRS	Tanganyika Christian Refugee Service
TCSD	Tanzania Coalition for Sustainable Development
TDA	Trans-boundary Diagnostic Analysis
UCSD	Uganda Coalition for Sustainable Development
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
WHO	World Health Organization
WB	World Bank
WWS	WWS Design and Development Company Limited

## Background

### 1.1 Objective of the Brief

This Lake Victoria Climate Change Brief No.2 is developed from an assessment report that was commissioned by the East African Sustainability Watch Network (EA SusWatch Network), a network of NGOs from Kenya, Uganda and Tanzania with a Regional Secretariat hosted by Uganda Coalition for Sustainable Development (UCSD) in Kampala, Uganda. The assessment is part of the ongoing EA SusWatch Network's *LVEMP II Civil Society Watch Project* that seeks to lobby and advocate for realization of results-based performance from the Lake Victoria Environmental Management Project (LVEMP II) and implementation of the East African Community Climate Change Policy (EACCCP). This Brief Code named Lake Victoria Readiness Brief 2 proceeds from the first Lake Victoria Readiness Brief 1 published in September 2012 with a focus on rural energy supply. The Lake Victoria Readiness Brief 3 anticipates to focus on Agriculture and food security

In relation to the EACCCP, EA SusWatch Network would like to assess progress and level of implementation of the East African Climate Change Policy (EACCCP) commitments related to mitigating the effects of Green House Gases (GHGs) and for adaptation to climate change in three key sectors of water supply and sanitation, agriculture and food security, and rural energy supply in the LVB.

The EACCCP identifies climate change adaptation as a primary priority of the region while mitigation is secondary. It further emphasizes the importance of mainstreaming climate change adaptation and mitigation into national and regional development plans taking a sectoral approach with emphasis on key socio-economic sectors and sub-sectors adversely impacted by climate change notwithstanding potential opportunities to contribute to mitigation efforts and sustainable development of the Partner States and the region at large. The identified sectors that are directly related to water and sanitation are: water resources development and management, energy, human health, infrastructure, disaster risk management, gender and community development, education, training and research and development (EACCCP, 2011).

Many countries are off-track in meeting the Millennium Development Goal (MDG) sanitation target, including much of sub-Saharan Africa (UNICEF and WHO, 2012). The region has not made commendable progress in reducing open defecation. In fact, it has decreased by 11 per cent since 1990. With population growth, this means that the number of people practicing open defecation has actually increased by 33 million (UNICEF and WHO, 2012). That said, Sub-Saharan Africa has the highest proportion of people using unimproved sanitation (these are facilities that fall short of being 'improved' and are unimproved, shared or public) of all the regions. This proportion is growing, suggesting that the demand for services and facilities is on the rise.

In Africa, the use of improved sanitation facilities is generally low at just 41 percent in 2008 (ADB/ECA, 2011). This means that it had increased by only 5 percentage points over a period of 20 years (from 36 percent in 1990). One of the key constraints to improved sanitation is the high cost of infrastructural work.

It is estimated that 242 million people were using improved sanitation facilities in 2006, so to increase this to 66 percent of the African population (to meet MDG Target 7.C to halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation), African countries would need to extend such facilities to an additional 370 million people.

There are stark disparities between rural and urban areas in relation to this indicator. In urban areas, the proportion of population using an improved sanitation facility was 58 percent in 1990, which declined slightly to 56 percent in 2008. This may be attributed to the high percentage of slum dwellers and a rapidly expanding urban population. Populations in rural areas continued to have lower access to improved sanitation than those in urban areas (ADB/ECA, 2011).

Hence, social equity considerations have to be considered when discussing the slow rate of progress toward improved sanitation access. According to an ECA study (ECA, 2009b) of 11 African Least Developed Countries (LDCs), countries such as Zambia, Niger, and Rwanda have witnessed a dramatic

spread of unequal access. The study showed greater access to improved sanitation by wealthier populations, to the detriment of the poor. On a positive note, countries such as Uganda and Malawi, which have integrated a water and sanitation policy into their National Development Plans/Poverty Reduction Strategies, have made considerable progress toward more equitable water and sanitation coverage.

Climate change complicates the above situation as it will, and already does, impact on people's access to water and sanitation by causing floods and droughts, changes in precipitation and temperature extremes that result in water scarcity, contamination of drinking water and exacerbation of the spread of disease (UNICEF and WHO, 2012). Water scarcity may also result in increasing the cost of water and sanitation provision (OHCHR, 2009). The poor, who are among the most vulnerable, are likely to be most affected

Therefore, a human rights approach to water and sanitation becomes necessary. The right to water is defined as the right of everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use (OHCHR, 2009). It is important to note that the right to water is limited to water for personal and domestic use and does not cover other water uses. Sanitation in human rights terms is understood as a system for the collection, transport, treatment and disposal or reuse of human excreta and associated hygiene.

In all spheres of life everyone has the right to physical and economic access to sanitation which is safe, hygienic, secure, socially and culturally acceptable, provides privacy and ensures dignity. These rights must be guaranteed without discrimination.

EA SusWatch has therefore decided to carry out a thorough study to assess progress made by East African Partner States in implementing the East African Climate Change Policy commitment related to mitigating the effects of GHGs and for adaptation to climate change in relation to water and sanitation for poor communities within the LVB, so as to influence prioritization, better investments and policy actions by the relevant actors at the International, regional and national levels.

## 1.2 Effects of climate change on water and sanitation in the Lake Victoria basin

Despite the existence of major towns and cities in the Lake Victoria Basin adjacent to the Lake, access to clean water remains a major challenge. In all the major towns (Mwanza, Bukoba, Musoma, Kampala, Jinja, Masaka, Kisumu, Homa Bay, and Kendu) situated on the shores of Lake Victoria, water supply remains far below the demand levels. Similarly, the hinter land towns such as Mbarara, Ntungamo and Kisii also experience water access problems. According to EAC study of 2007, for most of the urban centers of the water and sanitation analyses indicate that

- Water supply for domestic and industrial use is far below the demand levels;
- On the average, only about 40% the urban Basin population is served with clean water as at 2006;
- Most of the water supply and sewerage infrastructure is old consisting of very old and outdated equipment;
- The conventional waste-water treatment systems have, generally, collapsed. For example, Kisumu City discharges raw sewage into the Lake through Kisat River and into Kisumu Bay due to the collapse of the sewerage system.

From the Burundian part of the Lake Basin, the northern and eastern provinces have the lowest water supply coverage in the country with Kirundo at 33.2 %, Cankuzo at 36.5 % and Ruyigi at 31.9 %. In Rwanda, only about 5 % of the population is connected to piped water, and the rest depend on unimproved of water sources for domestic and other uses. Kenya, Tanzania and Uganda also have water supply coverage of between 60% and 75 % in the main towns of Kampala, Entebbe, Jinja, Masaka, Mbarara, Kabale, Kisumu, Mwanza, Musoma and Bukoba and between 1 % and 30 % in the rural areas (National TDA Reports, 2006). These data indicates that the state of improved and safe drinking water supply remains poor at all levels.

Major water-borne diseases afflicting people in the basin include Typhoid, Cholera, and Amoebiasis. According to the official definition of the World Health Organization, water-borne diseases refers to any significant and widely spread negative effect on human health (death, disability, disease or

disorder) that is directly or indirectly caused by the state or changes in quantity or quality of any water. There is a continuous threat of outbreaks of waterborne diseases in the Basin. Available data shows numerous limited outbreaks of diseases caused by exposure to or consumption of poor quality water containing pathogenic bacteria that are responsible for transmitting various contagious diseases mentioned above.

Similarly in Burundi, as it is the case in the other Lake Victoria Basin countries, diarrheal diseases are one of the prime causes of mortality in infants. Bilharzia is contained within the marshes and the lakes of Bugesera. Among the other widespread waterborne diseases in the Basin are typhoid fever, the bacterial dysentery and a variety of intestinal parasites.

In addition to the above challenges, the Lake Victoria region has been undergoing ecological changes which have been linked to climatic changes. The change of climate is attributed directly or indirectly to human activities which alter the composition of global atmosphere which is in addition to natural climate variability observed over comparable periods. This has been observed in temperature and rainfall changes.

### 1.2.1 Effects of climate change on water availability

Increasing rainfall variability and prolonged droughts cause intense pressure on available water resources in the region. In the last 3 – 4 decades, the EA region has experienced severe and recurring droughts with devastating effects to water as well as agriculture and energy sectors.

In Uganda, between 1991 and 2000, there were seven droughts in the Karamoja region, and major droughts also occurred in 2001, 2002, 2005 and 2008. Although there have always been droughts in Uganda, evidence suggests that they are becoming more frequent and more severe. In fact, the increased frequency and duration of droughts is the most significant climate-related change effect being experienced in Uganda. The high frequency of droughts has persisted since 2000, and Uganda particularly suffered in 2004/2005, when production of hydroelectricity declined substantially, resulting in a power crisis that undermined investment and slowed the country's economic growth (Uganda CC Policy, 2012).

In Tanzania, more than 70% of all natural disasters in the country are hydro-meteorological, and are linked to droughts and floods. For instance, the droughts of 2003, 2005 and 2009 severely affected water resources for agriculture and production, energy and business sectors. Following these droughts, Tanzania suffered serious energy crisis, hence severe social and economic implications. The floods of 2009, for instance, were particularly devastating to humans, property and infrastructure (TCCS, 2012).

In Kenya Serious droughts have occurred more frequently. Major rivers show severe reduction of water volumes during droughts, and many seasonal rivers completely dry up. The crop failure in 2009 for instance, placed an estimated 10million Kenyans or one fourth of the entire population at risk of malnutrition, hunger and starvation.



*Photo 1: Bismark rock in Mwanza showing the drop in LV water level*

As far as water and sanitation sectors are concerned in the LVB, increased rainfall variability as well as frequency and duration of droughts in the past few years triggered a decrease in water flow to rivers leading to decline in water levels in Lake Victoria (Photo 1 above) and drying up of seasonal streams, ponds and wetlands; changes of perennial rivers, ponds and streams

to seasonal flows; and increased prevalence of water borne diseases especially malaria, diarrhea, cholera and dysentery due to increased temperatures.

### 1.2.2 Effects of climate change on water quality

Many ecosystems are overwhelmed by an unprecedented combination of climate change related events, and land-use changing patterns, pollution, siltation, damming and over-exploitation of water resources. Pollution is in two forms: (1) contamination of water sources due to land degradation as a result of socio-economic activities in wetland areas and discharge of untreated or partially treated municipal and industrial wastewater; and overutilization of water resources as a result of climate change (2) increased pollutant concentrations attributed by siltation, and increased evapo-transpiration because of increased temperature.

Increased pH levels in Lake Natron which is affecting the breeding sites of ?amingos is an example of climate change induced water pollution (TCCS, 2012). The change in pH is associated with increased temperature and changed rainfall patterns in the Lake Natron catchment areas.

On the other hand, flooding from storm surges and droughts from increased temperature has exacerbated many forms of water pollution such as sediments, nutrients, organic carbon, pathogens and pesticides, and distributes human excreta and its attendant health risks across entire neighborhoods and communities



Photo 2: Floods after heavy rains in Kampala

### 1.2.3 Effects of climate change on water supply and sanitation services

There is an indirect relationship between climate change and increased costs for water supply and sanitation services. The case study field visits done during this assessment established that the rising costs are associated with increased investment and operation costs for extraction and treatment of water as a result of climate induced water scarcity and pollution and increased operation and maintenance costs for water supply and sanitation facilities resulting from destruction by floods. Expansion of scale of water business from local vendors in LVB is a vivid example entailing the rising prices for water. Yet, the quality of locally sold water is questionable, threatening the life of especially poor people in the basin.

### 1.2.4 Effects of climate change on acceptability of water and sanitation facilities

Climate change has increased water scarcity hence increasing demand and competition. As a result more sources of water including surface and ground are being enhanced to extract water. As such there is an increasing trend in LVB on accepting water from sources other than lakes and rivers including dams, springs, swamps, channels, shallow wells and boreholes. Likewise, there is an increasing trend on accepting new innovative sanitation facilities that are gauged towards addressing climate change impacts among others. The sanitation facilities on board include ECOSAN toilets, Constructed Wetland for decentralized wastewater treatment and Bio-centre facilities for communal use.

### 1.2.5 Effects of climate change on water accessibility

Floods and droughts are deteriorating existing water and sanitation infrastructure in LVB. Where long-term rainfall increases, groundwater levels rise, decreasing the efficiency of natural purification processes, increasing risks of infectious disease and of exposure to toxic chemicals. Potential indirect effects of climate change on the water supply and sanitation situation include increasing the unreliability of piped water and sewerage services. In addition, climate change affects physical accessibility of water sources and sanitation facilities including cases where extreme weather events render it impossible to arrive at the water source or sanitation facilities.

## Effects to socio-economic activities

Rainfall variation and changes significantly affect the availability of water for socio-economic activities including water for domestic use, crop and livestock production, and hydroelectric power generation, particularly in arid and semi-arid areas in LVB. Decreased rainfall, for example, reduces the water available for crops and livestock, the key economic activities of most rural populations in the basin where rain-fed agriculture is dominant.

On the other hand the relationship between economic activities, such as crop and livestock husbandry, charcoal production, fishing, settlements and industrial activities is that these activities alter natural vegetation cover, run-off and infiltration, and reduce the capacity of water sources to hold water after the rainy season.

As a result, both floods during the rainy season and water scarcity during the dry season are likely to occur owing to, among other factors, destruction of infrastructure and siltation that reduces the depth of water sources and hence reduces their storage capacity.

### 1.3 Approach and methodology

The assessment involved case study field visits that were carried out in Uganda (Kampala, Masaka and Kalungu-Lukaya town), Kenya (Kisumu) and Tanzania (Mwanza). The visits aimed at gathering field data and information in the view of assessing the impacts of climate change on water and sanitation. The field visits also did serve as quality checks for the data and information obtained from documents during preliminary documentary review. They were used to identify and document practical and innovative approaches being undertaken by NGOs and other development practitioners to address water and sanitation challenges as well as climate change effects on the same. It also involved desk review of best practices in Rwanda and Burundi

As such, the assessment involved semi structured interviews with key informants as well as questionnaires. It also involved physical observations and documentation in the form of write up, photos and video clips of practical and innovative approaches being undertaken by NGOs and other development practitioners to address climate change impacts and

adaptation in relation to water and sanitation, including opportunities to integrate and upscale them to on-going national and regional interventions.

Based on the assessment report, the Lake Victoria Climate Change Readiness Brief No.2 has been developed to highlight the extent to which the policy provisions in the EACCCP that relate to addressing the climate change effects in East Africa have addressed water and sanitation challenges of the LVB; point out successes and challenges that are hindering the effective implementation of EACCCP provisions in relation to water and sanitation; highlight practical and innovative approaches being undertaken by NGOs and the other development practitioners to address water and sanitation challenges as well as climate change effects; and provide recommendations and available options on how the poor urban and rural communities in LVB in Uganda, Kenya & Tanzania can be supported to cope with the adverse effects of climate change on water and sanitation at local, national and regional levels.

#### 1.4 Scope

The purpose of the assessment that has informed this brief is not to criticise, but to identify the level of policy implementation and offer recommendations that may support improved implementation of the EACCCP to address climate change mitigation with specific reference to water and sanitation for poor communities within the Lake Victoria basin.

The assessment involved Review of literature on effects of climate change in water and sanitation amongst the poor urban and rural communities of the LVB in Uganda, Kenya and Tanzania; establishment of policy provisions in the EACCCP that relate to addressing the climate change effects in East Africa and assess the extent to which they have addressed water and sanitation challenges of the LVB in Uganda, Kenya and Tanzania ever since they were adopted in April 2011; successes and challenges that are hindering the effective implementation of EACCCP provisions in relation to water and sanitation.

It also set out to highlight practical and innovative approaches being undertaken by NGOs and other development practitioners to address water

and sanitation challenges as well as climate change effects, including opportunities to integrate and upscale them in on-going national and regional interventions (like the LVEMPII, LVWATSANII, and MERECP implemented through the Lake Victoria Basin Commission); and to provide recommendations and available options on how the poor urban and rural communities in LVB in Uganda Kenya & Tanzania can be supported to cope with the adverse effects of climate change on water and sanitation at the local, national and regional levels in short, medium and long-term.

## 2.0 Analysis of progress in level of implementation of the EACCCP

### 2.1 What is the EACCCP?

The EAC formulated a climate change policy as part of efforts to respond to the increasing impacts of climate change in the region that was approved by the Heads of state during the 9th extra ordinary summit held on 19th April 2011 in Dar es Salaam, Tanzania.

The overall aim of the policy is to contribute to regional integration through harmonized and coordinated regional strategies, programmes and actions; and in this particular case specifically with regard to a response to the negative impacts of climate change.

The purpose of the policy is to guide EAC partner states and other stakeholders, particularly development partners, in the collective implementation of sector specific climate change response measures within the context of sustainable development. So, the policy gives a general framework for the region to act in a 'climate friendly' way. The policy identifies climate change adaptation as the main priority of the region while mitigation is secondary and, countries were requested to develop National climate change policies.

The EAC climate change policy thus prioritizes: adaptation measures; regions, sectors and communities that are more vulnerable to climate change impacts; mainstreaming climate change into national development plans; socio and economic development; as well as partnerships, collaboration and synergies among various stakeholders.

Justification for a regional policy hinges on the fact that the region needs an integrated, harmonized and multisectoral framework to respond to climate change in East Africa.

## 2.2 Water and Sanitation related provisions in the EACCCP

In relation to climate change, the EACCCP considers the following water and sanitation challenges:

- Increased water abstraction for various use among the partner states;
- Inadequate water distribution and utilization technologies;
- Inadequate water storage infrastructures;
- Lack of data on seasonal water flows that can allow proper planning and water management;
- Increased conflicts over water resources;
- Poor water resource management at farm level;
- Limited awareness of the value of water resources in the development context;
- Control recurrent floods and mitigate effects of prolonged droughts in order to reduce outbreak of waterborne diseases;
- Development of adequate sanitation facilities;

The EACCCP's adaptive strategy to water and sanitation challenges aims at (1) improving water conservation, efficiency and sustainable use and exploitation of regional water resources in view of the changing climate (2) reducing the vulnerability of populations to climatic sensitive diseases and enhance adaptive capacities within the health services. Specifically the policy proposes the following actions to enhance adaptation of climate change impacts in the water and sanitation sector:

- Support development and transfer of water and hydro-climatic information and technology to support water conservation through natural resource planning support, data acquisition and management, technology innovation and transfer, partnerships and joint ventures;
- Promote transfer and dissemination of efficient water technologies including recycling of waste water;
- Improve water security by promoting investment in water storage facilities and technologies;
- Promote rain water harvesting, protection of water wells and springs, and other water sources;
- Promote regional and international cooperation for improved water management and water resource based conflict prevention through trust and confidence building;
- Support regional initiatives geared towards trans-boundary water

resource management of lake and river basins;

- Promote participation of the private sector, civil society and women in management of water resources through Public Private sector Partnership including regulated abstraction and distribution of water for domestic, industrial, agricultural and energy production;
- Improve water supply infrastructure to ensure adequate and reliable supply of water; and
- Promote actions that reduce water pollution, including improving water quality and protection of aquatic habitats.
- Develop effective early warning systems and emergency health measures for climate change related diseases;
- Facilitate availability of health facilities, equipment and medicine to assist in early diagnosis and treatment in climate change related diseases;
- Enhance capacity of medical personnel on climate change, including traditional/indigenous knowledge;
- Promote awareness among populations on climate change related diseases and their prevention;

In relation to mitigation, the EACCCP identifies the waste management sector as one of the key intervention areas. Considered challenges include establishment of an integrated and comprehensive waste management system; and enforcement of existing laws and regulations of waste management at household level. The mitigation strategy therefore aims at promoting waste management to ensure air quality, water quality and mitigation of greenhouse gases. Specifically, the following actions are proposed:

- Promote sanitary landfill waste disposal, preventive recycling and incineration where there is no other solution;
- Promote the generation of energy, organic fertilizer, and other by-products from waste. Promote waste separation at source; and
- Promote waste water treatment technology and reuse.

## 2.3 Extent of EACCCP Domestication in each Country

The domestication of EACCCP for each country has been through the formulation of countries' climate change policies, strategies and action plans. It has however to be noted that though some national development policies, strategies and plans came into being before the EACCCP, they take cognizance of the water and sanitation provisions of the EACCCP. These include the country NAPAs, water, sanitation, health and environmental policies. The following sections provide synopsis of state of the EACCCP domestication for EAC countries whose documents were availed during data collection phase.

### 2.3.1 Tanzania

Tanzania has prepared two documents with regard to climate change. The documents are the National Climate Change Strategy (TCCS) of 2012 and National Adaptation Programme of Action (NAPA) of 2007. The climate change strategy built on and extends beyond National Programme of Adaptation to climate change (NAPA) as they have been prepared in a strategic approach that covers key sectors of social-economic growth of the country. The Strategy facilitates strategic implementation of climate change activities that is different from the previous approach of projects and/or programmes.

In compliance with the EACCCP water and sanitation provisions, the strategy aim at ensuring water quality, availability and accessibility in a changing climate through the following strategic interventions: protecting and conserving water catchment; enhancing exploration and extraction of underground and other water sources; facilitating and promoting water recycling and reuse; promoting rain water harvesting; enhancing coordination of water abstraction and use; promoting efficiency in water supply and use to ensure adequate and sustainable water supplies to all sectors; facilitate access to water resources; enhance management of water sources to improve sanitation and hygiene; promoting water treatment and storage; enhancing decentralization of water sources management; conducting vulnerability assessment in water resources.

### 2.3.2 *Uganda*

In Uganda, while the National Climate Change Policy (2012) is at the final/approval stages, the first draft of implementation strategy is out for consultations. The focus of the strategy is fully in line with the main national climate policy priorities which are in line with the country's NAPA (2007) and the EACCCP (refer page 3 of the Uganda Climate Change Policy Draft). The strategy therefore is meant to complement the National climate Change Policy and offers a way forward towards its operationalisation. The strategy is gauged to the following strategic interventions in the water and sanitation sector:

- Promote and encourage water harvesting and efficient water utilization among individuals, households, institutions and sectors
- Promote and strengthen water for production to ensure growth in the complementally sectors under changing climatic conditions
- Promote and strengthen the conservation and protection against degradation of watersheds, water catchment areas, river banks and water bodies
- Promote Integrated Water Resources Management (including underground water resources), including contingency planning for extreme even such as flood and drought
- Ensure guidelines for infrastructure/hydraulic works (i.e., water for production, piped water supply schemes & conditional grants guidelines for support to point sources protection) mainstream CC
- Improve and strengthen trans-boundary cooperation regarding water resources management
- Support institutional an human capacity building in water resource use, development and management
- Strengthen water resource monitoring networks and flood warning systems
- Make provisions for a safe water chain and sanitation facilities to limit outbreaks of water-borne diseases, and implement strong public awareness programmes to promote better hygiene

### 2.3.3 *Kenya*

The provisions of the EACCCP are well captured in the National Climate Change Action Plan – NCCAP - (2013 – 2017). Page 10 of the document insists that the action plan has taken into account the EACCCP provisions thereby

adopting priority actions in the region. The National Climate Change Action Plan (NCCAP) takes forward the implementation of the National Climate Change Response Strategy – NCCRS - (2010).

The NCCAP considers water and sanitation to be among the climate change vulnerable sectors that need priority actions. The NCCAP therefore identifies a series of actions for transforming climate change ambitions into reality. These include investing in actions that deliver development, mitigation and adaptation benefits; and enabling actions to improve the conditions for success.

Priority adaptation actions to improve water management include mainstreaming of Climate Change to all water resource management plans and actions, water conservation efforts including the reversal of degradation of the main water towers and rehabilitation and restoration of all water catchments, increasing urban and rural domestic water supplies, urban sewage services to help combating water borne diseases and their social and economic impacts, enhance irrigation and drainage to increase agricultural production and address water requirements for livestock production, carry out effective trans-boundary water resources management, carry out water resources assessment, documentation and dissemination of necessary information to stakeholders.

#### 2.4 Status of Implementation of the EACCCP Provisions in the LVB

The implementation of the EACCCP at partner states is at very early stages, basically at the planning stage.

In Uganda, signs of implementation of water and sanitation provisions of the EACCCP are found in the final programme document for the Joint Water and Environment Sector Support Programme in Uganda (JWESSP), 2013 – 2018, which considers climate change impacts on water and sanitation sector.

In Kenya, there have been on-going interventions which directly and indirectly consider the provisions of the EACCCP to addressing especially

regional water challenges: they include enforcement and/or enactment of laws for efficient water resource management, increasing capture and retention of rainwater, water quality monitoring, de-silting rivers and dams, protecting and conserving water catchment areas, investing in decentralized municipal water recycling facilities, campaigns on water harvesting, developing hydrometric network to monitor river flows and flood warning (NCCAP, 2013). In addition to that, the country is finalizing the water security and climate change resilient project (2013) which is at the final write up stage and has taken into account the EACCCP.

In Tanzania, there is no dedicated project designed to address the impacts of climate change on water and sanitation. However, the on-going water sector development programme (2006 – 2025) addresses some provisions of the EACCCP. The programme is comprised of Four Component namely; Water Resources Management; Rural Water Supply and Sanitation Services; Urban Water Supply and Sewerage Services and Sector Institutional Strengthening and Capacity Building. The programme supports public service and local government reforms and supports investments in other water-using and related sectors such as agriculture, energy, environment, mining, fisheries, and lands and supports development of shared water resources through inter-country joint basin management which is the key for the management of water resources and addressing sanitation challenges in LVB.

Besides, there is commendable contribution of local actors (NGOs and CBOs) whose activities are gauged to addressing the negative impacts of climate change in the water and sanitation sector in the LVB. Most of their work is directed to engage local communities at grass root level.

On-going work by these actors is in line with the actions emphasized by the EACCCP especially to address water and sanitation climate change challenges in LVB.

Generally, the implementation of the EACCCP provisions in partner states is more of the domestication and planning of the national policies, plans, strategies and projects; but catalysed by commendable actions of non – state actors within the LVB.

At regional level, the implementation of the EACCCP is the responsibility of the EAC secretariat working jointly with relevant government agencies in partner states, EAC organs and institutions. As far as management of LVB is concerned, the LVBC is the responsible institutions for addressing water and sanitation challenges of climate change.

In line with implementing the EACCCP provisions in the region, the LVBC has developed the strategic plan, 2011 – 2016. The plan incorporates a shift from the last Operational Strategy, 2007 – 2010. The plan guide is a shift from the promotion, facilitation and coordination of largely software actions of policies and harmonization of laws and regulations to include more hardware actions like support to infrastructure improvements of Lake Victoria and the Lake Basin). In the water and sanitation sector, the plan is gauged to improving public health services on sanitation and water supply through review and harmonization of laws, policies and guidelines for public health services as well as improving sanitation and water supply infrastructure. The plan is also directed to enhance management of ecosystems, natural resources including climate change adaptation and mitigation strategies.

More actions by the LVBC are captured through implementation of the regional projects especially the LVEMPII, LVWATSANII and MERECP which are gauged to improve collaborative management of trans-boundary natural resources of Lake Victoria Basin and reduce environmental stress in the basin.

## 2.5 Partner States and EAC Budgets for Implementation of EACCCP

EACCCP recognises that financial resources to implement the Policy are key elements in the implementation of the Policy. It envisages that substantial funds will be availed by development partners including multilateral agencies, bilateral partners and intergovernmental agencies and the private sector and Partner States.

## 2.5.1 Partner States budgets for implementation of EACCCP

### *2.5.1.1 Financing for climate change measures in Tanzania*

In accordance with the TCCS (2012), addressing climate change in Tanzania will largely depend on financial support from international community. Domestic funding from government budget, private sector, as well as individual contributions will complement this effort.

However, an integrated approach and coordinated working system is highly required to ensure that funds to address climate change are used to achieve the objectives presented in this strategy.

As such, to ensure resources availability, the strategy proposes establishment of a National Climate Change Fund (NCF) and a special Climate Change window under Basket Fund to finance its implementation.

Yet, the cost of implementing the Tanzania Climate Change strategy has not been established. A recent study undertaken by the Stockholm Environment Institute estimates that the cost of building adaptive capacity and enhancing resilience against future climate change in Tanzania is USD (\$)100 to 150 million per year (SEI, 2010).

But, an additional USD (\$) 500 million per year (but probably more) is needed to address current climate risks, in reducing future impacts and building resilience to future climate change (TCCS, 2012).

### Financing for climate change measures in Uganda

The national climate change policy identifies the following sources for financing and resource mobilization for climate change in Uganda:

- National and sectoral investment plans and budgets, as climate change concerns are mainstreamed and leveraged through various investment plans
- Private-sector investment with respect to energy, industrial development and technology transfer
- Multilateral and bilateral donor support, as well as support from international climate funds, particularly with respect to issues of capacity development, technical assistance and awareness raising

- Market-based mechanism for climate-related actions, such as Clean Development Mechanism, benefit-sharing schemes under REDD+, emissions-trading revenues, tax incentive and tariff scheme

Detailed financial resources for implementation of climate change policy and activities in Uganda have been provided in the Costed CC Implementation Strategy, 2012 (which is still under review) as provided in Table 1 and 2 below. In this cost strategy, a total of US\$40,700,000 has been allocated to address water and sanitation climate change based challenges for a period of more than 10 years. This is equivalent to about 16% of the total estimates for combating climate change in the country.

**Table 1:**  
**Adaptation costs (additional) for implementing the CC policy in Uganda**

Sector	Additional Amount Required due to Climate Change (US\$)	Time frame		
		Short-term (1-5 years)	Medium-term (6-10 years)	Long-term (10+ years)
1. Agriculture and Livestock	29,700,000	3,200,000	10,900,000	15,600,000
2. Water	34,700,000	5,000,000	9,900,000	19,800,000
3. Fisheries and Aquaculture	3,700,000	850,000	1,650,000	1,200,000
4. Transport and Works	16,500,000	3,000,000	5,200,000	8,300,000
5. Forestry	6,800,000	800,000	3,300,000	2,700,000
6. Wetlands	700,000	500,000	200,000	-
7. Biodiversity and Ecosystem Services	1,800,000	500,000	1,000,000	200,000
8. Health	8,100,000	1,100,000	3,000,000	4,000,000
9. Energy	11,000,000	700,000	4,800,000	5,500,000
10. Wildlife and Tourism	3,900,000	800,000	1,700,000	1,400,000
11. Human Settlements and Social Infrastructure	23,500,000	1,600,000	9,200,000	12,700,000
12. Disaster Risk Management	6,500,000	3,000,000	2,000,000	1,500,000
13. Vulnerable Groups	1,200,000	-	600,000	600,000
<b>TOTAL</b>	<b>148,100,000</b>	<b>21,150,000</b>	<b>53,450,000</b>	<b>73,500,000</b>

**Table 2:**  
**Mitigation costs (additional) for implementing the climate change policy in Uganda**

Sector	Additional Amount Required due to Climate Change (US\$)	Time frame		
		Short-term (1-5 years)	Medium-term (6-10 years)	Long-term (10+ years)
1. Land Use, Land-Use Change and Forestry (LULUCF):				
- Forestry	2,200,000	800,000	1,000,000	400,000
- Land Use and Land Use Change	3,000,000	700,000	1,800,000	500,000
- REDD+	12,500,000	12,000,000	300,000	-
2. Wetlands	3,000,000	2,500,000	500,000	-
3. Agriculture	8,600,000	3,900,000	4,400,000	300,000
4. Energy Generation	42,100,000	2,500,000	13,600,000	26,000,000
5. Energy Utilisation	3,800,000	500,000	1,100,000	1,700,000
6. Transport	26,000,000	3,200,000	7,500,000	15,300,000
7. Industrial Sector	3,600,000	1,250,000	350,000	-
8. Waste Management	5,500,000	500,000	2,500,000	2,500,000
9. Technology Transfer (cross-cutting)	4,500,000	3,200,000	1,000,000	300,000
<b>TOTAL</b>	<b>112,300,000</b>	<b>31,050,000</b>	<b>34,250,000</b>	<b>47,000,000</b>

*Source: Uganda Costed Climate Change Implementation Strategy, 2012*

### *Financing for climate change measures in Kenya*

Kenya developed a Resource Mobilisation Plan with the purpose of ensuring proposed programmes and projects are fully implemented. The Plan targets domestic resources from both local and national government as well as from the private sector.

In addition to international funding agencies such as the World Bank and International Monetary Fund (IMF), the Mobilisation Plan also covers external resources from development partners and regional funding agencies such as multilateral development banks e.g. the African Development Bank (AfDB). Kenya intends to spend about US\$12.76 billion for the next five years to implement the NCCAP. Adaptations costing for a five year period per sector are provided in Table 3 below. A total of KSh 278.76 billion has been allocated for the water and sanitation sector. This is equivalent to about 44% of the total estimates.

**Table 3:**  
**Kenya adaptation costing for a five year period per sector**

	<b>Sector</b>	<b>Estimated Cost billion KSh for 5 years</b>
ADAP-1	Agriculture	44.91 billion
ADAP-2	Livestock	27.1 billion
ADAP-3	Water & Sanitation	278.76 billion
ADAP-4	Environment	115 billion
ADAP-5	Infrastructure related to roads in ASALs	107 billion
ADAP-6	Sustainable livelihoods related to ASALs	59 billion
ADAP-7	Energy Infrastructure	5.3 billion
ADAP-8	Tourism	1.3 billion
<b>Total KSh for next five years</b>		<b>KSh 638 billion</b>
Total USD equivalent for five years		USD7.5 billion

*Source: Kenya NCCAP 2013 -2017*

From these country based financial information and data, 4 issues are pertinent. (1) the EAC Partner States, through the Climate Change CC policies, strategies and action plans, have established mechanisms for mobilization of financial resources to address CC (2) addressing CC in EAC Partner States will largely depend on financial support from international community; domestic funding from government budget, private sector, as well as individual contributions will complement this effort (3) there is a very big difference on budgetary allocation for combating climate change in EAC Partner States; from about US\$260 Million in Uganda (over 10 years period) to at least US\$650 Million per year in Tanzania to about US\$12.76 billion for 5 years in Kenya (4) similarly, there exists big difference between budgetary allocation for combating the impacts of CC on water and sanitation in EA ranging from 16% in Uganda to 44% in Kenya. Issues 2, 3 and 4 will continually affect the level of implementation of both national and regional climate change policies, strategies and action plans taking into account that the Partner States are almost facing common climate change based challenges.

### 2.5.2 Partner States contribution to implementation of EACCCP at the regional level

The Lake Victoria Basin Commission is currently funded through two sources, which are contributions by Partner States and Development Partners. The LVBC Secretariat has also entered into partnerships with Development Partners which have significantly contributed to the development objectives of the LVBC as it is shown in the Table 4 indicating the evolution of the budget contributions from the two existing funding mechanisms during the last five years.

**Table 4:**  
**LVBC Budget Evolution (2006-2011)**

Financial Year	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Contributions from Partner States	888,934	1,569,396	1,656,363	1,919,105	2,097,385
Contributions from Development States	1,653,723	1,289,123	784,463	10,319,448	13,060,211
Total	2,542,657	2,858,519	2,440,826	12,238,553	15,157,596

Source: LVBC, 2011

The cost for implementation of Strategic Plan (2011-2016) based on the LVBC development objectives and the defined key results are as are estimated at USD 207,218,372 over the five financial Years. The allocation of resources is based on the projections informed by Partners States and Development Partners commitment through existing and planned Projects and programmes. The detailed estimated allocation is as per the Table 5 below.



Photo 4: Algae spread indicating high nutrients in Lake Victoria. (Photo: NAPE)

**Table 5:**  
**Annual Budget Estimates 2011-2016(USD)**

<b>Development Objectives</b>	<b>2011/2012</b>	<b>2012/2013</b>	<b>2013/2014</b>	<b>2014/2015</b>	<b>2015/2016</b>
D1: To strengthen co-ordination and management capacity of VLBC					
	6,180,763	6,804,913	7,732,638	7,868,780	7,955,000
D2: To enhance partnership and collaboration with EAC organ, institutions and key stakeholders					
	892,250	872,650	838,650	388,800	397,470
D3: To harmonize policies, laws, regulations and standards and to strengthen institution development and governance in natural resource management					
	10,865,468	10,664,326	10,537,576	10,678,587	10,560,000
D4: To improve public health services on water supply sanitation ; HIV/AIDS; reproductive health; gender;					
	17,861,037	15,353,537	14,567,537	14,987,544	13,876,600
D5: To improve safety of navigation and security and Lake Victoria					
	5,890,100	2,024,683	2,056,233	1,600,700	1,720,470
D6: To enhance management of ecosystem, natural resources including CC adaptation and mitigation strategies					
	2,721,530	5,515,530	5,221,000	4,752,000	4,752,000
D7: To promote investments and sustainable livelihood					
	80,000	250,000	250,000	250,000	250,000
<b>TOTAL</b>	<b>44,491,148</b>	<b>41,485,639</b>	<b>41,203,634</b>	<b>40,526,411</b>	<b>39,511,540</b>
<b>GRAND TOTAL: USD 207,218,372</b>					

*Source LVBC, 2011*

From the regional final trends and budgetary arrangement, it can be seen that (1) regional development projects will continue relying on financial supports from external sources other than the contributions from the EAC Partner States (2) development objectives 4 and 6 which address water and sanitation as well as climate change issues constitute about 37% and 11% respectively of the total budget.

## 2.6 Factors Enabling Effective Implementation of the EACCCP

The results of literature review and stakeholders' consultation came up with the following issues that allow for effective implementation of the EACCCP.

### *Institutional and legal environment*

Existence of the EAC secretariat and underneath institutions promises significant benefits in terms of implementation of the EACCCP on the ground at regional level. With the Lake Victoria Basin Commission (LVBC), for example, a number of regional projects such Lake Victoria Environmental Management Programme (LVEMPII), Mount Elgon Regional Ecosystem Conservation Programme (MERECP) and Lake Victoria Water and Sanitation Programme (LVWATSANII) are implemented in line with the EACCCP. On the other hand, existence of line ministries at EAC partner states to specifically deal with EAC regional issues provides for potential platform for addressing regional issues including implementation of the EACCCP to address the impacts of CC on water and sanitation in LVB.

### *Existence of non – state actors –*

A rich body of non – state actors is present to take on the EACCCP dissemination to local communities and facilitate its implementation. The actors range from local based to national to regional environmental and climate change NGOs, CBOs and networks. Above all, there are national and regional climate focused CSOs such Climate Adaptation Network (CAN) and Kenya Climate Change Working Group (KCCWG) which are specifically dealing with CC thereby creating synergies, harmonizing and strengthening efforts in the design and implementation of activities that address CC in the region. These non – state actors have resources including expertise and vast experiences which are necessary towards action based implementation of local and regional policies.

### *Responsive local communities*

Local communities in the LVB, especially those undertaking socio-economic activities in the proximity of water sources, admit that there are changes in the trends and patterns of local climate. Such changes have brought about

negative impacts to the socio-economic development and livelihood. In line with this, appropriate solutions are highly required to mitigate and/or adapt to climate change and that they are readily available to join hands. This readiness, responsiveness and flexibility promise significant collaborations in implementation of the EACCCP which is gauged to responding to the impacts of climate change in the region.

## 2.7 Main Drawbacks for Implementation of the EACCCP in LVB

### 2.7.1 *Lack of awareness about the EACCCP*

While the EACCCP puts the responsibility of implementation on the EAC secretariat and partner states, it remains largely unknown especially to implementing institutions, NGOs, CBOs and local communities in partner states. They are not aware of the policy itself let alone its provisions in addressing climate impacts in LVB. The lack of awareness of the policy is attributed to inadequate involvement of stakeholders during its formulation as well as inappropriate communication strategy to disseminate and make it known to these actors as well as local communities in partner states.

### 2.7.2 *Poor coordination at national levels*

The partner states are required to put in place country specific policies, strategies, action plans, legislations and institutional arrangements for addressing climate change in line with the EACCCP. Yet, most partner states suffer from poor coordination of internal policies. The sanitation sector is the most affected since it does not belong to a specific line ministry of water, health and environment. To make it worse, most EAC partner states experience provision conflicts between one legislation and another leading to difficulties in implementation of existing internal policies and legislations. Unless coordination of policies is clearly sorted and conflicts between legislations are resolved in EAC partner state countries, implementation of regional policies will always be uncertain.

### 2.7.3 *Political interference*

Political interference in implementing development projects including climate change based programmes was reported by some consulted stakeholders during case study field visits in LVB. The interference is in the form of orders to bypass environmental legislations based on purely political grounds. It is also in the form of lack of political goodwill to support climate

change mitigation and adaptation initiatives especially at local implementation levels.

#### *2.7.4 Inadequate financial resources*

While much has been done regarding research to understand climate change and its implications, issues related to vulnerability as well as development of mitigation and adaptation measures to combat the impacts of climate change in water and sanitation, very little has practically been done to address climate change and its impacts. The little practical actions to combat climate impacts are linked to inadequate financial resources in responsible institutions in EAC partner states which are also gauged to less prioritization and lack of political goodwill at national and local levels. Climate change agenda is more dependent on the donors' funds and actually partner states seem to look at the EAC as one good link to access funding sources.

### 3.0 Water and Sanitation situation and potential to upscale it in the Lake Victoria basin

There is local and regional recognition that climate changes in the LVB are vivid not only from knowledgeable climate change experts, researchers and scientists but also from observational evidences by individual local community members who are the very primary source of information and from whom climate changes are continuously experienced in daily life.

Depending on vulnerability, various measures are available to either mitigate/adapt or enhance the impacts of climate change on water and sanitation sectors in LVB. The case study field visits identified that most of them are practical and innovative actions by state and non – state members including governmental institutions and authorities, networks/coalitions, CBOs, private companies, NGOs and local community groups.

Tables 6 and 7 below summarise the practical and innovative actions that are available in the LVB in Uganda, Kenya and Tanzania. The preceding table is a brief description of some actions and innovations.

**Table 6:**

#### **Climate change impacts on water resources in LVB**

CC indicator	Impact	Practical and innovative actions on board
<ul style="list-style-type: none"> <li>Increasing temperature</li> <li>Late on rainfall onset and early withdraw (cessation)</li> <li>Increasing rainfall intensity</li> <li>Decreasing rainfall amount</li> <li>Seasonal shifts in rainfall patterns</li> </ul>	<ul style="list-style-type: none"> <li>Decreased water flows in rivers due to increased temperature and prolonged droughts</li> <li>Dry up of seasonal streams, ponds and wetlands due to increased temperature</li> <li>Changes of perennial rivers, ponds and streams to seasonal flows due to increased temperature</li> <li>Shrinkage and decline of water levels in lakes and dams due to increased temperature</li> </ul>	<ul style="list-style-type: none"> <li>Spring/water sources rehabilitation</li> <li>Wetlands restoration through demarcation, entrance restrictions and tree planting</li> <li>Conservation of water catchment areas through trees planting and restriction of land use activities</li> <li>Rainwater harvesting at household and institution levels.</li> <li>Extraction of groundwater for domestic use through shallow wells and boreholes</li> </ul>

CC indicator	Impact	Practical and innovative actions on board
	<ul style="list-style-type: none"> <li>• Immediate flooding followed by immediate dry up</li> <li>• Increased percolation rate of storm water runoff into the ground due to decreased moisture content of the soil</li> <li>• Over-abstraction of water sources</li> <li>• Increased encroachment of water catchments for various land uses i.e. agriculture, urbanization and industrial development</li> <li>• Degradation of water sources due to increased anthropogenic activities</li> </ul>	<ul style="list-style-type: none"> <li>• Establishment of water storage facilities such as charcoal dams and water ponds to contain water during rain seasons for use during the dry season</li> <li>• Extension of water intake facilities far forward and deep down the lake for water extraction for supply purposes</li> <li>• Reducing dependence on water sources and resources by developing alternative socio-economic activities such as fish culture using offsite fish ponds</li> <li>• Practising irrigation agriculture (surface and drip agriculture)</li> <li>• Use of ultra violet radiations to treat domestic water for consumption</li> <li>• Establishment of hydrometric stations to determine water quantity in surface and ground water sources.</li> <li>• Design and operation of decentralized community based small water supply schemes</li> </ul>

**Table 7:**  
**Climate change impacts on sanitation services in LVB**

CC indicator	Impact	Practical and innovative actions on board
<ul style="list-style-type: none"> <li>• Increasing temperature</li> <li>• Late on rainfall onset and early withdraw (cessation)</li> </ul>	<ul style="list-style-type: none"> <li>• Increased pollutant concentration in existing water sources including Lake Victoria and other water sources in the LVB. The pollutants are in the form of:</li> </ul>	<ul style="list-style-type: none"> <li>• Rehabilitation and expansion of existing municipal sewerage and wastewater treatment systems</li> <li>• Use of constructed/artificial wetlands for decentralized wastewater treatment</li> </ul>

CC indicator	Impact	Practical and innovative actions on board
<ul style="list-style-type: none"> <li>Increasing rainfall intensity</li> <li>Decreasing rainfall amount</li> <li>Seasonal shifts in rainfall patterns</li> </ul>	Increased siltation due to degradation of water sources	<ul style="list-style-type: none"> <li>Use of ECOSAN toilets for decentralized sanitation services in squatter area of urban poor</li> </ul>
	Increased water turbidity due to siltation	<ul style="list-style-type: none"> <li>Use of improved pit latrines for decentralized sanitation services in rural and urban areas</li> </ul>
	Colour change due to increased turbidity	<ul style="list-style-type: none"> <li>Use of community based biological sanitation centres (Bio centres) in squatter areas of urban poor</li> </ul>
	Faecal contamination due to flooding	<ul style="list-style-type: none"> <li>Extraction of energy from waste streams via biogas plants to avoid contamination of water sources</li> </ul>
	Increased pH especially in wetlands associated with increased temperature and changed rainfall regimes	
	<ul style="list-style-type: none"> <li>Increased preference of water borne diseases especially malaria, diarrhoea, cholera and dysentery due to increased temperature</li> </ul>	

### 3.1 Water Harvesting and Storage Techniques

Most observed practical and innovative actions aim at storing water for domestic supply, irrigation agriculture and livestock consumption. Water is harvested from rainfall (direct rainfall and impounding storm-water runoff) as well as permanent and seasonal natural water sources including lakes, rivers, springs and wetland areas. The typical water storage facilities for domestic supply are underground, on-ground and raised water tanks most of them made of concrete and PVC plastics. The typical water harvesting facilities for agriculture and livestock consumption are charcoal dams and embankment ponds lined with clay soils to ensure retention of water within the facilities.



*Photo 5: Water harvesting and extraction techniques in Mwanza (Photos: EMEDO & TCRS)*

Other peculiar water harvesting and extraction techniques observed throughout the LVB especially in Kenya, Uganda and Tanzania include rehabilitation of water sources especially rivers and springs. At local levels the techniques are commonly known as subsurface sand dam and/or spring rehabilitation. They all aim at retaining water for a period of time, treating it and allowing it for use while maintaining its flow within the environment. Elsewhere in the region increased water harvesting and extraction through shallow and deep wells have been observed and reported (EMEDO, 2013).

### 3.2 Community Based Conservations of Water Catchment Areas

Community based conservation programmes have been developed in many parts of the LVB to call for joint efforts to conserve water sources and soil. The programmes involves establishment of tree nurseries, planting trees, reserving natural vegetation, restricting socio-economic activities close to water sources and carrying out best land use practices especially in agriculture and livestock farming. Others are wetland restoration which involves demarcation, entrance restrictions and tree planting.



*Photo 6: Kisumu Practical Action Spring rehabilitation*

### **3.3 Alternative Socio-economic Activities**

The overall goal is to reduce pressure on the Lake by promoting alternative activities like fish farming offsite the lake, irrigation agriculture (furrow and drip irrigations) thereby using water from other sources, shifting agriculture from water dependent to drought resistance crops like cassava and sorghum and horticulture activities offsite the lake.



*Photo 7: Recycled human waste using ECOSAN toilets can be used for to boost crop production*

### 3.4 Water Treatment Techniques

Increase of pollutant concentrations in domestic water sources is singled out among the climate change impacts in LVB. Some coping techniques are already in place. In Kishapu district Tanzania, TCRS has introduced Solar Disinfection System (SODIS) to treat domestic water for drinking. With this technique, water is fetched from a source, retained for some period of time to allow settlement of particles, then placed in plastic bottles with tight lids and placed under the sun for the whole day to destroy microorganisms that cause water borne diseases is limited to the drought season.



*Photo 8: SODIS for treatment of drinking water in Kishapu (TCRS, 2012)*

### 3.5 Use of Onsite and Decentralized Sanitation Facilities

In the efforts to address inadequate sanitation facilities especially in informal settlement, the approaches used are onsite and decentralized sanitation. Among the mapped techniques include improved latrines, ECOSAN toilets, community based improved toilets and communal Bio centres. The ECOSAN and Bio centres techniques consider human excreta as a resource that can be safely collected, treated, and reused in a variety of ways.

### 3.6 Wastewater Treatment, Recycling and Reuse Techniques

The use of Constructed Wetland (CW) technology is in place in LVB. The technology employs wetland vegetation and microorganisms to treat wastewater to recommended effluent discharge standards. Successful case studies indicate that CWs significantly reduce suspended solids, biological oxygen demand, pathogens, heavy metals and excessive nutrients from wastewater. Yet, the systems are characterized of lower total lifetime costs, lower capital costs than conventional treatment systems,

reduced air and water emissions, reduced secondary wastes, lower operations and maintenance costs and ability to tolerate high fluctuations in flow. Besides, the technology is ideal for decentralized wastewater treatment and to eliminate mosquito breeding sites. Treated water from CW can safely be used for irrigation and aquaculture.



*Photo 9: ECOSAN toilet in Wandiege, Kisumu (Kenya)*



*Photo 10: Constructed wetland units at Shinyanga (Tanzania) and Seeta High School – Mukono (Uganda)*

### 3.7 Energy Extractions from Waste Resources

Climate change has increased incidents of recurrent and prolonged droughts with severe implications on hydro power generation. Power rationing and black outs have become a common phenomenon in Kenya, Uganda and Tanzania, affecting individual household and industrial income generating activities. Some actors are engaged in energy extraction from waste resources in the form of biogas. Both; solid and liquid wastes are used. This measure is gauged to reducing dependence on hydropower and biomass sources. Existing initiatives include the use of bio digesters to generate biogas and development of briquettes from garbage. In Kisumu Kenya biogas generation (from human wastes) is directly linked to sanitary services along what is called a Bio centre facility.



*Photo 11: Obunga Bio-centre facility in Kisumu (Photo: Umande Trust)*

## 4.0 Recommendations

In light of the above, some recommendations to particular actors are proposed to secure that the impact of climate change on water supply and sanitation is addressed at appropriate levels.

### 4.1 Recommendations to EAC secretariat, LVBC, other EAC institutions and organs

- Intentional and immediate actions are required to scale up awareness and to widely disseminate the EACCCP in Partner States to target state and non-state regional actors including national authorities such as NEMC, NEMA, national and regional climate change units, regional climate change networks and NGOs. It is also important to disseminate the policy in simple and accessible formats at community level by Partners States.
- The on-going plan at regional level, to guide a shift from the software actions (including policies and harmonization of laws and regulations) to include more hardware actions (including support to infrastructure improvements) should be extended to Partner States. The EAC should set time limits for domestication of the EACCCP so as to embark on practical actions on the ground.
- EAC should carry out regular monitoring and evaluation as a way of assessing commitment by Partner Countries to implementation of EACCCP. This will bring in regular lessons for future intervention at the regional level.
- Because climate change, water and sanitation issues are almost common in LVB, and yet there are successful cases within the region, the EAC through the LVBC should carry out a comprehensive documentary of all successful cases, communicate and avail them in an EACCCP open access depository so that they can be available for replication and scaling up by development agencies. However technology protection should be observed in the form of patent, copyright, registration of design trademark and confidentiality agreements.

- Most useful innovations to combat climate change challenges in relation to water and sanitation in EA Partner States are implemented at small scale levels. The ongoing plan by LVBC (through the LVBC Action Plan 2011 – 2016) to shift from the software to hardware actions should incorporate up-scaling of innovative approaches to better realize commendable impact on the ground.
- The on-going regional projects that are gauged to addressing water and sanitation issues in LVB i.e. LVEMPII, LVWATSANII and MERECP, should be reviewed to incorporate the provisions of EACCCP for water and sanitation. In other words, the implementation of the EACCCP should not happen accidentally into on-going regional project, it should be well integrated and planned by the LVBC.
- The EAC should establish self or collective mechanisms for assessing the adequacy of budget allocations for implementation of the EACCCP in Partner States each financial year. This should be in line with the level of climate change vulnerability and impacts in the region as well as intended adaptation and mitigation plans.

#### 4.2 To the EAC Partner States

- Partner States through line ministries should take lead in raising awareness and disseminating the EACCCP to grass root levels to domesticate and implement the policy. Because climate change is a cross cutting issue, the dissemination of the policy should cut across all sectors and should involve local government authorities, national and local NGOs operating in the LVB. The translation of the policy into simple and local languages, and into typical climate change challenges on the ground could accelerate its alertness and understanding. Partner States should immediately finalize the domestication of the EACCCP to internal policies, strategies and actions and embark on its implementation on the ground.
- Since priority for water and sanitation project funding is targeted to provisions under water policies or water supply and sanitation strategies,

Partner States should mainstream EACCCP into their national water and sanitation policies and strategies. During this mainstreaming the NAPAs could also be included to ensure that the impact of climate change to water supply and sanitation is not seen as a concern for global community only.

- Tanzania should establish the cost for implementation of its climate change strategy. This is an important obligatory stage for implementing the EACCCP among others. In addition, the cost for implementation of climate change policies, strategies and action plans should be reflected in annual financial budgets in each Partner States.
- Partner States should carry out assessment of all wetland in LVB, map them, harmonise wise use and in partnership with other actors take up degraded wetlands for rehabilitation, restoration and protection of water sources in the basin.

#### 4.3 *To non-state actors i.e. regional, national and local NGOs, CBOs and Community groups*

- Implementation of the EACCCP does not depend only on governments. Awareness raising amongst different actors of EACCCP should be undertaken to ensure that different stakeholders implement the EACCCP. Therefore, non state actors stand to be very important advocates to accelerate the implementation of EACCCP by:
- Promoting awareness on the EACCCP and climate change adaptation and mitigation programmes to individual community groups and local community groups
- Acting as pressure groups / watch dogs for the implementation of EACCCP throughout the region.
- Extending research, promotion and replication of best practices that address the impact of climate change on water and sanitation in LVB

- **Establishing / improving community based learning centres to accelerate information flow to grass root levels and adoption of best practices**
- **Mobilizing financial resources, materials and volunteers to create localized programs to address climate change, water and sanitation challenges in LVB**
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## 5.0 Conclusion

Though the NAPAs, water and environmental policies in East Africa were instituted before the EACCCP, they address the water supply and sanitation issues. However, they are not addressing the impact of climate change on water supply and sanitation.

In fact, although almost all NAPA advocate for mainstreaming of climate change mitigation and adaptation into national budgets, they are built on the premise of external support for implementation. This is the same situation with the EACCCP. Hence, funding will remain a major drawback to implementing the EACCCP unless innovative and long-term financing sources are secured.

In spite of this challenge, some of adaptation measures can be available in the open source as such the Partner Countries should not re-invent the wheel. Successful examples in EA and other regions of the world may be included in an EACCCP implementation website. Access to such information may have a multiplier effect as it may assist the effective implementation of the EACCCP provisions in relation to water and sanitation for economic transformation, job creation, and achievement of social goals such as social justice and poverty reduction in a systematic, integrated and meaningful way.

It is also important to note that implementation of the EACCCP does not depend only on governments, since the adaptation to climate change can be a matter life and death all stakeholders at all levels have a major role to play in the implementation of EACCCP.

## 6.0 References and persons consulted

### *Tanzanian Documents*

- National Adaptation Programme of action (NAPA), 2007
- Tanzania Climate Change Response Strategy, 2012
- National Water Sector Development Programme, 2006 - 2025
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### *Kenyan Documents*

- National Climate change response strategy, 2010
- National Climate Change Action Plan, 2013 - 2017
- Water Security and Climate Resilient Project, Final Draft Resettlement Policy
- Framework, 2013

### *Ugandan Documents*

- National Adaptation Programme of action (NAPA), 2007
- National Climate Change Policy, 2012
- National Climate Change – costed Implementation Strategy (Draft), 2012
- Joint Water and Environment Sector Support Programme in Uganda (JWESSP), 2013 – 2018

### *Other Documents*

- Burundi National Adaptation Plan of Action to Climate Change, 2007
- Rwanda National Adaptation Plan of Action to Climate Change, 2006
- Regional Trans-boundary Diagnostic Analysis of the Lake Victoria Basin, 2007
- East African Community Climate Change Policy (EACCCP), 2011
- Strategic Plan for Lake Victoria Basin Commission, 2011 - 2016
- United Nations Framework Convention on Climate Change (UNFCCC)
- Protocol on Sustainable Development of Lake Victoria Basin
- Lake Victoria Environmental Management Programme (II)
- Mount Elgon Regional Ecosystem Conservation Programme
- Lake Victoria Water and Sanitation Project (II)

## List of stakeholders consulted during field visits

Consulted stakeholders in Uganda	
<b>Lake Victoria Environmental Management Programme Phase II (LVEMP II)</b>	Sowed Sewagudde – National Coordinator P.O. Box 19, Plot 10 Mpigi Road, Entebbe, Uganda
<b>Rural Development Media and Communications (RUDMEC)</b>	Vvube Richard – Environmental Officer P.O. Box 1350, Masaka – Uganda
<b>Rural Development Media and Communications (RUDMEC)</b>	Sarah K. Kisolo – General Secretary P.O. Box 1727, Plot 47/49 Nkrumah Road, Kampala, Uganda
<b>Ecological Christian Organization (ECO)</b>	Charles Kabiswa – Programmes Manager P.O. Box 2140, Old Kira Road, Bukoto, Kampala, Uganda
<b>National Association of Professional Environmentalists (NAPE)</b>	Frank Muramuzi – Director , Kampala Uganda
<b>Lukaya Town Council – Kalungu</b>	Dhabuliwo Mussa – Health Inspector Lukaya Town Council, Kalungu, Uganda
<b>Climate Adaptation Network (CAN – U)</b>	Everest Mugambwa – Coordinator Old Kira Road, Bukoto, Kampala, Uganda
Consulted stakeholders in Kenya	
<b>OSIENALA – Friends of Lake Victoria</b>	Dr. Godfrey Ogonda – Deputy Director P.O. Box 4580 – 40103, Dunga Beach, Kisumu, Kenya
<b>Practical Actions</b>	Mathew Okello – Project Officer P.O. Box 2260 – 40100, Lake Victoria Cluster, Kisumu
<b>UMANDE Trust</b>	Getrude Shisanya – Technical Project Officer P.O. Box 2173 – 40100, Kisumu, Kenya
<b>National Environmental Management Authority (NEMA)</b>	Stella Kamwasir – Environmental Officer P. O. Box 4279 40103, Kisumu, Kenya
<b>Sustainable Aid in Africa International (SANA)</b>	Alfred O. Adongo – Team Leader P.O. Box 1137 – 40100, Milimani Area, Kisumu, Kenya
<b>Lake Victoria Environmental Management Project Phase II (LVEMP II)</b>	John Okungu – Water Resources Specialist P.O. Box 9220 – 40100, Re-Insurance Plaza. Kisumu, Kenya

Consulted stakeholders in Tanzania	
<b>Lake Victoria Basin Water Office (LVBWO), Ministry of Water</b>	Dionisy Mkungu – Acting Head, P.O. Box 1342, Maji Igogo, Mwanza, Tanzania
<b>Lake Victoria Environmental Management Project Phase II (LVEMPII)</b>	Omari Myanza – Water Resources Specialist P.O. Box 211, Maji Igogo, Mwanza, Tanzania
<b>Environmental Management &amp; Economic Development Organization – EMEDO</b>	Wilson James Tutanya – Program Coordinator P.O. Box 2964, Mwanza, Tanzania
<b>Lake Nyanza Environmental &amp; Sanitation Organization – LANESO</b>	Benedict William Kwangu – Coordinator P.O. Box 10016, Nyamagana, Mwanza, Tanzania
Regional stakeholders consulted	
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<b>Lake Victoria Water and Sanitation Project Phase II</b>	Eng. Dan Oduor Owore - Coordinator P.O. Box 1510 – 40100, Re-Insurance Plaza. Kisumu, Kenya
<b>Mount Elgon Regional Ecosystem Conservation Programme (MERECP)</b>	George Sikoyo – Programme Coordinator P.O. Box 1510 – 40100, Re-Insurance Plaza. Kisumu, Kenya

## About the East African Sustainability Watch Network

The East African Sustainability Watch (EA SusWatch) Network was formed by Uganda Coalition for Sustainable Development, Tanzania Coalition for Sustainable Development and SusWatch Kenya in 2005. It has a mission to catalyze and mobilize civil society in Eastern African to exert accountability from governments and international development institutions to achieve a socially and environmentally sustainable world. EA SusWatch Regional Secretariat is hosted by UCSD in Kampala, Uganda.

Since November 2011, the EA SusWatch Network has been implementing the Lake Victoria Environmental Management Civil Society Watch (LVEMP II CS Watch) Project with support from the Government of Sweden to run for three years (November 2011 to October 2014).

*The LVEMP II CS Watch Project* is a three-year initiative of the East African Sustainability Watch Network, implemented from November 2011 to

October 2014, with support from the Government of Sweden, working in partnership with Uganda Coalition for Sustainable Development (UCSD), Tanzania Coalition for Sustainable Development (TCSD), and Sustainable Environmental Development Watch Network (SusWatch Kenya). It seeks to lobby and advocate for realization of results-based performance from LVEMP II and implementation of the East African Climate Change Policy (EACCP). *LVEMP II Civil Society Watch project* Focal Point contacts are as follows:

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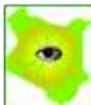
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Uganda Coalition for Sustainable Development



Sustainable Environment Development Watch  
(SUSWATCH KENYA)



Tanzania National Focal Point

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