THE COUNTY GOVERNMENT OF KISUMU

DEPARTMENT OF WATER, CLIMATE CHANGE, ENVIRONMENT AND NATURAL RESOURCES

KISUMU COUNTY CLIMATE CHANGE POLICY

September, 2019

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FOREWORD

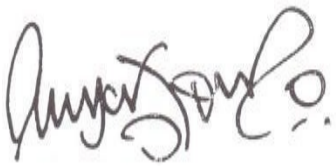
Climate change has serious effects in socio-economic development of Kenya and East Africa as a region. It is reported that since 1980s, there have been apparent indicators of persistent prolonged drought and unpredictable rainfall patterns which have negatively affected food production in the Lake region. Such consequences have threatened the livelihood of the people in the region and devastated the infrastructure in the community. Common impacts include; water stress and scarcity, food insecurity, diminished hydropower generation potential, loss of biodiversity and ecosystem degradation, increased incidence of disease burden, destruction of infrastructure, high costs of disaster management as result of increased frequency and intensity of droughts, floods and landslides associated with the El Niño phenomenon

Kisumu County as a recipient to most of these effects experience serious floods and pollutants washed away into the Lake, making it highly vulnerable to water toxicity. Mainstreaming of climate change into development is critical in mitigating the impacts. We appreciate the operationalization of the Climate Change Act, 2016 which counties are required to domesticate into law and roll out for implementation. In the Act, the County governments are tasked to mainstream climate change in their respective County Integrated Development Plans (CIDP) and report on climate actions through the County Assembly to the Climate Change Directorate in Nairobi. The purpose of Kisumu County Climate Change policy is to put in place robust measures needed to address most, if not all, of the challenges posed by climate variability and change; thus steering Kisumu County towards climate resilient, blue economy and green development pathway. It is noteworthy that the development of this policy has been very participatory and was conducted throughout the seven Sub-Counties. In addition, two County level workshops were conducted; seven sub-county workshops and two Assembly members meetings were held. The consultations enlisted various clusters of stakeholders, including the county government, private sector, civil society, women, youth, media and faith based organizations. The action plan on this strategy builds on the programs and projects for climate change adaptation and mitigation captured in the CIDPII and other County policy documents.

This policy is key to the agenda in my manifesto regarding conservation of environment, food security, water security and clean and healthy environment for all. The policy is consistent with the international and national principles and protocol such as the United

Nations Framework Convention on Climate Change (UNFCCC), Kenya Vision 2030, National Climate Change Action Plan (NCCAP) and National adaptation plan.

It's my appeal to all residents of Kisumu County and our partners to work hard in climate change adaptation and mitigation to make Kisumu a green and resilient County.



HON. PROF. PETER ANYANG' NYONGO

Governor-Kisumu County

ACKNOWLEDGEMENT

On behalf of the County Government of Kisumu, specifically the department of Water, Climate Change, Environment and Natural Resources, we are grateful to the Climate Change Policy preparation secretariat under the leadership of the Ag. Chief Officer, Dan Ongor and Mr. Evans Gichana (Director, Climate Change) for spearheading the development of the Climate Change Policy. The Policy was developed with the support of Prof. Benard Muok (Lead Consultant) and Director, Centre for Research, Innovation and Technology (CRIT) of Jaramogi Oginga Odinga University of Science and Technology (JOOUST).

We express our sincere appreciation to our key partners Friedrich Ebert Stiftung (FES), Devolution and Climate Change Adaptation Program (DaCCa) partners-Sustainable Energy(VE); Sustainable Environmental Development Watch (SUSWATCH Kenya) Osienala, Crep & Umande Trust, Transparency International,(TI)-Kenya) and Christian Aid International for their technical and financial support to this process. This team was led by Robert Muthami (FES); Nobert Nyandire and Velma Oseko (SUSWatch Kenya); Psamson Nzioki (Transparency International-Kenya); Nicholas Abuya (Christian Aid) Dr. Geofrey Ogonda(Osienala); Collins Otieno (CREP) and William Misati (Umande Trust). We acknowledge the valuable contributions, leadership and recommendations from the following officers from the County Government of Kisumu: Mrs. Lorna Omuodo (Former Chief Officer, Green Energy and Climate Change); Ms Judith Wanjallah (Green Energy and Climate Change (GECC)), Mrs. Anne Mokoro (Fisheries, Women in Blue Economy), Hon. Alice Moraa (CECM, Energy and Industry), Mr. Laban Okeyo (GE&CC), Miss Oduor Tabitha, Mr. Dan Ongo'r (Department of Environment, Water and Natural Resources), Mr. Kilinda Kilei (Attorney -CGK), Mr. John Sande (Environment), Mr. Joseph Shynguya (Energy & Mining), Ms. Belinda Nyakinya (Environment) and Mr. Philemon Agulo (former Director Planning).

The process of developing this policy was undertaken through a participatory and consultative approach. We take cognizance of and contribution of different stakeholders including civil Society Organizations including (CREP) and Family Health Options Kenya (FHOK)-Kisumu and Green Energy and Climate Change Committees at Sub-County levels which mobilized community and fully participated. Further, we thank Eng. Daniel Okia (Acting Chief Officer, Energy and Industry, Mrs. Rosemary Owigar from Maseno University, Committees of County Assembly for Water, Climate Change, Environment and Natural

Resources and Committee of Agriculture, Livestock and Fisheries and finally Mr. Inganga Mbinji – Director, Research Dimensions Services who developed the green paper and facilitated many of the stakeholder consultation forums on the policy. We thank different community members and interest groups across the county for their input and views (See annexed Lists of stakeholders). For those who contributed in any way and whom we cannot name, many thanks for your support.

HON. SALMON OKOTH ORIMBA
County Executive Committee Member
Water, Climate Change, Environment and Natural Resources

ABBREVIATIONS AND ACRONYMS

AF	Adaptation Fund
AFOLU	Agriculture, Forestry and Other Land Uses
BAP	Biodiversity Action Plan
GE & CC	Green Energy and Climate Change
CH4	Methane
CO2	Carbon dioxide
CSR	Corporate Social Responsibility
CBDR&RC	Common But Differentiated Responsibilities and Respective Capabilities
CSP	County Strategic Plan
DNA	Deoxyribonucleic Acid
DRR	Disaster Risk Reduction
FCPF	Forest Carbon Partnership Facility
GEF	Global Environmental Facility
GHG	Greenhouse Gas
GIS	Geographic Information System
HDI	Human Development Index
IPCC	Intergovernmental Panel on Climate Change
KBM	Knowledge Based Management
KCCCAC	Kisumu Climate Change Advisory Committee
LVB	Lake Victoria Basin
MNB	Multi-Nutrient Blocks
MRV	Monitoring, Reporting and Verification
MRV+	Measurement, Reporting and Verification Plus
N2O	Nitrous Oxide
NCCRS	National Climate Change Response Strategy
NTFPs	Non-Timber Forest Products
PPPs	Public Private Partnerships
RS	Remote Sensing
SDGs	Sustainable Development Goals
TFCC	Task Force on Climate Change
UNFCCC	United Nations Framework Convention on Climate Change

1. PREAMBLE

The Kisumu County Climate Change Policy provides a framework for addressing the issues that Kisumu face or will face in future due to the changing climate. The National Climate Change Response Strategy (2010), National Climate Change Action Plan (2013-2017) and the National Climate Change Act of 2016, the Sessional paper No. 3 of 2016 on Climate Change Framework Policy 2018, Nationally Determined Contribution, National Adaptation Plan (2015-2030), Green Economy Strategy and Implementation Plan (2016-2030), National long-term Vision 2030 and its third Medium Term Plan presently anchored in the President's "Big Four Agenda" and its implementation arrangements as well as the Kenya Constitution 2010 have all been used as building blocks for preparation of this policy. Furthermore, extensive consultations with stakeholders including sectoral heads at the County, communities in every sub-county and civil society provided valuable inputs to this policy document.

In view of Kisumu's high vulnerability to adverse impacts of climate change, in particular extreme events, adaptation efforts are the main focus of this policy document while not forgetting the need for mitigation. The vulnerabilities of various sectors to climate change have been highlighted and appropriate adaptation measures spelled out. These cover policy actions addressing sectors such as water resources, agriculture, forestry, biodiversity and various vulnerable ecosystems.

Notwithstanding the fact that Kenya's contribution to the Global Greenhouse Gas (GHG) emissions is very small, its role as a responsible member of the global community in combating climate change has been highlighted by giving due importance to the mitigation effort in sectors such as energy, forestry, agriculture and livestock. The six key sectors identified under the United Nations Framework Convention on Climate Change (UNFCCC) as having the highest mitigation potential are; waste, energy, forestry, agriculture, industry, and transport. Furthermore, appropriate measures addressing issues such as disaster preparedness, capacity building, institutional strengthening, technology transfer and international cooperation have been incorporated as important components of the policy. This policy document holds a living status and shall be reviewed and updated regularly to overarch the emerging concepts and issues of the ever-evolving science of climate change.

This document borrows from the rich traditional knowledge that has been accumulated by the communities over millennia in climate change

adaptation. The policy thus provides a comprehensive framework for the development of a legal framework and an Action Plan for the county's effort on adaptation and mitigation.

2. GOAL

To ensure that climate change is mainstreamed in the economically and socially vulnerable sectors of the economy and to steer Kisumu County towards climate resilience, blue economy and green development pathway.

3. POLICY OBJECTIVES

The main objectives of the Kisumu's climate change policy include:

1. To pursue sustained economic growth by appropriately addressing the challenges of climate change;
2. To integrate the climate change policy with other related county policies;
3. To contribute towards strengthening Kenya's role as a responsible member of the international community in addressing climate change challenges;
4. To focus on pro-poor and gender sensitive adaptation while promoting mitigation to the highest extent possible in a cost effective manner;
5. To ensure water security, food security and energy security of the county in the face of challenges posed by climate change;
6. To minimize the risks arising from expected increase in frequency and intensity of extreme events: floods, droughts, tropical storms etc;
7. To strengthen inter-departmental, inter-agency decision making and coordination mechanisms on climate change;
8. To facilitate effective mobilization and utilization of natural, human, technical and financial resources available both nationally and internationally;
9. To foster the development of appropriate economic incentives to encourage public and private sector investment in both adaptation and mitigation measures;
10. To enhance the awareness, skills and institutional capacity of relevant stakeholders in implementing climate change adaptation and mitigation measures;
11. To promote conservation of natural resources and long term sustainability;

4. KISUMU COUNTY BACKGROUND

4.1 LOCATION

Kisumu County is among the six counties that constitute the former Nyanza Province. The other counties are Siaya, Migori, Kisii, Homa Bay and Nyamira. The County borders Vihiga County to the North, Nandi County to the North East, Nyamira to the South, Homa Bay to the South West and Siaya to the West. Kisumu County occupies a geographical area of 2, 086 $Km^{2.}$ There are seven sub-counties in Kisumu County namely; Kisumu East, Kisumu West, Kisumu Central, Nyando, Seme, Nyakach and Muhoroni.

4.2 DEMOGRAPHY

Located along the shores of Lake Victoria in western Kenya, Kisumu County is home to 952,645 people. The population was projected to grow to 1,145,749 by 2017. This growth is largely a result of high fertility, which is currently 4.8 children per woman, compared to a national average of 4.6 children per woman. This number has declined from 5.6 children per woman in 1998, mostly because of increasing demand for smaller families and use of modern contraception. Addressing barriers to access and use of family planning would further reduce fertility. In 2011, about one in four married women who wanted to postpone their next birth or stop childbearing altogether were not using any method of contraception.

4.3 DEVELOPMENT

Kisumu County performs below the national average on most socio-economic indicators. The county scores a 0.49 on the Human Development Index (HDI)—a composite measure of development that combines indicators of life expectancy, educational attainment and income. This falls below the national average of 0.56. Poverty is prevalent in the county and manifests itself in other socio-economic outcomes such as poor nutrition, health, and education, as well as a lack of access to basic services. Unemployment is a major challenge in the county, especially among youth. The majority of the population is employed in fishing related activities, transport mainly *boda boda* (motor bike taxi) and agricultural activities, with some limited opportunities in commercial ventures and public service within Kisumu City. As more young people enter the workforce due to rapid population change, the pressure on available employment opportunities is expected to grow.

4.4 KISUMU'S VULNERABILITY TO CLIMATE CHANGE THREATS

The growing population in the region coupled with the changing climate has resulted in severe environmental concerns in the County. These challenges include: poor land use planning, lack of proper liquid and solid waste management; unregulated point and non-point source pollution; dropping water levels; Increase in silt loads entering the lake; catchment degradation (Land and forests); lack of protection of wetlands; and loss of biodiversity and ecosystem services.

The Kisumu County Integrated Development Plan (CIDP) II (2018 - 2022) identifies environmental degradation and climate change as key development challenges. Further the following phenomena have been pointed as among the main climate change threats in the area:

a. Recent observations have suggested that, alongside other East African countries, climate change has badly affected the Lake Victoria Basin (LVB). The deteriorating water quality and quantity, loss of biodiversity and declining agricultural productivity due to climate change, are no longer potential threats but rather threats that have already struck and caused the region repeated misery;

b. These extreme climate change impacts are already visible and are associated with climate events such as flooding, droughts, tropical storms all of which are projected to be more intense, frequent and unpredictable;

c. Increased siltation of Lake Victoria caused by more frequent and intense flood;

d. Increased temperature resulting in enhanced heat- and water-stressed conditions, particularly in drier areas, leading to reduced agricultural productivity;

e. Decrease in the already scanty forest cover due to climatic conditions adversely affecting species diversity and consequent ecosystem services;

f. Threat to fresh water ecosystems due to pollution and invasive species;

g. Increased conflicts between upper riparian and lower riparian regions on sharing of the water resources;

h. Increased health risks and climate change induced migration;

The above threats are the cause of major survival concerns for Kisumu, particularly in terms of the county's water, food and energy security considerations.

5. POLICY AND INSTITUTIONAL FRAMEWORK

Kenya signed and ratified the United Nations Framework Convention on Climate Change (UNFCCC), 1994 and submitted its first national communication in 2002, second national communication in 2015 and currently preparing the third communication. The county also ratified the Kyoto protocol in 2005 and submitted Nationally Determined Contribution (NDC) as part of the Paris Agreement.

The Constitution of Kenya 2010 has a legal commitment to attain ecologically sustainable development, which forms the basis for its climate change policy framework. Kenya has expended significant efforts to forge a comprehensive framework to address climate issues responding to the development of the international climate change regime since the 1990s. The climate change policy and legal portfolios are evolving towards an integrated framework.

In 2010, the Ministry for Environment and Mineral Resources launched the National Climate Change Response Strategy (NCCRS), complemented later by the Climate Change Action Plan 2013-2017. The National Climate Change Action Plan (NCCAP) was launched in March 2013. This Action, which is currently under revision, was the first framework to operationalize the National Climate Change Response Strategy (NCCRS). The Strategy aims to strengthen and focus nationwide actions towards climate change adaptation and greenhouse gas (GHG) emission mitigation.

Kenya has developed its green economy strategy referred to as the Green Economy Strategy and Implementation Plan (GESIP) 2016-2030. The GESIP is the country's blueprint in advancing towards a low-carbon, resource efficient, equitable and inclusive socio-economic transformation. The plan builds upon Kenya's commitment to a Low-Carbon Development Pathway and represents an advancement of this commitment to integrate resource use efficiency and minimizing environmental impacts into Kenya's economic development. The plan clearly reiterates the need for eco-innovation and technologies that address among others air pollution, increased resource use efficiency, ensure equity and social inclusion.

One of the outstanding achievements within the Action Plan period was the enactment of the Climate Change Act in May 2016. The law

provides a regulatory framework foran enhanced response to climate change, and promotes a mainstreaming approve to enhance action toward a low carbon climate resilient development pathway.

Part III section 19 of the Act provides for mainstreaming climate change actions into County Government functions and states as follows:

1. A county government shall, in performance of its functions, integrate and mainstream climate change actions, interventions and duties set out in this Act, and the National Climate Change Action Plan into various sectors.

2. A county government shall, in developing, updating and approval of the County Integrated Development Plan, and the County Sectoral Plans mainstream the implementation of the National Climate Change Action Plan, taking into account national and county priorities,

3. The Governor of a county shall designate a County Executive Committee Member to coordinate climate change affairs.

4. Subject to the Act and the Constitution, a county government may enact legislation that further defines implementation of its obligations under this Act, or other climate change functions relevant to the county or such other related purposes.

5. A county government shall at the end of every financial year, through the designated County Executive Committee Member, submit a report on progress of implementation of climate change actions to the County Assembly for review and debate, and a copy of this report shall be forwarded to the Directorate for information purposes.

It is based on these aforementioned provisions that this policy has been developed to mainstream climate change actions into Kisumu County Government functions.

6. CLIMATE CHANGE ADAPTATION

The communities around the Lake Victoria Basin (LVB) depend on the lake to support agriculture, fisheries and livestock. The negative effects of climate change disproportionately affect marginalized and rural communities, especially women and youth, by reducing the productivity of agriculture and wetlands, and the abundance of fish in Lake Victoria and its tributaries. In addition, the projected effects of climate change are likely to negatively impact economic sectors within the region that depend on water resources. Human health has already been compromised by a range of factors and further negatively affected by climate change and

climate variability. Climate change has altered the ecology of some disease vectors in the region and consequently the spatial and temporal transmission of these diseases such as malaria which prevalence has moved to cover the traditionally non-malaria zones in Kenya.

6.1 WATER RESOURCES

Kisumu County boasts abundant water resources due to its proximity to Lake Victoria. Rivers such as Nyando and Sondu-Miriu small rivers such as Ombeyi, Awach, Nyaidho, Ang'wecha and Kibos, Magada, Mugru, Kisian, Saka, Auji, and Kisat also serve the County. However as its population grows and climate change compounds water shortages, the county's water demands will increasingly put pressure on the supply. Degradation of upstream catchment (land area where water collects and subsequently flows into water bodies), mainly due to agricultural expansion associated with population growth, is already having negative impacts on the quality and quantity of water resources within the county.

The growing inadequacy of water supply and scarcity of fresh and clean water is among the most important concern for Kisumu County. Several factors have contributed to the emerging water crises in the county whose result has led to poverty and poor health among the communities. These include factors such as the ever continued growing population in urban areas, contamination of surface and groundwater, the frequent drought, water hyacinth invasion, destruction of forests and riparian areas, expansion of agricultural activities upstream, pollution of water bodies which have led to the uneven distribution of water resources.

Lake Victoria, the second largest fresh water lake in world is a source of water, which has not been optimally utilized to provide clean water even for the City itself. Kisumu City draws 80% of its water supply from Lake Victoria, with a small percentage extracted from Kibos River. Other rivers include Nyamasaria, Kisian, Kajulu, Mamboleo, Luanda and Lidango. While the city primarily relies on surface water, ground water is also available. Groundwater levels range from 2-5 meters from the soil surface. Efforts to improve water supply have nonetheless focused on surface water, mainly because groundwater is susceptible to contamination by overflowing pit latrines and inadequate drainage. In general, majority of Kisumu County population still live without access clean.

Some of the pertinent issues related to the water resources are: Rivers breaking their banks causing severe flooding and destruction of properties such as crops, livestock and buildings and causing human displacement and sometimes death; spread of water borne diseases during floods; Soil

erosion leading to siltation of rivers and the lake. Other problems include pollution of water resources through waste and raw sewage disposal, chang'aa (local brew) brewing, car washing and overexploitation of natural resources including papyrus reeds, sand harvesting, fish stocks and trees around the water resources.

Sand harvesting is also another major challenge in the County. Sand acts as a safe aquifer for water flowing below and through it. Removal of sand results in destruction of underground aquifers and loss of safe water. Sand scooping adversely affects surface water quality and quantity and damages the aquatic ecosystem. Haulage of sand by heavy trucks causes environmental degradation by accelerating soil erosion and affecting soil stability.

To enhance water security, the County, in collaboration with relevant entities, shall take on the following policy measures:

Policy Measures

I Water Storage and Infrastructure

a. Identify, map and profile suitable potential and existing sites for water resources e.g. dams, water pans etc;

b. Assess and address the needs for additional water storages, distribution infrastructure and increase storage capacities;

c. Develop necessary infrastructure to harness the hill torrents potential;

d. Construct dykes and check dams along the main rivers

II Water Conservation Strategies

a. Ensure water conservation by reducing irrigation system losses and provide incentives for adaptation of more efficient irrigation techniques;

b. Promote the use of efficient irrigation systems;

c. Promote technologies that enhance water resource efficiency;

d. Control sand harvesting by developing a sand harvesting regulation to ensure sustainable sand harvesting practices;

e. Introduce rain harvesting technologies

III Integrated Water Resource Management

a. Protect groundwater through management and technical measures like regulatory frameworks, water licensing, slow action dams,

artificial recharge especially for threatened aquifers, and adopt integrated water resources management concepts;

b. Strengthen water resource monitoring and assessment for early warning and planning;

c. Ensure recycling of waste water through proper treatment and reuse it in agriculture, artificial wetlands and groundwater recharge etc;

d. Protect and conserve water 'catchment' areas, and reservoirs against degradation, silting and irrigation system contamination;

e. Explore the possibility of joint watershed management of trans-boundary catchment areas with neighbouring counties and co-management with public participation;

f. Ensure to safe guard the County's rights on trans-boundary water inflows according to national water policy, international norms and conventions;

g. Promote integrated watershed management including ecological conservation practices in uphill watersheds;

h. Mainstream disaster risk reduction measures in the water sector planning and service delivery, particularly in vulnerable, high-risk regions.

IV Enhancing Capacity

a. Promote technologies for efficient water utilization, water recycling and avoiding wasteful use of domestic and drinking water;

b. Enhance county capacities in remote sensing and geographic information system (GIS) techniques for monitoring temporal changes in vegetation and water resources;

c. Enhance county capacities for making seasonal hydro-meteorological forecasts;

d. Prepare a comprehensive inventory of all water resources, including surface and ground water, in order to support an efficient water management system in the county.

e. Strengthen the present hydrological network to monitor river flows and flood warning systems.

V Awareness Raising

a. Promote awareness on climate change impacts and the water sector including promoting public awareness on water conservation (recycling, waste water management) and efficient water use.

6.2. AGRICULTURE AND LIVESTOCK

6.2.1 AGRICULTURE

Agriculture is central to human survival and is probably the human enterprise most vulnerable to change in climate. Agriculture sector is the lifeline and the single largest sector of Kisumu County's economy. The total acreage under cash crops is 38500ha while that for food crops is 56400ha. The main crops grown for subsistence include beans, maize, sorghum, finger millet, potatoes, groundnuts, kales and cotton. 62.10% of all households in Kisumu County depend on crop farming as a source of income. With a county household density of 107.8 per sq. km., much of this agricultural activity is practiced on small parcels of land. The main food crops grown include beans, maize, tea, sorghum, finger millet, potatoes, groundnuts and kales. The main cash crop grown in the county is sugarcane, which is grown extensively in Muhoroni and parts of Nyando Constituencies and is indeed the most important cash crop of the two areas. Most production (90%) is grown on small-scale farms, with smaller amounts on nucleus estates around the cane factories. Other cash crops are cotton and about 6000ha of rice growing along Rivers Nyando, Awach, Chemelil, Miwani and Kibos while the National Irrigation Board (NIB) west Kano uses water from Lake Victoria.

Generally, farmers are faced with many challenges which include; high cost of inputs, flooding, unpredictable rainfall/ low rainfall in some areas, weak marketing channels and crop diseases and pests, heavily dependent on rain fed agriculture, poor access to fertilizer, poor soil fertility, poor access to improved animal bred and crop varieties, prolonged events of drought and flooding, inadequate extension services, poor land tenure security especially to women and youth, poor infrastructure, land fragmentation leading to inadequate farm lands, human wildlife conflicts and use of uncertified seeds. A number of adaptation measures identified in the preceding section are equally applicable to the agriculture sector and will generally not be repeated. To enhance food security, the County, in collaboration with relevant entities, shall take on the following measures:

Policy Measures I Research

a. Conduct climate risk and vulnerability assessments of the agriculture value chain;

b. Promote adoption of new varieties of crops which are high yielding, resistant to heat stress, drought tolerant, early maturing, less

vulnerable to flooding, and less prone to insects and pests;

c. Develop and maintain quality datasets on crop, soil and climate-related parameters to identify ideal cropping patterns;

d. Develop capacity based on Remote Sensing and geographic information system (GIS) techniques to assess temporal changes in land cover in different agro-ecological zones;

e. Work closely with Kenya met department and embrace and use climate information in planning;

f. Promote adoption of sustainable land use management practices;

g. Enhance the capacity of the farming community to take advantage of scientific findings of the relevant research organizations.

II Technology

a. Improve the crop productivity per unit of land and per unit of water by increasing the efficiency of various agricultural inputs;

b. Promote energy efficient farm mechanization for increasing yield and labor saving;

c. Improve farm practices by adopting modern techniques such as crop diversification, proper cropping patterns, optimized planting dates etc;

d. Promote soil and water use management technologies;

e. Promote agroforestry and farm forestry;

f. Establish agricultural resource centre

g. Promote climate smart agriculture;

h. Promote through financial incentives solar water pumping for irrigation;

i. Promote low carbon irrigated agriculture such as use of solar powered irrigation systems;

j. Rehabilitation and expand existing irrigation schemes while Constructing new irrigation projects;

k. Improve irrigation practices by adopting, wherever feasible, modern techniques such as use of trickle irrigation;

III General Management

a. Promote ICT supported innovative extension approaches;

b. Support agro-processing

c. Adopt appropriate agroforestry practices in all agro-ecological zones (AEZs);

d. Improve market access and market infrastructure;

e. Improve access of credit to the farmers to invest in and adopt the relevant technologies to overcome the climate related stresses.

IV Risk Management

a. Increase awareness on climate change impacts on the agriculture value chain;

b. Develop a proper risk management system including crop insurance to safeguard against crop failures due to extreme events (floods, droughts etc.);

c. Promote and provide irrigation infrastructure

d. Provision of early maturing and drought resistant seeds;

e. Mainstream disaster risk reduction measure in agricultural progrrammes

6.2.2 LIVESTOCK

The main livestock bred in the county include; dairy cattle, beef cattle, pigs, goats, sheep, poultry, rabbits and bee keeping. On the overall, 92.5 per cent of households rear chicken, 47.3 per cent keep cattle, 38.7 per cent and 23.6 per cent keep goats and sheep respectively. The most common livestock kept in the large-scale commercial farms are dairy and beef cattle, goat and sheep.

Current milk production in Kisumu County is estimated at 27 million litters against 70 million litters demand resulting to a net deficit of 43Million litters demand that come from the neighboring Counties. According to a report by the County Government of Kisumu, about Kenya shillings 12.8million has been invested in a livestock development program to boost milk production within Kisumu County after the purchase of 80 dairy cattle and 70 dairy goats. The aim is to uplift the socio-economic status of women groups across 12 sub counties of with an estimated impact of 3,000 families with a 20% increase in milk production.

Policy Measures

a. Introduce improved breeds for higher productivity and better tolerance to climate related stresses;

b. Promote improve indigenous breeds;

c. Promote livelihood diversification and market access (indigenous poultry, beekeeping, rabbits, emerging livestock - quails, guinea fowls, ostriches etc.);

d. Promote energy efficient farm mechanization for increasing yield and labor saving;

e. Improve farm practices by adopting modern techniques such as zero grazing;

f. Improve market access and market infrastructure;

g. Ensure availability of quality feed and fodder to livestock to supplement their grazing;

h. Support develop new feeds especially for dry seasons and promote feed conservation techniques and fodder banks in the arable areas;

i. Improve nutritional quality of feed through the use of multi-nutrient blocks (MNB) prepared from urea, molasses, vitamins and minerals;

j. Improve access of credit to the farmers to invest in and adopt the relevant technologies to overcome the climate related stresses;

k. Improve the extension system and adopt use of ICT supported innovative extension approaches;

l. Establish livestock disease monitoring and surveillance system at sub county levels;

m. Establish livestock markets across the county;

n. Establish slaughterhouses strategically across the county.

6.2.3FISHERIES

Fishing is one of the key economic activities in Kisumu County. Most of the fish harvesting takes place in Lake Victoria. With the advent of fishponds, households are investing in the ponds and there are over 1,330 fishponds in the county. Overall, there are 3,275 fishermen and 189 fish farm families in the county. The fish produced include; *Rastrineobola argentea* (Omena), Tilapia, Nile perch, among others. The fishing gear used includes fishing nets, hooks, traps and motorboats.

Kisumu County has the following beaches: Kaloka Beach, Ndere Island, Kisumu Port, Dunga Beach, Sango Beach and Kusa Beach.

Despite the fact that it is one of the major economic activities, little has been done to enhance the sector to ensure sustainability, the resources are overexploited and post-harvest losses are high. For instance, fishermen still use traditional methods to preserve their fish, a process that leads to high losses. There used to be five fish processing plants that are now closed due to lack of fish. Only two are functional. Fisheries management in Lake Victoria faces a number of challenges. These include a lack of compliance with regulations and the rapid increase in fishing efforts/activities due to open access, which are threatening fish stocks, as well as causing environmental degradation and inadequate service provision to the fishing communities. Other challenges include the threat of water hyacinth, which has often hindered fishing in the lake as well as hindering the use of new fishing methods and declining fish stocks in Lake Victoria, which has become a major cause for concern given the economic benefits derived from the fishery. This has been attributed to overexploitation driven mainly by (i) the large export market for Nile perch fillets that emerged in the early 1990s, (ii) Increased human populations within the lake basin, (iii) poor governance in the fishing industry, and (iv) the unrestricted access status of the lake. To cope with the demand for fish to the processing factories, the number of illegal gears has increased in a bid to maintain the effort/supply. To address these challenges the County Government of Kisumu will take the following measures:

Policy Measures

a. Undertake risk and vulnerability assessment of the fisheries value chain;

b. Upscale sustainable aquaculture initiatives;

c. Strengthen monitoring capacity and capability to prevent overfishing and unauthorized exploitation;

d. Promote the up scaling of climate resilient strategies/ technologies in fisheries and fish varieties.

e. Develop preservation infrastructure at the landing beaches;

f. Provide early warning systems to the fishermen and communities to reduce accidents;

g. Regulation of pressure through the establishment of local fishing areas, authorized landings, closed seasons, and closed fishing zones;

h. Collaborate with researchers and development partners to provide a lasting solution for managing water hyacinth;

i. Promote use of eco-friendly fishing gear and technologies;

j. Strengthen existing co-management institution such as Beach Management Units (BMUs) to implement climate smart technologies.

6.3 HUMAN HEALTH

It is now widely recognized that that climate change induced increased frequency and intensity of extreme events such as heat and cold waves, heavy or too little precipitation and strong winds do have serious implications for human health. For example, floods and storms not only increase the risk of death and injuries, they also have implications for other health effects such as diarrheal diseases because of insufficient clean drinking water availability, water for personal hygiene or for washing food; they may also cause severe psychological problems among the affected population. Similarly, incidences of many vector borne and water based diseases such as malaria and schistosomiasis respectively, which are sensitive to temperature and rainfall, may increase with the expected changes in climate. Climate change also affects food production leading to malnutrition and growth retardation. Inorder to address the impacts of climate change on human health, the County Government shall take the following measures:

Policy Measures

a. Assess health vulnerabilities of the communities in areas most likely to be affected by adverse impacts of climate change and build their capacities to reduce their health vulnerabilities to climate change;

b. Increase public awareness and social mobilization on climate change and impacts on health;

c. Design appropriate climate change adaptation interventions for the health sector;

d. Design appropriate measures for surveillance and monitoring of climate change related diseases in order to enhance early warning systems, which includes enhancing existing databases on health sector indicators amongst others;

e. Introduce feeding programme in Early Child Development Education (ECDE) schools

f. Ensure that preventive measures and resources such as vaccines, personal protective equipment, pest & vector control, quality medications and clean drinking water are available to the general public easily and cost effectively particularly during climate related extreme events;

g. Enhance accessibility to health facilities by establishing and improving infrastructure;

h. Enforce environmental health related laws;

i. Ensure proper management of wastes such as municipal waste, e-waste, persistent organic pollutants (UPOPS) including and healthcare wastes.

6.4 FORESTRY

Forests play crucial role in carbon sequestration and thus enhancing the climate change mitigation potential. The Kisumu County forest cover is estimated at less than 1% which include only one gazetted forest that is Koguta Forest and a few existing hill tops forests which have been proposed for gazettement such as Karateng A and B, Oruga, Nyatigo, Kajulu, Fort Tenan and Songoh. There are also a number of non-gazetted forests in the County such as Got Aila-Owaga, Ruke-Koru, Kanyagwal, Gem Rae, Orongo- Kolwa, Waware- North East Kano. However, efforts need to be put in place in agro-forestry to raise the forest cover of the county for provision of wood- fuel, timber and environmental conservation. The county has some of its population engaged in forest related activities being sawmills, furniture and workshops.

Destruction of forests in the county, and the resultant biodiversity loss, is a key environmental challenge. Population growth, agricultural expansion, over-dependence on wood fuels, and low levels of afforestation has accelerated deforestation in the county. Climate change is likely to have multi-facet adverse effects on the ecosystem as a whole, particularly on the already vulnerable forestry sector. Consequently, the most likely impacts of climate change will be decreased productivity, changes in species composition, reduced forest area, unfavorable conditions for biodiversity, higher flood risks and the like. Population growth and associated increases in demand for farming and residential land will undoubtedly accelerate deforestation and exacerbate the effects of climate change in the county. To minimize the risks and vulnerability of forests and biological diversity from the impacts of climate change, the county

government of Kisumu, in collaboration with relevant entities, shall take the following measures:

Policy Measures

a. Support gazettement of important forest areas; including hilltops

b. Promote development of farm forestry and agroforestry

c. Promote adoption of participatory forest management approach and support community forest associations in the county;

d. Liaise with Kenya Forest Services and stakeholders to develop capacity to take over the devolved forest activities as per the Constitution 2010;

e. Face out the production and use of charcoal and replace with eco-friendly fuels such as biomass briquette by supporting communities to produce and use briquette;

f. Face out use of traditional biomass technologies like three stone cooking stoves and replace with clean cooking solutions.

g. Ensure the availability of sufficient and properly trained forest work force with enhanced capabilities to face the challenges of climate change in the forestry sector;

h. Establish recreational parks and arboretums in urban centres within

i. Aggressively pursue afforestation and reforestation programs with species suited to the looming climate change by setting clear annual planting targets;

j. Ensure documentation and utilization of indigenous knowledge while managing various types of forest in the context of changing climate;

k. Promote the sustainable management of forests according to national and international norms;

l. Consider expanding protected areas in the county with respect to ecological parameters including conservation of wildlife and its habitats;

m. Encourage sustainable use of non-timber forest products (NTFPs) including wild fauna and birds;

n. Support establishment of tree nurseries at Sub County and ward levels to stimulate tree planting.

o. Carry out riverbank stabilization by planting appropriate species such as bamboo.

6.5 INFRASTRUCTURE

The county's infrastructure serves communities, industries and businesses across the vast and geographically diverse areas. Infrastructure is often long-lived, which poses a particular set of challenges – infrastructure planning must take account of changes in climate projected for fifty or more years in the future, bearing in mind that uncertainties in climate change projections grow over time.

Infrastructure, whether publicly or privately funded, requires a significant capital outlay and on-going maintenance costs. Wear-and-tear on infrastructure generally includes an element of climate impacts – be it simple weathering (e.g. solar break-down of paint) or major damage or destruction during extreme events e.g. flood. The rate of deterioration will depend on design choices, construction processes, building materials, and the environment in which a structure is built. Decisions about what and how to build infrastructure will take into account lifespan (usually several decades), lifecycle maintenance costs and return on investment. Major climate-related damage to infrastructure can be a considerable burden on society and governments.

Transport. Rail and road are vulnerable to flooding and heat damage (e.g. rail buckling, road cracking, bridge washout); airports can be closed during severe electric storms, their runways may be rendered unusable by flooding. Severe damage to transport infrastructure can block emergency supply of food and goods as well as impeding evacuation.

Utilities. Both drought and flooding threaten water supply security: droughts limit water availability, floods can directly damage infrastructure such as purification plants, or increase turbidity to the point where the cost and time required to purify becomes prohibitive. Storms, dust storms, fire and heatwaves can damage or impair the function of electricity generation and transmission as well as telecommunications infrastructure. High service demand (e.g. telecommunications during extremes) can lead to electricity supply interruption (planned as rolling blackouts, or unplanned) and closure of mobile phone networks to the general public as these are reserved for emergency services.

To climate-proof its infrastructure, the County Government shall take the following policy measures:

Policy measures

a. Conduct risk and vulnerability assessments of existing infrastructure;

b. Conduct an assessment of whether existing and planned infrastructural assets are compatible with a low carbon climate resilient economy;

c. Promote the concept of green economy in infrastructural development;

d. Develop climate risk and assessment plans;

e. Provide financial or technical support for implementation of climate proofing

f. Develop long-term master transport plans.

6.6 BIODIVERSITY

An estimated 40 percent of the global economy is based on biological products and processes. Poor people, especially those living in areas of low agricultural productivity, depend heavily on the genetic diversity of the environment. The effective use of biodiversity at all levels - genes, species and ecosystems – is therefore critical to sustainable development.

The Lake Victoria basin is rich in biodiversity although natural habitats are under threat from rapidly increasing human population. Biodiversity consists of fish species, birds and higher vertebrates like amphibians, reptiles and mammals as well as several plant species. A total of 31 amphibians, 28 reptilian and 44 mammalian species have been recorded on various sites in the Lake Victoria basin. Inshore waters, satellite water bodies and fringe wetlands support several species of reptiles, the commonest of which are the Nile crocodile (*Crocodylus nilo*ticus) and snakes such as African rock python (*Python sebae*,), mambas and cobras.

In addition, there are a number of biodiversity high potential areas in the County such as Wasare wetland, Paw Akuche (for Birds), Ochingure Hill (baboon, monkeys, hyenas) in North West and South West Wards, Kabayi swamp (Cat fish, tilapia and birds) in the South and North Kapuonja boundary, Usoma-Paga lakeshore in central and south west wards, Kisian Hills (Baboons, hyenas, monkeys), Nyamthoe in Kisumu East, Dunga in Kisumu Central, Auji River in Kisumu East, Nyagondo Hills, Nyandiwa in Kolwa East, Ongadi Hills in Kajulu, Impala Park in Kisumu Central and Water works in Kajulu. There are also unprotected springs-Amito in North Kapuonja, Nduta, Yith, Olilo and Yuego in South Kapuonja.

Lake Victoria has continued to experience dramatic changes as a result of land use and land cover changes, industrialization, agricultural developments, introduction of invasive alien species, receding water levels, siltation and non-selective fishing. These, among other factors, have led to the destruction of native and endemic biota specific to the Lake Victoria basin. Lake Victoria lost about 60 per cent of its cichlid taxa in the last decade and has been facing deterioration in water quality, partly due to over- exploitation of fish resources and human impact on the ecosystem. Other affected components of the aquatic ecosystems include algae, macrophytes, invertebrates, birds, amphibians and reptiles.

Intrinsically important due to its contribution to the functioning of ecosystems, the biological diversity is difficult to recover or replace once eroded. As mentioned earlier (in Forestry section), the changing effects of climate are likely to have severe consequences on the entire ecological system; the case of biological diversity in Kisumu County is no exception to these effects. Climate change has impacted negatively on the *phenology* and species distribution along with community composition and ecosystem dynamics. A rapid increase of temperature, for instance, may exceed the ability of many species to adapt to these changes.

Biodiversity faces myriads of problems in the County which include pollution of air, water, and land, overexploitation of fauna and flora, extreme weather events such as drought and floods, habitat destruction and encroachment, deforestation for charcoal and timber selling as well as fire outbreaks. To conserve, restore and protect the biological diversity, the County Government shall take the following policy measures:

Policy Measures

a. Carry out mapping, inventory and classification and valuation of Kisumu County biodiversity

b. Encourage empirical research on flora and fauna in the context of their responses to current and historical climatic changes;

c. Develop a County Biodiversity Action Plan (CBAP);

d. Implementation, monitoring, control and surveillance of biodiversity action plan;

e. Establish gene banks, seed banks, zoos and botanical gardens to conserve the biological diversity of valuable species;

f. Mainstream conservation and protection of biological diversity in sectoral plans;

g. Encourage involvement of local communities in conservation and sustainable use of biodiversity;

h. Take necessary measures to establish nature reserves in areas that are rich in biodiversity to preserve their existence;

i. Establish protected areas in all vulnerable ecosystems;

j. Ensure that 'ecosystem based adaptation' is part of an overall climate change adaptation strategy at all scales;

k. Develop effective governance system to ensure inclusion of local communities in management of biodiversity resources;

l. Map and profile all invasive plants and animals in the county and adopt sustainable control measures to manage species;

m. Strengthen collaborative research amongst local, national and international partners;

n. Provide multi-sectoral data base within the county for easy access of information to the public;

o. Domesticate and implement the Convention on Biological Diversity, 1992.

6.7 ECOTOURISM

Kisumu County has a number of sites with high potential for ecotourism such as Kusa Beach, Lwanda Magere, Ogenya Beach, Singida Beach, Odino Falls, Kit Mikayi, Abindu in North Ward, Maria Hills, Okore Ogondo Museoleum, Kajulu Hills, Nyandiwa beach, Dunga Beach, Impala Sanctuary and Ndere Island. While of few of these sites have been developed for eco-tourism e.g. Impala Sanctuary and Ndere Island the rest have not been fully developed or at worst have been neglected. The County's proximity to national parks such as Ruma national Park, Ndere Island and Kakamega Forest and ecotourism destinations, as well as Lake Victoria, make it an excellent tourist location. However Kisumu's lack of tourist hotels and restaurants, poor roads leading to tourist sites, and the Lake's high pollution levels which make it unsuitable for swimming and other lake activities, may make Kisumu undesirable for international leisure tourists. Further, changing climatic conditions are a threat to existing biodiversity and may encouragement proliferation of invasive species thus becoming a threat to ecotourism. To address these challenges, the County Government shall take the following policy measures:

Policy measures

a. Conduct a climate risk and vulnerability assessment of the ecotourism sub-sector;

b. Identify, develop and protect ecotourism sites including cultural and historic sites, botanical gardens, biodiversity high potential areas and sites with scenic beauty among others;

c. Enhance the diversification of climate resilient ecotourism products;

d. Build capacity and raise awareness on impacts of climate change on the ecotourism sub-sector to relevant departments and partners;

e. Develop climate resilient action plans for the sub-sector;

f. Design a pilot project that enhances resilience in the ecotourism sector;

g. Promote private sector investment to build infrastructure such as accommodation; transportation and food for travelers;

h. Ensure community involvement through awareness creation and capacity building.

2.8 POPULATIONS, URBANIZATION AND HOUSING

A key challenge for Kisumu County's sustainable development is ensuring that its growing population both in rural and urban area is provided with safe and secure housing. Furthermore, many homes and critical infrastructure are not resilient to the impacts of climate change. A major area of concern, particularly as Kisumu City and other urban areas growth, is that marginal lands vulnerable to hazards such as flooding are becoming increasingly densely populated and in particular by more vulnerable poorer people.

Ensuring that continued population growth is matched with climate resilient urban development and green-housing programmes is critical for the County's sustainable development and will provide a foundation for improving health and safety.

Policy measures

a. Conduct climate risk and vulnerability assessment of the sector;

b. Increase awareness on impacts of climate change on population and housing;

c. Conduct capacity building on infrastructure climate proofing;

d. Promote the concept of green economy in all sectors;

e. Develop and implement new green building code through use of appropriate designs, building materials and green energy;

f. Climate proof buildings, roads, railway, marine, aviation and ICT infrastructure;

g. Integrate adaptation into relevant building and urban planning policies and regulations;

h. Enhance the adaptive capacity of the urban poor by increasing the number of affordable housing and related infrastructure.

6.9 OTHER VULNERABLE ECO-SYSTEMS

6.9.1HILLS

Hills in Kisumu play important role as micro-water towers and harbor remnant forests. The most likely climate change risks to the hills in Kisumu County are: Increased human destruction for wood fuel and timber, overgrazing, expansion of agricultural land resulting in topsoil erosion and human settlement. To safeguard against most likely climate change impacts on the mountain areas and to protect their ecosystems and to ensure the livelihood of communities, the County Government shall take the following measures:

Policy Measures

a. Carry out detailed studies to identify the most fragile and resilient ecosystem in all ecological zones;

b. Develop programmes to prevent agricultural expansion to the hills;

c. Promote afforestation of hills using appropriate tree species;

d. Make slope stabilization measures mandatory in all new road construction design and construction to minimize landslides;

e. Restrict commercial and development activities detrimental to mountain ecology;

f. Ensure minimal exploitation of declared sensitive watershed areas.

6.9.2FLOOD PLAINS

Kano Plains lie at the head of the Kavirondo Gulf. The area is surrounded by series of fault line escarpments descending abruptly onto the plain, which lie between 1,160 meters to 1,300 meter above sea level. Kano Plains, which is characterized by broken low ridges and river valleys further, extends deep into Kisumu East sub-county in

Kisumu County. This region of land formation in the lower course of Nyando River covers approximately 50 % of the Nyando sub-county. The area suffers from intractable alluvial soils, which have very poor drainage, together with years of drought and flooding and local problem of over population. Kano Plains experiences more severe river floods which is slow onset and predictable. Nyando, Nyakach, Muhoroni and parts of Kisumu East sub-county are usually affected by floods and this trend is increasingly becoming a major concern to the county's socio-economic development due to the substantial economic and financial losses incurred to respond to frequent flood disasters.

In Nyando sub-county, River Nyando in Kano Plains is notorious for bursting its banks during the rainy season from March to May and September to October every year. During this season of perennial floods, rains can assume deluge proportions within certain areas, such as the delta of the Nyando River, where the equivalent of two months' rainfall can be experienced within a 24-hr period. The Floods, from the spills of river Nyando and small rivers such as Ombeyi, Awach Kano, Nyaidho, Ang'wecha and Kibos, occur annually and the cost of moving people from one area to another and of other relief efforts is quite high. The cost of annual relief and rehabilitation measures in Kano Plains alone is estimated at Kshs 57 million or US$ 600,000. This is attributed to the fact that since disasters do not occur frequently, people feel highly burdened to participate in community-based disaster preparedness activities during normal times when nothing happens. In this context, perceived risk does not contribute directly to taking protective responses. During such events, public institutions have to be closed down. By and large, most floods in Kenya occur immediately after the droughts causing devastating impacts.

To safeguard against the impact of the floods and drought in the Kano Plains, which has been exuberated by climate change and human activities in the upper catchment areas, and to protect their ecosystems and to ensure the livelihood of communities, the County Government shall take the following measures:

Policy Measures

a. Carry out climate risk and vulnerability mapping

b. Incorporate climate risk and vulnerability mapping the county integrated development plan

c. Incorporate indigenous knowledge in disaster planning and management;

d. Promote flood water harvesting to be used for irrigation and other purposes that do not require very clean water;

e. Harness the wealth of traditional knowledge accumulated over the years by the local communities in construction of dams and dykes

f. Develop early warning systems and response strategies

g. Promote appropriate agricultural technology for the drought and flood situations,

h. Provide proper storage facilities for farm produce to reduce losses due to flooding;

i. Establish markets for rice and other commodities produced in the area

6.9.3WETLANDS

Natural and artificial wetlands are important resources for the sustenance of livelihoods of riparian and wetland dependent communities (Silvius et al., 2000). The Lake Victoria Basin (LVB) wetlands constitute a vital life support system for about 12 million people who extract freshwater, fish, medicinal plants and building materials from them. Naturally, wetlands are productive, and because of this, these ecosystems can support endemic wildlife and a considerable human population living around them. Natural wetlands provide a variety of ecosystem services to rural communities living around Lake Victoria, Kenya, ranging from papyrus biomass which has multiple and gender-specific uses, to food products such as fish and seasonal crops. They are also important habitats of plant genetic diversity and support large numbers of bird, mammal, reptile, amphibian, fish and invertebrate species. However the increasing human population, coupled with unsustainable exploitation has led to a decline in wetland goods, particularly fisheries and loss of other vital ecosystem services (Balirwa, 1998). The county has a large area of wetlands, i.e. the Singida, Ombeyi, Karucho, Kawindo, Kobadha Swamp, Oguodo, Adera, Nyalunya, Gem Nam, Nyaidho, Apondo/Ogenya, Nduru, Newa, Kaloka, Pombo, Amiyo, Nyamgun, Dunga, Koguta and Nyamthoe. However, people who live around the wetlands have been affected by regular flooding during rains while the wetlands also act as mosquito breeding sites.

Kisumu's wetlands play an important role in maintaining and sustaining regional ecological processes that support globally important biodiversity such as bird migration routes and fish breeding sites. There has been a dramatic change in the ecosystem of the wetlands in Kisumu County in the

last decade, affecting its ability to function as a habitat for various flora and fauna. These changes are mainly due to encroachment of wetlands for agriculture. To protect, sustain and enhance the wetlands in Kisumu, the County Government in collaboration with the relevant entities shall take on the following policy measures:

a. Ensure conservation and management of all wetlands in the County;

b. Explore possibilities of designing and creating artificial wetlands at appropriate spots of ecological concern;

c. Promote identification of the risks and impacts of climate change on Kisumu's wetlands;

d. Recognize and enhance the roles played by wetlands in natural disaster protection and climate change mitigation;

e. Ensure controlling and slowing down of conversion of wetlands and their immediate surroundings for agriculture and grazing purposes;

f. Ensure adequate water supply allowing ecologically necessary water flows to estuaries, peat lands, river, stream and lake marshes, mudflats and inter-tidal areas;

g. Develop adaptation mechanisms for wetlands and communities dependent on wetlands threatened by climate change;

h. Ensure sustainable harvesting of wetlands resources and grazing in the areas;

i. Ensure mapping and gazettement of wetlands;

j. Ensure control of siltation of wetlands by reducing deforestation and felling of timber in catchments areas;

k. Ensure setting up of scientific analysis systems to check water quality of the wetlands;

l. Develop regulations to address problem of organic and inorganic pollution of wetlands that includes flow of agricultural chemicals and pesticides into the wetlands;

m. Enforce laws regulating conservation of wetlands;

n. Ensure design and implementation of sustainable and participatory management plans for independent demonstration sites, each chosen to represent a broad eco-region in Kisumu;

o. Educate the public about the values of wetland resources.

6.10 DISASTER PREPAREDNESS

Climate Change is likely to increase climate-related natural disasters with the projected increase in the frequency and intensity of extreme climate events, including floods, droughts, landslides triggered by heavy rains and urban flooding due to congestion on storm drainage. Climate change projections are scenario based, hence, contain some degree of uncertainties. But in spite of this there are strong indications that in Lake Victoria Region, climate change is intensifying the above-mentioned hazards. The County is already experiencing impacts of climate change that are too visible to ignore. Furthermore, poor designs and planning has resulted in temporary urban flooding. Encroachment on drainage paths and wetlands has also resulted in temporary urban flooding and displacement. Most disasters or hazards that lead to destruction cannot be prevented; their impacts however, can be minimized by adaptive and preparedness measures. To address disaster management in a holistic manner in a changing climate, the County Government of Kisumu, in collaboration with other relevant entities, shall take the following measures:

Policy Measures

a. Establish a multi sectoral Disaster Preparedness Unit

b. Develop and allocate adequate financial and other resources to implement Kisumu County Disaster Risk Management Framework;

c. Clearly define coordination mechanism outlining the roles and responsibilities of each concerned department during natural disasters;

d. Redesign, upgrade and maintain storm drainage capacity of Kisumu City and other towns in view of climate change related likely increase in short duration intense rainfall events;

e. Implement Kisumu City drainage master plan;

f. Establish early warning systems and develop communities' evacuation plans for vulnerable areas;

g. Redesign and construct disaster resilience multipurpose school buildings to be used as evacuation centers during natural calamities;

h. Ensure community participation in early warning dissemination and disaster risk reduction activities, particularly in developing evacuation plans;

i. Ensure that the old, children, disabled and women get particular focus

in evacuation strategies;

j. Set up appropriate mechanisms to monitor the development of major rivers especially Nyamasaria, Awach, Nyando and Sondu Miriu to help in preparedness;

k. Undertake risk mapping for possible landslides in vulnerable mountain areas and take precautionary measures accordingly;

l. Undertake GIS mapping of all existing irrigation infrastructure especially flood embankments for efficient monitoring and flood management;

m. Strengthen flood forecasting, drought monitoring & early warning system in the county;

n. Enhance the capacities to address the impacts of floods, flash floods, droughts etc. by strengthening relevant agencies;

o. Link the communities to the insurance companies so that they can be compensated in case of losses arising from drought, floods, landslides etc.;

p. Develop a mix of strategies for flood management which may include use of dams for managing flood peaks, retarding basins and providing escape channels etc;

q. Ensure that infrastructure, including telecommunication, electricity, utilities and transport are resilient to the impact of climate change, particularly to the extreme weather events;

r. Control of activities that lead to deforestation such as charcoal burning and logging for timber.

6.11 SOCIO-ECONOMIC MEASURES

6.11.1 POVERTY

Climate change is a serious risk to poverty reduction efforts and threatens to undo decades of development efforts. While climate change is a global phenomenon, its negative impacts are more severely felt by poor people in underdeveloped countries. They are more vulnerable because of their high dependence on natural resources, their limited technical capacity and insufficient financial resources to cope with climatic extremes. Poverty reduction is at the top of all development agenda at the national and county level. With the onset of climate change, the plight of the poor is becoming even more miserable. Therefore, it is imperative to incorporate the possible impacts of climate change on the communities living in the

conditions of deprivation and poverty into future developmental plans for Kisumu.

The United Nations Sustainable Development Goals (SDGs) have specified a way forward by combining efforts towards poverty alleviation along with management of climate change impacts and environmental degradation effects.

High poverty level is one of the major developmental challenges in Kisumu County. Estimates show that over 60 per cent of the population is poor compared with the national average of 46 per cent as at 2006. Poverty levels are higher in the urban areas (70 per cent) compared with rural (63 per cent). The main causes of poverty include the HIV and AIDS pandemic, collapse of local agro-based industries, unemployment, low agricultural and fish production. Food insecurity, inaccessibility to affordable healthcare, lack of proper storage facilities, erratic and unreliable rainfall, poor and inaccessible road network, frequent floods, collapse of agro-industries such as problems with the sugar, rice, cotton and fish industries, lack of title deeds, poor water and sanitation systems, malaria, and water borne diseases worsen the poverty situation in the county. To address the problems of poor communities living in Kisumu's urban areas and those living in the rural areas practicing agriculture, in the wake of climate change, the County Government of Kisumu shall take the following measures:

Policy Measures

a. Integrate poverty-climate change nexus into economic policies and plans;

b. Ensure the implementation of the national population planning strategies and programs, as the population explosion may significantly contribute towards climate change;

c. Enhance general awareness of the problems of unchecked population growth and its impact on climate change, environmental conservation and natural resources;

d. Strengthen the community level climate change adaptation and mitigation measures to prepare them for enhanced and efficient natural resources management;

e. Improve access of poor communities to appropriate technologies for crop production, integrated pest management and credit facilities for agricultural development;

f. Facilitate land demarcation and issuance of land title deeds

g. Ensure that development process is sustainable and caters the needs of poor communities.

6.11.2 GENDER, VULENRABLE GROUPS AND YOUTH

Climate change is likely to affect poor and underprivileged regions, communities and people disproportionately as they are more vulnerable and have the least resources to adapt. In Kisumu County, the marginalized groups like women, people with disabilities (PWDs), children, youth and the aged who are likely to be strongly affected by climate change as majority of rural women are engaged in agriculture sector and any other forms of economic undertakings which are highly climate sensitive. Climate change is expected to increase the workload of women engaged in agriculture production and other subsistence activities such as collecting fuel wood and water. Further, marginalized groups are found to be more vulnerable during extreme climate events and disasters.

The County Government of Kisumu fully recognizes that women are powerful agents of change. Through a focus on Gender, Vulnerable Groups and Youth, the County Government is committed to achieving gender equity in all aspects of society, provide children with basic rights, have a labour force inclusive of young people at all levels (15-35 year olds), alleviate the condition of vulnerable persons (including orphans and vulnerable children, persons with disabilities, the aged, widows, widowers, internally displaced persons, and marginalized persons and enable the vulnerable to have equitable opportunities to participate in socio-economic activities.

It is indispensable to ensure participation of male and female gender in all policies, initiatives and decisions relating to climate change. To address the gender aspects of vulnerability from climate change, the County Government of Kisumu, in collaboration with other relevant entities shall take the following policy measures:

Policy Measures

a. Enhance access to the youth and women enterprise funds;

b. Facilitate access to social protection and insurance mechanisms against main climate hazards;

c. Establish affordable and accessible credit lines for the urban and rural poor, youth and other vulnerable groups;

d. Create awareness for climate opportunities that women and youth can access;

e. Reduce the vulnerability of women to climate change impacts, particularly in relation to their critical roles in rural areas in provisioning of water, food and energy;

f. Recognize the contribution of women use and management of natural resources and other activities impacting climate;

g. Undertake a comprehensive study on the gender-differentiated impacts of climate change with particular focus on gender difference in capabilities to cope with climate change adaptation and mitigation strategies in Kisumu;

h. Develop gender-sensitive criteria and indicators related to adaptation and vulnerability as gender differences in this area are most crucial and most visible;

i. Develop and implement climate change vulnerability-reduction measures that focus particularly women's needs;

j. Incorporate women's appropriate role into the decision making process on climate change mitigation and adaptation initiatives;

k. Ensure that women are well represented in land and natural resource governance and decision making;

l. Develop climate change adaptation measures on local and indigenous knowledge particularly held by women.

7. CLIMATE CHANGE MITIGATION

Under the Paris Agreement, Kenya committed itself to tackling climate change. Its nationally determined contribution (NDC), which builds on the 2013 Kenya Climate Change Action Plan, pledges to reduce greenhouse gas (GHG) emissions by 30% by 2030. At the same time, Kenya's NDC recognizes the country's development aspirations of becoming a newly industrialized middle-income country by 2030. For Kenya to continue on a development path to achieve its goals envisioned in the Country's long-term development policy 2030 Vision, it is imperative to prepare the ground that would enable it to face this new challenge. In pursuing its development goal, there is need to follow low-carbon development pathway.

7.1 ENERGY

Recent scenario modeling work by the Energy research Centre of the Netherlands (ECN) shows that it is feasible to expand Kenya's power sector to meet growing demand using low-carbon energy options.

However, nothing guarantees that power-sector expansion in Kenya will rely only on low-carbon energy solutions, especially given the large financial costs involved.

Kisumu County is endowed with vast renewable energy (RE) resources including geothermal, wind, solar, biomass such as agricultural waste and hydropower for both on-grid and off-grid systems. Despite the potential of renewable energy, the County's grid connection remains very low at approximate 14% in the rural areas. The majority of Kisumu County's population depends on wood fuel for cooking, with estimates that nearly 90 percent of households use firewood or charcoal for cooking and heating. To find solutions to the present energy needs and future energy requirements, a creative and sustainable energy policy framework is necessary that may help increase access to clean and sustainable energy. Towards this end, the County Government of Kisumu shall take the following policy measures for mitigating its GHG emissions and enhance energy access:

Policy Measures

a. Map renewable energy resources in the County and promote viable energy options based on empirical studies

b. Ensure that the negative impacts of hydro-power projects on the environment as well as on the local communities are properly assessed and addressed;

c. Promote development of renewable energy resources and technologies such as solar, wind, geothermal and biofuel energy;

d. Develop and implement green building code;

e. Promote investment in waste to energy technology – Circular economy concept;

f. Promote and provide incentives for activities required for shift in energy-mix and fuel-switching program to low-carbon sources;

g. Promote planting of dedicated woodlots for energy;

h. Establish and support renewable energy training and innovation centres;

i. Provide incentive schemes for communities to acquire renewable energy technologies such as biogas and solar;

j. Promote use of clean lighting technologies and set targets for elimination of kerosene for lighting;

k. Support adoption of clean cooking solutions and set targets for elimination of traditional biomass at institutional and household levels

l. Support afforestation and reforestation programmes.

7.2 ENERGY EFFICIENCY AND ENERGY CONSERVATION

To ensure ample energy supply to achieve the economic development goal, energy efficiency improvement, energy conservation and demand reduction provides excellent and cost effective ways to reduce carbon emissions and achieve the climate change mitigation goals. The County Government of Kisumu shall, therefore, take on the following policy measures:

Policy Measures

a. Create awareness on energy efficiency and conservation measures and management;

b. Ensure gradual introduction of Green Economy in all sectors of the economy to achieve carbon emission reductions objective;

c. Enforce energy conservation legislation in all sectors in the county;

d. Promote use of energy efficiency appliances in building by standardizing building and construction codes and legislating/creating incentives for retrofitting, maximum use of natural light, better insulation and use of energy efficient bulbs, boilers, appliances and ground water pumping units;

e. Promote and gradually make it mandatory to specify the energy efficiency/ fuel consumption rates of energy using equipment and devices of common use;

f. Carry out energy audits of institutions and facilities;

g. Identify and link up with initiatives of the national government.

7.3 TRANSPORT

Kisumu County has all the major transport types including road, water, rail and air:

Roads - The total length of bitumen surface (tarmac) road is 286km with the rest of the link roads being either gravel surface (725.6km) or earth surface (956.6km). The county is traversed by the main trunk road (B1) linking Nairobi to Kampala, Uganda through Busia. There is also an important road (A1) that links Kisumu to Tanzania through Kisii.

An alternative route to Tanzania from Kisumu is through Homa Bay. Besides these major highways, there are several bitumen surface (tarmac) roads linking the county to Western Kenya towns like Kakamega, Nandi Hill, Kapsabet, Eldoret, Bungoma and Kitale among others.

Air - As concerns air transport, the county has Kisumu International Airport that was recently improved and upgraded to international standards. The airport is the busiest airport in Western Kenya and the third busiest airport in the country. It handles over 10 flights daily including scheduled, chartered and nonscheduled arrivals and departures.

Water - Water transport on the lake is provided mostly by private operators in wooden boats with outboard engines, although a ferry service exists. The services connect towns on the shores and also help in crossing the lake. They also link the county with the other three-lakeside counties and the countries of Tanzania and Uganda. The port of Kisumu is very inactive at the moment but has the potential to become a regional centre of lake transport and a gateway for Kenya into the rest of the African Great Lakes region.

All the transport modes are however faced with a number of problems. Rail transport has collapsed with the collapse of the old Kenya Railways. Kisumu boast of an international airport though the facility is yet to host any international flights. Water transport has reduced compared to its old capacity when Kisumu was a hub of water transport connecting Kenya, Tanzania and Uganda. Currently small boats connecting local towns dominate water transport. Though providing essential services water transport has been experiencing frequent incidences of accidents with huge loss of life. The same problem is being faced with road transport, which has been reporting increasing number of traffic accidents. Moreover, the vehicles used are old with high emission of greenhouse gases. In addition, the road has no lanes for pedestrians and cyclists. To address safety and emission issues the County Government of Kisumu shall take the following policy measures:

Policy Measures Road Transport

a. Sensitize vehicle owners and regulatory bodies to the importance of proper vehicle maintenance for fuel efficiency enhancement and reduction of emissions;

b. Ensure the provision of efficient public transport (Busses) system in the county;

c. Develop infrastructure for motorized and non-motorized transport systems climate proof infrastructure

d. Examine and implement actions required for the use of biofuel for local transport;

e. Pilot E10 mandate in Kisumu County;

f. Support the private transport sector by providing incentives for reducing emissions and environmental friendly transport services, e.g. electric/ hybrid vehicle for urban use;

g. Secure financing for technology innovations for urban planning and the transportation sector, specifically to address the mitigation issues;

Water transport

a. Develop and promote in-land waterways transportation;

b. Develop a maritime safety system through innovation in ICT driven monitoring and warning systems to reduce weather related accidents;

c. Design and implement water transport safety by-laws;

d. Increase water transport surveillance to enforce safety measures;

e. Use fuel efficient vessels and boats;

f. Manage water hyacinth and its causes to ease lake transport;

g. Establish piers and landing beaches.

7.4 TOWN AND URBAN PLANNING

Climate change presents a range of socio-economic implications for town planning on two counts: First, town planning is a process by which adaptation to climate change impacts are possible in the urban areas. Second, town planning influences the level of emissions produced by human settlements by changing fuel and energy consumption patterns. To adapt to the impacts and to achieve the objectives of climate change mitigation, there is a need to introduce changes to town planning and building systems. The County Government of Kisumu, in this regard, shall take the following measures:

Policy Measures

a. Make installations of waste water treatment plants an integral part of industrial waste disposal;

b. Implement green economy concept in all sectors;

c. Ensure separate collection, disposal and recycling of recyclable, composite and biodegradable waste preferably at source;

d. Update town planning design principles for lower carbon foot prints;

e. Develop sewer systems in viable areas not served currently;

f. Develop and implement sanitation master plan

g. Ensure proper land use planning and encourage vertical instead of horizontal expansion of urban housing projects;

h. Undertake hazard mapping and zoning of areas before construction;

i. Ensure that rural housing particularly the flood damaged reconstruction is climate resilient;

j. Ensure that in large urban areas the industries are located in the designated areas;

k. Implement the Energy (Solar Water Heating) Regulations, 2012 in all new and old buildings;

l. Provide green spaces and urban forests

m. Sensitization of the public on the importance of waste management;

n. Promote provision, use and protection of open spaces within towns.

7.5 INDUSTRIES

The major industries in Kisumu include sugar factories, rice and maize mills. These industries though contribute only a very small percentage to the national greenhouse gas emission, never the less have responsibility to mitigate the emissions and contribute to the national targets on emission reduction. The County Government of Kisumu, shall take the following measures to play its role in reducing these emissions in the long term:

Policy Measures

a. Implement green economy concept in all industrial activities;

b. Incorporate economic incentives to promote emission-reduction by upgrading the industrial processes and technologies;

c. Prepare corporate social responsibility (CSR) guidelines and encourage corporate sector to create CSR-fund to cover carbon emission reductions efforts in industrial sector;

d. Promote the integrated cleaner production strategy in the industrial sector by making more efficient use of inputs such as energy, water, raw material etc and develop regulations for carbon emission caps;

e. Promote the use of energy efficient systems e.g. motors in the industries sector;

f. Ensure compliance by the industrial sector to undertake periodical energy efficiency audit (factored in environmental audits);

g. Ensure that technology transfer is accelerated for the industries to adopt modern and cleaner production technologies;

h. Enforcement of rules and regulations by the relevant lead agencies.

7.6 AGRICULTURE AND LIVESTOCK

Greenhouse gas (GHG) emissions from agriculture and livestock sectors accounted for about 14% of world's total GHG emissions. These emissions are essentially Methane (CH4) and Nitrous Oxide (N2O), 79%, and 21% respectively and originated mainly from four sub-sectors: 1) Enteric fermentation in cattle (all in the form of Methane), 2) Rice cultivation, 3) Releases of Nitrous Oxide from agricultural soils/ Nitrous Fertilizer, and 4) Manure management.

There is a pressing need to find ways to contain these emissions or at least to slow down their growth rate. These efforts will require technological innovations and financial resources and for that Kisumu County would need the support of national and international agencies. To mitigate and minimize the GHG emissions from agriculture and livestock sector the County Government of Kisumu shall take the following policy measures:

Policy Measures

a. Promote integration of indigenous knowledge and latest technology with scientific research to spearhead efforts towards an ecologically sustainable green revolution while ensuring extension, research linkages;

b. Promote wide scale adaptation of better management practices for agriculture and livestock with a reduction in the use of chemical fertilizer, water and pesticides;

c. Explore methods for reducing Nitrous oxide releases from agricultural soils, e.g. by changing the mix of chemical fertilizers commonly used;

d. Promote use of green manure, better manure storage and management, and soil and water conservation;

e. Promote development of biogas and manure digester for methane reduction and energy production;

f. Develop and adopt new breeds of cattle which are more productive in terms of milk and meat with lower methane production from enteric fermentation;

g. Encourage farmers to use appropriate feed mixes and additives to reduce methane production from enteric fermentation/ digestion in cattle;

h. Manage water in rice paddy to control releases of Methane from agricultural soil and introduce low water delta rice varieties;

i. Promote climate smart agriculture for GHG abatement; and resilience building

j. Promote cultivation of crops used for biofuel production to the extent that may not threaten the county's food security;

k. Develop capacity of the relevant institutions to undertake appropriate mitigation actions to reduce GHG emissions from agriculture and livestock sectors.

l. Promote catchment management approach by all partners

m. Enhance better management of various agricultural and livestock value chains such as agricultural wastes from markets

7.7 CARBON SEQUESTRATION AND FORESTRY

Mitigation of climate change is a global responsibility. Agriculture, Forestry and Other Land Uses (AFOLU) provide, in principle, a significant potential for GHG mitigation through CO2 sequestration. The County's land use and forestry sector contributes a very small fraction of the total GHG emissions of the country. Considerable mitigation potential, however, exists in land use and forestry sector to sequester carbon via afforestation and reforestation measures as well as avoiding deforestation in Kisumu.

The County Government of Kisumu, in collaboration with national entities and support from multilateral agencies, shall take on the following measures in the forestry sector to sequester the atmospheric carbon, playing its role in mitigating the climate change.

Policy Measures

a. Set and implement annual afforestation and reforestation targets to increase the county's forest cover;

b. Strictly prohibit illegal forest cutting and conversion of forest land to non- forest uses;

c. Use vast uncultivable wasteland as carbon sink and to build up soil organic matter;

d. Provide incentives and alternative fuel and livelihood options to the forest dependent communities to avoid deforestation and forest destruction;

e. Promote farm forestry and agroforestry practices by planting multipurpose fast growing species to meet the needs for timber, fuel wood and fodder for livestock;

f. Encourage and support forestry personnel in carbon forestry project development;

g. Establish linkages with regulated and voluntary carbon markets to promote and encourage forestry mitigation projects in Kisumu;

h. Prepare a framework for county REDD+ strategy on priority basis and ensure its implementation in accordance with the national and international conventions/ processes;

i. Develop a monitoring, reporting and verification (MRV) system for evaluation of emission reduction and change in land use;

j. Develop a legal and institutional framework for improved forest management and investment.

8. CAPACITY BUILDING & INSTITUTIONAL STRENGTHENING

Expertise to address climate change is low in the county. Kisumu is hardly prepared to meet the 21st century's biggest challenge of climate change as far as human resources and institutional capacities are concerned. Insufficient trained human resource is a big constraint, in part, due to brain drain, limited investment in climate change education and lack of demand and opportunity for skilled individuals in the County. The county does not have enough climate change scientists, modelers, technologists, and even experts who can handle the national and international negotiations, which are critical for every county. Similarly, there a few credible institutions in Kenya to deal with comprehensive climate change science, modeling, management, adaptation, mitigation, and policy issues. Since capacity building and institutional strengthening is a priority area for the county government, a number of area specific policy measures are mentioned in relevant sections and will generally not be repeated here. However to address the deficiencies in climate change related requirements, human resources and institutions, the County Government of Kisumu shall take the following measures:

Policy Measures Institutional Mechanisms

a. Establish climate change desk in all departments and sub-county levels up to the ward level;

b. Establish the County, Sub County and Ward and village Climate Change planning Committees for coordinating all climate change activities at the County;

c. Improve the inter-ministerial and inter-departmental decision making and co-ordination mechanism on climate change issues at the County level;

d. Strengthen the county institutional framework for undertaking tasks related to the implementation of national and international obligations;

e. Ensure the integration and mainstreaming of climate change in developmental, and that climate change and socio economic development are pursued as inseparable twin objectives;

f. Ensure that agriculture, water, fisheries, forests, energy and Disaster Risk Reduction (DRR) related vulnerabilities induced by climate change get duly integrated and addressed in all relevant county policy documents;

g. Identify the county institutional needs to develop the capacity climate change adaptation and mitigation;

h. Create a County, Sub-county and Ward Implementing Entities to deal with adaptation and mitigation projects at all levels;

i. Create a mechanism for public private partnership and non-state actors in climate change technology innovation.

Capacity Enhancement

a. Networking and collaboration with institutions of higher learning to promote learning on climate change;

b. Strengthen county climate change science related institutions, in particular the universities, in terms of necessary financial support;

c. Ensure institutional strengthening of the existing Climate Change department, Committees, working groups and relevant institutions dealing with climate change matters;

d. Develop Knowledge Base Management (KBM) and networking with strategic climate change research establishments to ensure benefits from international scientific advancements;

e. Provide training and support, at ward, sub-county and county levels, to the concerned officials and experts of line ministries and departments to further their knowledge and capacities on climate change issues;

f. Explore and provide training opportunities to enhance capacity for preparing projects and implementation of programs in the climate change area;

g. Enhance disaster mitigation and preparedness capacities at all levels;

h. Enhance capacity to undertake comprehensive assessment of economic implications of climate change impacts on various sectors with and without using different adaptation measures;

i. Develop county GHG emissions inventory and strengthen institutional capacities to ensure regular updates;

j. Develop an institutionalized system to regularly measure and monitor GHG emissions from various sectors including trans-boundary pollution and maintain a database;

k. Expand and upgrade meteorological services and monitoring stations in various parts of the county including sub county and ward levels;

l. Develop capacity for making reliable projections of climate change scenarios, seasonal forecasts and inter-annual forecasts for different parts of the county;

m. Actively participate in new national and international initiatives;

n. Promote the use of GIS/remote sensing (RS) based studies to assess and quantify the past temporal trends and monitor the future changes in lake and river water levels, deforestation, wetland loss, land degradation (salinity, water logging) and soil erosion;

o. Establish a county resource centre for climate information sharing and networking of regularly updated climate change related data.

9. AWARENESS RAISING

Public education and outreach are vitally important to create broad awareness of climate change issues and its impacts. As such the importance of communicating with the general public and engaging stakeholders in climate change related issues is fully recognized by the County. The County Government, both in collaboration with the private sector, civil society and independently, is already working actively to raise awareness regarding the issue. The scale of the change required, the vast

number of people and interests that must be influenced, call for outreach activities of much greater magnitude. Therefore, the County Government of Kisumu in collaboration with the relevant entities shall take the following measures:

Policy Measures

a. Conduct countywide surveys on the awareness level and capability of key stakeholders and other potential partners;

b. Develop a county climate change awareness program involving communities, various ministries and departments, civil society and private sector;

c. Ensure advocacy and mass awareness regarding importance of water and energy conservation impacts of climate change on various sectors including forest ecosystem, biodiversity etc using mass media, public- private partnership, civil society, learning institutions and community mobilization;

10. RESEARCH, INNOVATION AND TECHNOLOGY TRANSFER

Climate change being one of the most difficult and complex threat the world faces, needs innovative technological solutions to solve both mitigation and adaptation challenges.. At the 21st UNFCCC Conference of Parties (COP21), Parties to the Convention agreed to set-up a special "Technology Framework" for the development and transfer of new technologies from developed to developing countries. In line with this framework, Kisumu County government shall take the following policy measures to find solutions to the climate change challenges:

Policy Measures

a. Establish country climate information system and develop county climate information plan

b. Ensure that the technology needs to support actions on mitigation and adaptation are determined and are based on local priorities;

c. Promote the development and use of local technologies in combination of innovation and technological advancement in the field of climate change as an effective way to implement the adaptation and mitigation measures;

d. Establish infrastructure necessary for promoting innovation at grassroots level, learning institutions including vocational training institutions, polytechnics, universities and research institution;

e. Establish partnerships for technology transfer and development with Industries, Higher learning institutions, international research organization and village polytechnics

f. Find technological breakthrough to harness the potential of renewable energy resources in the county;

g. Explore the viability of new technological breakthroughs in the field of biofuels for use in Kisumu County;

h. Promote technology transfer for designing and manufacturing of emission monitoring equipment for installation near urban and industrial areas in Kisumu.

i. Set a base for technology transfer and absorption at technical institutions, village polytechnics, and universities;

j. Establish a system for climate monitoring, modelling and early warning systems connected to all the farmers in the county;

k. Develop new breeds of crops and livestock which are early maturing and less vulnerable to impacts of climate change;

l. Carry out research on proper land use systems and safe carbon emission.

11. INTERNATIONAL AND NATIONAL COOPERATION

Climate change is a global concern and its adverse impacts affect developing countries most. Kisumu County is committed to engaging vigorously with the international community to find solutions and help the world toward a new era of global cooperation on climate change. Furthermore, developing countries face the dual challenge of addressing the negative impacts of climate change and pursuing socio-economic development, hence, it is essential that they work together to face these challenges. Kisumu is particularly prone to climate change and related disasters making the need for a national response to meet the challenge of climate change more urgent and compelling. In order to achieve this cooperation, the County Government of Kisumu shall take the following measures:

Policy Measures

a. Support exchange of meteorological data within national, regional and international weather monitoring organizations including that obtained from high altitude monitoring stations;

b. Network and partner with national and international weather organizations to receive real time hydrological data in the region for improved flood forecasting and warning systems or services;

c. Work with neighboring counties to undertake initiatives on management of mountain ecosystems, particularly water catchments and their contribution to sustainable development and livelihoods and to showcase climate change findings;

d. Help establish institutional linkages between national institutions to facilitate sharing of knowledge, information and capacity building programs in climate change related areas;

e. Support the establishment of Lake Victoria Basin Climate Change Research Centre at one of the universities in the region;

f. Seek establishment of a regional Inter-County Expert Group on Climate Change to develop clear policy direction and guidance for regional cooperation;

g. Undertake together with other neighboring counties advocacy and awareness programs on climate change, and promote the use of green technology and best practices for transition to low-carbon, sustainable and inclusive development in the region.

12. FINANCE

There is urgent need for finance in addressing climate change. The developed countries have a responsibility to provide climate change financing under the UNFCCC based on the principle of Common but Differentiated Responsibilities and Respective Capabilities (CBDR&RC) and the financial mechanisms developed within and without the UNFCCC. In recent UNFCCC Cancun conference the developed countries have committed to create a sizable Green Climate Fund and fast start finance. To secure an appropriate share from this initiative, expected to be available in near future, a county needs to create an enabling environment, which can facilitate and attract this funding. In order to sustain climate chain interventions, the County Government of Kisumu shall take the following measures:

Policy Measures

a. Continue to assess how best to position the Kisumu vis-a-vis other counties in order to secure climate finance;

b. Commit 2% county budget to climate change projects/actions identified through ward climate planning committees and through climate change department or climate change activities implemented by the other departments;

c. Collaborate with accredited entities to explore opportunities for access and effective use of the opportunities available internationally

for adaptation and mitigation efforts e.g. through Green Climate Fund (GCF), Adaptation Fund (AF), Global Environmental Facility (GEF), World Bank's Forest Carbon Partnership Facility (FCPF) etc;

d. Establish a "Kisumu Climate Change Fund" for financing climate change related projects. The Climate Change Trust Fund to be incorporated in the County Annual budgets;

e. Develop Public-Private-Civil Society partnership for financing and implementation of climate change adaptation and mitigation projects;

f. Create domestic carbon market opportunities by introducing appropriate investment framework linked with national/regional banking institutions;

g. Develop mega project proposals on climate change to attract Global Climate Finance;

h. Promote clean development and climate proof initiatives (cleaning up of drainage systems) for informal settlements in the city and urban areas to attract funds from Green Climate Fund.

13. IMPLEMENTATION MECHANISM

13.1 THE FOCAL CLIMATE CHANGE INSTITUTION

The County Government of Kisumu will appoint a member of executive committee (CEC) in charge of the of Climate change Directorate which will be the coordinating body of all climate change activities in the County. The County will further establish The Kisumu County Climate Change Council to be chaired by the Governor with Deputy Governor as the Vice Chair.

The Council composed of the Governor, Deputy Governor, CEC CC&GE, CECs of key relevant departments including Health, Environment, Agriculture and Livestock, Planning and Economic Development, Finance, Land and Settlement and Tourism and Wildlife. Representation of the civil society and private sector will also be co-opted.

The Council shall provide an overarching county climate change coordination mechanism in the county to mirror the role of national climate change council at the county level. The CEC in charge of the Climate Change Directorate will be the secretary.

The Climate Change Directorate will be the secretariat of the Council. Each department will have a climate change desk to mainstream climate change in all the departmental and sectoral plans for implementation.

Since the coordinating body must possess the authority to conduct business with the various cross-sectoral and sectoral departments involved in the implementation of the policy. The main functions of the Climate Change Directorate will include:

a. Acting as an information clearinghouse on climate change concerns;

b. Providing policy and strategic advice on climate change;

c. Supporting communication and outreach on climate change;

d. Ensuring the integration of climate change concerns into overall county planning through coordination with the relevant ministries, departments and governmental agencies;

e. Directorate to provide Secretarial services to the Council Committee;

f. Monitoring the implementation of the County Climate Change Policy and its Implementation Strategy;

g. Serving as the County Focal Point on all climate change issues.

h. Ensure public participation, transparency and accountability.

i. Monitoring and evaluation of all climate change projects and programs as well as MRV+ in the County.

j. Capacity build communities on Climate change adaptation, mitigation and Disaster Risk Reduction.

k. Engage in partnership, learning and innovation on climate change actions.

13.2 OTHER KEY COORDINATING MINISTRIES AND AUTHORITIES

In addition to the Directorate, two departments will have special role to play in the coordination to ensure policy implementation.

1. The Department of Finance

The main functions of the department will be to:

a. Ensure that county, sectoral, sub-county and ward budgets and indicative planning figures integrate climate change through appropriate provisions for the implementation of the policy and its strategy

b. Facilitate the introduction of relevant financial mechanisms and tools (IFMIS segment 8) to the relevant stakeholders, as per the implementation strategy, to support financial resource mobilization and investment for the implementation of the policy

2. Department of Planning and Economic Development

The main functions of Planning and Economic Development will be to:

a. Ensure that the ministries, departments and agencies concerned mainstream climate change through adequate provisions in their annual work plans for the implementation of the climate change policy, building on the guidance provided in the costed implementation strategy but consistent with all relevant county policies and legislations;

b. Review quarterly and semi-annual reports from the ministries, departments and agencies concerned, to ensure that resource use is in line with expected and actual progress in implementing the policy;

c. Ensure that (there are short and long-term work plans) these agreed work plans are implemented, through a review of quarterly and semi-annual reporting by the institutions concerned and appropriate follow-up actions;

d. Mainstreaming climate change into County Integrated Development Plan (CIDP) and County Strategic Plans (CSP) as set out in the National Climate Change Action Plan (NCCAP).

e. Monitor and evaluate climate change community projects initiated from the grassroot level on adaptation and mitigation.

f. Support in the preparation of ward climate change adaptation plans.

13.3 OTHER DEPARTMENTS

Given the far-reaching nature of this policy, the departments covered under this policy are numerous. Each of the departments with a role to play in the implementation of the policy will designate a departmental

focal point/desk officer who will be accountable for the implementation of the prescribed policy responses that concern their respective department. The Implementation Strategy will detail the accountability mechanisms for the various departments concerned. They will be expected to report on quarterly and semi-annual basis on their progress of implementation based on stated performance targets detailed in Monitoring and Evaluation (M&E) Framework to be developed along with the Implementation Strategy for the policy.

This information will be forwarded to the CECM in charge of climate change. On the basis of these reports, the Directorate will be tasked with preparing a consolidated annual progress report on the overall implementation of the policy, for consideration by the County Assembly and with a copy to the National Climate Change Directorate.

13.4 AT THE DECENTRALIZED LEVEL

Climate Change planning Committees will be established at the County, ward and village levels. All departments will ensure that climate change issues in their sectors are integrated into the Sub-county and Ward development plans. The Committees will be charged with a responsibility of identifying climate change priority within their jurisdiction.

Adequate provision will be made at these levels to allocate budgets to each sector to implement the identified climate change policy priorities, along with the setting of relevant performance indicators. They will be expected to report respective department at the county level on quarterly basis on the progress of implementation of respective priorities, attainment of expected results and performance targets.

14. MONITORING AND EVALUATION

The full M&E Framework for the implementation of this policy builds on the Implementation Strategy developed to accompany the policy. The M&E Framework is clearly linked to the planned outcomes and outputs of the strategy and is instrumental in ensuring the full implementation of the policy by the various stakeholders involved. The M&E Framework specify performance indicators and targets for each policy priority and strategic action, and propose accountability mechanisms for the actors that are tasked to implement them. Each department for which specific responsibilities are identified, have to ensure enforcement of the relevant policy priorities and measures, using means and mechanisms at its disposal as identified in the costed Implementation. In addition to monitoring and enforcement against the M&E Framework, the implementation of the policy will undergo an independent external

evaluation in 5 years' time. The recommendations resulting from this evaluation will feed into the revision process for the policy. This revision is to be carried out based on a thorough public consultation process and review of the results at that point in time.

ANNEX I – TERMINOLOGIES\

Adaptation

Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Adaptive Capacity

The ability or potential of a system to respond successfully to climate variability and change, and includes adjustments in both behaviour and in resources and technologies.

Capacity building

In the context of climate change, the process of developing the technical skills and institutional capability in developing countries to enable them to address effectively the causes and results of climate change.

Carbon market

A trading system through which countries or other entities may buy or sell units of greenhouse gas emissions in an effort to meet their national limits on emissions, either under the Kyoto Protocol or under other agreements, such as that among member states of the European Union. The term comes from the fact that carbon dioxide is the predominant greenhouse gas, and other gases are measured in units called "carbon dioxide equivalents."

Carbon sequestration

The process of removing carbon from the atmosphere and depositing it in a reservoir or “sink”, such as soil or trees

Climate

The average pattern for weather conditions occurs over a long time period not less than 30 years. Weather refers to the atmospheric conditions at a specific place at a specific point in time. Climate has always varied because of natural causes. Increasingly, however, human increases in GHG emissions causing changes in climate as well.

Climate Change

Changes in global or regional climate patterns, including changes in temperature, wind patterns and rainfall. In particular, climate change refers to a change apparent from the mid to late 20th century onwards and attributed largely to human activities that increase levels of GHG emissions, especially atmospheric carbon dioxide produced by the use of

fossil fuels. Climate change is sometimes referred to as global warming, which specifically refers to the long-term trend of a rising average global temperature.

Climate Finance

Local, national or international financing that may be drawn from public, private and alternative sources of financing, and is critical to addressing climate change because large-scale investments are required for adaptation and mitigation.

Climate Resilience

Closely linked to adaptation, building climate resilience includes reducing vulnerability to climate change, making sure that the impacts of climate change are avoided or cushioned, and enabling people to respond to climate risks.

Conference of the Parties

The supreme governing body of the UNFCCC, which meets once a year to review the Convention's progress. The word "conference" is not used here in the sense of "meeting", but rather of "association".

Deforestation

The long-term or permanent loss of forest cover. The term implies transformation of forest into another land use, which is caused and maintained by a continued human-induced or natural perturbation.

E10

E10 is a mixture of conventional unleaded petrol and ethanol. E10 means it is 90 per cent petrol and 10 per cent ethanol.

Greenhouse gases

The atmospheric gases responsible for causing global warming and climate change. The major GHGs are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_20). Less prevalent -- but very powerful -- greenhouse gases are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

Intergovernmental Panel on Climate Change (IPCC)

Established in 1988 by the World Meteorological Organization and the UN Environment Programme, the IPCC surveys worldwide scientific and technical literature and publishes assessment reports that are widely recognized as the most credible existing sources of

information on climate change. The IPCC also works on methodologies and responds to specific requests from the UNFCCC's subsidiary bodies. The IPCC is independent of the UNFCCC.

Kyoto Protocol

An international agreement standing on its own, and requiring separate ratification by governments, but linked to the UNFCCC. The Kyoto Protocol, among other things, sets binding targets for the reduction of GHG emissions by industrialized countries.

Low Carbon Development Pathway

A national development plan or strategy that encompasses low-emission economic growth. Transitioning to this pathway means taking actions, where possible, to encourage GHG emissions that are lower than business-as-usual practice; and reducing the human causes of emissions by moving toward a resource efficient economy that is as low-carbon as possible and enhancing carbon sinks.

Mitigation

In the context of climate change, a human intervention to reduce the sources or enhance the sinks of greenhouse gases. Examples include using fossil fuels more efficiently for industrial processes or electricity generation, switching to solar energy or wind power, improving the insulation of buildings, and expanding forests and other "sinks" to remove greater amounts of carbon dioxide from the atmosphere.

Measurement, Reporting and Verification Plus (MRV+)

An integrated framework proposed for Kenya to measure, monitor, verify and report results and impacts of mitigation, adaptation and climate finance actions, and the synergies between them.

National Adaptation Plan

A document prepared by developing countries that identifies urgent and immediate needs for adapting to climate change.

National Climate Change Action Plans

National plans of action, prepared at five-year intervals, that set out in detail the requirements and costs for the design and implementation of the various climate change interventions required for Kenya to attain low carbon climate resilient development.

Public Private Partnerships (PPPs)

Public-Private Partnerships are an association between government and private sector through which private financing is utilized to perform a public function, at a profit to the private sector.

Sustainable development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Technology Transfer

A broad set of processes covering the flows of know-how, experience and equipment for mitigating and adapting to climate change among different stakeholders.

United Framework Convention on Climate Change (UNFCCC)

An international treaty signed by 195 countries that entered into force in 1994. The objective of the Convention is "…stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate systems…"

Vulnerability

The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude and rate of climate variation to which a system is exposed, its sensitivity and its adaptive capacity.

ANNEX II: IMPLEMENTATION MATRIX

The proposed template below is based on the information provided in section 14 (Monitoring and Evaluation) of the Kisumu Climate Change Policy.

1. HEALTH SECTOR CLIMATE CHANGE STRATEGY

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year				Budget (Ksh)	Resp	
						Y1	Y2	Y3	Y4	Y5		
Strategic Objective 1: Improve stakeholders coordination and communication												
Strengthen inter-sectoral coordination	Establish a Thematic Working Group on CC	Functional secretariat	1 Secretariat formed	Annually	1	1	-	-	-	-	10M	Director, Health
	Establish a CC Coordination mechanism	Functional TWG	1 TWG formed	Bi-annual	1	1	-	-	-	-	2 M	
	Establish Joint reporting on CC	Joint reports	No of meetings held	Bi-annual	10	2	2	2	2	2	2 M	
	Establish Stakeholder Forum	Functional stakeholders forum	Minutes of the forum meetings	Bi-annual	10	2	2	2	2	2	5 M	
Strategic Objective 2: Enhance Public Awareness on Climate Change Mitigation and Adaptation												
Training implementers	Educate and train health personnel on climate change related issues	Informed staff	No. of personnel trained No of trainings held	Annually	1,500	300	300	300	300	300	10M	
Community sensitization	Inform and sensitize the community on climate change	Sensitized and informed staff	No of groups sensitized and increased awareness of CC issues	Quarterly	1,800	360	360	360	360	360	10M	

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year				Budget (Ksh)	Resp	
						Y1	Y2	Y3	Y4	Y5		
	related issues											
	Annual Stakeholder Forum on CC	Forums	No of forums held	Annual	5	1	1	1	1	1	10M	
			No of delegates		1,000	200	200	200	200	200	10M	
Community outreach	Conduct community outreaches on health and CC adaptation	Informed community members	No. of people informed	Quarterly	2,800	560	560	560	560	560	10M	Chief, Health
		Community resilience established	Mortality rate due to CC impacts reduced									
Strategic Objective 3: Improve health services delivery on climate change health related issues												
Enforcement	Enforce the Public Health Act Cap 242, 254 and 356. EMCA Act 2009, TC Act 2007,OSH Act	Health Notices served/issued	No. of notices served	Quarterly	Notices served						10M	Chief officer of health
		Court prosecutions	No. of people prosecuted									
Prevention and promotive Services	Immunization	Immunized children	No. of children immunized	Annually	114,000	22,800	22,800	22,800	22,800	22,800	50M	
	Pest & vector control	Fumigated houses	No of Houses fumigated	Annually	5,000	1,000	1,000	1,000	1,000	1,000	100M	
	Sanitation and personal hygiene	ODF villages	No of ODF villages	Annually	1,000	500	500	-	-	-	23M	
	Food Quality control	Food sampled	No of food samples tested	Annually	2,100	420	420	420	420	420	105M	
		County food control	No of meetings of quality control	Quarterly	20	4	4	4	4	4	20M	

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year				Budget (Ksh)	Resp	
						Y1	Y2	Y3	Y4	Y5		
		committee	committee									
	Carry out water sampling, treatment, protection of water sources quality safe drinking water	Safe drinking water	No of water samples tested	Quarterly	2,100	420	420	420	420	420	20M	CO Health
	Conduct indoor residual spraying.	Protected water sources	No of water sources protected	Quarterly	105	21	21	21	21	21	10M	
	Conduct indoor residual spraying.	Sprayed houses (IRS)	No of households sprayed	Annually	10,000	2000	2000	2000	2000	2000	200M	CECM-Water
	Provide mosquito treated nets to community	Distribution of ITNs	No of treated mosquito nets distibuted	Annually	228,000	45600	45600	45600	45600	45600	114M	Chief, health.
	Provide typhoid, cholera and international vaccinations	Vaccinated population	No of people vaccinated	Annually	500,000	100,000	100,000	100,000	100,000	100,000	250M	
Strategic Objective 4: Equipping heath facilities to deal with Climate change hazards												
Equip the Health facilities with adequate commodities, supplies	Carryout an inventory of health equipment and facilities	An updated inventory	No. of updated inventory	Annually	5	1	1	1	1	1	2.5M	Chief, Health
	Procure health equipment,	Well equipped facilities	No of well equipped facilities	Annually	5	1	1	1	1	1	5B	

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year				Budget (Ksh)	Resp	
						Y1	Y2	Y3	Y4	Y5		
	commodities and supplies											
	Maintenance of health equipment	Well maintained equipment	No of equipment serviced	Annually	5	1	1	1	1	1	1B	
	Physical infrastructure development	Developed infrastructure	No of infrastructure developed	Annually	5	1	1	1	1	1	4B	
Staff recruitment and personnel development	Assess staff needs and capacity	Reports	Staff needs assessment report	Annually	5	1	1	1	1	1	1.5M	Chief, Health
	Staff recruitment	Staff recruited	No of staff recruited	Annually	5	1	1	1	1	1	2B	
Strategic Objective 5: Disaster management to conform with climate change hazards												
Develop a disaster preparedness, prevention strategies	Establish a disaster management and coordination committee	Functional committee	Minutes of meetings	Annually	1	1	-	-	-	-		Chief, Health
	Develop early warning systems, Surveillance, monitoring, evaluation and research	Operational research systems	No of disaster mapping and database developed.	Annually	5	1	1	1	1	1	8M	
	Resource mobilization	Availability of tools e.g..State-of the art Ambulances	No of tools	Annually	5	1	1	1	1	1	90M	

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year				Budget (Ksh)	Resp	
						Y1	Y2	Y3	Y4	Y5		
Strategic Objective 6: Operational research activities on climate change hazards												
Forge strategic partnerships	Collaboration with institutions of higher learning and research e. g. KEMRI, Universities, KEPHIS, KEFRI	No. of partnership developed	MOUs signed	Annually	5	1	1	1	1	1	3.5M	CEC, Health
Strengthen research and training activities	Conduct research, surveys and surveillance programs on emerging and re-emerging disease outbreaks	Research results	No of research results	Annually	5	1	1	1	1	1	50M	
Strategic Objective 7: Effective ICT system on climate change												
Access to information through use of internet and other channels of communication	Installation of communication infrastructure	Improved access to information.	No of infrastructure installed	Annually	5	1	1	1	1	1	25M	Chief, Health
		Enabled HMIS, CHMIS	No of database								25M	

2. AGRICULTURE SECTOR CLIMATE CHANGE STRATEGY

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
Strategic Objective 1: Promote sustainable land use, environmental conservation and climate change adaptation and mitigation												
Soil and water management	Pegging of river banks for protection and conservation	River banks Pegged	Km of river bank pegged Reports	Monthly	30 km	6	6	6	6	6	2.0 M	SCAO
	Laying out of farms for protection and conservation of soil on farms with 6 – 35% slopes.	Farms laid out	No. of farms laid	Monthly	15,000 farms	3000	3000	3000	3000	3000	70 M	SCAO
	Spring and wetland protection	Springs protected	No. of springs protected	Quarterly	30 springs	3	6	9	9	3	12.0 M	SCAO
	Protection of fish breeding grounds	No of breeding grounds protected	Reports	Yearly	20	4	4	4	4	4	10M	CDF
	Protection of Fish ponds by growing grass at the banks	No of ponds protected	Reports	Quarterly	200	40	40	40	40	40	2M	SCFO
	Train local community in management of	Fisherfolks involved in biodiversity management	No of fisherfolks trained	Quarterly	700	200	200	100	100	100	3M	CDF

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
	biodiversity											
	Train fishermen, crops, livestock and fish farmers adapt to climate change	Fishermen, crops, livestock and fish farmers trained	No of fishermen, crops, livestock and fish farmers trained	Quarterly	1000	400	300	100	100	100	20M	CDF/CDA/ CDLP
	Train farmers on soil fertility management and carry out soil fertility tests	Farmers trained and soil fertility tests carried out	No of farmers trained	Monthly	1200	240	240	240	240	240	2.0 M	SCAO
			No of soil fertility tests carried out	Monthly	1200							
	Train fish farmers on protection of fish ponds	No of fish farmers trained	Reports on training, training notes	Quarterly	200	40	40	40	40	40	5M	SCFO
	Protection of the fishing grounds	No of fish grounds protected	Reports	Quarterly	20	4	4	4	4	4	5M	SCFO
	Planting of improved fodder plots in bulks for dairy farmers	Acres of land planted	No of acres used to plant	Quarterly	75	15	15	15	15	15	2M	SCLPO
	Training on animal waste management	Farmers trained on animal waste management for	No. of farmers trained	Quarterly	1000	200	200	200	200	200	2M	SCLPO

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
	for manure	manure										
	Training on silos and feed fermentation process	Farmers trained on silos and feed fermentation process	No of farmers trained	Quarterly	1000	200	200	200	200	200	2M	SCLPO
Improved Farm forestry	Carry out agroforestry demonstrations	Farmers practicing agroforestry	No of farmers doing agroforestry.	Monthly	30,000 farmers	6000	6000	6000	6000	6000	75.0 M	SCAO, Forest service
Flood control	Construction and maintenance of Waterways	waterways constructed/maintained	No of Km of waterways constructed/maintained	Quarterly	10Km	1.7	1.9	2.1	2.1	2.2	24.0M	CO/CDA
	Disseminate weather forecast information to farmers	Weather forecast information disseminated	No of reports disseminated	Monthly	60	12	12	12	12	12	0.3M	CDA, KMD
	Prepare a disaster management plan for	1 plan prepared and revised annually	1 plan prepared and revised annually	Annually	1	1					1.5M	CO/CDA

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
	agriculture in flood prone areas	before long rains	before long rains									
	Train farmers on early warning systems	Training of fish farmers	No of farmers trained	Quarterly	200	40	40	40	40	40	2m	SCFO
	Train farmers on early warning systems	Identification of flood prone areas	No of farmers trained	Quarterly	200	40	40	40	40	40	1M	SCFO
	Train farmers on early warning systems	Training of fishermen	No of farmers trained	Quarterly	200	40	40	40	40	40	2M	SCFO
	Hold participatory scenario planning meetings (PSPs)	Meetings held	No of Meetings held plus reports	Quarterly	20	4	4	4	4	4	3M	CO/Stakeholders
Drought and erratic rainfall mitigation	Construct/excavate water pans for water harvesting/irrigation	Water pans constructed	No of water pans constructed	Quarterly	84	6	12	18	24	24	226 M	SCAO
	Bulk and distribute 1,000 tons of drought tolerant seed varieties e.g. Sorghum	Drought tolerant seed bulked and distributed	No of tons of seed distributed	Quarterly	1000	216	196	196	196	196	153 M	CO/ CDA
	Bulk and distribute 10 million cassava	Cuttings and vines	No of cuttings/vines	Quarterly	50 million	4.25M	7.5M	12.75	12.7	12.75	100 M	CO/CDA/KALRO/

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
	cuttings and sweet potato vines per year	distributed	distributed					M	5M	M		CBOs
	Develop/rehabilitate 6 irrigation schemes	Irrigation schemes developed/rehabilitated	No of irrigation schemes developed/rehabilitated	Quarterly	6	1	1	2	1	1	120M	CO/CDA
	Promote crop Insurance by training farmers	Farmers trained on crop insurance	No of farmers trained	Quarterly	1000	67	133	355	355	90	1.5M	CDA
	Promotion of fish insurance scheme	No if fish farmers trained	No of farmers trained	Quarterly	1000	200	200	200	200	200	1.5M	CDF
	Promotion of waters harvesting for fish farming	Water harvesting for fish farming	No of fish farmers train in harvesting water for farming	Quarterly	700	200	200	100	100	100	3.0M	CDF
	Promotion of drought resistant fish species	Drought tolerant fish species introduced	No of drought tolerant fish species introducing	Quarterly	2	2	-	-	-	-	1.5M	CDF
	Promotion of drought tolerant/hardy livestock breeds	Drought tolerant breeds distributed	No of drought tolerant breeds distributed, reports on training and distribution.	Quarterly	1500	300	300	300	300	300	45M	CDLP
Strategic Objective 2: To promote activities that minimize greenhouse gas emissions from key sources in agricultural production systems												
Minimized GHG	Construction/installa	Biogas plants constructed	No of biogas plants	Quarterly	100	20	20	20	20	20	10	CDLP/NG

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
emissions	tion of biogas plants		constructed									Os
	Training of biogas technicians	Technicians trained	No of technicians trained	Once	18	18	0	0	0	0	0.72	CDLP
	Training of farmers etc.	Farmers trained	No of farmers trained	Quarterly	2000	400	400	400	400	400	1	CDLP
	Increase acreage under efficient irrigated rice production systems by reducing emission rate.	Acreage under efficient irrigated rice production	No of acres under efficient irrigated rice production	Quarterly	1500	200	250	300	350	400	15	CDA
	Promote production of rainfed rice (NERICA rice varieties)	Acreage under rainfed rice production	No of acres under rainfed rice production	Quarterly	600	100	100	120	120	150	6M	CDA

3. ENVIRONMENT SECTOR CLIMATE CHANGE STRATEGY (INCLUDINGFORESTRY, KMD, LBDA)

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
Strategic Objective 1: To promote conservation of natural resources and long term sustainability												
Afforestation	Geospatial survey of forest cover, tree cover and degraded sites for Kisumu	Geospatial maps Potential carbon sink demarcated	Area mapped out in sq. km	Bi-annually	7	1	2	2	1	1	70M	KFS, KEFRI, CGK,
	Establish community Tree Nurseries to produce 15,000,000 tree seedlings	Tree seedlings produced from community tree nurseries	No. of tree seedlings produced from community tree nurseries	Quarterly	15M	3M	3M	3M	3M	3M	300M	Envt. Dept./ KFS/ LBDA
	Create arboretum and parks	Arboretum and parks created	No. of arboretum and parks created	Bi-annually	7	2	2	1	1	1	70M	Envt. Dept./ KFS/LBDA
	Establish institutional woodlots/tree planting	Institutional woodlots established Remark (legal documents)	No. of woodlots established	Quarterly	1,750	350	350	350	350	350	35M	Envt. Dept./ KFS/LBDA
	Rehabilitation of degraded sites	Degraded sited mapped and rehabilitated	No. of degraded sites mapped and rehabilitated	Quarterly	10	2	2	2	2	2	1M	Envt. Dept./ KFS/LBDA
	Hilltop afforestation	Ha. Of hilltops afforested	No. of ha. Of hill-tops afforested	Quarterly	100	10	10	10	10	10	10M	Envt. Dept./ KFS/LBDA
	Identify, mapping out and gazettement of additional forest areas	Identified and mapped forest	No. of gazzetted forest	Bi-annually	1	1	-	-	-	-	10 M	KFS, CGK, NEMA,

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
	Encourage agro- forestry practices	Agroforestry practices adopted	No. of agroforestry practices adopted	Quarterly	No. of household adopting the practices	-	-	-	-	-	-	KFS, LBDA, CGK, NEMA
Reforestation	Tree growing	Increased forest cover	No. of ha. of forests planted	Quarterly	200	40	40	40	40	40	20M	Envt. Dept./ KFS/LBDA
Wetlands protection and conservation	Identify and establish commercial woodlot	Commercial forest areas identified and established	No. of commercial forests identified and established	Quarterly	250	50	50	50	50	50	25M	Envt. Dept./ KFS/ LBDA
	Reafforestation of Koguta forest	Increasing forest cover in Koguta forest	No. of hectors reafforest	Quarterly	50	10	10	10	10	10	50M	KFS,KEFRI,
	Identify, mapping and gazettement	Wetlands mapped and gazetted	No. of wetlands identified and mapped	Quarterly	5	1	1	1	1	1	15M	Envt. Dept./ KFS/ LBDA
	Develop and implement wetland management plans	Wetland management plans developed and implemented	No. of wetland management plans developed and implemented	Quarterly	5	1	1	1	1	1	25M	Envt. Dept./ KFS/ LBDA
Protection and conservation of river banks and riparian lands	Mapping of degraded river banks	Degraded river banks mapped	No. of degraded river banks mapped	Quarterly	35	7	7	7	7	7	5M	Envt. Dept./ KFS/LBDA
	Construction of river bank protection structures	River bank protection structures constructed	No. of Check dams	Quarterly	35	7	7	7	7	7	17.5 M	Envt. Dept./ KFS/LBDA
			No. of gabions	Quarterly	5	1	1	1	1	1	25M	Envt. Dept./

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
												KFS/ LBDA
			No. of dykes	Quarterly	5	1	1	1	1	1	10M	Envt. Dept./ KFS/LBDA
			No. of kms of riverbank protected	Quarterly	100	20	20	20	20	20	100M	Envt. Dept./ KFS/LBDA
Establish wildlife enterprises	Utilize wildlife resources	Assess and license proposed community conservancies, sanctuaries and reptile parks	No of community conservancies,	Quarterly	5	1	1	1	1	1	1.2 M	KWS, Envr. Dept., NMK, NEMA
Minimize human wildlife conflicts	Identify problematic animals, mapping of Human Wildlife conflict spots, capture and translocation of problem animals	Human Wildlife conflicts reduced, Human Wildlife Conflicts minimized	Number of cases attended to, Distribution maps developed	Bi-annual	10	2	2	2	2	2	1.5 M	KWS
Eradicate invasive/alien plant species in Protected Areas (Pas)	Identify and map out invaded areas, develop appropriate control strategies	Distribution maps generated, control strategies developed	Number of maps developed, Expanse of areas controlled	Quarterly	10 control activities	2	2	2	2	2	9 M	KWS, KFS, KFRI, Environ Dept. Learning institutions
Flood Control	Maintaining existing dredged canals	Well maintained dredged canals	No. of canal Dredged	Annually	-							
Assessing current climate change threats and risks to	Analyse the current climate variability in marginal rainfall areas,	Historical climatic database on climate induced factors established,	No of studies conducted to determine threats and risks to wildlife	Bi-annually	5	1	1	1	1	1	5 M	KWS, NMK, NEMA, Environ.

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
wildlife, and vulnerability		Sensitivity analysis conducted										Dept.
	Identify and analyse climate risk factors,	Climate risk factors identified and analyzed,	No of studies conducted to determine risk factors	Annually	5	1	1	1	1	1	2 M	KWS, NEMA, Environ. Dept
	Collect and analyse historical data on climate induced impacts in the areas,	Historical data on climate induced impacts in the areas	No of studies conducted	Annually	5	1	1	1	1	1	2 M	KWS, NEMA, Environ. Dept
	Collect and analyse data on climate induced human disturbances in the wildlife areas,	Data on climate induced human disturbances in the wildlife areas	No of studies conducted	Annually	5	1	1	1	1	1	3 M	KWS, NEMA, Environ. Dept
	Assess the socioeconomic dynamics and activities of the communities living around wildlife protected areas,	Socioeconomic dynamics and activities of the communities living around wildlife protected areas documented	No of studies conducted	Annually	5	1	1	1	1	1	5 M	

4. ENERGY, MINING, ROADS, TRANSPORT AND PUBLIC WORKS, PLANNING, HOUSING AND CLIMATE CHANGE

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
Strategic Objective 1: Ensure low carbon development pathways, resilient to the effect of climate change and sustainable. **Outcome: Low Carbon Emission of 1.5 Metric Tonnes.**												
Surveillance and Monitoring at household level	Energy audits county government facilities	Recommendations on energy efficiency and conservation	Number of Audit Reports.	Quarter	50	10	10	10	10	10	250 M	Energy and Mining
	Implementation of recommendations from energy audit reports	Reduced energy consumption / billing. Reduce load on the National grid translating into increased connectivity.	Number of implementation reports from county government facilities	Quarterly	50	10	10	10	10	10	250M	Energy and Mining, line-departments, KAM, ERC
	Public awareness in relation to energy conservation at household level	Increased efficiency in energy use.	Number of surveillance and monitoring reports	Quarterly	35	7	7	7	7	7	40M	ENERGY and Mining, Green Energy, Communications, ERC, KAM
Develop infrastructure for non-motorized transport systems	Integrate non-motorized transport into the county physical and spatial planning	Non-motorized transport intergrated	Physical and spatial Plan developed.	Quarterly	1	1	0	0	0	0	10m	Roads Transport & Public Works
			Kilometers of Non-Motorized lanes	Quarterly	250km	50	50	50	50	50	100M	

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
			constructed.									
			Number of secured parking lot for NMT.	Quarterly	100	20	20	20	20	20	200M	
	Conduct a feasibility study of waste to energy production countywide	Recommendations in the feasibility reports	Feasibility study report.	10 year period	1	0	0	0	0	0	100M	County Government, private sector, public sector,
Designate separate collection, disposal and re-use of recyclable, composite and biodegradable waste preferably at source.	Establish mechanisms to increase efficient collection of solid waste and provide appropriate waste collection, disposal and management services.	Reduced waste.	The tonnage of waste reduced.	Quarterly	100	20	20	20	20	20	100 M	GECC
		Improved waste management	Number of Designated collection points									
			Number of Trucks.		7	7	0	0	0	0	84M	Transport, Environment
			Number of skips per sites		41	-	-	-	-	-	20.5 M	Environment
			Number of bins per sites, skips		300	-	-	-	-	-	3M	
	Sensitization on waste management.	The Tonnage of waste reduced.	Number of sensitization meetings	Quarterly	105	21	21	21	21	21	5.25 M (500*	Energy, Environment

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
		Improved waste management									100)	
	Create awareness and capacity building on sustainable forest management, fast growing types of trees and efficient production of charcoal and efficient use of biomass.	Increased awareness on sustainable forest management	Number trainings conducted.	Quarterly	700	140	140	140	140	140	17.5 M	Environment Dept and GECC
	Establishment of Tree Biotechnology Centre for Tree Production at community level.	Increased tree seedling production	Number of Tree Biotechnology centres.	Quarterly	7	2	1	1	1	2	700M	Green energy
	Establishment of Environmental and climate change Village Committees.	Increased awareness; M&E	Number of village committee established.	Quarterly	35	7	7	7	7	7	10.5 M	Green energy
	Tree planting on Hills such as Got Alila, Kajulu Hills, Ramogi.	Increased forest cover.	Number of tree seedlings planted.	Quarterly	50M	10	10	10	10	10	1B	All stakeholders, Lake basin, WARMA,
	Rehabilitate and establish green spaces.	Green spaces rehabilitated	Number of green spaces rehabilitated and established.	Bi-annually	100	20	20	20	20	20	500M	Planning, Environment and green energy
	Establishing SACCOs for carbon	Increased carbon trading	Number of carbon trading	Bi-annually	35	7	7	7	7	7	200M	Industrialization and green

Strategy	Activity	Output	Key Indicator	Reporting Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
	trading at the community level.		SACCOs created									energy
Sand harvesting regulations	Mapping of sand mining resource areas	Inventory created	Reports developed	Bi-annually	35	7	7	7	7	7		Water, Environment and Energy
	Construct adequate drainage facilities in the county to prevent flooding hampering transport movement and causing heavy congestion	Reduced flooding on our roads	Number of km constructed	Bi-annually							12M per km	Roads , KeNHA, KURA, KERRA
	Continue to encourage further private sector funding of road drainage system Rehabilitation and improvement works	Funding secured	Number of M.O.Us signed	Annually	3	1	2	0	0	0	3M	Roads , KeNHA, KURA, KERRA, CGK
	Improved arrangements for monitoring drainage system standards	Drainage system standards developed	Number of arrangements developed	Annually	5	1	1	1	1	1	3M	Roads , KeNHA, KURA, KERRA, CGK
	Collaborate with concerned government agencies to develop early warning systems resilient to extreme climate events	Collaborative agencies concensus	Number of agreements and treaties	Annually	5	1	1	1	1	1	3M	Roads , KeNHA, KURA, KERRA, CGK

5. PLANNING, INNOVATION AND RESEARCH DEVELOPMENT

Strategy	**Activity**	**Output**	**Key Indicator**	**Reportig Schedule**	**5 Year Target**	**Year**					**Budget (Ksh)**	**Resp**
						Y1	Y2	Y3	Y4	Y5		
Strategic Objective 1: To promote research and innovation on climate change mitigation and adaptation												
Evidence-based and innovative climate change mitigation and adaptation measures	Analyze the trends of climatic risks in the county	Report on the trend of climatic risks	Number of researches carried out	quarterly	5	1	1	1	1	1	25 M	KMD, Universities
	Conduct baseline survey on climate change needs for Kisumu County	Baseline survey report and publications	Baseline Data	Annually	1	1	-	-	-	-	10M	Universities; KMD
	Carry out quarterly impact and vulnerability assessment in Kisumu County	Assessment Report	No. Of Assessments Carried out	Quarterly	20	4	4	4	4	4	40M	Research Institutions; Universities; KMD
	Establish a research and innovative unit	Establishment of a full-fledged resource center	An operational resource center. Partnerships with research institutions and expert partners in climate change	Bi-annually	1	-	1	-	-	-	300M	C.G.K.; Partner Institutions
	Partnership with universities and other research institutions to conduct research on climate change in Kisumu County	An M.O.U. with partner institutions	No. of M.O.U.s	Annually	3	1	-	1	-	1	30M	C.G.K, Partner Institutions
Strategic Objective 2: To mainstream and integrate climate change in planning and budgetary processes												
Maistreaming climate change	Intergrade CC into CIDP 2017-	Integration of Climate Change into the CIDP	Budgetary allocation of funds for Climate Change	Annually	1	1	-	-	-	-	5M	C.G.K

Strategy	Activity	Output	Key Indicator	Reportig Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
adaptation and mitigation into county planning	2022.	and NGCDF Strategy	in CIDP.									
	Do a costing study of climate change adaptation/impact/performance for Kisumu County	Sectoral strategic plans with a climate change component	No. sectoral strategic plans	Annually	1	1	-	-	-	-	20M	C.G.K
	Establish a county climate change trust fund.	An established County Climate Change Trust Fund	A minimum of 1.5 Percent of the County's CRA allocation	annually	1	1	-	-	-	-		C.G.K
	Prepare and invest in disaster management and preparedness including establish early warning systems	Trainings done; Documentation of CC mitigation and adaptation measures	number of trainings done; An inventory of mitigation and adaptation measures within the county	Quarterly	20	4	4	4	4	4	10M	C.G.K Special Programs
	Develop Early Warning Systems including communication to communities	Early Warning systems Developed in collaboration with partners	Number of EWS established	annually	5	1	1	1	1	1	20M	C.G.K, KMD
Strategic Objective 3: To mainstream and integrate climate change in education and public awareness												
Create awareness on climate change in from an early age	Awareness creation from school level, incorporating climate change in the curriculum	Climate change Awareness	CC information materials established, number of schools sensitized Empowering climate and environmental clubs in schools	annually	5	1	1	1	1	1	5M	C.G.K. , Education
	Set up sub county forums on CC	Climate change Awareness	No. of fora conducted	bi-annually	10	2	2	2	2	2	35M	C.G.K. , Education

Strategy	Activity	Output	Key Indicator	Reportig Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
	Sensitize community members on CC mitigation and adaptation	Climate change Awareness	No. of workshops	bi-annually	10	2	2	2	2	2	35M	C.G.K. , Education
	Prepare and disseminate IEC materials on CC	Climate change Awareness	No. of IEC materials on CC	Quarterly	20	4	4	4	4	4	10M	C.G.K. , Education
	Develop a media strategy to disseminate CC information	Climate change Awareness	No. of IEC bulletins	Quarterly	20	4	4	4	4	4	40M	C.G.K. , Education
	establish a CC communication liaison point	Climate change Awareness	No. of IEC bulletin reports	annually	1	1					5M	C.G.K.,
	County Government to sponsors themes under climate change during music and drama festivals	Climate change Awareness	CC themed co-curriculum activities	annually	5	1	1	1	1	1	20M	C.G.K. , Education
Strategic Objective 4: Capacity Development												
Strengthened institutional and organizational capacity to implement CC management	Establish and train officers to manage climate change desks in all ministries	Improved access to CC information	Number of CC information desks established	annually	5	1	1	1	1	1	10M	C.G.K. K.S.G.
	Partners Institutions of Higher Learning within Kisumu county to Convene and annual lecture on Climate change	Climate change Awareness	No. of CC sensitization workshops	annually	5	1	1	1	1	1	25M	Partners, C.G.K
	Establish tree planting in all institutions i.e. homes, schools, hospitals and government facilities etc.	Developed Roadmap for tree planting	Number of trees planted	bi-annually	10	2	2	2	2	2	5M	Partners, C.G.K
	Mainstream gender & Disability in all climate change policies and	Developed gender & disability mainstreaming	Gender mainstreaming	Annually	5	1	1	1	1	1	5M	Partners,

Strategy	Activity	Output	Key Indicator	Reportig Schedule	5 Year Target	Year					Budget (Ksh)	Resp
						Y1	Y2	Y3	Y4	Y5		
	laws	strategy	strategy report									C.G.K
Strategic Objective 5: To reduce GHG emissions in industries and adopt clean and green technologies												
Promotion of multi-sectoral cooperation in GHG emissions reduction through regulation and CSR	Prepare CSR guidelines and encourage corporate sector to create CSR fund	A Climate Change CSR Fund	No. of CSR initiatives aimed at GHG reduction;	Annually	5	1	1	1	1	1		C.G.K.; Industries Partners
	Enforcement of rules and regulations by the relevant lead agencies on GHGs	Partnership with the relevant enforcement authorities	No. of Compliance certificates	Annually	5	1	1	1	1	1		C.G.K. ; NEMA
	Undertake energy efficiency audits of all industries in the county	Partnership with the relevant regulation authorities	No. of Energy audits done	Annually	5	1	1	1	1	1		C.G.K.; K.A.M.; E.R.C.
Strategic Objective 6: Establish a coordination mechanism for CC in Kisumu County												
Development of a gazzetted co-ordination taskforce	Formalize and gazette a technical coordination team on CC	A Climate Change coordination taskforce	A TORs for the technical coordination team	Annually	1	-	1	-	-	-	5M	C.G.K Partners

IMPLEMENTATION MATRIX FOR DIRECTORATE OF WATER AND SEWERAGE SERVICES

Appendix 1: Activities and Targets; Directorate of Water and Sewerage Services

					Planned Targets					Total Budget
Outputs	**Activities**	**Baseline**	**Targets**	**Indicators**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	
Master plan in place	Develop Kisumu County water and sewerage master plan	0	1	Master plan		1				30M
Increased production efficiency from 42% to 80%	Rehabilitate and expand existing 14 water treatment works.	41.6 %		Increased production	7.6 %	7.6 %	7.6 %	7.6 %	7.6%	2.5 B
Reduced distance of fetching potable water < 250m	Rehabilitation and expansion of piped water distribution network in the Peri-Urban, Rural areas and informal settlements	1000 M		Reduced distance of accessing to quality water.	800	600	400	300	200	3.0 B
Quick response (<24 Hrs.) to emergency water shortages	Purchase of water bowsers	0		Reduced complaints to water shortages	**2**	1				60M
Increased Number of functional boreholes	Rehabilitation and upgrading of existing viable boreholes	96 Non-functional Boreholes		Number of rehabilitated boreholes	24	19	19	20	19	400 M
Increased number of functional boreholes	Drilling and equipping of New boreholes	200 Boreholes		Number of new boreholes	15	26	27	26	26	200 M
Adequate water coverage within Upcoming Urban Centers and Rural Communities	Construction of Soin- Koru Dam to cover Nyando, Muhoroni and Nyakach Sub counties	0		Number of new water schemes	-		1	1	1	29 B
Adequate water coverage within Seme	Development of water supplies to cover Maseno and Seme									2 B

Outputs	Activities	Baseline	Targets	Indicators	Planned Targets					Total Budget
					2018/19	2019/20	2020/21	2021/22	2022/23	
and Kisumu West Sub counties										
Protected sources free from Chemical and Organic contamination	Protection and rehabilitation of viable water springs from 20 to 90	20		Number of springs protected and rehabilitated.	4	16	16	17	17	35 M
Increased rainwater storage facilities at institutions from 3000 to 10,000 m^3.	Promotion of rain water harvesting systems at institutions	3000 m^3		Number of rain catchment facilities developed for institutions	1400	1400	1400	1400	1400	100 M
Increased storage capacity from 5842 to 35,000 m^3	Increase water storage capacity in rural area	5842		Amount of increased storage capacity	5832	5832	5832	5832	5832	1.1 B
Increased storage and holding capacity of existing pans	Desilting of existing water pans	28		Number of water pans desilted	2	2	2	2	2	50M
GIS maps in place	Digital GIS Mapping of all the rural water supplies system	0		Maps of 12 water supplies	0	3	3	3	3	24 M
All water supplies with functional meters	Installation of 28 Production meters for treatment works, boreholes and springs	3		Number of production meters installed	0	7	7	7	7	28 M
District meters in place	Installation of District metering in specific areas	0		Number of District Meters installed.	0	25	25	25	25	10 M
Database on customers in place	Customer identification survey	0		Database of all customers	0	4	4	3	3	14M
Pressure reducing valves and break pressure tanks in place	Installation of pressure reducing valves and break pressure tanks	0		Number of pressure reducing valves and break pressure tanks in place	0	7	7	7	7	14 M
Reduction of pipeline leakages	Rehabilitation /replacement of old pipeline-200 within the entire County	0		Km of pipeline replaced	0	50	50	50	50	200M
Highly skilled and motivated staff	Training and Capacity building for staff	0		Number of trainings undertaken	2	2	2	2	2	5M
Adequate staff in the water Sector.	Staff establishment	0		Number of new staff employed.	1	-	-	-	-	1M

					Planned Targets					Total Budget
Outputs	**Activities**	**Baseline**	**Targets**	**Indicators**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	
Properly regulated and managed water provision	Formulation of WASH regulation instruments – (Policies,regulations,strartegies,standards,guidelines)	0		Availability of Water regulation instruments (Water policy, County Water Act)	2	-	-	-	-	1.2 M
enlightened Public on policy and legal framework	Creation of awareness on regulation instruments (publishing, Civic education, public participation	0		Number of trainings undertaken on water policy awareness	3	3	3	3	3	7.5 M
Institutionalized Public on policy and legal framework	Implementation and enforcement of regulatory instruments			Policy document and Water Act 2017 available in all the 7 sub county Offices	7	-	-	-	-	
Properly coordinated and effective WASH network	Strengthening of Kisumu County WASH Network	42		No of WASH Network meetings held	4	4	4	4	4	5M
WASH unit established in the water department	Institutionalise WASH Coordination unit within the department.	0		WASH coordination unit in place		1				1M
Gaps in human resource established	Interrogate the existing organization structure			Gap analysis report	1					
An efficient and effective structure	Design and implement new organizational structure			Structure aligned to strategic plan in place	1					
Skilled manpower for the sector	Undertake a job analysis, rationalization and evaluation study			Job analysis, rationalization and evaluation report	1					2M
				Total						**38.7877B**