KENYA COUNTY INTEGRATED DEVELOPMENT PLANS 2013-2017: REVIEW OF CLIMATE CHANGE MAINSTREAMING

JANUARY 2017

UKaid
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Developed with the support of the StARCK+ Climate Change Technical Assistance to the Government of Kenya programme

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Strengthening Adaptation and Resilience to Climate Change in Kenya Plus

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DAI

IISD International Institute for Sustainable Development

MATRIX DEVELOPMENT CONSULTANTS

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For further information contact DMI Consortium at info@ficcf.com

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CONTENTS

ABBREVIATIONS

ASAL	Arid and Semi-Arid Land
CFA	Community Forest Association
CIDP	County Integrated Development Plan
DRR	Disaster Risk Reduction
EIA	Environmental Impact Assessment
GDP	Gross Domestic Product
GHG	Greenhouse gas
GoK	Government of Kenya
Ha	Hectare
HFA	Hyogo Framework for Action
IPCC	Intergovernmental Panel on Climate Change
KFS	Kenya Forest Service
LPG	Liquefied petroleum gas
MENR	Ministry of Environment and Natural Resources
MTP	Medium Term Plan
MW	Megawatt
NAP	National Adaptation Plan, 2015-2030
NCCAP	National Climate Change Action Plan, 2013-2017
NCCRS	National Climate Change Response Strategy
NDC	Nationally Determined Contribution
NDMA	National Disaster Management Authority
NEMA	National Environment Management Authority
NGO	Non-governmental organisation
REDD+	Reducing emissions from deforestation and forest degradation in developing countries, plus the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations International Strategy for Disaster Reduction

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All of Kenya's 47 County Governments, formed in 2013 under Kenya's 2010 Constitution, identified climate change in their first County Integrated Development Plans (CIDPs).

The CIDPs submitted in September 2013 contained a wealth of information, providing an analysis of economic, social and environmental factors to guide development plans and projects. This report examines how the 47 CIDPs integrated climate change. The objectives of the research were to: i) provide insights on how climate change was addressed by the various counties and ii) recommend actions to improve the mainstreaming of climate change in the 2017 CIDPs.

Integration of climate change in county planning is particularly relevant with the enactment of the Climate Change Act in May 2016, which requires that county governments mainstream climate change actions and interventions in their CIDPs. The Climate Change Act, 2016 defines mainstreaming as "the integration of climate change actions into decision making and implementation of functions by the sector ministries, state corporations and county governments (Government of Kenya [GoK], 2016a: Section 2). A core element of the Act is that county governments "shall, in development, updating and approval of the County Integrated Development Plan, and the County Sector Plans, mainstream the implementation of the National Climate Change Action Plan, taking into account national and county priorities" (GoK, 2016a: Section 19[2]). Many actions to address climate change take place in sectors under county jurisdiction, such as agriculture, health and waste management.

This report first provides definitions and background on climate change, and then provides an analysis of climate-relevant sectors. The report then explores the mainstreaming of climate change in the CIDPs, identifying and summarizing climate change vulnerabilities and impacts, and adaptation and mitigation actions. The report concludes with recommen-dations for mainstreaming climate change in the 2017 CIDPs.

Annex 1 includes information on climate change mainstreaming, and detailed information for each sector is included in Annex 2. Annex 3 contains a short summary of climate change information for each of the 47 counties. These summaries in Annex 3 can be used as stand-alone documents to describe the climate-relevant information and intended actions to address climate change in each of the 47 counties. The information in the Annexes is organized by nine regions to facilitate review and comparison.

SECTOR ANALYSIS

The Climate Change Act notes that climate change is an economic, social and environmental issue that impacts many sectors that are discussed in CIDPs. Key observations from the CIDPs that would inform climate change mainstreaming in these climate-relevant sectors include:

Agriculture, Livestock and Fisheries – All counties identified actions in the agricultural sector as a priority, reflecting the economic and social importance of the sector. The sector was a priority for adaptation actions, including conservation agriculture, drought and pest resistant crop varieties, control of soil erosion, control of land fragmentation, irrigation systems and improved livestock practices. Many agricultural activities take place on land holdings ranging in size from 0.2 hectares (ha) to 1.5 ha, reflecting the need for climate actions to address small-scale farmers.

Forestry – Many CIDPs noted the decline in forest cover and included actions to increase forest cover or prevent further deforestation. Actions to address the forest decline included curbing of illegal logging; control of charcoal production; enforcement of laws on harvesting forest products including poles and timber; and regulation of settlements and agricultural activities. Actions in the CIDPs to increase forest cover included tree planting, restoration and rehabilitation of degraded forests, and agroforestry promotion.

Energy – The percentage of households connected to the national grid electricity varied, from 0.3 per cent of households in Kakamega County to 98 per cent in Kiambu County. Seventy per cent of Kenya's population rely on biomass for cooking, mainly charcoal and wood fuel. Several counties identified renewable energy priorities in their CIDPs, including solar, wind, biogas, hydro and geothermal – and the penetration of renewable energy technologies is expected to increase in most counties. In regard to energy demand, counties identified the need for efficient cookstoves and improved lighting, including solar home systems.

Water – The priority actions to improve water resource management included: increased domestic water supply through constructed dams, boreholes and ponds; improved sewage and drainage systems; enhanced irrigation and drainage systems; construction of water pans and dams for commercial purposes; investing in water harvesting measures; and protection and conservation of water catchments.

Environment – The mains causes of environmental damage were tree logging and charcoal burning, which reduce forest cover and increase soil erosion, especially during rainy season. Other causes of environmental degradation mentioned in CIDPs included unregulated waste disposal, overgrazing, sand harvesting, human encroachment on forests, and motor vehicle pollution.

Disaster Risk Reduction – The CIDPs identified the need for disaster preparedness programmes, early warning systems, increased awareness of disaster prone areas, and training of county disaster management officers to ensure timely and effective response to disasters. Several counties recognized the growing threat of climate change, and the need to incorporate climate change in disaster risk reduction programmes.

CLIMATE CHANGE MAINSTREAMING IN CIDPS

All 47 CIDPs mentioned the impacts of climate change, and many plans identified actions to address these impacts (set out in Annex 1). The main climate change impact was an increase in temperatures resulting in prolonged dry spells and drought. Unpredictable and erratic rainfall, flooding and unpredictable weather patterns were also noted. The CIDPs noted that climate change impacted negatively on economic activities, leading to reduced food and livestock production, scarcity of potable water, increased spread of diseases, and increased conflict (human/human and human/wildlife).

Adaptation actions were a priority for many counties, consistent with the National Climate Change Action Plan 2013-2017 (NCCAP) that stated that adaptation is the priority for Kenya. Thirty-nine CIDPs identified adaptation actions including: awareness creation and capacity building to improve understanding of and action on climate change, sustainable agriculture (including conservation agriculture, irrigation and improved livestock practices), improved access to water, establishment of early warning systems, and water catchment conservation and protection.

The 2013 CIDPs did not include actions to improve the resilience of infrastructure - such as roads, bridges, electricity infrastructure and irrigation projects – to withstand anticipated climate change and its impacts. Given the slow rate of capital stock turnover in the energy and transport sectors, and the long lifetime of equipment, governments and developers should consider the possible impacts of climate change and identify necessary adaptation measures. Inadequate attention to climate impacts can increase the long-term costs of sector investments and reduce the likelihood that these investments will deliver intended benefits.

Forty-two counties identified actions that address mitigation of greenhouse gas emissions in their CIDPs. The actions included increasing forest cover through tree planting, restoration and rehabilitation of degraded forests, and reducing emissions from deforestation. Other actions included agroforestry and promotion of renewable energy. Many of these actions, such as increasing forest cover and agroforestry, also generate climate resilience benefits and can be considered adaptation actions.

A lack of understanding of climate change was evident in some CIDPs, reflecting the complexity of the issue. For example, some CIDPs confused adaptation (building resilience to climate change impacts) and mitigation (reducing greenhouse gas emissions). In some instances, climate change was identified as an environmental issue resulting in actions to address environmental degradation (such as sand harvesting) being identified as actions to address climate change. Additionally, the climate change analysis was similar across several CIDPs, suggesting a common approach to the development of plans. This is understandable given that the CIDPs were developed in a very short timeframe and were the first such documents to be developed by new developed County Governments.

Most of the County government began to mainstream climate change in their 2013 CIDPs. All county plans included mention of climate change impacts, and 28 CIDPs identified priority mitigation and adaptation actions. Nine counties indicated plans to allocate budgets for mitigation and adaptation actions. No county could be considered to have fully mainstreamed climate change in its CIDPs, but there is a readiness and an experience to build on to improve the integration of climate change in the upcoming 2017 CIDPs.

RECOMMENDATIONS

Recommendations to improve the mainstreaming of climate change in the 2017 CIDPs were developed based on this review and expert input, and are listed below:

Update the National Climate Change Action Plan in a timely manner – to enable distribution prior to the development of the 2017 CIDPs. A summary of the NCCAP that is specifically directed toward county needs would be useful.

Provide tools to assist County Governments to mainstream climate change in their CIDPs – including information about climate change, and a framework or guidance document for mainstreaming climate change in CIDPs and county budgets.

Provide tools to assist County Governments to identify actions to climate proof infrastructure – to help governments consider adaptation actions that protect infrastructure investments from climate change. Specific tools are needed to help County Governments understand the impacts of climate change on infrastructure and overcome this gap.

Build the capacity of County officials and planners – to enable these officials to apply a climate change lens across sectors. This

could also help officials to better understand climate change and correctly address adaptation and mitigation.

Develop common indicators to be used by counties to track climate change action – to improve understanding of the implementation of actions and climate change results, and provide the basis for reporting on climate change, which is required under the Climate Change Act, 2016.

Link the identification of climate change actions with County spatial planning – Counties are to develop spatial plans that identify development projects and programs and locate them in specific geographic areas in the county. These plans will inform the CIDPs and climate change mainstreaming should account for and build on the spatial plans.

Undertake a similar review of the 2017 CIDPs – which would:

- Assist county governments in identifying common areas of climate change action and potential synergies across counties;
- Help the national government identify priority climate change areas for intervention;
- Help development partners identify and prioritize climate change-related actions at the county level; and
- Provide useful information to the National Climate Change Council and the Climate Change Directorate in its climate change coordination function.

Kenya is extremely susceptible to the impacts of a changing climate because most livelihoods and economic activities are reliant on climate-sensitive natural resources. Droughts, floods, extreme weather events and rising temperatures in particular have devastating consequences for the environment, society and economy.

Climate change is defined by the United Nations Framework Convention on Climate Change (UNFCCC) as a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods (UNFCCC, 2005).

All 47 country governments, which were formed in 2013 under Kenya's new Constitution, identified climate change in their first County Integrated Development Plans (CIDPs). These CIDPs were developed in 2013 and are required by law as primary planning tools. This report examines how the CIDPs integrated climate change, with the objective of providing insights on how climate change was addressed by the various counties and recommending actions to improve the integration of climate change in future plans. This is particularly relevant with the enactment of the Climate Change Act in May 2016, which requires that county governments mainstream climate change in their CIDPs.

This report first provides definitions and background on climate change, and Section 3 explains the process to develop the CIDPs. Section 4 sets out the methodology used to review climate change in the 47 CIDPs. Section 5 includes a review of action in the climate-relevant sectors of agriculture, forestry, energy, water, disaster risk reduction and environmental degradation. Section 6 reviews the climate change aspects of the CIDPs, setting out the climate change impacts identified in the 47 counties, identifying mitigation and adaptation actions, and providing a ranking of climate change mainstreaming in the counties.

Annex 1 provides a climate change analysis by county. Annex 2 reviews climate change-related actions in the key sectors of energy, agriculture, forestry, disaster risk reduction and environment. Annex 3 contains a short summary of climate change information for each of the 47 counties. These summaries can be used as stand-alone documents to describe mainstreaming of climate change in a county. The counties are organized by nine regions in the Annexes to facilitate review and comparison: Central, Coastal, Eastern, North Eastern, Nyanza, Rift Valley and Western.

Responding to climate change is a priority for Kenya, and both national and county governments are taking action. Kenya's first national policy document on climate change, the National Climate Change Response Strategy, 2010 (NCCRS), improved understanding of the issue and guided policy decisions (GoK, 2010b).

To operationalize the NCCRS, Kenya prepared the National Climate Change Action Plan 2013-2017 (NCCAP) that recommended that climate change be mainstreamed in national and county planning and budgeting processes (GoK, 2013a). The national government has developed a National Adaptation Plan, 2015-2030 (NAP) that promotes integration of adaptation into actions across all planning sectors (GoK, 2016b). Kenya's Nationally Determined Contribution (NDC), submitted to the UNFCCC in 2016 when Kenya the Paris Agreement, sets a goal of mainstreaming adaptation actions in Medium Term Plans (MTPs) and identifies key mitigation actions to reach the emission reduction target of 30 per cent greenhouse gas (GHG) emission reductions by 2030 relative to the business as usual scenario (GoK, 2015).

The Climate Change Act, 2016, is a critical action and demonstrates Kenya's commitment to take action on climate change. The Act provides a regulatory framework for an enhanced response to climate change. In regard to the county governments, the law stipulates that a representative of county governments is a member of the National Climate Change Council that has responsibility to coordinate climate change actions. The law requires that county governments mainstream climate change actions and interventions in their CIDPs (GoK, 2016a). Many actions to address climate change are in sectors under county jurisdiction, such as agriculture, health and waste management. The Climate Change Act defines mainstreaming as "the integration of climate change actions into decision making and implementation of functions by the sector ministries, state corporations and county governments (GoK, 2016a: Section 2). A core element of the Act is that county governments "shall, in development, updating and approval of the County Integrated Development Plan, and the County Sector Plans, mainstream the implementation of the National Climate Change Action Plan, taking into account national and county priorities" (GoK, 2016a: Section 19[2]).

The NCCAP identified climate change as a crosscutting issue in the government's planning process and explained that mainstreaming refers to the incorporation of climate change considerations into development plans, rather than developing separate adaptation and mitigation initiatives. The NCCAP identified lessons for successful mainstreaming that are set out in Table 1.

Table 1. Lessons for successful mainstreaming identified in the NCCAP

LESSONS FOR SUCCESSFUL MAINSTREAMING
Use comprehensive and up-to-date socioeconomic, geographic and climatological information for assessing risks and vulnerabilities
Identify mitigation and adaptation priorities through an inclusive stakeholder consultation process, in order to increase ownership and buy-in
Identify mainstreaming "champions" at senior levels of government to help maintain interest and momentum.
Use cost-benefit analysis and other tools to assess priority mitigation and adaptation measures
Build upon existing programs, processes and institutions (such as disaster risk reduction measures) in order to increase familiarity and recognition of the importance of mainstreaming
Frame mainstreaming as a crosscutting issue, rather than a sectoral environmental program
Actively monitor results and, when possible, use mainstreaming approaches that can incorporate new knowledge and experiences

Source: McFatridge and Murphy (2012), pages 2-3

Actions to address climate change are generally referred to as mitigation and adaptation, and mainstreaming is a crucial tool to ensure that these actions are included in plans and budgets. The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as to an adjustment in natural or human systems in response to actual or expected climate change in order to moderate harm or exploit beneficial opportunities (IPCC, 2007). The priority adaptation actions identified in the NCCAP included: coordinating and mainstreaming climate change into agricultural extension services, grazing management systems, fodder banks and strategic reserves, mainstreaming climate change into water resource management plans and actions, climate proofing of roads in the Arid and Semi-Arid Lands (ASALs), supporting sustainable livelihoods in drought prone ASALs, and development and implementation of action plans to build resilience of vulnerable

tourism areas to climate change and variability. Effective adaptation will require capacity building of national and county institutions responsible for climate change coordination (GoK, 2013: 60). The Climate Change Act and the NCCAP identify the importance climate proofing infrastructure, as well as building resilient livelihoods.

Mitigation refers to efforts that seek to prevent or slow down the increase of atmospheric greenhouse gases concentration by limiting current and future emissions and enhancing potential sinks for greenhouse gases (IPCC, 2007). The priority mitigation actions identified in Kenya's NCCAP included: restoration of forests and degraded lands, increase of geothermal capacity, reforestation of degraded forests, improved cookstoves (more efficient biomass and liquefied petroleum gas [LPG]), agroforestry, and a mass rapid transit system in Nairobi. Enabling actions included the development of Kenya's GHG inventory and improvement of emissions data; improved measuring and reporting of emissions from the forestry sector; and mainstreaming of low-carbon development options into planning (GoK, 2013a: 194).

The Constitution of Kenya, 2010 created a two tier system of governance, comprised of the national government and 47 county governments (Government of the Republic of Kenya [GoK], 2010a).

The County Government Act, 2012 (amended 2014), stipulates that each county government is to develop a County Integrated Development Plan that is a five-year plan that sets out financial and economic priorities, and guide expenditures and strategic midterm priorities of the county governments (GoK, 2014).

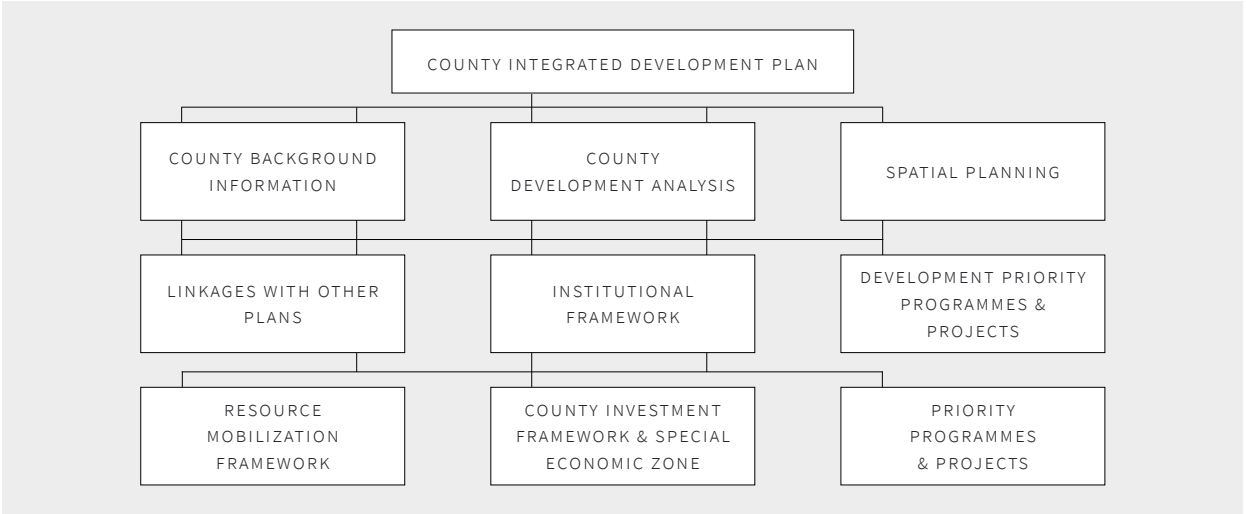
The CIDP contains specific goals and objectives, a costed implementation plan, provisions for monitoring and evaluation, and clear reporting mechanisms. The County Government Act identifies county integrated development planning as an integral step in organizing and coordinating the affairs of county government, including effective delivery of public services (GoK, 2014). The first CIDPs were submitted by the statutory deadline of 1st September 2013, less than six months after the formation of the county governments in March 2013.

CIDPs mirror the aspirations of Kenya's national development strategy Vision 2030 and its Second Medium Term Plan (2013-2017). Vision 2030 is Kenya's national long-term development blueprint that aims to transform Kenya into a newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. Vision 2030 is anchored on three key pillars; economic, social and political governance (GoK, 2007a).

Two references guided the development of the CIDPs. Section 108 of the County Government Act of 2012 provided a framework for the CIDP. In addition, the Ministry of Devolution and Planning with UNDP support issued CIDP development guidelines (Institute of Economic Affairs, 2012). As such, the CIDPs tended to follow a similar format, illustrated in Figure 1. Each CIDP was produced through wide stakeholder participation involving the county government, private sector, civil society and local communities.

Generally, the CIDPs attempted to address climate change consistent with the NCCAP recommendation that climate change mitigation and adaptation measures be mainstreamed in national and county planning and budgeting processes and across sectors of the economy (Section 6 and Annex 1). This mainstreaming is required by law in the 2017 CIDPs. The Climate Change Act, states in Section 19(1) that "A county government shall in performance of its functions integrate and mainstream climate change actions, interventions and duties set out in the Act and the National Climate Change Action Plan into various sectors." The law further requires in Section 19(2) that counties mainstream the NCCAP into CIDPs and county sectoral plans (Government of Kenya, 2016a: 197).

Figure 1. CIDP formulation framework



Source: Institute of Economic Affairs (2014), page 15

4: METHODOLOGY – REVIEW OF CIDPs FOR CLIMATE CHANGE ACTION

The first step of the CIDP review undertaken to develop this report was the collection of documents. Twenty-seven CIDPs were publically available through county government websites. The remaining twenty county plans were collected from partners, including the UNDP. Each CIDP was reviewed to develop a three-page summary of climate-change related information. Each of the 47 summaries, included in Annex 3, can be used as a stand-alone document to describe mainstreaming of climate change in a county.

The information in the summaries is organized by nine regions in the Annexes to facilitate review and comparison: Central, Coastal, Eastern, North Eastern, Nyanza, Rift Valley & Western.

This summary information was the basis for a review of climate change-related actions by sector, discussed in Section 5. The review included the sectors of: agriculture and forestry (Annex 2A), water and energy (Annex 2B), and disaster risk reduction and environmental degradation (Annex 2C). The review of information by sector was organized by region to enable comparison and analysis.

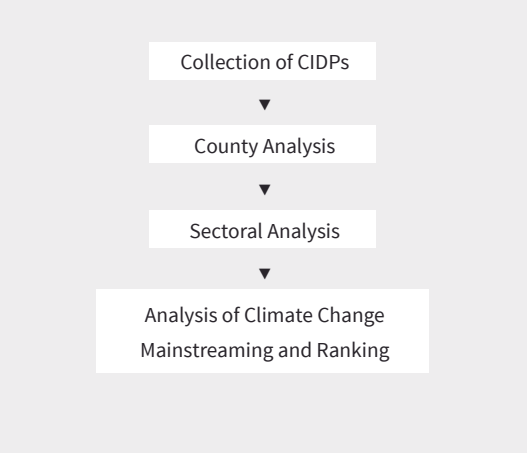
The next step was the review of climate change actions, identifying how counties assessed climate change vulnerabilities and impacts, and the mitigation and adaptation actions identified as priorities in their CIDPs. This information is included in Annex 1 and analysed in Section 6. The team attempted to rank counties for their mainstreaming efforts on a scale of 1 to 5, using the criteria listed in Table 2.

The final step was developing recommendations for mainstreaming climate change in future CIDPs, building on the information gathered in this CIDP review and expert advice.

Table 2. Climate change mainstreaming criteria

RANKING	CRITERIA
0	No mention of climate change
1	Mention impacts of climate change
2	Mention climate change impacts and governance framework
3	Mention impacts and identify priority adaptation and/or mitigation actions
4	Climate change actions identified and indication that budget will be allocated for mitigation and/or adaptation actions
5	Climate change fully mainstreamed

Figure 2. CIDP review and analysis methodology



Climate change is a cross-cutting issue that impacts on various sectors that are under County Government jurisdiction and are discussed in county CIDPs. This section reviews the information in the CIDPs about key climate-relevant sectors that require action to address mitigation and adaptation priorities.

5.1 AGRICULTURE

The agricultural sector is the mainstay of Kenya's economy. The sector contributes 51 per cent of the nation's GDP, 24 per cent directly and 27 per cent indirectly through linkages with manufacturing, distribution and other service-related sectors (National Environment Management Authority [NEMA], 2015). The sector is sensitive to climate change and at the same time it is a large and growing greenhouse gas emitter. The Kenya's Second National Communication explained that the agriculture sector was responsible for about 30 per cent of Kenya's greenhouse gas emissions in 2010; with about 90 per cent of these agricultural emissions generated from the livestock sector (NEMA, 2015: 9).

All counties indicated actions in the agriculture sector in their CIDPs, with the actions summarized in Annex 2A. The main economic activities in the sector were: crop production, livestock production, fish production and ranching. Mixed farming, which is crop and livestock production on the same farmland, was more prevalent in counties in the Central, Eastern, Rift Valley, Nyanza and Western regions. Livestock production was dominant in the North Eastern region (Garissa, Mandera and Wajir).

CROP PRODUCTION

The common cash crops listed by the counties included: coffee, tea, simsim, wheat, rice, coconut, tobacco, sunflower, groundnuts, sugarcane, cotton, rice, macadamia and pyrethrum. Coffee, tea, sugarcane, pyrethrum and maize are considered Kenya's main cash crops, making a large contribution to GDP. Coffee is grown in 15 counties, tea in 12 counties, sugar cane in eight counties, maize (as a cash crop) in four counties, and pyrethrum in two counties. The common food crops listed by the counties included: maize, beans, cowpeas, green grams, vegetables, bananas, potatoes, sweet potatoes and cassava. Food crop production is primarily small scale. Small scale farming is prevalent in all counties, with small scale farms ranging in size from 0.2 hectares (ha) to 1.5 ha. Large scale farming is mainly practiced in counties where cash crops are grown. Large scale farms range in size from 4 ha in Nyeri County to 263 ha in Nakuru County.

LIVESTOCK PRODUCTION

Livestock types listed by counties included: cattle, sheep, goats, camels, donkeys, pigs and poultry. Livestock production was more prevalent in the North Eastern region where pastoralists kept camels, goats, sheep and cattle. Poultry production was common in the counties in the Western and Nyanza regions.

FISH PRODUCTION

Fish production was most common in counties in the Nyanza and Coastal regions because of the proximity of Lake Victoria and the Indian Ocean, respectively. Other counties that have lakes mentioned fishing as an activity including Nakuru and Baringo counties. Fish production was also undertaken in fish ponds in Tana River, Nyandarua, Nairobi, Muranga, Nyeri, Isiolo, Taita Taveta, Bomet, Embu, Kitui and Trans Nzoia counties.

5.2 FORESTRY

County actions in the forestry sector are summarized in Annex 2A. Forestry can make an important contribution to climate change action, providing climate resilience benefits as well as GHG emission reductions by increasing or maintaining forest cover. The NCCAP recognizes restoration of forests and degraded lands and reforestation of degraded forests as priority mitigation and adaptation actions under this sector (GoK, 2013 a:78). Kenya's forest resources provide important environmental and ecosystem services, and contribute to economic development, employment, rural livelihoods, and availability and quality of water. Forests provide raw material for several industries; the commonly listed forest products are fire wood, poles, timber, medicinal plants, honey and gum.

Kenya's national forest cover increased from 5.9 per cent in 2000 to about 7 per cent in 2010 as noted in the country's National Forest Policy, 2014, (NEMA, 2015:3). Kenya has a total of 135 gazetted forests and 89 non-gazetted forests. Counties with large forest areas included Samburu 3,250 km^2, Meru 1,776 km^2, Nyeri 862 km^2, Narok 724 km^2, Nakuru 680 km^2, Baringo 652 km^2 and Laikipia 580 km^2. Kwale County has the largest non-gazetted forest of 1,900 km^2. The decreasing forest cover between the years 1990 to 2000 was

Table 3. Causes of deforestation identified in the CIDPs

CAUSE OF DEFORESTATION	NO. COUNTIES	NAME OF COUNTY
Fuel wood collection and charcoal burning	33	Baringo, Bungoma, Busia, Elgeyow, Garissa, Homa Bay, Isiolo, Kajiado, Kericho, Kilifi, Kisumu, Kitui, Laikipia, Lamu, Machakos, Makueni, Mandera, Marakwet, Marsabit, Migori, Mombasa, Muranga, Nakuru, Nyamira, Nyandarua, Nyeri, Samburu, Siaya, Taita Taveta, Tana River, Tharaka Nithi, Trans Nzoia, Turkana, Wajir
Illegal logging	14	Bomet, Kilifi, Kirinyaga, Kwale, Laikipia, Lamu, Mandera, Migori, Nandi, Narok, Nyandarua, Taita Taveta, Uasin Gishu, West Pokot
Settlements	11	Bomet, Elgeyo, Kajiado, Mandera, Marakwet, Nairobi, Nandi, Nyandarua, Taita Taveta, Tana River, Vihiga, West Pokot
Clearing for agriculture	6	Lamu, Nakuru, Nandi, Narok, Nyandarua, Taita Taveta
Unregulated quarrying	4	Lamu, Mandera, Tana River, Tharaka Nithi
Forest fires	3	Kwale, Migori, Nyandarua
Over grazing	3	Garissa, Mandera, West Pokot
Charcoal production	3	Kiambu, Kirinyaga, Muranga
Road construction	1	Nairobi
Poor urban planning	1	Narok
Influx of refugees	1	Garissa

Table 4. Percentage of households connected to the national grid reported in CIDP

% HOUSEHOLDS CONNECTED TO NATIONAL GRID	NO. COUNTIES	NAME OF COUNTY
Less than 1%	1	Kakamega
1-10%	20	Bungoma, Busia, Embu, Garissa, Homa Bay, Kirinyaga, Kitui, Makueni, Marsabit, Migori, Murang'a, Nandi, Narok, Samburu, Siaya, Taita Taveta, Trans Nzoia, Wajir, West Pokot
10 – 25%	8	Isiolo, Kericho, Kisumu, Laikipia, Meru, Nyamira, Nyandarua, Vihiga
25- 50%	5	Kajiado, Kisii, Mombasa, Nakuru, Nyeri
50 – 75%	4	Bomet, Nairobi
75 – 100	1	Kiambu, Machakos

Table 5. Renewable energy priorities in CIDPs: number of counties

RENEWABLE ENERGY PRIORITIES	NO. COUNTIES	NAME OF COUNTY
Solar	29	Baringo, Bomet, Bungoma, Elgeyo Marakwet, Garissa, Kakamega, Kericho, Kilifi, Kisii, Machakos, Makueni, Mandera, Meru, Muranga, Nandi, Narok, Nyamira, Nyandarua, Nyeri, Siaya, Taita Taveta, Tana River, Tharaka Nithi, Trans Nzoia, Turkana, Vihiga, West Pokot
Wind power	10	Baringo, Bungoma, Elgeyo Marakwet, Garissa, Kisii, Mandera, Tana River, Tharaka Nithi, Turkana
Biogas	8	Bomet, Elgeyo Marakwet, Kisii, Nairobi, Nandi, Nyeri, Tharaka Nithi, Trans Nzoia
Biomass residue	7	Bungoma, Kakamega, Marsabit, Meru, Nyamira, Nyandarua, Nyeri
Hydro power	2	Elgeyo Marakwet, Vihiga
Bio fuels	2	Laikipia, Mandera
Geothermal	2	Baringo, Nakuru
Improved cookstoves	5	Nyamira

attributed to unsustainable utilization and conversion of forest land to other land uses (NEMA, 2015:3).

The decline of forest cover was noted in many CIDPs. The causes of deforestation noted by the counties included clearing for agriculture, settlement, road construction, charcoal production, fuel wood, forest fires, timber production, production of poles for construction, unregulated quarrying, and influx of refugees (Table 3).

The suggested actions in the CIDPs to maintain forest cover or prevent further deforestation include: curbing of illegal logging; control of charcoal production; enforcement of laws on harvesting forest products including poles and timber; and regulation of settlements and agricultural activities. Many of these actions could be supported through REDD+ (reducing emissions from deforestation and forest degradation plus the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries), a mechanism under the UNFCCC designed to offer payment and incentives to not cut down forests. Actions in the CIDPs to increase forest cover included: tree planting, restoration and rehabilitation of degraded forests, and agroforestry promotion. Such actions are aligned with the Constitution's goal of 10 per cent forest cover.

5.3 ENERGY

Climate change assessments in the energy sector typically include electricity generation, energy demand and climate proofing of infrastructure. The 2013 CIDPs did not include actions to improve the resilience of energy infrastructure to withstand anticipated climate change and its impacts. Given the slow rate of capital stock turnover in the energy sector, and the long lifetime of equipment, county governments should consider the possible impacts of climate change and identify necessary adaptation measures. The information on the energy sector in the CIDPs is summarized in Annex 2B.

ELECTRICITY GENERATION

Kenya's installed (grid connected) electricity capacity was 2,295 megawatts (MW) as of March 2015, which had grown from an installed capacity base of 1,885 MW at the end of June 2014. About 65 per cent of electricity was generated using renewable energy sources (hydropower – 36 per cent, geothermal – 26 per cent, cogeneration from bagasse – 1 per cent, wind – 1 per cent), and 35 per cent was generated using fossil fuels (Ministry of Energy and Petroleum, 2016: 10). The number of households connected to electricity has increased, facilitated by the national last mile rural electrification process.

Electricity demand in Kenya is increasing because of growing electricity consumption by industries, companies and households. Projections indicate that electricity demand will be 18,000 MW by 2030 because of an increase in the number of customers connected to electricity as well as increased intensity of energy utilization. The recent growth of geothermal production has made the energy mix more resilient to climate change. Hydropower generation had been impacted by drought and unreliable rainfall leading to shortages and higher prices.

Counties with access to renewable energy sources for electricity generation include Nakuru country with the Olkaria I, II, III and IV, and Menengai geothermal developments. Hydropower is generated on the borders of Embu and Machakos counties, which house the seven forks hydro-generating dams; as well as in Kisumu (Sondu Miriu). The Lake Turkana Wind Power Project has the potential to generate 300 MW of electricity once completed.

Recent discoveries of coal (Lamu and Kitui) could potentially impact on the proportion of renewable energy in the electricity mix. The planned Lamu coal plant is estimated to cost US$ 2 billion and will be Kenya's first coal-fired power plant, adding 1,050 MW to the grid (Langat, 2014). Exploration is underway in regard to the coal deposits in the Mui Basin in Kitui.

The percentage of households connected to the national grid electricity varied from county to county; from 0.3 per cent of households in Kakamega County to 98 per cent in Kiambu County. The information in Table 4 indicates that 20 counties had low grid connectivity rates of 1 to 10 per cent of households. Only 10 counties had household connectivity rates to the national electricity grid of above 25 per cent. Seven CIDPs did not provide information on household connection to the national grid electricity.

The main sources of energy for lighting at the household level were paraffin (kerosene), electricity, firewood and charcoal. This varied significantly, with electricity supplying the lighting needs of 6o per cent of the population in Bomet, 63 per cent in Nairobi and 77 per cent in Machakos County. The percentage of households using kerosene for lighting varied. Counties with larger urban populations had rates of kerosene use (as low as 5 per cent of household), while in counties with larger rural populations, up to 98 per cent of households used kerosene for lighting purposes. The CIDP review indicated a penetration of solar household systems in many counties.

Seventy per cent of Kenya's population relied on biomass for cooking, mainly charcoal and wood fuel. The other 30 per cent relied mainly on other sources of bio-energy including agricultural waste, ethanol, bio-diesel and biogas (Energy Regulatory Commission, 2010). Thirteen counties that included cities and large towns indicated that LPG was a source of cooking energy, suggesting some fuel switch in urban areas. For example, 25.4 per cent of households in Nairobi County, five per cent in Mombasa and three per cent in Kisumu and Kiambu counties used LPG (KNBS, 2014). The increased penetration of improved cookstoves was identified as a priority action by five counties. Improved cookstoves offer GHG emission reductions as well as very large rural development benefits, including improved indoor air quality and related health benefits. Improved cookstoves also offer substantial cost savings for households and institutions over the life cycle of the equipment. Several counties identified renewable energy priorities in their CIDPs, listed in Table 5.

Table 6. County challenges to water supply and availability reported in CIDP

CHALLENGE IN WATER SECTOR	NO. COUNTIES	NAME OF COUNTY
Encroachment of water catchment areas	23	Baringo, Bomet, Embu, Kajiado, Kiambu, Kirinyaga, Kisii, Kisumu, Kitui, Laikipia, Machakos, Marsabit, Meru, Muranga, Nakuru, Nandi, Narok, Nyamira, Nyeri, Tana River, Turkana, Vihiga, West Pokot
Drought	19	Embu, Garissa, Homa Bay, Kilifi, Kirinyaga, Kisii, Kisumu, Kitui, Kwale, Machakos, Marsabit, Meru, Muranga, Nyamira, Nyeri, Taita Taveta, Tana River, Tharaka Nithi, Wajir
Rise in temperatures	12	Kiambu, Baringo, Bomet, Kajiado, Laikipia, Nakuru, Nandi, Narok, Turkana, West Pokot, Vihiga
Floods	3	Kisumu, Narok, Tana River
Rise in sea levels	2	Lamu, Mombasa

Table 7. Causes of environmental degradation identified in the CIDPs

CAUSES OF ENVIRONMENTAL DEGRADATION	NO. COUNTIES	NAME OF COUNTY
Felling of trees in forests and charcoal burning	24	Bomet, Elgeyo Marakwet, Embu, Garissa, Homa Bay, Isiolo, Kericho, Kiambu, Kilifi, Kirinyaga, Kitui, Laikipia, Machakos, Makueni, Marsabit, Nandi, Narok, Nyandarua, Samburu, Taita Taveta, Tharaka Nithi, Trans Nzoia, Turkana, Uasin Gishu
Soil erosion	15	Busia, Isiolo, Kajiado, Kericho, Kiambu, Kisumu, Kitui, Laikipia, Lamu, Nakuru, Narok, Nyeri, Siaya, Uasin Gishu, Wajir
Unregulated and uncontrolled waste disposal	11	Kakamega, Kiambu, Kirinyaga, Kwale, Marsabit, Muranga, Nakuru, Narok, Uasin Gishu, Vihiga, Wajir
Reducing volumes of water in water bodies	10	Busia, Elgeyo Marakwet, Kakamega, Kiambu, Laikipia, Lamu, Mombasa, Nyeri, Samburu, Siaya
Sand harvesting along river beds	10	Homa Bay, Kisumu, Machakos, Makueni, Migori, Nyamira, Taita Taveta, Tharaka Nithi, Vihiga
Presence of quarries leaving many openings which pose dangers	9	Bomet, Kiambu, Kisii, Nakuru, Narok, Nyandarua, Taita Taveta, Tharaka Nithi, Wajir
Poor farming methods	8	Kitui, Lamu, Migori, Nyamira, Siaya, Taita Taveta, Trans Nzoia, Vihiga
Encroachment of expanding populations into forested areas	5	Elgeyo Marakwet, Garissa, Kisii, Nandi, Nyandarua
Agricultural inputs contaminating soil and water bodies resulting in eutrophication	5	Kajiado, Kisii, Nakuru, Nandi, Vihigaw
Overgrazing	4	Kajiado, Mandera, Wajir, West Pokot
Unplanned and rapid expansion of towns	3	Laikipia, Narok, Trans Nzoia
Increased number of vehicles and related pollution	1	Nairobi

5.4 WATER

The water and sanitation sector can provide sustainable development benefits and contribute to a clean and healthy environment, which is a fundamental right under Kenya's constitution (GoK, 2010a). The water sector is vulnerable to climate change and adaptation measures are needed. Water quality and quantity are influenced by extreme drought and excess rainfall which can alter water availability and disrupt the life of some species.

The identified sources of water in the counties, summarized in Annex 2B, included rivers, constructed dams and water pans, boreholes, shallow wells and piped water systems. Most of the counties planned to establish water and sewerage companies to take control of water and sanitation. The challenges in the sector as identified in the CIDPs include: encroachment of water catchment areas by logging and human settlements, drought, high temperatures which cause high evaporation thus reducing water volumes in water bodies, and rise in sea level which then contaminates the fresh water sources (see Table 6).

The priority actions to improve water resource management include: increased domestic water supply through constructed dams, boreholes and ponds; improved sewage and drainage systems; enhanced irrigation and drainage systems; construction of water pans and dams for commercial purposes; investing in water harvesting measures; and protection and conservation of water catchments. Some counties have formed water resource user associations that have helped to regulate water use for domestic, agricultural and industrial purposes.

5.5 ENVIRONMENTAL DEGRADATION

The United Nations International Strategy for Disaster Reductions (UNISDR, 2009) defines environmental degradation as the reduction of the capacity of the environment to meet social and ecological objectives and needs. The different types of environmental degradation identified in the CIDPs include: depletion of resources such as air, water and soil; the destruction of ecosystems; and the extinction of wildlife. The main causes of environmental degradation identified in the CIDPs are summarized in Annex 2C and listed in Table 7). Twenty-four counties identified tree logging and charcoal burning as main cause of environmental degradation because they reduce forest cover and increase soil erosion especially during rainy seasons. Unregulated waste disposal was identified as another cause of environmental degradation and many counties acknowledged not having sanitation systems in place that sufficiently addressed garbage disposal and wastewater generated from households and factories. Other causes of environmental degradation mentioned in CIDPs included overgrazing, sand harvesting, human encroachment on forests and motor vehicle pollution.

The effects of environmental degradation identified in the CIDPs included:

- Reduced volume of water following in the rivers
- Pollution of rivers and catchment areas
- Low agricultural productivity
- Conflicts due to competing demands
- Reduced forest products
- Increased incidence of food insecurity
- Increased size of degraded land

5.6 DISASTER RISK REDUCTION

Disasters can be both naturally caused and manmade. Natural disasters are those which occur without accelerated human causes, while the occurrence of man-made disasters is accelerated by human activities (Davis, 2008). Natural disasters varied in the different counties, as discussed in Annex 2C and summarized in Table 8. Common disasters identified in the CIDPs were floods, drought, lightning, pest and disease outbreaks, and landslides. Manmade disasters occurred through accidents, tribal clashes, fire outbreaks, human-wildlife conflict, and infrastructure collapse. Narok, Siaya, Tana River, Kisumu and Garissa mentioned flooding as a disaster especially during the rainy season. Drought was mentioned by the counties in the Eastern and North Eastern part of the country. Lightning and landslides were mentioned in Kisii, Migori and Nandi counties.

The CIDPs identified the need for disaster preparedness programmes, with many noting the influence of the Hyogo Framework of Action (UNSDR, 2007). Twenty counties noted the need for early warning systems and increased awareness of disaster prone areas. Twenty-five counties prioritized training of county disaster management officers to ensure timely and effective response to disasters, and capacity building across sectors. Fifteen counties recognized the growing threat of climate change and the need to incorporate climate change in disaster risk reduction programmes.

Table 8: Natural and man-made disasters reported in CIDPs

NATURAL DISASTERS	NO. COUNTIES
Flooding	33
Drought	27
Landslides	10
Fires and forest fires	14
Pest and disease outbreaks	11
Lightning	6
Crop failure and loss of livestock	6
Wind	4
Famine	4
Increase temperatures	1
Earth quakes	1
Volcanic eruptions	1

MAN-MADE DISASTERS	NO. COUNTIES
Road accidents	15
Human conflict	10
Disease outbreak	9
Pollution	7
Human-wildlife conflict	4
Poverty	2
Terrorism	2
Oil spillage	1

6: CLIMATE CHANGE IN THE CIDPs

6.1 CLIMATE CHANGE IMPACTS

All CIDPs included mention of the impacts of climate change, and many identified needed actions and priorities to address these impacts, which are described in Annex 1. Main climate change impacts stated in the CIDPs are set out in Table 9.

The main vulnerabilities identified in the CIDPs included:

- Drought due to lack of rainfall, leading to reduced food and livestock production and food insecurity
- Flooding as a result of unanticipated high rainfall
- Scarcity of potable water
- Increased vector-borne and water-borne diseases, spread of diseases and pests in areas where they did not exist before
- Low agricultural productivity because farmers are unable to prepare properly for planting and harvesting seasons
- Declining volume of species (fauna and flora) in most ecosystems
- Increased conflicts (human/wildlife, human/human) due to lack of resources such as pasture, grazing lands and water

6.2 ADAPTATION ACTIONS PRIORITIZED IN CIDPs

39 of the 47 counties identified specific adaptation actions in their CIDPs. Many adaptation actions addressed vulnerabilities in the agriculture sector, likely a reflection of the economic importance of the sector. Eighteen counties also noted the need for capacity building, a need that will likely be more prevalent with obligations under the Climate Change Act to mainstream climate change. The prominent adaptation actions and the number of counties that identified the actions are listed in Table 10.

6.3 MITIGATION ACTIONS PRIORITIZED IN CIDPs

42 of the 47 counties identified specific mitigation actions in their CIDPs. Many counties noted the importance of action in the forestry sector, perhaps influenced by the Constitution's goal of 10 per cent tree cover. Additionally, actions in the forestry sector have important climate resilience benefits and are often undertaken as adaptation actions. Promotion of renewable energy was also a priority mitigation action for 20 counties. The priority mitigation actions and the number of counties that identified the actions are included in Table 11.

6.4 CLIMATE CHANGE MAINSTREAMING

All counties identified the issue of climate change in their 2013 CIDPs and no county was ranked 0 in the climate change mainstreaming analysis (see Table 12). Only two counties (Mombasa and Kisii) were ranked 1, indicating that their CIDPs mentioned climate change impacts, but went no further. Eight counties were ranked 2 because their CIDPs acknowledged the impacts of climate change and went further to identify that a governance framework needs to be put in place to enable the county government to address the impacts of climate change. Twenty-eight counties - the majority - were ranked 3 because their CIDPs mentioned climate change impacts and identified priority adaptation and/or mitigation measures. Only nine counties were ranked 4 because in addition to mentioning climate change impacts and identifying priority mitigation and adaptation actions, the CIDPs also identified the need for budget allocations to undertake specific mitigation and adaptation actions to address climate change.

Table 9. Climate change impacts as reported in CIDPs

CLIMATE CHANGE IMPACTS	NO. COUNTIES	COUNTY NAME
Rise in temperatures over time which has resulted in prolonged dry spells and drought	31	Baringo, Bomet, Embu, Garissa, Homa Bay, Kajiado, Kiambu, Kilifi, Kirinyaga, Kisii, Kisumu, Kitui, Kwale, Laikipia, Machakos, Marsabit, Meru, Mombasa, Murang'a, Nakuru, Nandi, Narok, Nyamira, Nyeri, Taita Taveta, Tana River, Tharaka Nithi, Turkana, Vihiga, Wajir, West Pokot
Unpredictable rainfall patterns, erratic, inadequate or excess rainfall	16	Elgeyo Marakwet, Garissa, Isiolo, Kajiado, Kiambu, Kisii, Kisumu, Machakos, Meru, Narok, Nyamira, Siaya, Vihiga, Wajir, West Pokot
Flooding	14	Baringo, Garissa, Homa Bay, Isiolo, Kakamega, Kirinyaga, Kisumu, Kwale, Lamu, Murang'a, Nandi, Nyandarua, Taita Taveta, Tharaka Nithi
Unpredictable weather patterns	13	Baringo, Bomet, Embu, Homa Bay, Kakamega, Kericho, Kilifi, Kitui, Marsabit, Mombasa, Murang'a, Taita Taveta, Tharaka Nithi
Massive erosion	2	Elgeyo Marakwet, West Pokot
Recession of glaciers	1	Kirinyaga
Rise in sea level	1	Lamu

Table 10. Adaptation actions prioritized by Counties as reported in the CIDPs

PRIORITY ADAPTATION ACTIONS	NO. COUNTIES	COUNTY NAME
Institutional capacity building (awareness creation, partnership building)	18	Baringo, Bomet, Bungoma, Elgeyo Marakwet, Embu, Isiolo, Kisumu, Kwale, Laikipia, Laikipia, Makueni, Marsabit, Murang'a, Nyamira, Nyeri, Taita Taveta, Wajir, West Pokot
Sustainable crop farming practices (conservation agriculture, adoption of drought/pest resistant crop varieties and seeds, controlling land fragmentation and soil erosion)	18	Bungoma, Embu, Isiolo, Kajiado, Kirinyaga, Kitui, Kwale, Laikipia, Lamu, Murang'a, Nandi, Nyandarua, Nyeri, Samburu, Siaya, Taita Taveta, Vihiga, West Pokot
Improved access to water (excavation of more water pans, drilling more boreholes, water harvesting, reviving stalled water projects)	13	Kiambu, Kirinyaga, Kitui, Makueni, Mandera, Marsabit, Nairobi, Narok, Samburu, Siaya, Taita Taveta, Tharaka Nithi, West Pokot
Establishment of efficient early warning systems	11	Bungoma, Garissa, Isiolo, Kakamega, Kitui, Kwale, Laikipia, Nairobi, Taita Taveta, Uasin Gishu, Wajir
Water catchment conservation and protection, and rehabilitation of existing water catchments including wetlands	10	Bungoma, Homabay, Kakamega, Kiambu, Kisumu, Laikipia, Meru, Migori, Nyandarua, Trans Nzoia
Establishment of irrigation systems (construction of dams for irrigation, up-scaling drip irrigation)	7	Baringo, Isiolo, Kiambu, Kitui, Migori, Nyandarua, Siaya, Turkana
Improved livestock practices (livestock breeding through the exploitation of adaptive genotypes, livestock off-take programmes)	2	Samburu, Turkana

Table 11. Mitigation actions prioritized by Counties as reported in the CIDPs

PRIORITY MITIGATION ACTIONS	NO. COUNTIES	COUNTY NAME
Promotion of tree planting and establish forests	20	Bomet, Bungoma, Elgeyo Marakwet, Kajiado, Kilifi, Kirinyaga, Kisumu, Kwale, Laikipia, Lamu, Machakos, Mandera, Marsabit, Migori, Nakuru, Nyandarua, Samburu, Trans Nzoia, Uasin Gishu, Wajir
Promotion of renewable energy, such as solar, wind and hydro-power	20	Bungoma, Garissa, Isiolo, Kitui, Kwale, Laikipia, Makueni, Marsabit, Meru, Nairobi, Nandi, Nyandarua, Nyeri, Samburu, Siaya, Taita Taveta, TransNzoia, Uasin Gishu, Wajir, West Pokot
Restoration and rehabilitation of degraded forests	15	Garissa, Homa Bay, Isiolo, Kericho, Kiambu, Kitui, Lamu, Meru, Migori, Narok, Nyamira, Siaya, Taita Taveta, Wajir, West Pokot
Reducing emissions from deforestation, such as forest conservation, enforcement of a ban to curb logging, charcoal burning and harvesting of indigenous forests	7	Isiolo, Kwale, Makueni, Nakuru, Narok, Uasin Gishu, West Pokot
Agroforestry - encourage farmers to plant 10 per cent of total land area with trees	6	Busia, Homa Bay, Kiambu, Makueni, Marsabit, Nyeri
Establishment of projects to generate carbon credits to sell through carbon markets	4	Kitui, Nyandarua, Nyeri, Tana River
Alternative cooking energy, efficient cook stoves and lighting bulbs	2	Marsabit, Wajir
Proper management of waste, especially agricultural waste	2	Nairobi, West Pokot
Maintenance of good roads to ensure efficiency of vehicles and public transports	2	Marsabit, Murang'a

Table 12. County climate change mainstreaming in CIDPs

RANK	CRITERIA	NO. COUNTIES	COUNTY NAME
0	No mention of climate change	0	–
1	Mention impacts of climate change	2	Kisii, Mombasa
2	Mention impacts of climate change and governance framework	8	Kilifi, Kwale, Kisumu, Murang'a, Machakos, Mandera, Nyamira
3	Identify priority adaptation and/or mitigation actions	28	Bomet, Bungoma, Busia, Elgeyo Marakwet, Embu, Garissa, Homa Bay, Kajiado, Kakamega, Kericho, Kirinyaga, Makueni, Marsabit, Meru, Migori, Nakuru, Nandi, Samburu, Siaya, Taita Taveta, Tana River, Thara Nithi, Turkana, Vihiga, Wajir, West Pokot
4	Priority adaptation and mitigation actions identified and mention of need of budget allocation for climate change action	9	Isiolo, Kiambu, Kitui, Laikipia, Nairobi, Nyadarua, Nyeri, Trans Nzoia, Uasin Gishu
5	Climate change fully mainstreamed	0	–

The CIDPs submitted in September 2013 were the first plans to be developed for the 47 counties that were formed earlier that year in March 2013. The CIDPs contained a wealth of information, providing an analysis of economic, social and environmental factors to guide development plans and projects.

Some of the analyses were similar across CIDPs, suggesting a common approach to the development of plans. This is understandable given that the CIDPs were developed in a very short timeframe and were the first such documents to be developed by new developed County Governments.

All counties identified climate change in their CIDPs, indicating some awareness of the issue. A lack of understanding of climate change issues was evident in some CIDPs, reflecting the complexity of the issue. For example, some CIDPs confused adaptation – building resilience to climate change impacts, and mitigation – reducing greenhouse gas emissions. In addition, climate change was identified as an environmental issue in some CIDPs, resulting in actions to address environmental issues (such as sand harvesting) being identified as actions to address climate change. Climate change, as defined in the Climate Change Act, 2016, is an economic, social and environmental issue that impacts many sectors.

Most counties identified climate change impacts in their CIDPs, with the main issue identified being an increase in temperatures resulting in prolonged dry spells and drought. Unpredictable and erratic rainfall, flooding and unpredictable weather patterns were also noted. The CIDPs noted that climate change impacted negatively on economic activities, leading to reduced food and livestock production, scarcity of potable water, increased spread of diseases, and increased conflict (human/human and human/wildlife).

Adaptation actions were a priority for many counties, consistent with the National Climate Change Action Plan, 2013-2017 that states that adaptation is the priority for Kenya. Thirty-nine CIDPs identified adaptation actions including: awareness creation and capacity building to improve understanding of and action on climate change, sustainable agriculture (including conservation agriculture, irrigation and improved livestock practices), improved access to water, establishment of early warning systems, and water catchment conservation and protection.

The 2013 CIDPs did not include actions to improve the resilience of infrastructure – such as roads, bridges, electricity infrastructure and irrigation projects – to withstand anticipated climate change and its impacts. Given the slow rate of capital stock turnover of much infrastructure and the long lifetime of equipment, governments and developers should consider the possible impacts of climate change and identify necessary adaptation measures. Inadequate attention to climate impacts can increase the long-term costs of sector investments and reduce the likelihood that these investments will deliver intended benefits.

Forty-two counties identified actions that address mitigation of greenhouse gas emissions in their CIDPs. The actions included increasing forest cover through tree planting, restoration and rehabilitation of degraded forests and reducing emissions from deforestation. Other actions included agroforestry and promotion of renewable energy. Many of these actions, such as increasing forest cover and agroforestry also generate climate resilience benefits and can be considered adaptation actions.

Most of the County government began to mainstream climate change in their 2013 CIDPs. All county plans included mention of climate change impacts, and 28 CIDPs identified priority mitigation and adaptation actions. Nine counties indicated plans to allocate budgets for mitigation and adaptation actions. No county could be considered to have fully mainstreamed climate change in its CIDPs, but there is a readiness and an experience to build on to improve the integration of climate change in the upcoming 2017 CIDPs.

RECOMMENDATIONS

Recommendations to improve the mainstreaming of climate change in the 2017 CIDPs were developed based on this review and expert input, and are listed below:

Update the National Climate Change Action Plan in a timely manner – to enable distribution prior to the development of the 2017 CIDPs. A summary of the NCCAP that is specifically directed toward county needs would be useful.

Provide tools to assist County Governments to mainstream climate change in their CIDPs – including information about climate change, and a framework or guidance document for mainstreaming climate change in CIDPs and county budgets.

Provide tools to assist County Governments to identify actions to climate proof infrastructure – to help governments consider adaptation actions that protect infrastructure investments from climate change. Specific tools are needed to help County Governments understand the impacts of climate change on infrastructure and overcome this gap.

Build the capacity of County officials and planners – to enable these officials to apply a climate change lens across sectors. This could also help officials to better understand climate change and correctly address adaptation and mitigation.

Develop common indicators to be used by counties to track climate change action – to improve understanding of the implementation of actions and climate change results, and provide the basis for reporting on climate change, which is required under the Climate Change Act, 2016.

Link the identification of climate change actions with County spatial planning – Counties are to develop spatial plans that identify development projects and programs and locate them in specific geographic areas in the county. These plans will inform the CIDPs and climate change mainstreaming should account for and build on the spatial plans.

Undertake a similar review of the 2017 CIDPs – which would:

- Assist county governments in identifying common areas of climate change action and potential synergies across counties
- Help the national government identify priority climate change areas for intervention
- Help development partners identify and prioritize climate change-related actions at the county level
- Provide useful information to the National Climate Change Council and the Climate Change Directorate in its climate change coordination function

ANNEX 1: CLIMATE CHANGE IMPACTS, MITIGATION & ADAPTATION ACTIONS

COUNTY MAINSTREAMING RANKING	IMPACTS	MITIGATION	ADAPTATION
CENTRAL REGION			
Kiambu *4*	• Lack of predictability of the timing and the intensity of rainfall • Increased flooding • Prolonged dry spells	• Encourage farmers to plant trees on 10% of total land area • Degraded sites identified and trees have been planted to rehabilitate them • Some industries with large parcels of land have established woodlot plantations • Trees planted around water catchment sites • Exploit waterfalls for hydro energy generation and alternative energy	• National Soil & Water Conservation Programme uses an individual farmer extension approach to teach farmers proper methods resulting in reduced soil erosion and chemical pollution • Drill more boreholes for irrigation water • Develop more water pans to store rain water • Irrigate using dams and scale up drip irrigation
Kirinyaga *3*	• Rise in temperatures • Lack of rainfall resulting in some rivers drying up • Flooding, esp. on lower parts of Mwea • Recession of Mt Kenya glaciers, which acts a water tower for the county • Most affected sectors are agriculture, health	• County is planting more trees, especially along rivers, roads, public places and schools	• Promotion drought resistant crops • Distribution treated nets in malaria prone areas • Construction water pans to reduce withdrawal of water from rivers
Murang'a *2*	• Prolonged dry spells, drying of river beds • Variation in weather patterns with reduced rainfall and failed crop seasons • Frequent and prolonged drought with diminishing water resources • Floods, flash floods and landslides • Destruction of forest habitat, breeding grounds • Food insecurity from severe famine and hunger	• Transport mitigation and adaptation measures include good maintenance of road network to ensure high efficiency of vehicles, less emissions of GHGs, and enforcement of air quality regulations and standards	• Diversify crops to help cope with shifting rainfall patterns, using drought resistant/tolerant crops and promotion of good agricultural practices • Strengthen public health institutions to cope with increased occurrence of climate change-related diseases (malaria, cholera) • Intensify public health campaigns and public participation on climate change related diseases
Nairobi *4*	• Water scarcity, increased health threats • Increasing temperatures • Low precipitation • Erratic weather patterns • Food insecurity, increased cost of food commodities	• Diversify energy sources by investing in renewable sources of energy • Adaptation of new technology in waste management instead of open dumping sites • Leading contributor to climate change is from industrial and motor vehicle emissions	• Establish early warning systems • Monitor climate change and disseminate information to farmers • Water harvesting, recycling and conservation efforts
Nyandarua *3*	• Topsoil erosion and threats to forests • Fires	• Protect of water catchment areas including river line tree planting • Sensitization of Community Forest Associations members • Develop alternative energy sources (biogas, solar, renewable energy, energy saving jikos) • Encourage farmers to move from range management of livestock to zero grazing • Embrace carbon credit programmes • Plant indigenous trees while gazetting steep slope and hilltops as conservation areas	• De-silt lake to enhance retention of the lake and reduce human-wildlife conflict • Enhance tree planting on farms and public land • Promote greenhouse farming for productivity • Encourage planting of drought resistant crops and the practice of irrigation farming • Build multipurpose dams for farming, livestock watering, power generation • Rehabilitate degraded sites on farmland and steep slopes on river banks
Nyeri *4*	• Increased droughts and scarcity of water • Change in rainfall pattern, temperature extremes • Increased incidences of poverty, food insecurity, hunger and water conflicts, lack of pastures for livestock, and malaria causing mosquitoes spreading to non-traditional areas	• Promote green economy • Promote agroforestry • Renewable energy (solar, hydro, wind, biogas) • Reduce carbon foot print through organic farming and zero tillage agriculture • Investigate carbon credit possibilities	• Institutional capacity building, create awareness • Build partnerships and promote climate smart technologies, especially in agriculture • Nyeri Climate Change Policy Framework supports mainstreaming of climate change adaptation; economic and development policies • Conduct trials on drought resistant crops
Kilifi *2*	• Long-term alterations in weather patterns • Severe droughts and floods in Ganze, Kaloleni and Magarini constituencies • Negative socio-economic impacts due to extreme events • Kenyan coast has been subject to shoreline changes because of its geo-characteristics	• Tree planting exercise on farm and forests	–
Kwale *2*	• Emission of greenhouse gases that lead to rising temperature and sea-level rise • Rise in sea levels will cause flooding and other damage • Loss of wetlands, destruction of coastal zones	• Use cleaner, more efficient technologies (solar, wind energy, etc.) • Actions that aim at increasing GHG sinks (e.g. afforestation, tree-planting, protection of wetlands, or changes in consumption behaviors that lead to reduced GHG emissions)	• Adopt early warning system • Education and awareness campaigns, research on adaptive agriculture/livestock production • Introduce of new breeds • Introduce insurance coverage

COUNTY MAINSTREAMING RANKING	IMPACTS	MITIGATION	ADAPTATION
CENTRAL REGION			
Lamu *2*	• Rising sea levels, floods, drought • Coral bleaching and salt water infiltration due to rising sea levels • Increased water borne diseases due to floods • Reduced crop yield and crop death • Drying up of water sources and lakes, livestock deaths, and increased cases of human-wildlife conflicts due to drought	• Afforestation and reforestation initiatives and programs, especially of the mangrove forest	• Build embankments along sea shore • Increase restocking of health facilities to control outbreak of disease • Increase promotion of drought tolerant crops and livestock • Tree planting/reforestation, water tankering and excavation of water pans for both human and wildlife use
Mombasa *1*	• Declining water supply while demand increases • Inadequate water infrastructure • Changes in local temperature regimes • Frequent changes in weather patterns	–	–
Taita Taveta *3*	• Drought, floods • Rainy seasons have reduced, and onset of the rains delayed • Food insecurity due to reduced yields • Rising temperatures • High prevalence of pests and disease • Frost in parts of County due to extreme cold	• Use of cleaner and more efficient technologies (e.g. solar, wind) • Actions that aim at increasing GHG sinks (e.g. reforestation, protection of wetlands, or any relevant change in consumption behaviors)	• Adopt early warning system • Awareness and education • Introduce drought resistant crop, animal varieties, and proper natural resource management • Adopt water harvesting technologies, and efficient water use
Tana River *3*	• Droughts, floods • Rising sea levels along coastal areas • Intrusion of salt water upstream • Reduced fish population in the sea • Drying of oxbow lakes, reduced crop productivity • Loss of biodiversity, changing ecosystems, and destruction of infrastructure	• Pricing of natural resources. Policies should be enacted for pricing of natural resources like trees which act as carbon sinks in the absorption of carbon dioxide by trees • Carbon footprints. Policies should be enacted to promote carbon footprints for quantification of carbon emission and costing by those who travel	• Mainstream climate change and disaster mitigation into national planning programmes • Create awareness on the effects of climate change among the population • Discard old practices, embrace modern and sustainable practices and technologies
EASTERN REGION			
Embu *3*	• Increased periods of drought • Erratic weather patterns • Increased temperatures especially in lower areas	• Alternative approaches to mitigate effects, available opportunities and strategies to mitigate climate change • Forest cover ensures sequestration and carbon sink, and also firms up soil to prevent erosion	• Adopt modern, appropriate farming tech • Adopt practices for prevention, tolerance, resilience, chage of land use • Adopt sector-specific climate change coping mechanisms allowing relevant/applicable interventions to be formulated and implemented
Isiolo *4*	• Droughts, unpredictable rainfall, floods • Spread of water-borne and vector-borne disease • Loss of forest and wetland ecosystems • Land degradation and desertification • Scarcity of potable water	• Initiate afforestation and reforestation programmes • Construct hydro power micro-stations • Diversify energy sources to wind, solar, biogas	• Train farmers on issues of climate change, adaptation strategies and building resilience • Implement early warning systems and raise awareness, plan settlements in low risk areas • Control landslides and erosion through infrastructure planning • Introduce drought resistant crop varieties • Adopt community irrigation and water saving irrigation, put more land into production • Improve weather forecasting • Introduce better adapted livestock • Adopt improved food processing and preservation techniques, establish food banks • Diversify food production • Construct shelters for displaced populations, resettle at-risk communities • Construct water gates and culverts
Kitui *4*	• Unreliable, erratic and inadequate rainfall • Persistent and more frequent drought and imminent famine leading to food insecurity • High and increasing temperatures • Aggravated incidences and levels of poverty • Increased reduction in pasture and vegetation cover, soil erosion • Food insecurity, increased conflicts and insecurity – all contributing to increased poverty	• Promotion of reforestation and afforestation • Develop County renewable energy plan • Support public institutions with renewable energy systems and equipment • Promotion of renewable energy and energy saving devices • Use of modern charcoal burning technology • Carbon trading • Formulation of policies geared towards climate change mitigation	• Rehabilitate 75% of existing water supply by 2017 • Construct 40 bore holes by 2017, and 20 more dams and shallow wells by 2015 • Use of drought resistant seed varieties for food, fodder crops, and trees

COUNTY MAINSTREAMING RANKING	IMPACTS	MITIGATION	ADAPTATION
EASTERN REGION			
Machakos *2*	• Increased periods of drought, erratic rainfall • Increase in temperatures leading to low agricultural productivity	• Tree planting programmes	–
Makueni *3*	• Reduced vegetation cover negatively affecting agricultural productivity • Depletion of existing forests	• Encourage community energy needs, farm forestry (woodland) • Agro-forestry programme has enabled the community to embark on tree planting • Regulate charcoal burning	• On-going interventions by Kenya Forest Service (KFS) such as the Economic Stimulus • Increased forest cover will reduce soil erosion while protecting the water catchment areas • Improve soil fertility, beautification of institutions and major urban centres • Programme to raise community awareness
Marsabit *3*	• Difficult to predict onset of short and long rains • Agricultural productivity • Water resources affected with many springs flowing from the forest drying up • Prolonged and recurrent drought has led to reduced forage availability • Degraded environment • Increase in destitution	• Carbon free fuels (solar, wind, hydropower) • Increase use of energy efficient technologies (e.g. efficient cook stores, bulbs) • Reduce GHG emissions through greater use of public transport instead of private vehicles • Encourage recycling • Maintenance/conversion of forests for carbon sequestration • Encourage agroforestry in existing agricultural systems to increase size of the forest cover that would sequester carbon dioxide	• Improve water harvesting techniques • Encourage planting of drought resistant and fast maturing seedlings • Promote organic farming • Strengthen links between community education and awareness
Meru *3*	• Increased periods of drought, erratic rainfalls • Increase in temperatures as a result of changing climatic conditions	• Reforestation	• Reclaim wetlands through tree planting and community sensitization
Tharaka Nithi *3*	• Extreme weather conditions • Floods and droughts • Extreme weather events, such as severe flooding has increased the spread of waterborne diseases (malaria, diarrhea)	• Promote rainwater harvesting • Promote conservation agriculture (ensuring soil cover, crop rotation and intercropping, promoting productivity, carbon sequestration) • Promote use of clean energy (electricity, solar, biogas) to reduce over reliance on firewood, which is a major source of pollution	• Harvest rainwater to combat effects of drought; water can be used for irrigation to ensure food security
NORTH EASTERN REGION			
Garissa *3*	• Rainfall is less and more unpredictable • Frequent, prolonged drought • Unpredictable floods • Adverse impacts of climate change are compounded by environmental degradation through illegal encroachments and settlements, logging, and livestock grazing.	• Afforestation programmes • Sensitize community on Disaster Risk Reduction and Early Recovery • Support provision of energy saving means of cooking	• Adopt adaptation strategies (including restocking and destocking of livestock) • Implement population management policies to prevent future problem of high population size against available resources (e.g productive land) • Identify development principles to guide the utilization of natural resources in support of sustainable livelihood options • Strengthen early warning system
Mandera *2*	• Prolonged droughts and flooding leading to severe famine, disease outbreaks, livestock loss • Human and wildlife conflicts over resources	• Tree planting	• Promote rain water harvesting • Provide relief food • Promote agro-pastoralism • Promote de-stocking and re-stocking • Promote water trucking
Wajir *3*	• Rainfall is less and more unpredictable • Frequent and prolonged drought • Outbreak of waterborne diseases	• Adopt renewable and alternative energy sources • Afforestation and reforestation • Encourage green building (to cushion high temperatures), and efficient use of energy and water to reduce environmental degradation • Plant a variety of trees to increase vegetation cover to increase carbon sequestration capacity • Develop the proposed wind and solar energy firm off Wajir-Mandera road • Promote alternative sources of cooking energy to complement firewood and charcoal	• Increase public awareness on climate change through early warning system

COUNTY MAINSTREAMING RANKING	IMPACTS	MITIGATION	ADAPTATION
NYANZA REGION			
Homabay *3*	• Drought, floods • Erratic weather patterns • Famine	• Increase forest and tree cover • Adopt sustainable farming/settlement practices • Embark on tree planting programmes of re-afforestation in hills (Gembe, Gwassi, Ruri, Wire) and Kodera Forest	• Rehabilitate degraded land and protect wetlands • Clean up Lake Victoria and protect riparian reserves
Kisii *1*	• Erratic rains • Extreme temperatures • Cyclic and prolonged droughts • Environmental pollution • Loss of biodiversity	–	–
Kisumu *2*	• Increased temperature resulting in increased algal blooms in the lake which favour invasive species (water hyacinth) • Increased amount and intensity of rainfall • Frequent flooding especially in the Kano Plains • Frequent dry spells leading to droughtsv	• Promote tree planting to increase the carbon sink level	• Improve information communication systems • Intensify capacity building among stakeholders at all levels • Promote water catchment conservation and protection • Enhance link between research findings, the general population, and stakeholder institutions relating to climate change
Migori *3*	• Food production cannot be sustained • Many residents will lose livelihoods – especially in fishing, agriculture, and forestry, which form the major source of income and employment	• Increase forest and tree cover • Rehabilitate degraded land and protect wetlands • Embark on re-afforestation programme in the hills (Ranen, Nyatike, Ombo, Magina Hills)	• Promote irrigation activities (e.g. Kuja irrigation scheme) • Enhance food security and County food basket through irrigation • Adopt sustainable farming and settlement practices • Promote spring protection, afforestation and protection of catchment areas • Protect riparian reserves
Nyamira *2*	• Bimodal rainfall pattern affected by climage change, making it difficult to predict • Extreme temperatures • Hot weather conditions during the day have led to serious decline in water levels in running springs and rivers (Sondu Miriu)	• Plant trees on destroyed sections of forests	• Encourage community participation • Promote economic empowerment • Include enforcement of regulations on harvesting of indigenous forests
Siaya *4*	• Changed and erratic rainfall patterns • Reduction of water quantity and quality • Frequent fires • Flooding • Siltation of rivers, dams and lakes • Increased temperatures • Frequent diseases outbreaks • Low agricultural productivity due to prolonged drought	• Form multistakeholder platform • Promote afforestation and reforestation • Introduce alternative sources of energy (solar, hydro power) and promote use of bio-fuels and other generation technologies	• Promote rain water harvesting • Construct and rehabilitate water systems • Adopt drought resistance crop varieties and scale up irrigation projects • Increase area under irrigation area from current 670 ha to 1800 ha • Construct pans, dams and other water harvesting measures • Use of proper farming methods (good farming practices) and zoning land use
RIFT VALLEY REGION			
Baringo *3*	• Intensity and frequency of weather extremes • Floods, landslides and droughts • Vulnerable segments of communities who lack resilience or capacity to prepare, adapt, rebuild • Extreme weather events increase the risk of water-borne and vector-borne diseases	–	• Improve irrigation in dry areas (e.g. Perkerra irrigation scheme) as a long-term solution • Enhance community participation in climate change adaptation to curb environmental degradation
Bomet *3*	• Unpredictable rainfall patterns • Rise in temperatures over time, which has resulted in food insecurity • Farmers are unable to effectively prepare for planting and harvesting seasons	• Rehabilitate degraded forests • Educate the public and disseminate information • Encourage agro-forestry and ensure adherence to the 10% tree cover policy • Adopt/enforce laws to protect gazetted forests • Agroforestry widely practiced due to reduced land sizes and benefits from the practice (esp. carbon sequestration, carbon trading)	• Develop legislation to protect water catchment areas • Identify opportunities for carbon-related projects and programmes in the county

COUNTY MAINSTREAMING RANKING	IMPACTS	MITIGATION	ADAPTATION
RIFT VALLEY REGION			
Elgeyo Marakwet 3	• Rain pattern changes • Massive soil erosion in the Escarpment and Kerio Valley, landslides at the Escarpment and prolonged drought seasons in the Kerio Valley • Reduced agricultural productivity jeopardizes the already vulnerable food security given that County population is agriculture-dependent	• Promote afforestation • Enforcement of various acts and laws have been advocated and disseminated by agricultural and environmental practitioners in a bid to mitigate climate change	• Adopt proper land-use practices • Various government institutions including KFS, NEMA and Kenya Wildlife Service together with NGOs such as Nature Kenya and World Vision have embarked on mitigation measures to reverse the adverse climatic change effects • Protection of catchment areas has been initiated
Kajiado 3	• Erratic rains, extreme temperatures, and prolonged droughts • Pastoral communities continue adjusting to climate variability by maintaining mobility as they respond to spatial and time-related weather changes	• Promote tree planting in all major public institutions and offices	• In areas where crop farming has been practised, more farmers are planting drought resistant crops like cassava, sorghum, millet and early maturing maize varieties • Control soil erosion by building gabions
Kericho 3	• Rivers banks and their sources encroached • Reduction in water levels • Low agricultural productivity	• Reforestation and agro-forestation programmes are being undertaken to increase forest cover	• Due to water shortages for livestock, KSh 3 million has been allocated for construction of dams in 2011-12
Laikipia 4	• Decreased volume of surface and ground water resources • Reduced land productivity leading to loss of pasture and increased conflicts (human/wildlife, human/human) • Loss of forest cover • Frequent fluctuations in temperature, wind speeds, and increased humidity and reduced surface run offs	• Promote energy efficiency and renewable energy resources (e.g. biogas, solar energy, wind energy) • Adopt tree planting to enhance forest cover and increase carbon sinkw	• Develop early warning signals within systems using scientific and indigenous knowledge • Enhance effective communication of government policies to reduce information gap between locals and policy implementers • Introduce drought resistant crops and diversify crops varieties to mitigate against shifting rainfall patterns • Integrate watershed planning and management for sustainable utilization of water resources
Nakuru 3	• Extreme temperatures • Lake Nakuru National Park is experiencing unprecedented migration of flamingos to other lakes including Lake Bogoria. If unchecked, the migration will impact the attractiveness of the park and cause a slump in revenue projections	• Tree planting on the depleted forests sites • Promoting community participation and enforcement of a ban to curb illegal logging, charcoal burning and harvesting of indigenous forests	–
Nandi 2	• Floods • Unusually heavy rainfall with hailstones • Rise in temperature, and change in rainfall patterns among others • Reduced agricultural output caused by crop damage • Road network destroyed by heavy rains leading to high cost of maintenance	• Clean, environmentally friendly, renewable energy sources (solar, biogas, natural gas, electricity, wind energy) • Recyclable materials (polythene, plastics) to make fencing, electric posts and roofing to reduce over reliance on forests • Use of steel to construct roofs will reduce over reliance on forests for timber • Pest-resistant crop varieties to reduce use of harmful pesticides	–
Narok 3	• Climate change affected bimodal rainfall pattern • Difficult to predict onset of short and long rains hence affecting agricultural productivity • Hot weather conditions during the day have led to serious decline in water levels vital for wildlife survival in Maasai Mara Game Reserve • High temperatures resulted in reduction in amount of water for livestock and domestic use	• Enforcement of a ban to curb logging, charcoal burning and harvesting of indigenous forests • The county government will develop initiatives to promote forest conservation with a view to tap the potential for carbon trading	• Increase funds to excavate more pans; to drill more boreholes; to revive stalled water projects • Greenhouse technology and irrigation farming have been adopted as adaptation strategies to climate change
Samburu 3	• Charcoal burning, overstocking and crop cultivation in the catchment areas and wetlands has contributed greatly to the destruction of the environment	• Reducing GHG emissions from human induced activities needs to be put in place • Re-forestation to increase the forest cover which enhances carbon sinks • Promotion of alternative clean energy sources; solar, wind and biomass	• Promotion of drought resistant crops • Construction of water pans • Diversification of livelihoods systems

COUNTY MAINSTREAMING RANKING	IMPACTS	MITIGATION	ADAPTATION
RIFT VALLEY REGION			
Turkana *3*	• Continued drought which was not the case in the past • Increased vulnerability to floods and loss of biodiversity • Pastoralism and agro-leading to famine • Poverty	–	• Anticipatory adaptation that is done before the impacts of climate change are observed • Deliberate policy decision based on awareness that conditions have changed or are about to change and that action is required • Investing in water harvesting technologies and irrigation • Improved veterinary healthcare service delivery • Livestock breeding through adaptive genotypes • Planting of drought resistant crops • Developing effective drought early warning/ monitoring systems
Trans Nzoia *4*	• More frequent and severe droughts • More and frequent floods • Prevalence of malaria in an area where malaria was previously not considered as a major illness	• The Mt Elgon regional ecosystem conservation program is also developing a strategy to reduce production of GHGs • Efforts are ongoing for increasing forest cover • An NGO, VI agro-forestry, is encouraging communities to use solar energy	• Lake Victoria basin commission through the Mt Elgon regional ecosystem conservation programme is preparing a strategy on climate change adaptation and disaster management • The community forest associations collaborate with the KFS in the management of the forests and conservation of water catchments
Uasin Gishu *3*	• Increase in variability of rainfall patterns • Prolonged droughts • Flooding has become a common occurrences in the county • Reduced crop yields	• Tree planting will be intensified throughout the county • Proper enforcement of laws on pollution regulation • Explore the use of renewable energy systems thus contributing to the security of energy supply and protection of the environment	• The county with the help of the meteorology department and other agencies will develop an early warning system to guide farmers on when to carry out farming activities • Conservation efforts
West Pokot *3*	• Temperatures have risen throughout the county • Rainfall has become irregular and unpredictable • Flooding, landslides • Prolonged drought • Adverse soil erosion with huge gully erosion, while landslides and flooding frequently affects parts of Muino, Sondany and Ptirap in Pokot Central Sub-County • Encroachment on forest and water catchment areas, charcoal burning, deforestation, desertification	• Agroforestry, reforestation • Green energy development • Proper management of agricultural waste • Laws limiting charcoal burning	• Providing early warning information on floods, landslides and drought • Promoting planting of drought tolerant crops (such as cassava, sorghum, millet, green grams and cow peas), camel keeping • Laws for dam and water pan construction
WESTERN REGION			
Bungoma *4*	• Climate change especially terrestrial and fresh water biodiversity • All these ecosystems have recorded declines in both volumes of species and quality of life hitherto supported indigenous fauna and flora • Increased food insecurity and constant human-wildlife conflicts	• Shifting to bio-fuels for domestic/industrial use • Adopt low carbon economic growth through agro-forestry and carbon trading • Promotion of green economy and agro-forestry through afforestation, reforestation, sustainable forest management and sustainable land use • Non-forestry activities such as fuel-switching snf energy efficiency at the community level, and the use of bio-fuels • Carbon Offsets to Alleviate Poverty: this programme will empower individuals, communities and businesses to fight deforestation, climate change, and global poverty	• The strategy specifically advocates for a policy and legislative action to protect and conserve wetlands and water sources • Enhancing formal, non-formal and informal environmental and climate change education • Promoting planting of drought tolerant crops (such as cassava, sorghum, millet, green grams and cow peas), camel keeping • Focusing on sustainable farming practices, including adoption of drought/pest resistant crop varieties and seeds and controlling land fragmentation • Promotion of agri-business and value addition chain
Busia *3*	• All these ecosystems have recorded declines in both volumes of species and quality of life hitherto supported indigenous fauna and flora • Varying rainfall patterns • The occasional rise in temperatures affects moisture retention • Increased food insecurity	• There are organizations such as International Centre for Research in Agro-forestry that are assisting farmers in agro-forestry farming	–

COUNTY MAINSTREAMING RANKING	IMPACTS	MITIGATION	ADAPTATION
WESTERN REGION			
Kakamega *3*	• Flooding has been experienced in the county due to climatic changes leading to displacement of populations • Farming on the lower lands has been reduced • Human health has also been affected • During heavy rains and flooding, human beings are exposed to waterborne diseases • Reduced soil fertility	• Proper waste disposal systems	• Enforcement of environmental laws by the government agencies such as National Environmental Management Authority (NEMA), KFS and Ministry of Agriculture also come in handy to mitigate against notable climate change impacts • Conservation and protection of catchment areas
Vihiga *3*	• Heavy and erratic rainfall • More dry spells • Wetlands are diminishing • Siltation of dams • Water pollution • Enhanced spread of diseases • Changes in temperatures and precipitation	–	• Early warning and management systems will be put in place to facilitate adaptation to climate variability and change • Farmers will have to continually adjust cultivation and breeding practices to varying climate conditions • Adopt environmentally sustainable methods that preserve and enhance soil and ground water • Terracing to prevent soil loss and degradation through erosion, radically reducing tillage, rotating crops and applying natural fertilizers to improve soil structure and fertility • Farmers will be encouraged to monitor precipitation patterns to change crops or use different harvest and planting dates

ANNEX 2: COUNTY SECTOR ANALYSIS

SECTION A: COUNTY PROFILE, AGRICULTURE & FORESTRY

	PROFILE		AGRICULTURE			FORESTRY		
COUNTY	POPULATION (2009 CENSUS)	AREA (KM^2)	ARABLE LAND AREA (KM^2)	AVERAGE FARM SIZE	MAIN ACTIVITIES	GAZETTED FORESTS (QTY & AREA)	NON-GAZETTED FORESTS (QTY & AREA)	FOREST CHALLENGES
CENTRAL REGION								
Kiambu	1,623,282	2,544	1,878	Small: 0.36 ha Large: 69.5 ha	• Crop and livestock production • Food crops: maize, beans pineapples and potato • Cash crops: coffee and tea	2 forests 427 km^2	– –	• Deforestation; leading to reduced volume of water and soil erosion
Kirinyaga	528,054	1,478	821	Small: 1 ha Large: 5.2 ha	• Crop and livestock production • Food crops: maize, beans, tomato • Cash crops: paddy rice, tea, coffee	5 forests 357 km^2	2 forests 02 km^2	• Illegal logging • Deforestation
Murang'a	942,581	2,559	2,135	Small: 0.5 ha Large: 6.5 ha	• Crop, livestock and fish production, ranching • Cash crops: tea, coffee, macadamia, horticulture (vegetables, flowers)	5 forests 254 km^2	– –	• Deforestation • Indiscriminate felling of trees
Nairobi	3,138,369	696	300	Small: 0.0295 ha –	• Crop production, fishing, ranching • Food crops: cassava, potato • Cash crops: horticulture (onion, tomato)	3 forests 10 km^2	– –	• Deforestation • Uncontrolled settlements • Road construction
Nyandarua	596,268	3,245	1,849	– –	• Livestock, crop and fish production, ranching • Food crops: potato, cabbages, wheat, maize, vegetables • Cash crops: horticulture (cut flowers)	4 forests 499 km^2	6 forests –	• Illegal logging • Charcoal production • Cultivation • Settlements • Forest fires
Nyeri	693,558	3,337	995	Small: 0.7 ha Large: 4 ha	• Livestock, crop and fish production • Food crops: maize, beans, potato • Cash crops: tea, coffee, ranching	12 forests 862 km^2	– –	• Tree logging
COASTAL REGION								
Kilifi	1,109,735	12,610	6,891	Small: 3 ha Large: 8 ha	• Livestock and crop production • Food crops: cowpea, green gram, cassava • Cash crops: coconut, cashew nuts, sisal	14 forests 220 km^2	7 forests 25 km^2	• Deforestation due to uncontrolled felling of trees for charcoal production
Kwale	649,931	8,270	1,812	Small: 2 ha Large: 40 ha	• Livestock and crop production, fishing along coast line • Food crop: cassava, grams, coconut, peas, maize • Cash crop: cashew nuts, tobacco, sugar cane, cotton, bixa	– 350 km^2	– 1,900 km^2	• Logging • Bush fire and bush clearing by farmers
Lamu	101,539	6,273	5,517	Small: 2 ha Large: 4 ha	• Crop and livestock production, fishing, ranching • Food crop: cowpea, dolichos, pigeon peas, green gram • Cash crop: coconut, cotton, simsim	– 428 km^2	– 280 km^2	• Illegal logging • Expansion of agri-culture activities • Unregulated quar-rying • Charcoal
Mombasa	939,370	230	9	– –	• Crop and livestock production, fish production along coast line	– –	– –	• Deforestation from use of charcoal/ firewood
Taita Taveta	284,657	17,059	2,055	Small: 0.4 ha Large: 30 ha	• Crop and livestock production, fishing	25 forests 15 km^2	– 90 km^2	• Tree cutting for firewood and charcoal • Logging • Slash and burn agriculture • Human settlements
Tana River	240,075	38,862	2,547	Small: 0.71 ha –	• Crop production, livestock products, ranching, fishing • Food crops: maize, cowpea, green gram • Fish: 900 fish ponds	– –	– –	• Forest degradation, firewood • Construction due to increased settlements and mining

	PROFILE		AGRICULTURE			FORESTRY		
COUNTY	POPULATION (2009 CENSUS)	AREA (KM^2)	ARABLE LAND AREA (KM^2)	AVERAGE FARM SIZE	MAIN ACTIVITIES	GAZETTED FORESTS (QTY & AREA)	NON-GAZETTED FORESTS (QTY & AREA)	FOREST CHALLENGES
EASTERN REGION								
Embu	516,212	2,818	826	Small: 0.8 ha –	• Crop, livestock and fish production • Food crops: maize, beans, Irish potato, cabbage • Cash crops: coffee, tea	1 forest 38 km^2	4 forests –	• Deforestation, esp in farming areas • Illegal logging, charcoal production
Isiolo	143,294	25,700	35	– –	• Crop, livestock and fish production • Food crops: maize, beans, kale, tomato, watermelon, mango, cowpea, onion	– –	– –	• Tree cutting mainly for firewood and charcoal production
Kitui	1,012,709	30,496	1,211	Small: 2 ha –	• Crop, livestock (poultry) production, bee keeping, fish production • Food crops: maize, millet, sorghum, legumes, green gram, beans, cowpea, pigeon peas, cassava, sweet potato • Cash crops: mango, pawpaw, tomato, watermelon, avocado, castor fruit	14 forests 345 km^2	15 forests –	• Deforestation as a result of firewood harvesting and charcoal production
Machakos	1,098,584	6,208	3,720	Small: 0.7 ha Large: 10 ha	• Crop, livestock and fish production • Food crops: maize, beans, pigeon peas and cassava • Cash crops: coffee, french beans, pineapples, sorghum	– 7 km^2	– 17 km^2	• Tree cutting mainly for cooking wood
Makueni	888,527	8,035	888	Small: 3 ha Large: 30 ha	• Crop, livestock and fish production • Food crops: maize, green gram, pigeon pea, sorghum	5 forests 151 km^2	2 forests 40 km^2	• Deforestation as a result of wood harvest and charcoal
Marsabit	291,166	70,961	15,827	Small: 0.8 ha	• Crop, livestock and fish production • Food crops: maize, teff, beans, millet • Cash crops: vegetables, fruits	1 forests 153 km^2	2 forests 750 km^2	• Tree cutting mainly for charcoal and Firewood
Meru	1,356,301	6,936	1,777	Small: 1.8 ha Large: 18 ha	• Crop, livestock production, ranching	10 forests 1,776 km^2	19 forests 345 km^2	–
Tharaka Nithi	365,330	2,662	586	Small: 2.9 ha Large: 6.7 ha	• Crop and livestock production • Food crops: maize, beans, green gram, sorghum, cowpea, millet, black bean • Cash crops: coffee, tea	– 447 km^2	– 33 km^2	• Deforestation from quarrying, charcoal and firewood needs
Garissa	623,060	44,174	8,940	Small: 1.3 ha	• Crop, livestock and fish production • Food crops: maize, beans, green gram • Cash crops: simsim	– –	2 forests –	• Illegal encroach-ments/settlements • Logging • Over-grazing • Influx of refugees • Charcoal
Mandera	1,025,756	25,992	200	Small: 1.5 ha Large: 15 ha	• Crop, livestock and fish production • Livestock: camels, donkeys • Food crops: maize, sorghum, cowpea • Horticultural crops: onion, watermelon, capsicum, mango, banana, kale, tomato • Cash crops: simsim, sunflower, groundnut	– –	– –	• Charcoal • Overgrazing • Cutting trees • Quarrying • Mushrooming of unplanned settlements
Wajir	661,941	56,686	1,024	Small: 2.4 ha Large: 7.8 ha	• Crop, livestock and fish production • Food crops: sorghum, drought resistant maize, beans, melon, cowpea, green gram • Horticultural crops: kale, spinach, tomato, peppers	– –	– –	• Firewood and charcoal for lighting and cooking increases tree cutting
NYANZA REGION								
Homa Bay	963,794	4,267	1,228	Small: 4 ha	• Crop, livestock and fish production • Food crops: maize, beans, sorghum, millet, kale, sweet potato, peas	2 forests 30 km^2	8 forests 128 km^2	• Tree cutting for firewood mainly for cooking

	PROFILE		AGRICULTURE			FORESTRY		
COUNTY	POPULATION (2009 CENSUS)	AREA (KM^2)	ARABLE LAND AREA (KM^2)	AVERAGE FARM SIZE	MAIN ACTIVITIES	GAZETTED FORESTS (QTY & AREA)	NON-GAZETTED FORESTS (QTY & AREA)	FOREST CHALLENGES
Kisii	1,152,282	1,318	903	Small: 2.1 ha	• Crop, livestock and fish production • Food crops: maize, banana, beans, potato, tea, sugarcane • Cash crops: coffee, horticultural crops	– –	– –	–
Kisumu	968,909	2,010	214	Small: 0.6 ha	• Crop, livestock and fish production • Food crops: beans, maize, sorghum, finger millet, groundnut, kale, cotton • Cash crops: sugarcane, rice	– –	– –	• Deforestation purposely for Firewood and charcoal
Migori	917,170	2,597	2,077	Small: 1.2 ha Large: 2.8 ha	• Crop, livestock and fish production • Food crops: maize, sorghum, beans, cassava, finger millet, sweet potato • Cash crops: tobacco, sugarcane, potato	– 436 km^2	– 26 km^2	• Charcoal • Frequent outbreak of wild forest fires • Illegal logging • Firewood for tobacco curing and household use
Nyamira	598,252	899	818	– –	• Crop, livestock and fish production • Food crops: maize, beans, cassava, sweet potato, vegetables, millet, sorghum • Cash crops: tea, coffee, pyrethrum, banana	– –	10 forests 27 km^2	• Tree cutting for Firewood and charcoal
Siaya	842,304	2,530	2,059	Small: 1.5 ha Large: 7 ha	• Crop, livestock and fish production • Food crops: maize, sorghum, millet, beans, cowpea, cassava, sweet potato, groundnut, finger millets • Cash crops: cotton, rice, sugar cane, groundnut	– –	2 forests –	• Deforestation from fire-wood and charcoal use
RIFT VALLEY REGION								
Baringo	555,561	11,015	11	Small: 2.5 ha	• Crop and livestock production • Food crops: maize, finger millet, sorghum, beans, cowpea, green gram, garden peas, Irish potato, sweet potato • Cash crops: coffee, cotton, macadamia	– 653 km^2	– 139 km^2	• Unregulated charcoal
Bomet	730,129	2,037	1,717	Small: 2 ha Large: 5 ha	• Crop, livestock and fish production • Food crops: maize • Cash crop: tea	– 483 km^2	– –	• Illegal logging; forests like Chepalungu are near extinction b/c water catchment areas are being destroyed • Loss of biodiversity
Elgeyo Marakwet	369,998	3,030	2,171	Small: 1.3 ha Large: 7 ha	• Crop, livestock, fish and poultry production • Food crops: maize, wheat, Irish potato, beans • Cash crops: tea, coffee, pyrethrum	16 forests 30 km^2	– –	• Charcoal • Human encroachment on gazetted forests
Kajiado	687,312	21,901	3,468	Small: 9 ha Large: 70 ha	• Crop and livestock and ranch production • Food crops: maize, beans, potato, veg • Cash crops: onion, tomato	3 forests 155 km^2	2 forests 13 km^2	• Charcoal • Human settlement
Kericho	752,396	2,479	1,982	Small: 0.9 ha Large: 14 ha	• Crop and livestock production • Cash crops: tea, flowers	7 forests 327 km^2	– –	• Reduced forest cover due to overreliance on wood
Laikipia	399,227	9,462	1,984	Small: 0.8 ha Large: 8 ha	• Crop, livestock and ranch production • Food crops: wheat, maize, beans, potato, vegetables • Cash crops: cut flowers, tomato, French bean, aloe, chili pepper, watermelon	6 forests 580 km^2	1 forest –	• Tree cutting mostly by farmers for timber and pole production • Charcoal for commercial purposes

	PROFILE		AGRICULTURE			FORESTRY		
COUNTY	POPULATION (2009 CENSUS)	AREA (KM^2)	ARABLE LAND AREA (KM^2)	AVERAGE FARM SIZE	MAIN ACTIVITIES	GAZETTED FORESTS (QTY & AREA)	NON-GAZETTED FORESTS (QTY & AREA)	FOREST CHALLENGES
Nakuru	1,603,325	7,495	3,151	Small: 0.77 ha Large: 263 ha	• Crop, livestock, ranch, fish production • Food crops: maize, beans, Irish potato, wheat • Cash crops: tomato, peas, carrot, onion, French bean, citrus fruit, peach, apple, asparagus, leek	2 forests 680 km^2	6 forests –	• Mass felling of trees for firewood and timber • Clearing land for agricultural use
Nandi	752,965	2,884	1,520	Small: 1.32 ha Large: 11 ha	• Crop, livestock and fish production • Food crops: maize, beans, cowpea, potato, cabbage • Cash crops: tea, coffee, sugarcane	– –	– –	• High demand for agricultural land and wood products due to ever increasing urban and rural population
Narok	687,312	17,933	5,821	Small: 6.1 ha Large: 26.3 ha	• Crop and livestock production • Food crops: wheat, barley, maize, beans, potato, horticultural crops • Cash crops: barley, sugarcane	– 724 km^2	– 930 km^2	• Massive tree cutting for firewood/timber • Clearing land for agricultural use • Poor physical planning in urban areas
Samburu	223,947	21,022	72	Small: 0.4 ha Large: 20 ha	• Crop and livestock production • Food crops: maize, beans, wheat, barley, millet • Cash crop: barley	– 3,250 km^2	– –	• Continued use of firewood is a health and environmental concern and has contributed to forest degradation
Turkana	855,399	68,680	25,000	Small: 0.8 ha	• Crop, fish and livestock production • Food crops: sorghum, millet, maize, vegetables	– –	– –	• Deforestation: illegal charcoal
Trans Nzoia	818,757	2,496	1,453	Small: 1 ha Large: 12 ha	• Crop, livestock and fish production • Food crops: maize, beans, wheat • Cash crop: coffee, tea	– 455 km^2	– 3 km^2	• Reduced forest cover mainly due to charcoal and firewood use for cooking
Uasin Gishu	894,179	3,327	2,995	Small: 0.8 ha Large: 4 ha	• Crop and livestock production	6 forests 298 km^2	– –	• Deforestation
West Pokot	512,690	9,164	220	Small: 10 ha Large: 50 ha	• Crop and livestock production • Food crops: maize, finger millet, potato, beans, sweet mango, orange • Cash crops: coffee, pyrethrum	– 207 km^2	– 157 km^2	• Charcoal • Overgrazing • Deforestation • Human encroachment of the protected areas
WESTERN REGION								
Bungoma	1,375,063	3,032	2,881	Small: 0.5 ha Large: 5 ha	• Crop and livestock production • Food crops: maize, beans, finger millet, sweet potato, banana • Cash crops: sugar cane, cotton, palm oil, coffee, sun flower, tobacco	1 forest 618 km^2	– –	• Firewood and charcoal
Busia	743,946	1,695	1,791	Small: 0.4 ha Large: 6 ha	• Crop, livestock and fish production • Food crops: maize, cassava, beans, sorghum, rice, sweet potato, cowpea, groundnut, green gram • Cash crops: cotton, tobacco, sugarcane, oil palm, peppers	2 forests 53 km^2	– –	• Tree cutting mainly for cooking and lighting
Kakamega	1,660,651	3051	2,555	Small: 0.6 ha Large: 4 ha	• Crop, fish and livestock production • Food crop: maize • Cash crop: sugarcane	3 forests 244 km^2	1 forest 27 km^2	– –
Vihiga	554,622	531	480	Small: 0.4 ha Large: 3 ha	• Crop, livestock and fish production • Food crops: maize, beans, millet, sweet potato • Cash crops: tea, coffee	– 42 km^2	– –	• Rising populations invade the existing forest, thereby destroying water catchments

ANNEX 2: COUNTY SECTOR ANALYSIS
SECTION B: WATER & ENERGY

	WATER		ENERGY		
COUNTY	SOURCE OF WATER	SOURCE OF LIGHTING (% POPULATION)	SOURCE OF COOKING (% POPULATION)	CLEAN ENERGY PENETRATION	HOUSEHOLDS CONNECTED TO GRID (%)
CENTRAL REGION					
Kiambu	Piped water system (tap)	Paraffin Electricity	Firewood (47%)	–	98
Kirinyaga	29 unprotected springs in number, 12 water pans, 3 dams, and 208 shallow wells, boreholes and protected springs	Paraffin	Charcoal (11%) Gas (5%) Firewood (19%)	–	3
Murang'a	Rivers, shallow wells, springs, dams, boreholes and roof catchment	Electricity (13%) Paraffin	Firewood Charcoal	Solar (1%)	3
Nairobi	Nairobi Water and Sewerage Company, private wells	Paraffin (63%) Electricity	Cooking gas Charcoal Firewood	Biogas	68
Nyandarua	Rainwater which ends up in dams and rivers	Paraffin (1.4%) Electricity (11%)	Electricity (0.2%) Firewood Charcoal (79%)	Biomass residue (0.3%) Solar (6%)	11
Nyeri	Water and Sewerage Companies, piped water	Electricity Paraffin	Firewood (72%) Gas Charcoal	Solar, biogas and biomass residue	26
COASTAL REGION					
Kilifi	Shallow wells, 135 water pans, 90 small earth dams and 50 boreholes	Electricity Paraffin	Firewood (80%)	Solar	50
Kwale	Rivers, shallow wells, springs protected and unprotected), water pans, dams, rock catchments and boreholes	Firewood (1%) Paraffin (96%)	Paraffin (6%) Charcoal (12%) Firewood (80%)	–	–
Lamu		Firewood Electricity, Paraffin (72%)	Charcoal (23%) Firewood (70%) Gas	Solar	–
Mombasa	Rivers, springs and the Indian ocean	Paraffin (52%) Electricity (48%)	LPG (4.7%) Firewood (9%) Charcoal (30%) Paraffin (57%) Electricity	–	48
Taita Taveta	Main rivers, 95 shallow wells, 92 protected springs, 25 water pans, five dams, 25 boreholes and 57 Water supply schemes in the County	Paraffin (86%) Electricity (8%)	Charcoal (14%) Firewood (75%)	Solar (4%)	8
Tana River	Tana River	Paraffin (78%) Electricity (1%)	Firewood (88%)	Solar and wind	1
EASTERN REGION					
Embu	Rivers, piped water, wells and boreholes, dams, springs and pans	Paraffin Electricity	Firewood (80%) Charcoal (80%)	–	3
Isiolo	Boreholes and shallow wells	Firewood (8%)	Firewood (70%)	–	15
Kitui	–	Paraffin Electricity	Firewood Charcoal	–	4
Machakos	Rivers, dams and boreholes	Electricity (77%) Paraffin (88%)	Charcoal Firewood (82%) Gas	Solar	77
Makueni	Protected springs and 117 boreholes, piped water There are 289 water pans and 159 surface dams	Electricity (6%) Paraffin (69%)	Charcoal (11%) Firewood (85%)	Solar (4%)	6
Marsabit	Boreholes, springs and wells	Paraffin (28%) Firewood (57%) Electricity (4%)	Firewood (93%) Charcoal (6%) Paraffin (1%)	Biomass residue (0.2%)	4
Meru	Rivers, 12 shallow wells, 30 protected springs, two water pans, 16 dams and 105 boreholes	Paraffin (5%) Electricity (14%)	Charcoal (7%) Firewood (86%) LPG (2%)	Biomass residue (0.1%) Solar (7%)	14
Tharaka Nithi	Rivers, springs, underground water	Paraffin Electricity	Firewood Charcoal	Solar Biogas Wind	–
NORTH EASTERN REGION					
Garissa	Rivers	Paraffin Electricity (1%)	Firewood (79%) Charcoal (18%)	Solar Wind (0.2%)	1

	WATER		ENERGY		
COUNTY	SOURCE OF WATER	SOURCE OF LIGHTING (% POPULATION)	SOURCE OF COOKING (% POPULATION)	CLEAN ENERGY PENETRATION	HOUSEHOLDS CONNECTED TO GRID (%)
Mandera	Mandera Water and Sewerage Company	Firewood	Firewood (96%)	Solar Wind mills Biofuels	–
Wajir	Ewaso Nyiro River and Lake Yahud, boreholes, shallow wells, pans and dams	Firewood Charcoal, Paraffin (32%) Electricity (3,039 HHs)	Firewood and charcoal (97%)	Sustainable energy (3%)	3
NYANZA REGION					
Homabay	Rivers, swamps, lakes, boreholes and hand dug wells	Paraffin (95%) Electricity (3%)	Paraffin Charcoal Firewood (58%) LPG (less than 1%)	–	3
Kisii	From rivers, protected springs and wells/ boreholes	Electricity (45%) Paraffin	Firewood Charcoal	Biogas Wind Solar	45
Kisumu	40 Boreholes, 70 Shallow wells and 7 water pans	Paraffin (79%) Electricity (18%)	Firewood (60%), Charcoal (17%) Paraffin (7%) LPG (3%)	–	18
Migori	Kuja, Migori and Riana rivers	Paraffin (94%) Firewood (3%) Electricity (2%)	Firewood (77%) Charcoal (19%) Paraffin (3%)	–	2
Nyamira	Rivers, shallow wells, springs, dams, pans and boreholes	Lantern and tin lamp paraffin (6%) Electricity (20%)	Firewood (50%) Grass (0.4%) Charcoal (4%) Paraffin (37%) LPG (1%)	Solar Improved cooking stoves at institutions Biomass residue *(total of 4%)*	20
Siaya	Rivers	Electricity (4%) Lanterns Tin lamps Pressure lamps Gas lamps Firewood	Firewood (83%) Charcoal (14%) Paraffin (1%)	Solar	4
RIFT VALLEY REGION					
Baringo	Lake Baringo and Bogoria, which occupy 164km^2, Lake Kamnarok covers 1km^2	Electricity (10,400 households)	–	Geothermal to be drilled Solar Wind	–
Bomet	Rivers	Electricity (60%) Firewood	Firewood (91%)	Solar Biogas	60
Elgeyo Marakwet	Water catchment areas, protected springs and rivers	Paraffin	Charcoal and firewood (91%)	Solar Hydro Wind Biogas	–
Kajiado	Rivers, shallow wells, protected/unprotected springs, dams, water pans, and boreholes	Electricity Paraffin (40%)	Firewood Charcoal	Solar Wind Geothermal	40
Kericho	Rivers	Lanterns (46%) Tin lamps (39%) Electricity (12%)	Firewood Charcoal	Solar (2%)	12
Laikipia	Swamps namely; Marura and Swamp	Electricity (18%)		Solar Biofuel	18
Nakuru	Lakes, rivers, shallow wells, springs, dams, pans and boreholes	Electricity (34%) Paraffin (36%) Tin lamps (25%)	Firewood	Geothermal	34
Nandi		Electricity (6%) Paraffin (92%)	Charcoal Firewood (88%)	Solar (1%) Biogas (0.1%)	6
Narok	Rivers and streams	Firewood Electricity (6%) Charcoal	Firewood (83%) Charcoal (13%)	Solar (1.4%)	6
Samburu	Water pans, dams and shallow wells	Firewood	Firewood (70%)	–	2
Turkana	Hand dug shallow wells, piped water and river water	Paraffin and firewood (95%)	Firewood Paraffin Charcoal	Solar (98 panels installed) Wind power	–

	WATER		ENERGY		
COUNTY	SOURCE OF WATER	SOURCE OF LIGHTING (% POPULATION)	SOURCE OF COOKING (% POPULATION)	CLEAN ENERGY PENETRATION	HOUSEHOLDS CONNECTED TO GRID (%)
Trans Nzoia	Streams, springs and boreholes	Paraffin and firewood (1%) Electricity (9%) Tin lamps (49%) Lantern lamps (39%) Gas lamps (1%)	Firewood (70%) Charcoal (18%) Paraffin (5%) Electricity (1%) Biogas (1%)	Solar (1%) Biogas (4%)	9
Uasin Gishu	Dams, rivers, boreholes, shallow wells and springs	–	–	–	–
West Pokot	Rivers, streams, wells, boreholes, dams, roof catchment and piped water	Paraffin (8%) Electricity (2%)	Firewood (90%) LPG (5%) Charcoal	Solar	2
WESTERN REGION					
Bungoma	Individual piped, roof catchment and communal water points such as boreholes, springs and wells	Paraffin (97%) Firewood (4%) Dry cells (4%) Electricity (2%)	Firewood (93%) Charcoal (5%)	Solar Biomass residue (4%) Wind	2
Busia	Rivers, streams, dams, pans, wells, springs, roof catchment and scattered boreholes	Paraffin (90%) Electricity (3%)	Firewood (98%) Paraffin (2%) LPG (1%)	–	3
Kakamega	Western Water Services Company, rivers and streams	Paraffin (95%) Firewood (1%) Grass (0.4%) LPG (0.2%)	Firewood (88%), Grass (0.4%) Paraffin (2%) Electricity (0.3%) LPG (1%) Charcoal (4%)	Solar (1%) Biomass residue (1%)	0.3
Vihiga	Piped water, protected and unprotected springs	Paraffin (89%) Electricity (16%)	Firewood (85%)	Hydro power Solar	16

ANNEX 2: COUNTY SECTOR ANALYSIS
SECTION C: DISASTER RISK REDUCTION & ENVIRONMENT

	DISASTER RISK REDUCTION		ENVIRONMENTAL DEGREDATION	
COUNTY	COMMON DISASTERS	REDUCTION STRATEGY	CAUSES & IMPACT	
CENTRAL REGION				
Kiambu	• Natural hazards particularly floods along Athi River • HIV/AIDS • Livestock diseases • Drugs abuse among the youth • Road accidents and environmental degradation	• Involves Government, Red Cross, Faith Based Organizations, NGOs, community and other players	• Massive felling of trees in forests like Kinale and Aberdare Forests • Reducing volume of water following in the rivers • High soil erosion • Pollution of rivers by factories may increase water borne diseases	• Presence of quarries in some parts of the county like Ndarugu and Kilimambogo has changed the landscape leaving many openings which poses dangers to the motorists and residents
Kirinyaga	• Floods • Forest fires • Human-wildlife conflict • Crime • Road accidents • Drug and substance abuse • High unemployment rate	• Preparedness; relief, rehabilitation, mitigation and prevention of disasters	• Water waste from residential areas and car washes located on river banks has also greatly contributed to water pollution due to a poor solid waste management system in the county • Illegal logging • Noise pollution	
Murang'a	• Landslides • Drought and famine • Accidents related to quarrying • Frost • Human-wildlife conflict • Water pollution • Forest fires	• Kenya Red Cross provide disaster relief services • First aid trainings for volunteers throughout the County	• Solid waste dumping and management of solid waste to the environment • Human waste disposal is a challenge in the county as only Murang'a Town is served by a sewerage treatment plant	
Nairobi	• Flooding in the lower parts of the County • Industrial, chemical, electrical and oil spill fires have become increasingly common especially in informal settlements	• County will prepare a disaster contingency plan This will assist in mapping out possible disasters prone zones and the response mechanisms	• Increased number of vehicles • Efforts to control carbon monoxide emissions by motor vehicles, with NEMA taking a lead role in enforcement of related laws • Changing methods for disposal of solid waste from dumping and burning to recycling • Unplanned/uncontrolled settlements	• Poor solid waste management, uncontrolled development, untreated industrial discharge and inefficient energy use • Pollution control measures are hampered by inadequate capacity for enforcement of existing environment conservation policies
Nyan-darua	• Drought • HIV/AIDS • Livestock diseases • Environmental degradation and deforestation leading to desertification and climate change • Droughts/floods are more frequent • Increase in average temperature • Successive crop failure • Vector borne diseases (malaria) in areas not previously associated with it	• Existence of disaster management committees and institutions • Awareness of possible disasters and areas prone to these disasters • Availability of improved farming technologies • Availability of funding from international partners • The existence of devolved governance	• There are threats to Lake Ol'bollosat due to encroachment and pollution from human settlements and agricultural activities • Increased number of quarries which has caused loss of vegetation cover and topsoil • Illegal logging, charcoal production, cultivation, settlement and fires are some of the challenges facing environmental conservation in the county	
Nyeri	• Drought • Floods, mudslides, landslides • Fire • Effects of climate change • Road accidents • Domestic violence	• Various stakeholders incl. gov't • NGOs and the communities are addressing this challenge • Short-term security assured by arming house guards, reserve police • Constant barazas by Provincial Administration	• Reduced farm productivity due to soil erosion • Increased resource scarcity (water, grazing lands, farmable area) • Crops failures, low yields and new pest infestations can be attributed to this phenomenon	• Soil acidification due to the uncontrolled applications of agro-chemicals and bad agricultural practices (over cultivation) is another common symptom of degradation
COASTAL REGION				
Kilifi	• Drought • Floods • Insecurity • Resource-based conflicts • HIV/AIDS	• Disaster preparedness, mitigation and prevention must also be integrated into development initiatives particularly in high-risk areas for natural disasters • Need to capacitate the local people to deal with disasters	• Air pollution from the quarries and cement factories, water pollution, soil degradation, deforestation, poor solid waste management • Charcoal production leads to widespread destruction of environment through uncontrolled felling of trees • Sand harvesting in Marereni and quarries in Ganze	• Environment Management Committees have put measures in place to regulate private and public sectors development so as to minimize negative impact on the environment • Environmental Impact Assessment • Environmental conservation awareness and soil and solid waste management

	DISASTER RISK REDUCTION		ENVIRONMENTAL DEGREDATION	
COUNTY	COMMON DISASTERS	REDUCTION STRATEGY	CAUSES & IMPACT	
Kwale	• Droughts • Flooding	• Hyogo Framework of Action	• Solid waste management • Logging (charcoal burning) • Bush fire (burning vegetation by farmers) • Overgrazing	• Mining and sand harvesting also contribute to environmental degradation • Law enforcement and better community management of environment and natural resources management
Lamu	• Flooding • Fire • Drought, inter-community conflicts • Poverty • Youth unemployment • Exposure to tourists has significantly increased HIV & AIDS prevalence • Drug and substance abuse • Poor disaster management	• Kenya red cross society • Institutions engaged in response: Kenya ports authority, Kenya petroleum refineries, oil spillage committee, Moi international airport and Kenya ferry services	• Reduced farm productivity due to soil erosion • Increased scarcity of resources such as water, grazing lands and farmable area • Soil acidification due to the uncontrolled applications of agro-chemicals and bad agricultural practices (over cultivation)	• Crops failures, low yields and new pest infestations can be attributed to this phenomenon
Mombasa	• Transport related accidents such as ferry and boat accidents • Factories and go down-related accidents • Terrorism	• Drought Risk Reduction interventions proposed to ensure that community is more resilient to shocks/hazards	• The declining water supply increase demand resulting to inadequate water	• Changes in local temperature regimes with frequent change in weather patterns
Taita Taveta	• Landslides • Drought • Floods	• Reduced exposure to hazards, lessened vulnerability of people and property • Wise management of land and the environment • Improved preparedness for adverse events	• Slash and burn agriculture • Forest logging, • Poor agricultural practices such as cultivation along river banks, and human settlement on hilltops • Sand harvesting along rivers	
Tana River	• Droughts • Floods sometime flash floods • Displacement of people and livestock • Destruction of crops, property and infrastructure • Water-borne diseases • Clashes occur seasonally	• Periodic assessments by National Disaster Management Authority Availability of trained Disaster Risk Reduction (DRR) staff is strength of NDMA • Adopt modern early warning systems by June 2018 • Increase irrigation farming by 50% by June 2018 • Hold peace meetings every three months by June 2018	• Shifting weather patterns • Flooding • Warming atmosphere • Spread of pests and diseases once limited to the tropics • Policies should be enacted to encourage payment for ecosystem services such as medicinal plants and biodiversity • Identify and protect ecologically sensitive and fragile areas	
EASTERN REGION				
Embu	–	–	• Sand harvesting, land degradation and deforestation esp. in farm areas • Illegal logging and charcoal production in ASALs	• Mt Kenya forest/wetland encroach-ment esp. near major waterways • Relocation or initiating restoration of degraded environments
Isiolo	• Severe drought • Floods • Famine • Tribal clashes, cattle rustling, bandits • Severe environmental degradation	• Support from NGOs • Disaster prevention awareness and early warning system through seminars, trainings and mapping • Existence of District Disaster Management Committees	• Charcoal burning • Sand harvesting • Overgrazing and overstocking • Soil erosion • Massive environmental destruction	
Kitui	• Natural hazards: drought, floods, wildfire • HIV/AIDS • Poverty	• Early Warning & Monitoring systems • Preparedness planning and manage-ment of disasters within the county • Participatory strategies include identification of alternative areas of settlements • Coordination of relief supplies • Effective rescue services • Promotion of flood control mechanisms	• Deforestation and destruction of watershed areas • Soil erosion, declining soil fertility and resultant low farm yields • Loss of biodiversity and alteration of the natural tropical habitat • Outbreaks of pests and diseases • River bank erosion due to poor farming practices • Seasonality of rivers and emergence of dry river beds	• Inadequate policy, legal and institutional frame work and poor implementation of laws • Poor infrastructure • Sensitization and enforcement of environmental law • Harmonization of environmental conservation laws • Environmental conservation, education and awareness programmes

	DISASTER RISK REDUCTION		ENVIRONMENTAL DEGREDATION	
COUNTY	COMMON DISASTERS	REDUCTION STRATEGY	CAUSES & IMPACT	
Machakos	• Floods • Drought • Waste management from industries	• County Public Administration Department response and DRR • Hyogo Framework of Action • Establish and maintain an efficient and coordinated system • Sand harvesting regulations	• Sand harvesting has resulted in drying up of some rivers • Surrounding communities encounter water scarcity because of the substantial reduction of water	• Most locals use firewood and charcoal as primary source of fuel • This has led to deforestation in leading to expansive soil erosion. Most affected areas are Kibauni Forest, Yathui and Mumandu Hills
Makueni	• Floods • Drought	• Risk assessment	• Industrial effluent and plastic waste into Athi River upstream, and poor farming methods contribute to environmental degradation • Degradation has resulted in reduced vegetation cover and negatively affects agricultural productivity • Sand harvesting has led to conflicts	• Charcoal burning has reduced the vegetation and forest cover • County has embarked on protecting hilltops, regulating sand harvesting and charcoal burning • Alternative economic activities to mitigate environmental degradation
Marsabit	• Prolonged drought; the pattern of drought has changed drastically with more frequent occurrence • Shortage of food and reduced crop production • Loss of livestock • Shortage of water	• Established radio station (Kangema FM) broadcasts in local dialect warning of imminent landslides • To mitigate deforestation, through KFS the gov't has introduced licenses for cutting and transporting trees • NGOs, donors, community-based organisations educate local communities on the importance of environmental conservation	• Deforestation and forest encroachment due to dependency on firewood and overgrazing • Inadequate solid waste collection and its disposal • Lack of sewerage system	• Unsustainable management practices of ecosystems and their inherent biodiversity are major contributors to environmental degradation in the county
Tharaka Nithi	• Famine affects the ability of institutions to offer effective services • Health facilities cannot cope with the high level of malnutrition and disease outbreaks • Unsold livestock due to quarantine	• NGOs and local communities are addressing this challenge • In the short term, security assured by arming home guards/reserve police • Constant barazas by the Provincial Administration	• Charcoal burning • Sand harvesting • Quarrying	
NORTH EASTERN REGION				
Garissa	• Floods • Animal diseases • Drought, pests and agricultural diseases	• Trained community members on Disaster Risk Reduction • Presence of early warning systems • Strong presence of civil society organizations • Existence of disaster management committee	• Illegal encroachments and settlements • Logging and over-grazing, mushrooming of settlements on grazing land • Increase in population • Climate change	• Influx of refugees • Charcoal burning • Frequent floods during rainy season have also contributed greatly to environmental degradation
Mandera	• Droughts • Floods • Diseases	• Allocate adequate resources to reduce disasters	• Over grazing • Charcoal burning • Quarrying	• Poor waste disposal in settlement areas and towns • Soil erosion, wind storms, formation of gullies, drought, climate change and floods during rainy season
Wajir	• Drought and famine • Floods • Terrorism • Conflicts • Fires • HIV/ AIDS • Environmental pollution and degradation	• Adequate resources need to be allocated for mitigation and developing resilience mechanisms • Disaster management committees • County Steering Group • Presence of meteorological department • Devolved systems that promote coordination	• Continued charcoal burning • Tree cutting • Overgrazing and overstocking • Proper waste disposal system lacking in all towns and market centers • Encourage community environmental awareness through electronic (e.g. Wajir community radio) and print media	• New settlements due to high population growth is a strain on available resources • Poor sanitation, only 23% of the population have access to toilets • Environmental degradation is attributed to illegal encroachment, droughts, floods, deforestation, overgrazing and uncontrolled felling of trees for charcoal

	DISASTER RISK REDUCTION		ENVIRONMENTAL DEGREDATION	
COUNTY	COMMON DISASTERS	REDUCTION STRATEGY	CAUSES & IMPACT	
NYANZA REGION				
Homa Bay	–	• Established disaster management committee • Develop early warning system to detect drought so that coping mechanisms initiate in good time • With the completion of Sondu-Miriu hydroelectric project, problems associated with frequent floods will be minimized • Set up food reserves to assist those affected by drought • Health service providers will intensify sanitation campaign to stem frequent outbreak of cholera • Water providers will ensure that water is made accessible • Increase capacity of dams and pans to ensure is water stored for longer	• Both natural and man-made forms of degradation that have adversely affected the carrying capacity of the local ecosystem • Desertification and floods • Control and manage sand harvesting	
Kisii	• Lightning • Landslides • Droughts • Floods • Quarrying and mining especially in Tabaka • Crop and animal diseases	• Presence of Kenya Red Cross • Ministry of Devolution and Planning (Special Programmes Department) • Drought management officers in arid areas • Trained County planning officers • Trained disaster personnel	• Depletion of vegetation • Use of farm chemicals has caused pollution in both surface and undersurface water sources • Coffee and tea processing factories contribute to water pollution • Mining of soapstone has led to land degradation	• The main effects of environmental degradation are destruction of water catchment areas, increased spread of disease (e.g. malaria) • Uncovered quarry sites are breeding grounds for mosquitoes and cause landslides • Weather pattern has significantly changed resulting in unpredictable planting seasons
Kisumu	• Floods • Drought • Disease outbreaks • Accidents	• Hyogo Framework of Action	• Effects of environmental degradation include hazards posed by expanding gullies due to soil erosion • Continued discharge of raw waste and industrial effluent into the Lake Victoria has promoted the growth of water hyacinth that has engulfed the lake	• There is also continued loss of fertile soils and siltation of rivers and water ways leading to frequent flooding especially in the lowlands • Sand harvesting activities in some parts of the county is not organized and threatens to contribute to further soil erosion
Migori	• Lightning • Desertification • Flooding • Conflicts • Mining related accidents	• Construction of dykes • Peace campaigns and public forums • Knowledge on disaster-prone areas • Development partners: Red Cross, UNHCR and UNICEF	• Overstocking • Flooding and deforestation • Loss of productivity of land leading to poor crop yields and food insecurity	• Addition measures shall be put in place to control and manage sand harvesting
Nyamira	• Road accidents affecting the busy roads like Kisii-Sotik and Kisii-ngoina and potential industrial areas	• Installation of lightning arrestors in most learning institutions, gov't buildings, and health institutions • Community awareness • County needs to develop strategies that will reduce the vulnerability of the populace and the magnitude of the effect of such emergencies	• Unsuitable farming methods • Effects of climate change • Poor solid waste management • Soil erosion, inadequate sanitary facilities and cultural practices • Massive cutting down of trees for firewood, timber and to clear land for agricultural use	• Poor physical planning in urban areas • Quarrying activities • Pollution and effluents from agro-chemicals • Alien and invasive species
Siaya	• Disease outbreaks • Strong winds • Floods • Fires • Others include road accidents affecting the busy roads like Kisii-Sotik and Kisii-Ngoina and potential industrial areas • Boat accidents in the lake resulting in loss of property and lives	• Hyogo Framework of Action	• Reduction of water levels • Soil erosion and silting of the dams and water pans • Low agricultural productivity due to prolong drought	

	DISASTER RISK REDUCTION		ENVIRONMENTAL DEGREDATION	
COUNTY	COMMON DISASTERS	REDUCTION STRATEGY	CAUSES & IMPACT	
RIFT VALLEY REGION				
Baringo	• Deforestation • Desertification • Pollution and climate change • Overgrazing and overstocking • Unregulated charcoal burning • Frequent droughts • Soil erosion	• Provision of water and relief food • Establishment of irrigation system	• Environmental education and awareness training in schools and colleges will be promoted • The county government shall support volunteer programmes and formation of ward/sub-county-specific thematic DRR action	
Bomet	–	–	• Environmental degradation has led to reduced and erratic rainfall, poor sanitation, increased river siltation, low agricultural productivity and loss of biodiversity • Quarrying activities	• Escalating poverty from food insecurity, water shortages, and water borne diseases • Encroachment on gazetted forests for grazing and illegal logging
Kajiado	• Drought and famine • Flash floods • Winds • Environmental pollution and degradation • Accidents • Human-wildlife conflict • Spread of communicable diseases, poor sanitation • Population displacement and damage to physical infrastructures	• Strategic interventions will be instituted to mainstream DRR in all sectors	• Water pollution and worsened the quality of the already scarce water • The increase in degraded areas has resulted to decrease of pasture for livestock and low productivity of agricultural land • Resource conflict due to competing demands • Air pollution from industrial activities in Kitengela and flower farms in Isinya poses a health risk	
Kericho	• Earthquakes • Floods • Droughts • Road and rail accidents	• Development projects/programs • Mainstreaming DRR in all sectors of the economy • Budgetary allocation and legislation to assist in implementation of DRR activities	• Wetlands available are encroached and sub-segment destruction • Riverbanks often are encroached by individual farmers • Pollution, emission control and waste management • Over reliance on Firewood deplete the forest cover • Tree felling exposes the soil hence becomes susceptible to soil erosion • Information related to environment is readily available on the internet	• Cultivation on hilly areas in the county has predisposed the soils to soil erosion • Environment Committees should be strengthened so as to enhance their mitigation measures • Efforts are being made to enforce the Environmental Management Coordination Act and Water Act, among other Acts • There will be need to further decentralize the structures addressing environmental issues
Laikipia	• Drought • Floods	• Kenya Red Cross, WFP, Government departments, Caritas Nyeri • Disaster management committees at all levels to supplement efforts of existing actors • Disaster preparedness mechanisms need to be intensified to mitigate the effects of disasters • Communities awareness of their role in the management of disasters	• Fragile ecosystem devastated by heavy soil erosion • Deforestation and charcoal burning • Destruction of catchment areas thus reducing the carbon sink • Increased horticultural activities around major water catchment areas (Mt Kenya and Aberdare ranges) have led to rivers drying up downstream	• The unplanned rapid expansion of the major towns and market centres has constrained the ability of the town boards' sewerage and solid waste management facilities
Nakuru	• Floods • Drought • Wind	• Enhancing early warning systems • Building a culture of resilience • Reducing underlying risk factors • Strengthening preparedness for effective response • All stakeholders will be sensitized to proper, sustainable environmental conservation measures	• Effects of climate change • Poor solid waste and liquid waste disposal • Soil erosion • Inadequate sanitary facilities • Poor urban planning	• Massive felling of trees for firewood and timber, clearing land for agricultural use • Quarrying activities • Pollution and toxins from agro-chemicals contributes to environmental degradation
Nandi	• Drought • Lightning • Landslides • Conflicts • Crop/animal diseases and forest fires • School fires reported in the past • Malaria, typhoid, HIV/AIDS • Hail, army worms, road accidents	• Existence of disaster management committee	• Demand for agricultural land and wood products • Increasing urban and rural population • Exposure of land to agents of soil erosion and pollution of water bodies	

	DISASTER RISK REDUCTION		ENVIRONMENTAL DEGREDATION	
COUNTY	COMMON DISASTERS	REDUCTION STRATEGY	CAUSES & IMPACT	
Narok	• Floods • Drought • Pest and diseases outbreaks • Possible volcanic eruptions • Landslides • Man-made disasters occur through, accidents, tribal clashes, fire outbreaks, wildlife menace and infrastructural collapse	• County government has set aside Ksh 50 million for emergencies • Supportive public awareness on environmental conservation is currently on-going • NEMA, KFS and county administration	• Unsuitable farming methods • Effects of climate change • Poor solid waste management • Soil erosion • Inadequate sanitary facilities • Massive cutting down of trees for firewood, timber and clearing land for agricultural use	• Poor physical planning in urban areas • Quarrying activities • Pollution and toxic from agro-chemicals and alien and invasive species • Extreme weather conditions
Samburu	• Cattle rustling • Displacement of families and loss of lives	• Government, NGOs and local communities are addressing this challenge • Short-term security assured by arming house guards and reserve police • Constant barazas by the provincial administration	• Repeated droughts • Occasional floods • Reduced vegetation cover • Diminishing surface water volumes overtime	
Turkana	• Flash floods • Serious livestock diseases • Recurring drought	• Come up with feasible systems and structures to reduce the effects of these disasters • Adapt to the guidelines of the Hyogo Framework of Action, including five priority areas to be considered while undertaking DRR strategies	• Charcoal burning • Use open defecation in the bush with only 20,214 households using latrines This situation contributes to water, soil and air pollution and poses a health threat to the communities	• The effects of environmental degradation include; soil degradation and erosion, air pollution, garbage pollution, deforestation, desertification, climate change, wild fires, sand and dust storms, and losses due to strong winds like blown off roofs
Trans Nzoia	• Floods during long rainy seasons • Drought during dry season • Conflicts arising from cattle rustling along the Trans Nzoia-West Pokot county boundary • Crop and animal diseases (e.g. maize necrotic diseases, goat plague) • Fires in Mt Elgon forest and Cherangany Hills during dry season	–	• Poor farming practices, farming that promotes soil erosion, farming along river banks • Poor disposal of chemical waste • Destruction of forests; mainly for human settlement and firewood • Unplanned land use; County does not have a comprehensive land use plan	• Natural causes such as landslides; especially in the hilly mountain slopes
Uasin Gishu	• Floods • Fires • Road accidents which pose a challenge to achieving sustainable development	• Strategic interventions will be instituted to mainstream disaster risk reduction in all sectors	• Poor solid waste disposal • Soil erosion • Deforestation has on its part led to unpredictable weather conditions greatly affecting farming	• Rainfall patterns increasingly unpredictable • Health affected due to increased survival of vectors and microbes
West Pokot	• Drought • Floods • Landslides • Conflicts • Livestock diseases • Lightning strikes • Road accidents • Deforestation • Soil erosion and fire	• Disaster contingency plan to assist mapping out disaster-prone zones and response mechanisms • Prepared by the County disaster management committee, the plan will take forecasting and precautionary measures into account • Improve response mechanisms, educate/train officials and at-risk population, secure resources	• Poor disposal of solid/liquid waste • Unsustainable farming methods, charcoal burning, overgrazing, deforestation, human encroachment on protected areas • Poor waste disposal, especially at Makutano trading centre where there is no sewage system • Charcoal burning prevalent in Kongelai, Marich, Sigor • Human encroachment in Pokot South Sub-County forests	• Effects of environmental degradation include massive soil erosion, unpredictable weather patterns, resource-based conflict, water and air pollution, reduced agricultural output, increased drought incidence, desertification, reduced forest products, flooding • Construction of more health facilities, sensitization of the community through workshops and barazas to protect the environment
WESTERN REGION				
Bungoma	• Landslides • Fires • Lightening • Oil spillage • Human/livestock disease epidemics • Collapsing building/bridges • Destructive winds	• Formulation of policies for public private partnerships in disaster management • Annual budget for disaster emergency response	• Reduced crop and animal yields • Pest resistance • Loss of biodiversity • Erratic weather patterns which result into flooding and droughts • Reduced river volumes and reduced water for domestic use, irrigation activities	• Extinction of species and reduced fish stocks • Increased water borne illnesses such as diarrhea, dysentery, cholera and typhoid

	DISASTER RISK REDUCTION		ENVIRONMENTAL DEGREDATION	
COUNTY	COMMON DISASTERS	REDUCTION STRATEGY	CAUSES & IMPACT	
Busia	• Floods • Famine • Fire	• Establish and equip disaster management and response centres in disaster prone areas • Capacity building across all centres • Enforcing the Environmental Management Coordination Act and ensuring that Environmental Impact Assessments are carried out by all developers before undertaking any project	• Loss of quality and quantity of natural biodiversity, soil erosion, and flooding in southern parts of Teso North and Budalang'i sub-counties • Reduced river volumes and extinction of species • Perennial reduction of most river volumes and water pollution	
Kakamega	• Road accidents from trailers transporting sugarcane to the factory • Lightning • Fires mainly in sugarcane plantations • Floods along major rivers • Landslides in Shinyalu and Kuvasali areas	• Create a framework for implementation of DRR and climate change adaptation approaches	• Lack of modern waste disposal and management systems, • Quarrying, poor land use practices, low degree of enforcement of the environmental laws and encroachment on the gazetted forest land, hilly tops and slopes • Declining water volumes/ levels and drying of many springs and streams, unreliable weather patterns resulting in reduced farm yields, frequent flash floods and general rise in temperature	• In addition, there is increased recording of a number of vector diseases such as malaria, typhoid, and upper respiratory tract infections among others • Environmental Impact Assessments ought to be undertaken before any project or programme is implemented • Provision of environmental education that addresses issues of sustainable utilization of natural resources
Vihiga	• Lightning and heavy rains • Deforestation • Destruction of loose surface roads and bridges, and road accidents • Occasional rocks falling at quarry sites • Collapsing of buildings • Fire outbreaks	• Existence of Kenya Red Cross, World Food Programme and NDMA • Existence of an early warning system • Presence of county government	• Poor land use • Improper waste disposal • Sand harvesting • Pollution of rivers and springs • The rising population has resulted in community invading the existing forest destroying the water catchments	• Poor farming practices in sloped areas have led to soil erosion and depleting the soils fertility This has resulted to low yields leading to food shortages

ANNEX 3: SUMMARY OF CLIMATE CHANGE ACTIONS IN CIDPS BY COUNTY

CENTRAL REGION

KIAMBU

Kiambu County is located in the central region and covers a total area of 2,543.5 km^2 with 476.3 km^2 under forest cover according to the 2009 Kenya Population and Housing Census. The County lies between latitudes 0° 25′ and 10° 20′ South of the Equator and Longitude 36° 31′ and 37° 15′ East. It is divided into four topographical zones Gatundu north, Gatundu south, Githunguri and Kabete constituencies.

The County experiences bi-modal type of rainfall. The long rains fall between Mid-March to May and short rains between mid-October to November. Average rainfall received by the County is 1,200 mm.

SECTOR SUMMARY	
Agriculture	Agriculture is the predominant economic activity in the County and contributes 17.4% of the County's population income. The size of arable land in the County is 1,878.4 km^2 and the non-arable land is 649.7 km^2 and 15.5 km^2 is under water mass. The average holding size of land is approximately 0.36 ha on small scale and 69.5 ha on large scale Due to the fact that farms have been subdivided into small units, majority of the food crops produced is consumed within the family and hence no problems associated with storage have been documented. Low adoption of new technologies; Use of uncertified seeds; High cost of inputs; Erratic rainfall; Poor soil; Low acreage; High cost of inputs; Inadequate extension services; High cost of production; High dependency of cash crops; Post-harvest loss are some of the challenges/ constraints facing the agricultural sector.
Forestry	The main forest types are natural/indigenous and plantation forests. Exotics are mainly planted in private farm forests but the data on the specific forest size is not available; although plans to carry out a survey are in process. The County has six forests with the major ones being Kieni and Kinale forests occupying an area of 426.62 km^2. The County has a plan to increase forest cover to 10% from the current 6.5%.
Water	About 90% of the County's water resources are comprised of both surface and ground water resource potential. Domestic water supply has recorded a noticeable growth over the last 5 years; 35% of the populations have access to potable water.
Energy	The main source of cooking energy is firewood which accounts for about 47.3%, while paraffin is the major source of lighting fuel. This poses a great challenge to the realization of 10% forest cover within the County. Connection to the national grid is good with 98% of all trading centers connected and only 4% of public institutions currently not connected. However, connection to individual homes is low and there is need for up-scaling of the rural electrification programme.
Disaster Preparedness	The County is highly vulnerable to natural hazards particularly floods along Athi River, HIV/AIDS, livestock diseases, drugs abuse among the youth leading to reduced productivity, road accidents and environmental degradation. In this case the respective stakeholders like the Government, Red Cross, Faith- based Organizations, NGOs, the community and other players will be coordinated to address various strategies to manage the disasters. To mitigate against more disasters, a County disaster management committee is needed, which will strengthen the respective measures that will reduce the risk of disasters. The County will set up an independent Disaster Management Unit within the Office of the Governor that will co-ordinate activities between the County and other players including the National Government, key players such as the Kenya Red Cross, the private sector and the civil society. A key priority will be mapping and evaluating the key disaster issues within the County in order to develop a comprehensive Resilience and Disaster Management Framework that is strengthened through County legislations.
Environmental Degradation	Environmental degradation has been rampant in the County with massive felling of trees in forests like Kinale and Aberdare Forests. This has led to destruction of water towers/ catchment areas and thus reducing the volume of water following in the rivers that originate from these natural forests. Poor farming methods and deforestation has led to high soil erosion and desertification which has brought about environmental degradation and climate change. The degradation of the environment has resulted in soil erosion and decreased food production. Pollution of rivers by factories may increase waterborne diseases. Presence of quarries in some parts of the County like Ndarugu and Kilimambogo has changed the landscape leaving many openings which poses dangers to the motorists and residents. Another challenge is related to insecurity where the openings have been used as hiding places by thugs. NEMA should enforce the Environment Management and Coordination Act (EMCA) by ensuring that industries and other stakeholders operating within the towns of the County treat their effluents to the required standards so as to reduce pollution to the environment. The County should embark on elaborate system to construct sewerage system in urban and peri-urban areas. A County landfill should be constructed to deal with solid waste disposal.

CLIMATE CHANGE	
Impact	Climate change impacts in the County are mostly experienced through lack of predictability of the timing and the intensity of rainfall, as well as increased flooding and prolonged dry spells.
Mitigation	Efforts are being made to encourage farmers to plant 10% of total land area with trees which can be fruit trees, fodder trees or any other plantation. Degraded sites are also identified and planted with trees to rehabilitate them (Increase tree coverage by tree planting and enforcement of the Forest Acts. Agro-forestry should be practiced at the farm level. Exploit waterfalls in the County for hydro energy generation as an alternative energy source. Some industries that have large parcels of land have established woodlots plantations. Trees are planted around identified water catchment sites to protect these areas.
Adaptation	In order to address the effects of climate change in the County, the following measures and strategies should be in place: Drill more boreholes for irrigation water; Develop more water pans to store rain water; Use of dams for irrigation and up-scaling drip irrigation.
On-Going Projects	Projects supported both by national and County government addressing issues including agriculture, food security, water harvesting, energy use and efficiency, forestry, disaster management, among others. The County will benefit from the National Soil and Water Conservation Programme (NSWCP) that uses individual farmer extension approach to teach farmers proper farming methods to reduce soil erosion and pollution from chemicals. It is also important to enforce the Forest Act to control illegal logging and unplanned cutting of trees on farms.
Climate Change Mainstreaming	The County was ranked 4 in Climate Change Mainstreaming as it identified climate change actions and budget allocation for adaptation and mitigation actions.

KIRINYAGA

Kirinyaga County is one of the 47 counties in Kenya and is located between latitudes 0° 01′ and 0° 40′ South and longitudes 37° and 38° East. The County borders Nyeri County to the northwest, Murang'a County to the east and Embu County to the east and south. It covers an area of 1,478.1 km^2.

The County lies between 1,158-5,380 metres above sea level in the south and at the Peak of Mt. Kenya respectively. Mt. Kenya which lies on the northern side greatly influences the landscape of the County as well as other topographical features. The mountain area is characterized by prominent features from the peak, hanging and V-shaped valleys. The snow melting from the mountain forms the water tower for the rivers that drain in the County and other areas that lie south and west of the County. The snow flows in natural streams that form a radial drainage system and drop to rivers with large water volumes downstream. The County can be divided into three ecological zones; lowland areas that fall between 1,158-2,000 metres above sea level, midland areas that lie between 2,000-3,400 metres above sea level and highland comprising areas of falling between 3,400-5,380 metres above sea level.

The County has a tropical climate and an equatorial rainfall pattern. The climatic condition is influenced by the County position along the equator and its position on the windward side of Mt Kenya. The County has two rainy seasons, the long rains which average 2,146 mm and occur between the months of March to May and the short rains which average 1,212 mm and occur between the months of October to November. The amount of rainfall declines from the high altitude slopes of Mt. Kenya towards the semi-arid zones in the eastern part of Mwea constituency. The temperature ranges from a mean of 8.1°C in the upper zones to 30.3°C in the lower zones during the hot season.

SECTOR SUMMARY	
Agriculture	There are 154,220 households and the total land mass is 1478.1 ha giving a mean land holding size of 0.0958 ha/household. In the lower regions of the County which comprise Mwea Constituency, the average land holdings are larger while they are smaller in the central and upper regions of Gichugu, Ndia and Kirinyaga Central Constituencies. Agriculture is the most important activity in the County with 87% of the total population deriving their livelihood from the sector and accounting for 72% of household income. The type of crops grown is influenced by the various ecological zones. Main crops include rice which is grown in paddies in the lower zones and tea which is grown in the upper parts of the County. Coffee is also a major crop grown in the upper and middle zones. Other major crops grown include bananas, tomatoes, beans, mangoes, maize and other horticultural crops. The total arable land in the County stands at area 116,980 ha which represent 79% of total area. The total land under food crop production is currently 50,864 ha and 31,244 ha under cash crop production which shows that only 70% of the arable land is utilized in food production. The average farm size for large scale farms is 5.2 ha and 1 ha for small scale farms. This is likely to change in future as the population increases and land is fragmented for inheritance. There are 762,682 Poultry in the County comprising of 680,343 indigenous chicken, 55,578 layers; 20,439 broilers and 5,162 ducks. Cattle total which 98,899 and comprise 69,183 dairy cattle and 29,716 zebu cattle. The zebu cattle are mostly bulls used for cart pulling as well as in tilling the land. These are mostly found in the upper and middle parts of the County. Goats total 73,978 where 48,960 are indigenous goats and are 11,068 dairy goats; the total number of sheep is 13,950. Other livestock bred are bees with a total of 18,199 beehives in the County and rabbits with a total number of 39,491 being bred in the County.
Water	There are six main rivers namely: Sagana, Nyamindi, Rupingazi, Thiba, Rwamuthambi and Ragati, which ultimately drain into the Tana River. These rivers are the principal source of water. Other resources are unprotected springs which are 29 in number, 12 water pans, 3 dams, and 208 shallow wells, boreholes and protected springs. Water quality in the County is good in the upper parts where there are numerous springs, but in the lower parts of Mwea Constituency the water is contaminated due to use of fertilizers and pesticides in irrigation. Water supply schemes – The water in the rivers has been harnessed through canals to provide water to the lower zones of the district especially in Mwea for irrigation purposes. Domestic water has also been tapped from these rivers using piped schemes. The piped schemes supply 51,515 households. Water sources – There are 12 Water Resource User Associations (WRUA) along various sub-catchments.
Forestry	The main types of forests are indigenous natural forests which cover an area of 35,876 ha, plantations which cover 1,540 ha, and bamboo forests which cover 7,500 ha, bush land/grassland forests that cover 6,956 ha and tea zone forests which cover 290 ha. There are 7 forests in Kirinyaga County with 5 gazetted forests namely, Mt. Kenya forest covering 35,043 ha; Njukiini west forest covering an area of 570.2 ha; Murinduku forest covering an area of 194.2 ha; Kariani forest covering an area of 24.28 ha and Kamuruana forest with an area of 23 ha. There are also 2 non gazetted forests namely Karimandu forest covering an area of 12 ga and Kerugoya urban forest covering an area of 10 ha. The main products from these forests are timber, poles, fuel wood, fruits and honey. Illegal logging has also been a major challenge and deforestation is a challenge.
Energy	All the major towns and urban centers in the County such as Kerugoya, Sagana, Wang'uru, Kianyaga, Kimunye, Kagio, and Kagumo are connected with electricity, however the major source of energy in the County is firewood which is used by 105,756 HHs followed by charcoal and gas used by 59,579 households and 28,987 households respectively. There are only 11,652 rural homes with electricity and 40 trading centres are not connected to the national grid.
Disaster Preparedness	Although there are some institutions equipped to handle some forms of disaster for example fires and human-wildlife conflict, the County does not have an elaborate disaster preparedness system which can improve coordination and disaster preparedness. There is need to have in place a County Disaster Management Committee whose capacity requires to be strengthened so as to inculcate the practice of DRR in the County. Regular reports of activities undertaken and challenges experienced by the Disaster Management Committee will eventually enhance disaster management decisions. The most prevalent disaster risks in the County are Floods, forest fires, human-wildlife conflict, crime, road accidents, drug and substance abuse and high unemployment rate. DRR strategies to be used in the County should encompass a full continuum from preparedness, relief, rehabilitation, mitigation and prevention of disasters.
Environmental Degradation	The major contributors to the degradation of the environment are deforestation, poor solid waste disposal, cultivation along river banks by the community, and pollution from industries and farmers. Water waste from residential areas and car washes located on river banks has also greatly contributed to water pollution. Due to a poor solid waste management system, there is rampant dumping especially in urban centres. Illegal logging is a major challenge and a cause of environmental degradation. Noise pollution associated with exhibition and road shows greatly contribute to noise pollution. Air pollution is mostly caused by the burning of old tires and

	motor vehicle emission. Disease prevalence has increased due to water and air pollution, leading to increased treatment costs and loss of labour force.

CLIMATE CHANGE	
Impact	Climate variability and extremes is emerging as a major threat to sustainable development of the County. There has been a rise in temperatures which has resulted in increase of malaria, erratic rainfall resulting to drying up of some rivers and also flooding especially on the lower parts of Mwea. The County is also already experiencing the effects of the recession of the glaciers on Mt Kenya which is a water tower in the County. The most affected sectors are agriculture and health. Deforestation has caused unpredictable weather conditions which adversely affect farming due to lack of proper rainfall patterns.
Mitigation	In addressing climate change, the County is planting more trees especially along the rivers, roads, public places and schools.
Adaptation	Other actions being undertaken are distributing treated nets to malaria prone areas, constructing water pans which will reduce withdrawal of water from rivers and public education on awareness of environmental friendly technologies and their transfer to the community. Also there has been promotion of drought resistant crops.
Ongoing Projects	Water harvesting for food security, Horticultural productivity and marketing, Urban and Peri-urban Project.
Climate Change Mainstreaming	The County was ranked 3 in climate change mainstreaming, as they have adaptation and mitigation actions prioritized.

MURANG'A

The County lies between 914 metres above sea level in the east and 3,353 metres above sea level along the slopes of the Aberdare Mountains in the west. The highest areas in the west have deeply dissected topography and are drained by several rivers. All the rivers flow from the Aberdare ranges to the west, southeastward to join Tana River. The geology of the County consists of volcanic rocks of the Pleistocene age and basement system rock of Achaean type. Volcanic rocks occupy the western part of the County bordering the Aberdare's while rocks of the basement system are in the eastern part. Porous beds and disconformities within the volcanic rock system form important aquifers, collecting and moving ground water, thus regulating water supply from wells and boreholes.

The County is divided into six agro ecological zones. The agro ecological zone one consists of the highest potential zones where forestry, tea and tourism industry form the most important economic activities. Agro-ecological zones two and three are the lowlands east of Aberdares and are generally suitable for both coffee and dairy farming. The flatter area of Makuyu division of Maragwa constituency is characterized by arid and semi-arid conditions. This forms the agro ecological zones 4, 5, and 6. In these zones coffee and pineapple plantations thrive by irrigation.

The County is divided into three climatic regions: the western region with an equatorial climate, the central region with a sub-tropical climate and the eastern region with semi-arid conditions. The long rains fall in the months of March, April and May. The highest amount of rainfall is recorded in April, and reliability of rainfall during this month is very high. The short rains are received during the months of October and November. The western region, Kangema, Gatanga, and higher parts of Kigumo and Kandara, is generally wet and humid due to the influence of the Aberdares and Mt. Kenya. The eastern region, lower parts of Kigumo, Kandara, Kiharu and Maragwa constituencies receive less rain and crop production requires irrigation.

SECTOR SUMMARY	
Agriculture	The major cash crops in the County include tea, coffee, avocado, mangoes, macadamia and horticulture crops, among others. Horticultural crops include tomatoes, cabbages, kales, spinach and French beans while food crops include maize, beans, bananas, sweet potatoes and cassava. The acreage under food crops and cash crops are 329,234 and 177,636 respectively. The acreage under food crop is almost twice that of cash crop. Food crop farming is practiced in all parts of the County but cash crop farming is practiced in upper zones and in some lower zones of the County. Agro forestry involves tree farming with crops and/or pasture. This entails the planting of trees that do not compete with crops.
Water	Murang'a County's water resources are rivers, shallow wells, springs, dams, boreholes and roof catchment. There are 10 permanent rivers, 400 shallow wells, 75 springs, 30 dams and 100 bore holes that supply water for domestic and agricultural use in the County. All these sources supply 60% of the County population with clean and safe drinking water. The County has 27 water supply schemes and about 16 irrigation schemes. Water supply schemes are managed by three different entities. There are some which are managed by the water companies, the department of water and some others are managed by the community members through water project committee. The irrigation schemes, which are managed by the community members, got funding from community own initiatives as well as government and development partners' support. In the County, the mean distance to the nearest water point is 3 km with about 29.4% of the households taking five to 14 minutes. Water supply schemes such as the Gatanga community water schemes supply water directly to households at reasonable cost. The County will expand the capacity of water schemes to ensure a minimum of 40% of the households are directly supplied with water. About 99.78% of the households use toilet facilities. Out of these, 4.97% use flush toilets, 3.97% use VIP latrines and the others use ordinary pit latrines. The majority of people living in the market and trading centres use ordinary pit latrines.
Forestry	The County has five indigenous gazetted forests covering a total area of 254.4 km^2. They are: Gatare, Karua, Kimakia, Kiambicho and Wanjerere forests. These forests are divided into two zones; the tropical Montane forest zone located along the Aberdare ranges and the semi-arid forest zone located in the lower parts of the County. However, there are 204,557 farm forests which are privately owned plantations. The main forest product in the County include: timber (approximated at over 64 million running feet), firewood (over 500,000 stacks) and seedling production of over 63 million. Other minor forest products include grass, bamboo sticks, medicinal herbs, honey and charcoal. The forests are also the major sources of various rivers namely Maragwa, Mathioya north, Mathioya south, Kiama and Thika rivers.
Energy	The energy subsector promotes environmental friendly, sustainable and renewable sources of energy. There are 33,861 households out of 255,696 households with electricity connections. A negligible number, less than 1% of households use solar energy. Much needs to be done to expand rural electrification programme to increase the proportion of households with access to electricity. Other main sources of energy commonly used in the County are firewood, paraffin, charcoal, LPG gas and solar. Emphasis needs to be put on reforestation to replace the trees that are felled in search of firewood which is the main cooking fuel in the County in addition to exploring other alternatives of fuel such as biogas.
Disaster Preparedness	The major disasters experienced in Murang'a County include: landslides, drought and famine, accidents related to quarrying, frost, human-wildlife conflict, water

	pollution, and forest fires among others. It is therefore important to mainstream disaster risk reduction DRR in the County development planning to help reduce risks, mitigate prepare for and respond to both natural and man-made disasters. To mitigate on losses due to landslides the Government of Kenya through the meteorological department has established a radio station (Kangema FM) which broadcasts in the local dialect to warn communities whenever there is an imminent landslide. Poor households were also issued with small radios. The government through National Environment Management Authority (NEMA) has put up measures to reduce disasters in the quarrying sites through introduction of permits, regular site visits and public education.
Environmental Degradation	The main environmental pollutants in the County are identified as agrochemicals from agricultural activities and factories, vehicle exhausts, quarrying activities and emissions of Green House Gases (GHGs) into the atmosphere through natural causes and human induced activities and solid wastes from markets and towns. Solid wastes include: plastic, polythene papers, glass, human waste, animal waste, organic plant matter, synthetic material, rubber and medical waste. Dumping and management of solid waste to the environment remains a major challenge for the County. Human waste disposal is a challenge in the County as it is only Murang'a Town which is served by a sewerage treatment plant. Makuyu, Maragwa, Kangari and Kangema Towns as well as Kiria-ini, Kahatia, Kandara, Kenol and Kigumo Markets are in dire need of solid waste management facilities. Non-governmental organisations, donors, community bases organisations, etc. with interest in environmental conservation have come out to educate communities on the importance of conserving the environment. Some rivers in the County especially those near urban centres and markets are polluted due to poorly managed sewerage and drainage systems. This usually leads to diseases and environmental degradation. NEMA and the ministry of public health and sanitation has been sensitizing the public on proper waste treatment and discharge. To curb human-wildlife conflict, the government through the Kenya Wildlife Service has erected a life fence along the Aberdare ranges to control wild animals from moving out of the forests.

CLIMATE CHANGE

Impact	Climate Change has caused negative socio-economic consequences across most sectors with the most vulnerable being environment, agriculture, livestock, forestry, water, health, energy, fisheries as well as physical and social infrastructure. Climate change is a reality in Murang'a County and has led to prolonged dry spells and drying of river beds in the lower parts of Kiharu and Maragwa constituencies. Most of the disasters in the County are experienced as a result of extreme weather events due to climate change. Some of the adverse effects of climate change experienced at Murang'a County include: variation in weather patterns with reduced rainfall and failed crop seasons; frequent and prolonged droughts and diminishing water resources; floods, flash floods and landslides; environmental degradation and habitat destruction; Water bodies have been rescinding due to reduced inflow following the massive destruction of catchment areas; resurgence of weeds, diseases and pests that are destructive to both human and livestock wellbeing; loss of biodiversity especially where the ecosystems is fragile. Climate Change has also affected species distribution as an adaptive response. The African elephant (Loxodontaafricana) found at Aberdares is threatened due to destruction of its habitat and breeding grounds in the forest. Severe famine and hunger causing food insecurity especially in the ASALs regions like Kambiti, Maragwa Ridge. This is exacerbated by over dependence on rain-fed agriculture and rural poverty. Resource use conflicts: Wildlife has been forced to stray from protected areas to farms in search of water and forage thus enhancing human/wildlife conflicts e.g. at Kasevehills in Murang'a south there is conflict between the locals and monkeys. The main environmental pollutants in the County are identified as agrochemicals from agricultural activities and factories, vehicle exhausts, quarrying activities and emissions of Green House Gases (GHGs) into the atmosphere through natural causes and human induced activities and solid wastes from markets and towns. The GHGs disrupt atmospheric balance and global warming therefore heating the earth surface. The County heavily relies on hydro generated energy which results in frequent power outages and blackouts during the dry spells.
Mitigation	The transport mitigation measures include: good maintenance of road network to ensure high efficiency of vehicles and less emissions of GHGs and enforcement of air quality regulations and standards. Energy: diversification of to use of solar energy, wind energy, biogas and promotion of wood energy efficiency and conservation through using improved stoves at household levels. Green economy involves the production of energy from renewable sources such as bio fuel, solar, wind and biogas.
Adaptation	Murang'a County needs to make the necessary and deliberate adjustments to cope with effects of climate change. Adaptation comprises all actions aimed at enhancing the coping mechanisms to climate change which cannot be abated or mitigated thus reducing the magnitude of negative effects. These include prevention, tolerance, resilient, change of land use practices, relocation or initiating restoration of degraded environments. There are also damages to infrastructure such as roads, water supply pipes and housings roofing. Measures aim at reducing negative impacts occasioned by loss of human life, death of animals, and destruction of infrastructure among others. This is attained through the application of modern and appropriate farming technologies, alternative approaches, available opportunities and strategies to adapt to climate change. Coping mechanisms to climate change are sector specific allowing relevant and applicable interventions to be formulated and implemented. The water 'supply-side' adaptive techniques involve changing structures, operating rules and institutional arrangements. The water 'Demand-side' adaptive techniques involve water demand management e.g. efficient irrigation, water pricing, and emphasis on conservation, awareness raising campaigns, policies and regulations to encourage efficient use of water. Adaptation measures in health sector include: Strengthening the public health institutions to cope with increased occurrence of climate change related diseases e.g. malaria, cholera among others; and intensifying public health campaigns and public participation on climate change related diseases. Adaptation measures for agriculture include: Diversification of crops to help cope with shifting rainfall patterns, using drought resistance/tolerant crops and promotion of good agricultural practices. The ministry of agriculture is encouraging farmers in the County to grow high value traditional drought resistance crops e.g. cassava, sweet potatoes, sorghum to ensure food security during dry seasons.

Ongoing Projects	County agricultural development fund for innovation and food security support 2014-15, promote and manage agroforestry farming systems, establish carbon trading projects, promote soil and water management, Green schools
Climate Change Mainstreaming	The County was ranked 2 as it mentioned impacts of climate change and governance framework

NAIROBI

Nairobi County borders Kiambu County to the north and west, Kajiado to the south and Machakos to the east. Among the three neighbouring counties, Kiambu County shares the longest boundary with Nairobi County. The County has a total area of 696.1 km^2 and is located between longitudes 36° 45′ East and latitudes 1° 18′ South. It lies at an altitude of 1,798 metres above sea level. The County has a fairly cool climate resulting from its high altitude. Temperature ranges from a low of 10°C to a high of 29°C. It has a bi-modal rainfall pattern. The long rains season fall between March and May with a mean rainfall of 899 millimeters (mm) while the short rains season falls between October and December with a mean rainfall of 638 mm. The mean annual rainfall is 786.5 mm.

SECTOR SUMMARY	
Agriculture	The main crops grown in the County are maize and beans though mainly on a small-scale basis especially in Njiru, Langata and Kasarani. Other crops include sweet and Irish potatoes, kales and cassava. High value crops such as onion, tomato, and Swiss chard are also produced. Most of these crops are meant for consumption by the farming households while the surplus is sold to earn supplementary income. The land under crop cultivation is about 751.5 ha. However, sack gardening and green houses are coming up as an alternative method of farming due to limited space for conventional farming. The average farm size is approximately 0.0295 ha. Main livestock breeds are dairy cattle, beef cattle, sheep, goats, poultry donkeys, bees, rabbits and pigs. There is a total population of 25,536 dairy cattle, 29,010 beef cattle, 35,980 sheep, 52,412 goats, 127,083,985 commercial chicken, 181,721 indigenous chicken, 12,824 donkeys, 18,430 rabbits and 29,976 pigs. Livestock products in the County include milk, beef, mutton, chevon, pork, hides/skins, eggs, honey and wax. These products form an important source of income for livestock farmers as well as a source of raw materials for
Water	processing industries. Nairobi County has no main water tower; most of the supply is from the Tana Basin and is pumped to the City from distances of around 50 km. This bulk water supply is not reliable during periods of drought, and is also endangered by siltation of the reservoir due to deforestation in the catchment areas. The supply problem is further aggravated by the poor state of the distribution system, which results in about 50% losses due to leakage, illegal connection and inefficient and wasteful use of water by some consumers. Nairobi Water and Sewerage Company is the main water company in the County. Most of the water wells are operated by large private consumers (industrial enterprises, hotel complexes) or by individual residential owners in parts of the City that receive only intermittent supply (for example, Langata, Karen). Wells are often shared with neighbors or water is sold for distribution by tankers. Many private well owners are also connected to the mains water supply network (which provides cheaper water) but use groundwater as a back-up.
Forestry	Nairobi County is home to three gazetted forests namely Karura, Ngong Road forest and Nairobi Arboretum. Karura forest is the largest of the three with 1,041 ha located in northern Nairobi. It contains 605 species of wildlife including three types of antelopes. 632 ha contain plantations while indigenous trees cover 260 ha. The rest of the forest is shrubs and other plants. Ngong Road forest covers 538 ha with 80% being indigenous trees and 20% exotic eucalyptus plantations. Nairobi Arboretum is 30 ha of wooded landscape, an oasis close to the heart of the City situated about 3km from the City centre and adjacent to State House. It is one of the few remaining green spaces in Nairobi with shaded walkways, picnic lawns and jogging trails. The main forest products in Nairobi County vary from furniture, firewood, poles, posts and medicinal herbs. These products are obtained from both the indigenous and exotic trees.
Energy	Firewood, Grass, Paraffin, Charcoal, Biomass Residue, Biogas, Gas (LPG) are among cooking energy with a larger percentage using paraffin 63.2%. 68.2% are connected to electricity for lighting.
Disaster Preparedness	The Nairobi County development gains are under threat from increasing natural, human and climate change related disasters. Notable risks include flooding in the lower parts of the County, along the Nairobi river where landslides that have claimed lives in the recent past. Industrial, chemical, electrical and oil spill fires have become increasingly common especially in informal settlements. To avoid disasters and to minimize potential negative impact, the County will prepare a disaster contingency plan. This will assist in mapping out possible disasters prone zones and the response mechanisms. The plan prepared by the County disaster management committee will take into account the need to forecast and take precautionary measures, improve response mechanisms, educate and train officials and the population, and secure resources among other issues.
Environmental Degradation	Nairobi's large and growing population is one of the main forces driving the County's overwhelming environmental degradation. Other contributors include increased number of vehicles, unplanned and uncontrolled settlements, poor solid waste management, uncontrolled development, untreated industrial discharge and inefficient energy use. The leading contributor to climate change is from industrial and motor vehicle emissions. Pollution control measures are hampered by inadequate capacity for enforcement of existing environment conservation policies. In addition, there is need to address existing policy gaps particularly on bio-technology, environmental planning and accounting for natural resources. Environment degradation has contributed to loss of biodiversity and destruction of habitats along river basins. It has also led to diminishing health and sanitation standards as a result of environmental pollution. Environmental degradation results in loss of biodiversity, heavy-metal poisoning, spread of water-borne diseases, insidious effects of toxic substances, loss of sustainable livelihoods for communities living along river banks, reduced availability and access to safe potable water. The water hyacinth and other aquatic weeds have covered the entire water surface on the Nairobi Dam and have choked aquatic life in the dam. This has resulted in a smelly water body, which receives human waste daily from the Kibera informal settlement and Jua-Kali refuse, above Nairobi Dam. Efforts have been made to control carbon monoxide emissions by motor vehicles with NEMA taking a lead role in enforcement of related laws. There has been a change in ways of disposing solid waste from dump-an- burn to recycling.

CLIMATE CHANGE	
Impact	Climate change affects the environment negatively leading to water scarcity, increased health threats, increasing temperature, low precipitation, erratic weather patterns,

	food insecurity and increase in cost of food commodities. Development gains are under threat from increasing natural, human and climate change related disasters. Notable risks include flooding along the Nairobi river where landslides have claimed lives in the recent past.
Mitigation	Diversify energy sources by investing in renewable energy sources. Agroforestry and green economy is also promoted.
Adaptation	In order to address the missing gaps in this area the following strategies will be adopted: establishment of early warning systems; monitoring climate change and disseminating information to the farmers; water harvesting, recycling and conservation.
Ongoing Projects	Urban and Peri Urban Agriculture and Livestock (Upal).
Climate Change Mainstreaming	The County was ranked 4 as they identified climate change actions and have budget allocation for mitigation and or adaptation actions.

NYANDARUA

The County is located in the central part of Kenya. The County has an area of 3245.2 km^2 lying between latitude 0° 8′ to the north and 0° 50′ to south and between 35° 13′ East and 36° 42′ West. The County borders include several counties; Laikipia to the north, Nyeri to the east, Kiambu to the south, Murang'a to the southeast and Nakuru to the west. The main physical features of the County include Kinangop Plateau and Ol'kalou/Ol'joroOrok plateau which have slopes that are interrupted by low undulating hills. The gentle slopes flatten to plain-like features encouraging formation of marshlands and swamps.

The County was affected by volcanic and faulting which gave rise to major land forms, the Great Rift Valley to the west and Aberdare ranges to the east. The highest point of the Aberdare ranges is 3,999 metres above sea level. There are steep slopes that have undergone great transformation through weathering creating shallow valleys and gorges. The ranges drop gradually in a series of faults giving way to an escarpment that has been broken into sharp valleys occasioned by change in levels of the river courses.

Some areas in the County are in the highland savannah zone, characterized by scattered trees with expansive grass cover. In elevated areas, tree cover increases forming thick forests with thick undergrowth. However, most of the natural vegetation has been cleared leading to environmental hazards such as environmental degradation which has claimed large portions of arable land. This has had some negative effects such as reduced rainfall, global warming, soil erosion, climate change, poor health and reduced food production.

SECTOR SUMMARY	
Agriculture	The main crops grown are potatoes, wheat, maize and vegetables. The County has a large proportion of its farming area dedicated to food crops which include potatoes, cabbages, peas, carrots among others. These crops are not exclusively meant for subsistence as they also account for significant income for most of the households. Cut flowers and horticulture are the main cash crops grown in the County. Revitalization of the pyrethrum growing industry will play an important role in improving the economic status of the County. The County has 96,062 ha under crop production. The total arable land area in the County is 184,900 ha. This shows that slightly more than half of the arable land is cultivated. The region enjoys adequate rains making it suitable for farming apart from some periods of dry spells. The County has high potential for agricultural production. Horticulture and dairy production are the leading enterprises.
Water	The County is categorized as a water scarce area. The situation has been aggravated by the degradation of water catchments leading to reduced ground water recharge. As a result, boreholes have medium to low yields. The main source of water in the County is rainwater which ends up in dams and rivers. The major rivers within the County originate from the Aberdare forest and drains into Ewaso-Nyiro and Narok in Rift valley and Tana catchment areas. The County has one lake, 222 dams, 280 boreholes, 6,244 shallow wells and 96 springs. Main source of water for domestic use is dams and shallow wells. This water is issued for domestic, agricultural and industrial use. Most of the water used is untreated and pose a great health risk. There are two water companies in the County registered by the Rift Valley Water Services Board. These are: the Nyandarua Water and Sanitation Company and the Ol'kalou Water and Sanitation Company. Most of the areas in the County are not covered under these schemes thus remains un-served. The water supply system is unreliable and there will be need to expand water schemes to increase the number of HHs with access to piped water.
Forestry	Total gazetted forest area in the County is 49,916.2 km^2 which is concentrated in the Western side of the Aberdare Ranges. They include four forests namely; Ndaragwa (13,233.5 ha), Ol'bollosat (3,326.9 ha), Geta (19,884.3 ha), north Kinangop (6,811.5 ha), and south Kinangop (6,660 ha). It also includes Ol'bollosat wetland which covers 33.3 km^2. Out of the 49,916.2 km^2 of gazetted forests, plantation type of forest covers 84.3 km^2, natural forests area 21.2 km^2, grassland 39.4 km^2, bush land 84.35 km^2 and bamboo 77.01 km^2. There are non-gazetted forests in the County namely; Muruai, Kirima, Kaimbaga Extension, Mawingu, Salient and Malewa Tree Nursery as well as two presidential tree parks within Ol'kalou urban centre. The main forest products are livestock fodder (grass), timber, poles and fuel wood. These are both from gazetted and un-gazetted forests. About 57.6% of the households in the County use firewood as cooking fuel and 28% use charcoal as cooking fuel. There is, therefore, need to explore more alternative sources of energy in order to sustain and increase the County forest cover. Activities on protection of water catchment areas include river line tree planting has been ongoing. Other activities include sensitization of Community Forest Associations (CFA) members who are sensitized on forest protection for their sustained benefits from the Forest, enforcing conservation efforts by arresting and prosecuting offenders, involving all other stakeholders and relevant arms of government as well as adequate facilitation of the responsible officers. In addition to riverine tree planting, degraded sites in farmlands have been rehabilitated and steep slopes in river banks have continuously been planted with indigenous trees while gazetting steep slope and hilltops have been maintained as conservation areas.
Energy	The main source of cooking energy is firewood while electricity covers 10.5% of the County and is mainly found in urban centres of Mairo-inya, Ol'kalou, Njambini and Engineer and several trading centres located in different parts of the County. The total number of households using electricity for cooking is 0.2%, while 77.8% of household use firewood as the main source of cooking fuel. The proportion of households using charcoal is 19.3%, paraffin is 1.4%, and biomass residue is 0.3%. Households using firewood for lighting are 0.3%; paraffin 82.7%, electricity 10.5%, and solar 6.0%.
Disaster Preparedness	The County is vulnerable to natural hazards particularly drought in the northern part, HIV/AIDS, livestock diseases, and environmental degradation. In coping with disasters the five priority areas on Disaster Risk Reduction (DRR) will be emphasized.

	These are: ensuring DRR is a County priority with a strong institutional basis of implementation; identifying, assessing and monitoring disaster risks and enhancing early warning; using knowledge, innovation and education to build a culture of safety and resilience at all levels; reducing underlying risk factors and strengthening disaster preparedness for effective response at all levels.
Environmental Degradation	There are threats to lake Ol'bollosat due to encroachment and pollution from human settlements and agricultural activities; increased number of quarries which has caused loss of vegetation cover and topsoil making land vulnerable topsoil erosion and threats to forests due to illegal logging, charcoal production, cultivation, settlement, fires are some of the challenges facing environmental conservation in the County. There have been cases of blocking of natural water ways by farmers leading to enhanced volumes of water in fewer water ways. This has led to increased erosion and flooding. This was evidenced during the 2013 long rains where we witnessed flooding of magnitudes never witnessed before. Lack of proper waste management, both liquid and solid waste, has also been another factor contributing to degradation and loss of livestock due to consumption of plastic waste.

CLIMATE CHANGE	
Impact	The County has witnessed a change in the weather patterns over the years. Previously the County did not have distinct rainfall seasons as is now the case. The
	County experienced rainfall throughout the year but nowadays there are two rainfall seasons with the long rains in March to May and short rains from September to December. This change in weather patterns has changed the farming patterns as some areas such as Ndaragwa experience periods of famine. Cases of crop failure have also been common due to extremely low temperatures at night leading to frost bite. Livestock farming has also been affected leading to reduced productivity especially for dairy and beef products. The County experiences deforestation leading to desertification and climate change. Droughts and floods have become more frequent and severe and there has been an increase in average temperature. The County is experiencing hotter days, colder nights, successive crop failure and spread of vector bone diseases such as malaria in places which were not previously malaria zones. These changes affect the resources critical to the prosperity and economic growth of the County.
Mitigation	Development of alternative sources of energy e.g. biogas, solar, electricity and energy saving jikos, encouraging the farmers to move from range management of livestock to zero grazing. Greenhouse farming should also be promoted for enhanced productivity.
Adaptation	De-silting of the lake to enhance retention of the lake and reduce human wildlife conflict, enhanced tree planting both at the farm level and public land, embracing the carbon credit programmes. Farmers in the drier areas of Ndaragwa and Kipipiri should be encouraged to plant drought resistant crops and also practice irrigation farming. Building of multipurpose dams for farming, livestock watering, power generation should be undertaken.
Ongoing Projects	National Agricultural Extension Programme CEP-GOK, Traditional high value crops, Promotion of Greenhouse technology, Promotion of Greenhouse technology.
Climate Change Mainstreaming	The County was ranked 3 as they identified priority actions for mitigation and adaptation actions

NYERI

Nyeri County is located in the central region of the country. It covers an area of 3,337.2 km^2 and is situated between longitudes 36° 38′ East and 37° 20′ East and between the equator and latitude 00 38° South. It borders Laikipia County to the north, Kirinyaga County to the east, Murang'a County to the south, Nyandarua County to the west and Meru County to the northeast.

The annual rainfall ranges between 1,200-1,600 mm during the long rains and 500-1,500 mm during the short rains. In terms of altitude, the County lies between 3,076-5,199 meters above sea level and registers monthly mean temperature ranging from 12.8°C to 20.8°C.

SECTOR SUMMARY	
Agriculture	Total area under food crop is 80,943 ha while 18,521 ha are under cash crop production. Food crops are mainly produced on small scale, which is due to the smallholding sizes as a result of population pressure. The area under cash crops is limited since economical production requires large parcels of land. The average farm size is 0.7 ha for small-scale farmers and 4 ha for large-scale farmers. This is due to high population density though the farms are intensively utilized. Large scale farms are mainly found in Kieni Sub-County. In the County, the main food storage facilities include: National Cereals and Produce Board in Kiganjo with a
	storage capacity of 100,000 metric tons; on farm storage granaries and in the farmers houses. Most farmers store their produce in their houses due to low production as a result of small parcels of land. Agricultural and livestock productivity is worsened by limited, unreliable and poorly distributed rainfall pattern. In recent years the rains have become erratic and unpredictable hence making it difficult to plan on farming.
Forestry	The County has a total of 12 gazetted forests mainly of indigenous and plantation trees. The major forests are found within the Aberdare ranges and Mt. Kenya with the size of gazetted forest being 861.7 km^2. The ungazetted forests are managed by the County government. There are also a number of important hills, with a combination of indigenous and plantation flora (Karima, Tumutumu, Nyeri)
Water	There are four major supplies of water in the County namely; Tetu-Aguthi, Mathira, Othaya- Mukurwe-ini and Nyeri Water and Sewerage Companies. There are also other schemes coming up under the departments of water and irrigation. A total of 98,125 households have access to piped water and 187,087 households to potable water. The County is adequately served with surface and underground water with average distance to the nearest water point being two km. Majority of the population, that is, 41.6% take between five and 29 minutes to fetch water for domestic use.
Energy	The County is poorly supplied with electricity with only 26.3% (2009 population and housing census) of the households connected. A total of 112 trading centers and 170 secondary schools are connected with electricity. There are plans to increase the percentage of households and institutions connected with electricity through up scaling of the rural electrification programme. The main sources of energy are; firewood, paraffin, electricity, gas, charcoal, biomass residue, biogas and others. Firewood is widely used with 72.2% of the households using it as main cooking fuel. In the energy sub-sector, firewood accounts for approximately 72% of the County energy source, while rural electricity accounts for only 26.3%. Priority in the sub sector therefore is shifting the pattern of consumption towards other renewable sources of energy such as biogas, hydro, solar and wind in order to enhance environmental

	protection. The over reliance on firewood has continued to be a major contributing factor to deforestation. Rural electrification requires to be intensified to increase access of electricity as an alternative source of energy especially in learning institutions and spur growth of Jua Kali enterprises in urban areas.
Disaster Preparedness	The most prevalent disaster risks include natural phenomena such as drought, floods, fire, mudslide, landslide and effects of climate change. Other disasters include man-made risks such as road accidents and domestic violence. Drought is the major natural disaster that frequently occurs in the semi-arid regions of Kieni Sub County. County Public Administration Department has the responsibility to coordinate emergency response and DRR. The County will adopt 'The Hyogo Framework of Action' whose overarching goal is to build resilience of the nation and communities to disaster risks. The County will therefore build on these foundations to establish and maintain an efficient, effective and coordinated system. These systems will be critical in managing disasters, in order to minimize loss of life and resultant disruptions on population, economy and environment. There is need for the County to have a Disaster Management Committee with adequate capacity up to the village level. Regular reports of activities undertaken and challenges experienced by the Disaster Management Committee will enhance management decisions. These will be based on priorities, requirements and perceptions of those at risk such as the vulnerable community living in disaster prone areas.
Environmental Degradation	There has been general reduction of the natural resources ability to support the population e.g. reduced farm productivity due to soil erosion, increased scarcity of resources such as water, grazing lands and farmable area. Soil acidification due to the uncontrolled applications of agro-chemicals and bad agricultural practices (over-cultivation) is another common symptom of degradation. Crops failure, low yields and new pest infestations can be attributed to this phenomenon. The County needs to establish a mobile soil testing facility and extend advisory services to farmers on soil restoration measures.

CLIMATE CHANGE	
Impact	These effects of climate change threaten to undermine long-term efforts to achieve sustainable development, affecting disproportionately the most vulnerable groups in society, mostly the small-scale farmers who are heavily dependent on natural resources for their livelihoods. The main indicators of climate change include: increased failure of the rains leading to increased droughts, scarcity of water, changes in rainfall patterns, and temperature extremes. The result has been increased incidences of poverty, food insecurity and hunger due to unsuccessful harvests, water conflict, and lack of pastures for livestock. Malaria causing mosquitoes are spreading to non-traditional areas.
Mitigation	Promotion of green economy. This should include measures that promote agroforestry, renewable energy (solar, hydro, wind and biogas), organic farming and zero tillage agriculture to reduce the carbon foot print in the County. Nyeri research and development unit: this must be established to act as research and advisory body to the County government. To keep track on the impact of climate change, mapping of cropping and energy technology specific areas, conducting trials on suitable drought resistant crops, investigating carbon credit possibilities, etc. Mandate to recommend adoption, stoppage and/or further investigation of technologies/ practices/species etc. Agroforestry and green economy are promoted.
Adaptation	The County must address the serious economic and social impacts of climate change by promoting clear climate change adaptation measures through institutional capacity building, creating awareness, building partnerships and promoting climate smart technologies, especially in agriculture. Mainstreaming climate change and disaster mitigation into County planning programmes, forecasts should incorporate climate and economic indicators to enable monitoring of short and long term development strategies. Nyeri Climate Change Policy Framework: This is meant to improve the Nyeri County government policy and regulatory framework to effectively respond to climate change adaptation and mitigation. It supports the mainstreaming of climate change adaptation into the County economic and development policies. Effort toward this is being facilitated by the NGO, Help Self Help Centre, the County government and other stakeholders. Conservation and protection of critical natural resources of particular importance are the conservation of existing natural forests (Mount Kenya, Aberdares and a range of hills), re-vegetation of rivers catchment areas with bamboo and other suitable trees, planting of trees on farm and public places to increase forest cover, initiate mechanism for waste recovery and management and promote climate smart agriculture.
Ongoing Projects	Agricultural Sector Development Support Programme (ASDSP) County Wide, Njaa Marufuku Kenya (NMK), County Agricultural Extension Project. Countywide, Soil water and environmental conservation Countywide, Soil Testing Centre Wambugu ATC, Kenya Agricultural Productivity Programme (KAPAP).
Climate Change Mainstreaming	The County was ranked 4 as they identified climate change actions and have budget allocation for mitigation and or adaptation actions

KILIFI

Kilifi County is one of the six counties in coast region. The County lies between latitude 2° 20′ and 4° 0′ South, and between longitudes 39° 5′ and 40° 14′ East. It borders Kwale County to the southwest, Taita Taveta County to the west, Tana River County to the north, Mombasa County to the south and Indian Ocean to the east. The County covers an area of 12,609.7 km^2. The County can be divided into five Agro- Ecological Zones (AEZ), which define areas that have similar characteristics such as annual mean temperatures, vegetation and humidity.

The average annual rainfall ranges from 300 mm in the hinterland to 1,300 mm at the coastal belt. The coastal belt receives an average annual rainfall of about 900 mm to 1,100 mm with marked decrease in intensity to the hinterland. Areas with highest rainfall include Mtwapa and to the north of the coastal strip around the Arabuko Sokoke Forest. Evaporation ranges from 1800 mm along the coastal strip to 2200 mm in the Nyika plateau in the interior. The highest evaporation rate is experienced during the months of January to March in all parts of the County. The annual temperatures in the County range between 21°C and 30°C in the coastal belt and between 30°C-34°C in the hinterland. The County experiences relatively low wind speeds ranging between 4.8-12 km/hr.

SECTOR SUMMARY	
Agriculture	The main crops grown for subsistence are maize, cowpeas, green grams and cassava. The major cash crops in the County include coconut, cashew nuts, pineapples, sisal, and mangoes. The acreage under food crops and cash crops are 52,519.4 ha and 47,681 ha respectively. The acreage under food crop is higher than that of cash crop. The County arable land is estimated to be approximately 6,891.2 km^2 with a non-arable land of 5,407 km^2. This indicates that 56% of the land is useful for agriculture while 44% could be made useful through irrigation and this would help achieve and sustain MDG goal number one which is to eradicate extreme poverty and hunger by 2015. Food crop farming is practiced in all parts of the County but cash crop farming is practiced in Kilifi south, Kilifi north, Malindi, Kaloleni, Rabai and Magarini constituencies. The average farm size for most of the County's households is 3.04 ha for small scale farms and 8.09 ha for large scale farming activities. This means that farmers are not able to produce large quantities of crops to warrant large storage facilities at household level. The storage facilities at household level are mainly granaries due to small quantities of produce. Livestock is a major economic activity in the County providing income and food to the residents in the hinterlands of Ganze, Langobaya and Magarini. The main types of livestock in the County include cattle, sheep, goats and poultry. Upgrading of local livestock breeds would play a major role in the growth of the subsector because majority of the livestock in the County are indigenous.
Water	Water in the County remains a problem for domestic use, livestock and Irrigation. The County has 1205 shallow wells, 135 water pans, 90 small earth dams and 50 boreholes. The proportion of households with access to piped water is 48.1% while proportion of households with access to potable water is 63.3%. Baricho water works and Mzima springs are the only schemes in the County. Water sources in the County are as follows; permanent rivers such as Sabaki, shallow wells, protected springs, unprotected springs, water pans, dams and boreholes. Average distance to the nearest water point is 5 km.
Forestry	The forests within the County fall within the Eastern African coastal forests which are heterogeneous group of isolated evergreen or semi-green forests with high biodiversity. The County has 14 gazette forests with a total size of 220 km^2 and 7 non-gazette forests with a total size of 25 km^2. The main forests include; Arabuko Sokoke, Mangrove and Dakacha woodlands. The main forest products are timber, firewood, poles, medicinal herbs, honey, charcoal, fodder and butterfly pupae. Agroforestry and green economy is being promoted.
Energy	The main sources of energy include; firewood, electricity, paraffin and solar energy which are mainly used for cooking and lighting. The number of trading Centres connected with electricity stands at 50 while over 80% of the households use firewood. The number of trading Centres connected with electricity is expected to increase as the County continues to implement the Rural Electrification Programme (REP) which is aimed at connecting rural Centres with electricity so as to promote wealth and employment creation.
Disaster Preparedness	Kilifi County has witnessed repeated loss of socio-economic development gains to disasters related to drought, floods, insecurity, resource based conflicts and HIV/AIDS. These have adversely impacted lives and livelihoods of communities in the County. In order to create a prosperous resilient County, there is need to create a framework for implementation of Disaster Risk Reduction and climate change adaptation approaches that will secure development gains or at least enable the communities to quickly rebound following disasters. In order to achieve effective and efficient disaster management, the County Government shall establish and strengthen structures for disaster risk management (DRM) by creating institutions and frameworks for their operations. Also, the County Government shall support PDRA activities at the grassroots to enable community to identify development opportunities with DRR perspective.
Environmental Degradation	The County is faced with a number of environmental challenges ranging from air pollution from the quarries and cement factories, water pollution, soil degradation, deforestation, poor solid waste management in the major urban Centres and towns like Kilifi, Malindi, Mtwapa, Mariakani, and Gongoni. The County's arid zone is a major source of charcoal for Mombasa, Malindi, Kilifi and Mtwapa towns leading to widespread destruction of environment through uncontrolled felling of trees. The areas mostly affected by this are Ganze, Kaloleni and Magarini. Another contributor to this is sand harvesting in Marereni and quarries in Ganze. The effects of environmental degradation are being experienced at County level as a result of over exploitation of forests and unsustainable utilization of non-renewable resources. Indiscriminate felling of trees in gazetted and non-gazetted forests has led to environmental degradation leading to drought in most parts of the County. This includes areas in Ganze, Rabai, Magarini and Kaloleni. The County has in place Environment Management Committees which are at the forefront in mobilizing stakeholders to promote environmental conservation programmes such as tree planting exercise on farm and forests, environmental conservation awareness and soil and solid waste management. The Environment Management Committees have also put measures in place to regulate private and public sectors development so as to minimize the negative impact on the environment. These measures include requirements such as conducting of Environmental Impact Assessment and Environmental Audits before commencement of all projects in the County.

CLIMATE CHANGE	
Impact	Climate change is a long-term alteration in global weather patterns, especially increases in temperature and storm activity, regarded as a potential consequence of the greenhouse effect. There has been increased appreciation

	of the role that climate plays in people's lives in recent years. This awakening has been occasioned by an increase in intensity and frequency of extreme weather events such as severe droughts and floods in Ganze, Kaloleni and Magarini constituencies. These extreme events have had negative socio-economic impacts on almost all sectors such as health, agriculture, environment and tourism. The Kenyan coast has been subject to shoreline changes due to its geological character. Human influences have also accelerated this process. A good example is the Watamu-Malindi-Ugwana bay area which is currently most affected.
Mitigation	Agroforestry and green economy is being promoted in the County. The County is currently promoting the use of renewable energy and energy saving jikos by households and institutions such as schools and hospitals. The County is also promoting the establishment of woodlots to ensure a constant and sustainable supply of firewood.
Adaptation	Under the Ministry of Agriculture, Livestock and Fisheries farmers have been encouraged to grow drought resistant crops like cassava and millet as a coping mechanism to climate change.
Ongoing Projects	Rehabilitation of tree crops; Horticultural development; Intensification of extension services, Promotion of dairy and beef. Cattle farming; Development of poultry farming; Intensification of veterinary services, Protection of forests; Encourage agro-forestry; Traditional high value crops.
Climate Change Mainstreaming	The County was ranked 2 as the mentioned impacts of climate change and governance framework

KWALE

Kwale County is one of the six Counties in the coastal region. It borders Taita Taveta County to the northwest, Kilifi County to the northeast, Taita Taveta and Kilifi to the north, Mombasa County and Indian Ocean to the east and United Republic of Tanzania to the south. The County is located in the South-eastern corner of Kenya, lying between Latitudes 30° 3′ and 40° 45′ South and Longitudes 38° 31′ and 39° 31′ East. The County covers an area of 8270.2 km², of which 62 km² is under water. The area excludes the 200-miles coastal strip known as the Exclusive Economic Zones (EEZ). The position of the County puts it in a strategic location for accelerated economic growth in the Kenyan Coast.

Kwale County has four major topographic features namely the Coastal Plain, the Foot Plateau, the Coastal Uplands and the Nyika Plateau. The coastline in Kwale County is about 250 kilom. This strip of land consists of corals, sands and alluvial deposits. The County has monsoon type of climate which is hot and dry from January to April/May, while the period from June to August is the coolest in the year. Rainfall is bi-modal with short rains being experienced from October to December, while the long rains are experienced from March/April to July. Average temperature ranges from 26.3°C to 26.6°C in the coastal lowlands, 25°C to 26.6°C in Shimba Hills, and 24.6°C to 27.5°C in the hinterland.

SECTOR SUMMARY	
Agriculture	The main food crops grown in Kwale County include maize, cassava, beans, peas, grams and semi-commercial crops like coconuts and mangoes. The cash crops grown are cashew nuts, sugarcane, cotton, simsim, bixa and tobacco. Total acreage under food crops and cash crops production is 69,014.08 Acres and 112,171.98 Acres respectively. The average farm size for Kwale County is 4.4 acres and 100 acres for small scale and large scale respectively. The storage facilities in the County are traditional granaries for on-farm and NCPB stores at Kwale town for off-farm. The County NCPB store is mostly used for storage of surplus cereals from the County and from neighbouring counties.
	Livestock production is the main economic activity of the Nyika Plateau which receives rainfall of below 700 mm. The Nyika Plateau covers about two thirds of the County. According to the 2009 Census the population of livestock stood at 255,143 cattle, 349,755 goats, 83,133 sheep and 433,827 indigenous chickens. The main cattle breeds are Zebu and Boran for beef and Crosses of Ayrshire and Sahiwal for dairy. There are 13 ranches in the County with an average size of 15,055 ha. Kwale has abundant fisheries reserves along the coastline. Major fish reserves include: Shimoni, Vanga, Msambweni, Diani, and Tiwi. There are 40 landing sites and the main types of fish catch are Rabbit Fish, scavengers, Jack Fish and King Fish. and the number is expected to go up because of the ongoing Fish Farming Enterprise and Productivity Programme under the Economic Stimulus Programme (ESP)
Water	The main water resources in Kwale County comprise of rivers (7), shallow wells (693), springs (54, protected and unprotected), water pans, dams (6), rock catchments and boreholes (110). However, most of the rivers are seasonal thus cannot be relied upon to supply the much needed water in the County for agriculture and household uses. The Kwale Water & Sewage Company is mandated by the Coast Water Services Board to supply/distribute, control and manage all the water supply schemes within the County. Private water service providers in liaison with the Kwale water services board have been supplying water to the community to ensure water is available for all. Other water supply schemes include community owned and managed boreholes, dams and even water pans. Local community participation in the projects has been poor, thus creating problems of operation and maintenance. The main sources of water are boreholes, springs, dams, water pans and rock catchments. The average distance to the nearest water point in the County is two Kilom. This is well above the internationally required five (5) meters distance to the nearest water source. More stakeholders are called upon to contribute towards the provision of this important resource to improve the lives of majority of the population in the County through access to safe and clean water. Latrine coverage is a key component as far as household sanitation is concerned. The main type of toilet facility in the County is the pit latrine accounting for 34.7% of the total population in the County followed by uncovered pit latrine at 33.5%. Generally, latrine coverage in the County is at 41.4%, which is below the national target of 90%.
Forestry	Kwale County does not have commercial plantations. There is one rain forest that is Shimba Hills Forest. There are a number of indigenous forests commonly known as Kayas which are sacred sites and are maintained by the Miji Kenda Councils of elders. The size of the gazetted forest is 350.45 km² and 1900 km² for non-gazetted forest. Forestry is a major source of income, food and medicine to local communities. The many indigenous forests facilitate ecotourism by providing tourists with nature trails, scenic attraction, animal viewing, and bird and butterfly watching. They also provide wood and timber for construction purposes as well as charcoal on which over 90% of rural households depend. The mangrove forests sustain bee-keeping that produces high quality honey and provide shelter to some fish species and oysters. Additionally, mangrove poles are used in the making of fishing traps and in construction. Forests also provide raw materials for the manufacture of mosquito repellents, tooth brushes, glue, dyes, shampoos, soaps and rope. Agroforestry is also promoted in the County.
Energy	The most common source of energy in Kwale County is firewood used by 80.2% of households for cooking, and 0.5% for lighting. Paraffin is used by 5.7% and 95.5% for cooking and lighting respectively, whereas 11.5% of household use charcoal for cooking with 10.6% using electricity for lighting. Petroleum is used mainly in

	transport and households e.g. water pumps and generators. Paraffin is the main source of lighting in rural areas. It is also used for cooking in both urban and rural areas. The County has potential for solar, wind (Samburu and Kinango) and biogas (along the coastal strip) which has not been exploited.
Disaster Preparedness	Despite disasters such as droughts, flooding and outbreaks being common in Kwale, disaster management is not integrated in development programmes. The management of disasters is not well coordinated due to the presence of many actors responsible for implementing and coordinating disaster management initiatives. Poor coordination has led to duplication, confusion, lack of synergy, poor accountability and hence delayed response.
Environmental Degradation	The main contributor to environmental degradation in the County is solid waste such as plastic bags; bottles; cans; garden and kitchen waste; vegetable waste and oil waste, logging (charcoal burning), bush fire (burning vegetation by farmers), overgrazing, dumping of solid waste by the hotels next to the ocean. Mining and sand harvesting also contribute to environmental degradation by leaving behind sites that are not rehabilitated as well as leaving mines and materials that have radioactive emissions. The effects of environmental degradation are diverse and include but not limited to persistent droughts/famine due to inadequate rainfall, increased human-wildlife conflict, decreased land productivity, increased water borne diseases among others.

CLIMATE CHANGE	
Impact	Kwale County being a coastal region is prone to climate change such as emissions of greenhouse gases that lead to rising temperature and sea-level rise. This will have a negative effect on environment as rise in sea level will cause flooding and other damages, loss of wetlands and destruction of coastal zones. Although climate data from the Kenya Meteorological Department for the County is scanty, there is evidence of a changing climate evidenced by increased frequency and severity of extreme events. There are observed changes in the seasons whereby the rainy season has shortened and the onset of rains delayed. These changes present additional challenges to the socio-economic development of the County in a number of ways. Within the agriculture sector, which is most vulnerable to impacts of climate change, farmers have experienced reduced yields leading to food insecurity. Rising temperatures are associated with high prevalence of pests and diseases that affect both crop and livestock productivity. Moreover, shifting seasons means changes in planting dates which affect crop performance, while drought results in reduced pasture.
Mitigation	Mitigation measures which seek to reduce Greenhouse Gases (GHG) emissions in the County should then be put in place. These include use of cleaner more efficient technologies such as solar and wind energies, among others. They also include those actions that aim at increasing GHG sinks e.g., afforestation or tree-planting, protection of wetlands, or any relevant change in consumption behaviour that lead to reduction in GHG emissions.
Adaptation	Traditionally, communities living in the County have devised strategies to cope with climate change and variability that worked well under traditional management regimes that are no longer in place. In modern times, measures to cope with the effects of climate change can be in the form of hard or soft applications or measures. Hard measures mainly involve engineering/technological options such as construction of dykes, water harvesting technologies, efficient water uses, migration to other regions, famine relief, etc. Soft measures include early warning systems, education and awareness campaigns, research on adaptive agriculture/livestock production, introduction of new breeds, introduction of insurance covers, law enforcement and better community management of environment and natural resources management. The County should endeavor to adopt these measures to mitigate and adapt to climate change and variability.
Ongoing Projects	Establish and expand water supply infrastructure for adequate and safe and clean water,
Climate Change Mainstreaming	The County was ranked 2 as the mentioned impacts of climate change and governance framework

LAMU

Lamu County is located in the northern coast of Kenya and is one of the six counties in the coastal region of Kenya. It borders Tana River County to the southwest, Garissa County to the north, Republic of Somalia to the northeast and the Indian Ocean to the south. It lies between latitudes 1° 40′ and 2° 30′ South and longitudes 40° 15′ and 40° 38′ East. The County has a land surface area of 6,273.1 km^2 that includes the mainland and over 65 Islands that form the Lamu Archipelago. The total length of the coastline is 130 km while land water mass area stands at 308 km^2. The County experiences no marked variation in temperatures with annual temperature ranging between 23°C and 32°C. The high temperatures are experienced from December to April while low temperatures occur from May to July. The annual mean temperature in the County is 27°C.

There is a bimodal rainfall pattern with long rains occurring from mid-April to the end of June with the highest rainfall recorded in the month of May. The long rains agricultural output account for 80% of the annual crop production. Short rains occur in the months of November and December and are generally unreliable.

SECTOR SUMMARY	
Agriculture	The size of arable land in the County is estimated to be 85% of the land surface. The land is classified as follows, 7,000 ha, 319,000 ha classified as medium potential, and 321,000 ha classified as low potential. The exploited land currently stands at 56,923 ha (per cent of total land) with 21,311 ha under food crops, 22,476 ha under cash crops and 13,136 ha under farm forest. The rich agriculture zone is composed of Mpeketoni, Witu and Hindi Divisions. These areas consist of land parcels ranging from five to 10 acres. The size of agriculture farm land varies from one division to another, but on average, the farm size per household for the County is four acres.
Forestry	The gazetted forest area covers 428 km^2, 64% of the total forested area in the County. These comprises of Mangrove forests (382 km^2), Witu forest reserve plus parcel No 751, 973 and area C (46 km^2). The non-gazzeted forest area covers 280 km^2, 36% of the total forested area. These comprises the Lunge forest (95 km^2), Boni forest (185 km^2) and Lake Kenyatta buffer zone (0.16 km^2). Both the gazetted forest and non-gazzeted forest cover 708 km^2 or 11.51% of the total area of Lamu County. The main forest product includes the mangrove poles used for construction of houses and boats. Others include; fuel wood, firewood, seedlings, charcoal and casuarinas poles.
Water	Main sources of water include ground water (mostly saline) and surface water from dams, pans, jabiars, lakes, seasonal rivers and the ocean. 4 organizations including Lamu water and sewerage company, lake Kenyatta water association, Hindu water association and Witu water users association, manage the County's water supply. Rainwater is the main source of fresh/soft water for the County residents. Due to its inhibitive costs, only rich private individuals and hotels carry out desalination. The average distance of household access to clean water is approximately 5 km.

Energy	Firewood and charcoal remains the main source of cooking fuel with 70.9% and 22.8% of the households in the County using them as a source of energy. Other sources include electricity, gas (LPG) and paraffin which are consumed mostly in the urban centres. The main source of lighting in the County is paraffin used by 72.0% of the households. Other sources of lighting include fuel-wood, electricity, solar and gas. The electrical power in the County is generated through diesel generators. Mpeketoni power station run by KENGEN has three generators and produces 1,300 KW per day against a daily demand of 1,000 KW per day and this is supplied in Mpeketoni, Witu and Hongwe. The Lamu Town power station has seven generators run by KENGEN with a capacity of 20,000 KW per day against daily demand of 18,859 KW. The number of electricity consumers in the County stands at 2,936. Faza residents have a community run generator where consumers are supplied with power for lighting only. Other trading centres in the County such as Matondoni, Ndau, Mbwajumwali, Faza, Kiunga and Tchundwa have generators bought through CDF but are yet to start functioning. However, this is expected to end as the County is being connected to the Nation Grid under the Rabai-Garsen -Lamu project which is almost complete.
Disaster Preparedness	Due to physiographic and topographic features of the County, congested style of Swahili villages, lack of land use and spatial plans, nomadic pastoralism and impact of climate change, the County has in the past experienced disasters such as flooding, fire, drought and inter-community conflicts. Poverty, youth unemployment and exposure to tourists has significantly increased HIV/AIDS prevalence and drug and substance abuse culminating in poor disaster management. Organizations have not been proactively mitigating occurrence of disasters but reactively responding to occurrences. There is need to upscale disaster management capacity in anticipation of expanded disaster challenges resulting from implementation of the LAPSSET project.
Environmental Degradation	Forest degradation poses major threats to socio-economic and environmental sustainability in the County. In particular, loss of mangrove forest at an unprecedented level has led to the destruction of breeding sites on marine life while exposing the main to the risks of sea level rise. The increased illegal logging, overgrazing and unregulated quarrying exposes the land to effects of reduced soil fertility, desertification and increased incidences of human/human and human/ wildlife conflicts. The problem of waste management (both solid and liquid) has adverse effects mainly in Lamu Town. The waste generated from various sources is disposed directly to the sea thereby impacting negatively on the marine biodiversity. Indiscriminate disposal of solid waste in the streets of Lamu has negatively affected the tourism sector besides posing a health threat to the community.

CLIMATE CHANGE	
Impact	The effect of climate change in the County is manifested through sea level rise, floods and drought among others. The effect of sea level rise includes coral bleaching and salt water infiltration. Floods result in water borne diseases, reduced crop yield and death, while the effects of drought include drying up of water sources/lakes, livestock death and increased human-wildlife conflict.
Adaptation	On sea level rise, efforts being undertaken include building embankments along the sea shore. There is also increase in restocking of health facilities to control outbreak of diseases. Other measures include; increased promotion of drought tolerant crops and livestock, tree planting/ reforestation, water tankering and excavation of water pans for both human and wildlife use.
Mitigation	The mitigation measures being undertaken in the County include afforestation and reforestation initiatives/ programs, especially of the mangrove forest. Agroforestry and green economy are promoted.
Ongoing Projects	ASDSP, Promotion of Mechanised Agriculture, Smallholder Horticulture Empowerment and Unit Program (SHEP UP).
Climate Change Mainstreaming	The County was ranked 2 as they identified climate change impacts and governance framework.

MOMBASA

Land area of 229.9 km^{2}and 65 km^{2}of water mass (200 nautical miles into the Indian Ocean). Lies between latitudes 30° 56′ and 40° 10′ South of the Equator and between longitudes 39° 34′ and 39° 46′ East of Greenwich Meridian.

Climate is influenced by monsoon winds with the rainfall pattern being characterized into long rains (April-June with an average of 1,040 mm) and short rains (end of October-December with an average of 240 mm). The annual average rainfall for the County is 640 mm. The annual mean temperature in the County is 27.9°C with a minimum of 22.7°C and a maximum of 33.1°C. The hottest month is February with a maximum average of 33.1°C while the lowest temperature is in July with a minimum average of 22.7°C.

SECTOR SUMMARY	
Agriculture	The main crops under cultivation in the County include cassava, cucurbits family, maize, vegetables, millet and sorghum. The total acreage under food crop stands at 400 ha while the total acreage under cash crop is 500 ha. The County is generally a net importer of food and other agricultural products and this makes the cost of food high and inaccessible to most of the low income earners. Mombasa County has a considerable number of domestic livestock kept for domestic and commercial purposes. The main livestock bred in the County include goats, sheep, cattle, and poultry. However, most of the livestock supporting infrastructures such as dips and slaughter houses are insufficient for disease control. The County will therefore be expected to establish more such infrastructure in order to improve on livestock production within the County. Low application of appropriate technology; Lack of credit facilities; Diminishing land sizes; Poor extension services. Fisheries: The County has 65 km^2 of open water and an Exclusive Economic Zone extending 200 nautical miles into the Indian Ocean. Thus the County has access to 40 km^2 of the Exclusive Ecological Zone (EEZ) which is a high potential fishing ground. There are 14 fish landing sites and one fish processing plant. Despite the County's proximity to the Indian Ocean the average annual amount of fish landed has remained below the potential thresholds of 994,718 metric tonnes.
Forestry	The County has a natural forest cover of approximately 300 ha and 138 ha acres of agro-forestry. The County hosts three main mangrove forests that are protected by the Kenya Forests Service. The main products from the County's mangrove forests are building materials and firewood for use by the local communities. Certain species of indigenous trees are believed to have medicinal properties. Most species are found in forests that are traditionally believed to be sacred, commonly referred to as kaya forests such as The Kaya Bombo in Likoni Sub-county.
Water	Natural Drainage in Mombasa County is mainly is formed by semi-perennial rivers and streams. Rivers include Kombeni and Tsalu Rivers that drain into the Indian Ocean.

	There are three permanent springs in the rural parts of the County. Some parts of the County have favourable geology therefore the water table is high. The County is severely deficient in reticulated domestic water supply and is only able to meet 24% of its water demand, production being 43,000 m^3/day, against a demand of 182,000 m^3/day. The shortfall is as a result of an old water reticulation system which results in frequent breakdowns leading to water losses and disruption of supply. The other cause of water scarcity stems from the unavailability of water sources within the County leading to over reliance on other counties. This is further complicated by the County's rapidly growing population. The water problem has had a negative impact on the development of the County as most of the industries are relocating their operations to other Counties. This has also led to the emergence of water vendors who not only sell water at exorbitant prices but also whose quality of water has not been certified.
Energy	The main source of cooking energy for the County residents is paraffin at 53.6%, charcoal at 30%, firewood at 8.8% LPG at 4.7% and electricity at 1.7%. This trend continues when it comes to lighting where paraffin also leads at 51.5% followed closely by those relying on electricity at 47.5%. The Kipevu power plant produces power which is fed into the national grid. The County has a high potential for generation of solar and wind energy, but this remains unexploited.
Disaster Preparedness	The County is prone to disasters in the following areas; Transport-related accidents such as ferry and boat accidents, Terrorism, Factories and go downs related accidents. While there are a number of institutions with emergency operation services, such as the Kenya Red Cross Society, Kenya Ports Authority, Kenya Petroleum Refineries, Oil Spillage Committee, Moi International Airport, Kenya Ferry Services, they are not coordinated and they respond to disasters individually. Thus the proposed disaster management plan should provide the coordination mechanism to harmonize their activities during emergencies given the County's strategic location and economic importance. Any disaster occurring in the County could have spillover effects in several economies within the east and Central Africa region. The County has a disaster management committee and is in the process of preparing a Disaster Management Plan. Although the County's institutions responsible for disaster management frequently respond to disasters, in most cases the response is poor and uncoordinated which has a potential for a huge loss of life and property during emergencies. Delay in the implementation of national policy on Disaster Management has further contributed to the unpreparedness and inability to effectively respond to disasters.
Environmental Degradation	Poor waste disposal is the leading cause of environmental degradation due to lack of effective solid waste management systems. The County has witnessed a proliferation of illegal dumpsites with piles of uncollected garbage littering most estates of the County.

CLIMATE CHANGE	
Impact	Climate of the County is influenced by global, regional and local factors. At this point the County's residents' contribution to global climate change cannot be substantiated. However, the County has witnessed climate change and its effects. There is declining water supply, increase demand and inadequate water infrastructure. There are also changes in local temperature regimes with frequent change in weather patterns. Growth and performance of important sectors in Mombasa County are vulnerable to climate change impacts. The County imports almost 100% of its food and livestock product's needs. Therefore, variability in rainfall which impacts negatively on agricultural and pastoral activities in other parts of the country, will have an impact on Mombasa. Reverberating effect on the economy of County and Kenya in general. Heavy rainfall in some parts compromised transport through destruction of road networks hence disrupts flow of people, goods and other services to and from the County. At the same time parts of the County with poor drainage will heavily be affected by flash floods. The resulting costs were often transferred to the road users and reflected in the cost of living.
Mitigation	NOT CAPTURED
Adaptation	NOT CAPTURED
Ongoing Projects	Alternative sources of energy.
Climate Change Mainstreaming	The County was ranked 1 as they only mentioned climate change impacts with no mitigation or adaptation actions.

TAITA TAVETA

Taita Taveta County is one of the six counties in the Coastal region of Kenya. It is located approximately 200 km northwest of the coastal city of Mombasa and 360 km southeast of Nairobi, the capital city of Kenya. It borders Tana River, Kitui and Makueni Counties to the north, Kwale and Kilifi Counties to the east, Kajiado County to the North-west, and the Republic of Tanzania to the south and South-west. The County covers an area of 17,084.1 km^2 and lies between latitude 2° 46′ and 4° 10′ South and longitudes 37° 36′ and 30° 14′ East.

The County is divided into three major topographical zones. The upper zone, suitable for horticultural farming, comprises of Taita, Mwambirwa and Sagalla hills regions with altitudes ranging between 304-2,208 metres above sea level. The lower zone consists of plains where there is ranching, national parks and mining. The third topographical zone is the volcanic foothills zone which covers the Taveta region with potential for underground water and springs emanating from Mt. KilimanjaroThe County experiences two rainy seasons – the long rains between the months of March and May; and the short rains between October and December. Rainfall distribution is uneven, with the highlands receiving higher rainfall than the lowland areas. During long rains, on average the highlands record 265 mm while the lowlands record 157 mm whereas during short rains, annual rainfall is 1,200-341 mm for highlands and lowlands respectively. The annual mean rainfall is 650 mm.The average temperature in the County is 230C, with temperatures geting as low as 18.2°C in the hilly areas (Taita, Mwambirwa and Sagalla), while on lower zones, temparatures rise to about 25°C.

SECTOR SUMMARY	
Agriculture	Total land area is 17,059.1 km^2. Of this, total agricultural land is approximately 10,630 km^2, with arable land constituting about 2,055 km^2. The rest is range land, suitable for livestock rearing. Approximately 14,307.2 km^2 of land is non-arable. The percentage of arable and non-arable land area is 12% and 88% respectively. Land available for household farming activities is reduced drastically due to the presence of a total of 28 ranches which combined, cover an approximate area of 773.5 km^2. Eight of these belong to the Kenya Government, nine to group ranches and 11 are privately owned. The average size of the ranches is 2,762.5 ha. Large scale sisal farming for fibre production further reduces land available for settlement and household farming activities. There are

	three companies that produce sisal for both domestic and export markets. Rain fed agriculture is the dominant activity by most households as a subsistence and/or economic undertaking. The average farm holding in the areas that have agricultural potential ranges between 0.5 ha to 30 ha. Maize and beans are the main crops produced with annual production currently estimated at 50,000 bags. Majority of farmers grow these two crops to serve as food crops. However, most of what is produced for subsistence ends up in markets. Other crops being grown are green grams, sorghum, cowpea, pigeon pea, casssava and sweet potato. The hectarage under food and cash crop production is approximately 18,125 ha and 3,296 ha respectively. This represents a mere 0.01% of County's arable land, which is estimated at 2,909.9 km^2.
Water	The County has a total of 71,090 households, of which 35% (24,882) have access to piped water. 41,390 households, representing 58% of the total households have access to portable water. The number of households with roof catchment systems stands at 13,400 representing 19% of the total number of households. With scarcity of rainfall, efforts should be made to increase the number of households with roof catchments to tap rain water. The water quality (per cent of cleanliness) is 80%.In terms of water resources, there are six main rivers, 95 shallow wells, 92 protected springs, 25 water pans, five dams, 25 boreholes and 57 water supply schemes in the County. The County has the biggest water supply scheme in the coastal region. This is the Mzima Water ProjectIn Taveta, there are four schemes. These are Taveta Lumi water supply, Challa water project, Chumvuni water project, and Kitobo water project.The County is home to both surface and underground water sources. The average distance to the nearest water point is 1.25 km. In the County, an estimated 13% of households take between 1-4 minutes one way to fetch drinking water. Likewise, 27.2 peercent take between 5-14 minutes and 35% take between 15-29 minutes.About 24.8% of households take 30 minutes and above one way to fetch water.
Forestry	The County has a total of 78 forest parcels, of which 25 are gazetted under the Kenya Forest Service (KFS) and one, Jaycee forest, is in the process of being gazetted. 52 parcels are yet to be gazetted, an exercise that is to be undertaken by the County Government. The gazetted forests cover an area of 1,489.8 ha whereas the non gazetted ones cover an area of approximately 9,000 ha. In addition to forested areas, farm forestry is also widely practiced in the County by nearly every household. The average number of trees per farm stands at 110, while the annual seedlings production is estimated at 1,701,086. Of the total seedlings production, KFS produced 426,086 while 1,275,000 were produced from private and corporate tree nurseries. Timber is the main product from Farmlands in the County since harvesting in both gazetted and County forests had been under a ban. An estimated 8,000 metric tons of timber is produced annually from farmlands. Other products include construction/fencing poles, firewood, herbal medicine, tubers, latex, gum, wild fruits and honey. Charcoal is also produced from ranches and private farms.
Energy	With regard to access to energy, the number of consumers connected to the national electricity grid stands at 3,963, while 7.7% of the total households have access to electricity for lighting. There are 86 trading centres connected to the grid, while the rest (62 trading centres) are not connected. Firewood and charcoal are the main sources of cooking fuel at 75.2% and 14% respectively. The main lighting fuel is paraffin (86.1%), followed by electricity (7.8%) and solar (3.8%).
Disaster Preparedness	Disaster Risk Reduction (DRR) is the concept and practice of reducing disaster risks and their interruption to development through systematic efforts to analyze and manage the causal factors of disasters, including reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. Disasters, risks and hazards are cross cutting issues in the County. The occurrence of a disaster in the County will affect large numbers of people and disrupt the normal activities, with serious financial implications that often will require external assistance, hence the need to be proactive rather than reactive. The County is exposed to a number of disasters and hazards including landslides, drought and floods as discussed below. No sector of the County economy is immune to disasters and as a result DRR should be approached as an issue that cuts across all sectors and levels of the County.
Environmental Degradation	Environmental degradation is a major cause for concern in the County. The quest for development will ultimately present a challenge to the natural environment. Major contributors to environmental degradation include slash and burn agriculture, forest logging, poor agricultural practises such as cultivation along river banks, human settlement on hilltops, sand harvesting along rivers among others. Environmental degradation poses a major challenge to sustainable development in the County. Among the effects of environmental degradation are the loss of species and integrity of habitat, habitat fragmentation and loss, and loss of water catchment areas.

CLIMATE CHANGE	
Impact	Climate change and variability is an emerging threat to sustainable development in the County. Although climate data from the Kenya Meteorological Department for the County is scanty, there is evidence of a changing climate characterized by increased frequency and severity of extreme events such as drought and floods. There are observed changes in the seasons whereby the rainy seasons have reduced and the onset of the rains delayed. These changes present additional challenges to the socio-economic development of the County in a number of ways. Within the agriculture sector, which is the most vulnerable, farmers experienced reduced yields leading to food insecurity in the County. Rising temperatures are associated with high prevalence of pests and diseases which affect productivity both in crops and livestock. Extreme cold is responsible for frost experienced in some parts of the County.
Adaptation	Strategies to cope with climate change include water harvesting technologies, efficient water use, adoption of Early Warning Systems (EWS), awareness and education, introduction of drought resistant crop and animal varieties and proper natural resource management.
Mitigation	Mitigation measures which seek to reduce GHG emissions should then be elaborated. These include use of cleaner and more efficient technologies such as solar and wind. They also include those actions that aim at increasing GHG sinks such as reforestation, protection of wetlands, or any relevant change in consumption behaviors.
Ongoing Projects	National Accelerated Agricultural Inputs Access Programme (NAAIAP), 3G Irish Potato Project, Promotion of peri-urban agriculture Voi, Taveta, Wundanyi and Mwatate Towns, Soil and water conservation. Agriculture Sector Support services Programme, smallholder irrigation
Climate Change Mainstreaming	The County was ranked 3 as the prioritized climate change actions for adaptation and mitigation actions.

TANA RIVER

Tana River County borders Kitui County to the west, Garissa County to the northeast, Isiolo County to the north, Lamu County to the southeast and Kilifi County to the south. The County lies between latitudes 0° 0′ 53′′ and 2° 00′ South and longitudes 38° 25′ and 40° 15′ East.

SECTOR SUMMARY	
Agriculture	The arable area in the County is 2,547 km^2 with the average farm size being 0.71 ha. Farmers normally grow subsistence crops. The total acreage of farms under food crop production is 7,527 ha while that under cash crop production is 7,063 ha. The main storage facilities for farm produce in the County include houses, barns and granaries. National Cereals and Produce Board has one storage facility in the whole County at Bura. Majority of the farmers in the County do not use modern methods of farming and storage of farm produce. This leads to low productivity and post-harvest losses. The farmers also rely on rain fed agriculture and floods recession agriculture. This makes them vulnerable to hunger when the rains or river flooding delay. Though various minor irrigation schemes have been initiated in the County to boost agricultural production, only 6.25% of the land with potential for irrigation is utilized.
Forestry	The County is dominated by complex ecosystem of high canopy coastal, riverine forests, wooded bush land and thickets as well as the grasslands and mangrove forests covering 355,688.65 ha.) Positive attitude towards forest conservation, Variety of natural flora State of environment report of 2012. Availability of environmental governance and institutions created through EMCA, donor support and more NGO's supporting reforestation activities. Involvement of Community, Private sector and other stakeholders Introduction of Community Forest Users Groups through participatory forest management Existing Environment Management Act, conducting EIAs and environment audit are some of the strengths towards increasing forest cover. Opportunities include gazettement of forests in the County, forest conservation promotion programmes, establishment of tree nurseries, and development of sustainable community based environmental management strategies such as social forestry. Increase forest cover to 10% by June 2018; increase sensitization and awareness of environment to protect and promote agroforestry.
Water	The main source of water is Tana River, which is the largest river in Kenya covering about 850 km. The main water supply schemes in Tana River are Hola Water supply scheme in Galole, Bura water works in Bura, Garsen water supply and Ngao water supply. The Hola water supply is currently under expansion and rehabilitation with Government of Kenya/World Bank funding. The County's water resource comprises of both ground and surface water. Surface water consists of permanent rivers such as River Tana and ground water sources that include; boreholes, shallow wells, and earth pans. Increase water structures by 50% by June 2018; Form and train 20 water user associations by June 2018.
Energy	Majority of the population (87.5%) use firewood for cooking and 78.2% use Paraffin for lighting. Only 0.9% of the households are connected with electricity. There is a lot of potential for the exploitation of renewable energy sources such as solar and wind and in the expansion of electricity transmission through the main grid.
Disaster Preparedness	Disaster risk reduction (DRR) measures need to be undertaken to safeguard against eminent loss of livelihoods resulting from such an outbreak. Key among them is development of early warning systems, natural resource and drought management and rapid response activities. During the long rains when Masinga dam reservoir is opened, the river Tana floods. This leads to displacement of people and livestock, destruction of crops, property and infrastructure and brings waterborne diseases. Clashes occur seasonally especially around election periods. This leads to loss of life, displacement of people and livestock, and destruction of property. Periodic assessments by NDMA and availability of trained DRR staff are some of the strengths. Adopt modern early warning systems by June 2018; Increase irrigation farming by 50% by June 2018; Hold peace meetings every three months by June 2018.
Environmental Degradation	Environmental degradation is attributed to illegal encroachment of river banks and forests, poor farming methods and practices, deforestation, overgrazing and uncontrolled felling of trees for charcoal, firewood and construction owing to the increasing human settlements and mining. It is a growing crisis with economic, health and safety, food production, security, and other dimensions.

CLIMATE CHANGE	
Impact	Shifting weather patterns threaten food production through increased unpredictability of precipitation, rising sea levels contaminate coastal freshwater reserves and increase the risk of catastrophic flooding, and a warming atmosphere aids spread of pests and diseases once limited to the tropics. Effects of climate change include droughts, flooding, rise in sea levels along the coastal parts, intrusion of salt waters upstream, reduced fish population in the sea, drying of the ox bow lakes, reduced crop productivity, loss of biodiversity, changing ecosystems and destruction of infrastructure. Tana River County experiences various disasters. Droughts occur annually and affect most parts of the County especially the hinterlands. This leads to loss in livestock and poor agricultural produce. Floods are also prone especially during the heavy rains. Sometimes flash floods from the neighbouring Kitui and Makueni Counties affect the County.
Mitigation	Pricing of Natural Resources: Policies should be enacted for pricing of natural resources like trees which act as carbon sinks. Carbon Footprint: Policies should be enacted to promote carbon footprint for quantification of carbon emission and costing.
Adaptation	Good governance, practice sustainable approaches to development, develop a comprehensive land use planning, creation of awareness on the effects of climate change among the population, identify and protect ecologically sensitive and fragile areas and discard old practices and embrace modern and sustainable practices/technologies. Policies should be enacted to encourage payment for ecosystem services such as medicinal plants and biodiversity. Establishment of irrigation schemes. Mainstreaming climate change and disaster mitigation into national planning programmes; Economic forecasts should incorporate climate forecasts and economic indicators of weather and climate should be developed to enable monitoring of short and long term development strategies.
Ongoing Projects	Gazettement of County Forests, Rehabilitation of degraded areas and mangroves. New Projects: Construct Community Grain Storage Facility; Dissemi-nation of Effective Agricultural Extension; Information and support Services; Water Harvesting for horticultural crop production: Crop Pests and Diseases Control and Management; Provision of assorted Strategic Relief seeds for Disaster Risk Reduction; Provision ofassorted Drought tolerant seeds to famers; Establish Agricultural Training Centre (ATC); Njaa Marufuku Kenya (NMK); Strengthen Credit service provision and accessibility to famers in the Major Irrigation Schemes.
Climate Change Mainstreaming	The County was ranked 3 as they prioritized climate change mitigation and adaptation actions.

EASTERN REGION

EMBU

The rainfall pattern is bi-modal with two distinct rain seasons. Long rains occur between March and June while the short rains fall between October and December. Rainfall quantity received varies with altitude averaging to about 1,067.5 mm annually and ranging from 640 mm in some areas to as high as 1,495 mm per annum. Temperatures range from a minimum of 12°C in July to a maximum of 30°C in March with a mean average of 21°C. Average annual rainfall reflects this contrast: from more than 2200 mm at 2500 metres to less than 600 mm near the Tana River at 700 metres.

SECTOR SUMMARY	
Agriculture	Embu is food insecure in terms of staple food and sometimes relies on relief food supplies especially in areas at the lower side of the County like Muminji, Kiambere and Evurore. Food insecurity is attributed to several factors that include: inadequate and unreliable rainfall, poor terrain, small parcels of land, poor soil fertility, poor coverage by extension services, and concentration in growing of cash crops such as coffee, tea, high prices of farm inputs and poor storage facilities. Over 80% of the households depend on agriculture and related activities. The main challenges are that agricultural land is limited and the supply of farm inputs is irregular particularly for non-cash crop growers who are not members of cooperative societies. Prices of the inputs are high and the distribution not well coordinated. Shortages of inputs lead to low productivity in maize, beans, Irish potatoes and cabbages. These being the main staple food crops in the County.
Forestry	The County has gazetted and non-gazetted forests. Mt. Kenya forest is the only gazetted forest in the County. The County has only one gazetted and four non gazetted forests which are Kiang'ombe, Kirimiri, Kianjiru and Kiambere with a total of 3,751 ha. The main forest products include timber, poles, firewood, carvings, charcoal, posts, seedlings and honey.
Water	The County is served by six major rivers which are Thuci, Tana, Kii, Rupingazi, Thiba and Ena. There are also some major dams which generate hydroelectric power for the country that are partly in the County. These include Masinga, Kiambere, Kindaruma and Gitaru dams which are situated along the Tana River. The main sources of drinking water include rivers, piped water, wells and boreholes, dams, springs and pans. The County is served by six major rivers; Thuci that borders Tharaka-Nithi that borders, Tana that borders machakos County, Kii forms the boundary to Kirinyaga County, Rupingazi forms the boundary to kirinyaga, Thiba and Ena. All these major rivers originate from Mt. Kenya forest in Manyatta and Runyenjes constituencies. 30.1% of the population get water from rivers, 35% from piped water and 21% from dug well. In Mbeere north and Mbeere south constituencies, 40.4% get water from rivers, 8.2% from piped water, 23.7% from dug wells and 10.9% from boreholes.
Energy	Embu County is a major stakeholder in the energy sector nationally. It is host to the regionally famous seven-folk project which has an installed capacity of 543.2 MW, placing its contribution to the national installed H.E.P capacity at 80.2%. The production capacities for the various stations are as given below. The main source of energy is firewood (80.4%) while electricity coverage is more confined to urban areas as compared to rural areas. Many trading centers have not been connected to the national grid although the rural electrification programme is reversing this scenario. The other major beneficiaries of rural electrification are public institutions such as schools and health facilities. The majority of residents use paraffin as the main source of lighting. Over 80% of Households in the County use charcoal energy.
Disaster Preparedness	There is a Disaster Management Committee which is the main body that is charged with the mandate to control, prevent and respond to events threatening the stability and sustainability of human and natural environment in the County. There is also Drought Management Office with active Sub-county Steering Groups in Mbeere north and Mbeere south areas. The Drought Management Office monitors issues of food security and disaster occurrence and takes precautionary measures to mitigate the effects. There is need to strengthen the capacity of Sub-county Steering Groups and improve the existing disaster response systems to cope with emerging challenges especially in urban areas and lower parts of the County.
Environmental Degradation	The main contributors to environmental degradation in the County include sand harvesting, land degradation, deforestation especially in farming areas, illegal logging and charcoal production in ASALs in Mount Kenya forest and wet land encroachment especially near major waterways in the County. Land degradation reduces the land capability to satisfy a particular use. Land continues to be degraded with the situation projected to worsen in future. A total of 24.98 km of river banks have been protected to control siltation into the Rivers.

CLIMATE CHANGE	
Impact	Climate change is felt all over the world and continues to affect weather patterns in different regions. The County experiences its share of climatic change through increased periods of drought, erratic weather patterns and increased temperatures especially on the lower sides of the County. Droughts are most frequent and severe reducing per capita food production.)There are also damages to infrastructure such as roads, water supply pipes and housings roofing.
Mitigation	Mitigation measures aim at reducing negative impacts occasioned by loss of human life, death of animals, and destruction of infrastructure among others. This is attained through the application of modern and appropriate farming technologies, alternative approaches to mitigate effects, available opportunities and strategies to mitigate climate change. Coping mechanisms to climate change are sector specific allowing relevant and applicable interventions to be formulated and implemented. Forest cover ensures that carbon sink and sequestration while at same time firming up soil thus preventing soil erosion.
Adaptation	Adaptation comprises all actions aimed at enhancing the coping mechanisms to climate change which cannot be abated or mitigated thus reducing the magnitude of negative effects. These include prevention, tolerance, resilient, change of land use practices, relocation or initiating restoration of degraded environments. Agro-Forestry and Green Economy is greatly promoted in the County for its benefits including riverbank protection.
Ongoing Projects	Irrigation projects in sub-counties, Njaa Marafuku Kenya.
Climate Change Mainstreaming	The County was ranked 3 as they prioritized climate change mitigation and adaptation actions

ISIOLO

The County covers an area of approximately 25,700 km^2. The rainfall received in the County is usually scarce and unreliable posting an annual average of 580.2 mm. The mean annual temperature in the County is 29°C.

SECTOR SUMMARY	
Agriculture	The erratic and unreliable rainfall cannot support crop farming which partly explains the high food insecurity and food poverty levels recorded in the County. A large portion of the County is arid and cannot support meaningful crop farming. With no rain fed agriculture, the ha under food crops is small. There are only 1,497 ha under food crops production. However, the area under food crops is expected to increase to 2,000 ha with the completion of Rapsu and Makadaka irrigations schemes.
Forestry	Currently two forests are earmarked for gazettement in the County, namely Gotu and Kipsing forests. The types of trees in found are those suitable for dry areas. These are mainly Acacia Propopis and Cassiasis species. Efforts to protect acacia totelis species from being cut for production of charcoal are on-going and will be intensified.
Water	Over 58% of the domestic water is sourced from boreholes and 17% from shallow wells. 59% of the total number of water sources are operational during the wet season, with only 36% operational in the dry season. The County is prone to drought resulting to poor accessibility to clean water. Water shortage is the main cause of severe food insecurity. The water shortage mostly affects women and children as they have to walk long distances to collect water. The average distance to the nearest water source for most households is 3 km. Out of 31,326 households, only 6 and 35% have access to piped water and potable water respectively. Scarcity of water has affected women participation in development as they spend time searching for water at the expense of other economic activities. Water insecurity due to low rainfall and lack of water storage and management practices.
Energy	The County's main source of energy is firewood. Over 70% of the households rely on firewood as their main source of power. This has led to over-harvesting of trees primarily for charcoal causing extensive land degradation. Of the 31,326 households, only 2,500 have access to electricity. 85% of the trading centres, most schools and health facilities are not connected with electricity. Provision of clean sources of alternative energy will be critical in slowing down the cutting of trees. It will further save the time spent especially by women and girls in fetching firewood for domestic use.
Disaster Preparedness	Disaster risk reduction is the concept and practice of reducing disaster risks through systematic efforts to reduce exposure to hazards, lessening vulnerability of people and property through improved preparedness. Disaster Risk Reduction aims to reduce the damage, severity and impact on society and the environment. The DRR efforts have been previously coordinated by the provincial administration but this has changed with the establishment of the County governments and it is one of the main devolved functions. Therefore, Isiolo County needs to develop DRR plans and strategies as well as capacity to deal with disaster. Currently the County lacks fire stations and should fire tragedy happen the consequences are unmanageable. The common disasters therefore include severe drought, floods, famine, tribal clashes, cattle rustling, and banditry which have all along led to displacement, loss of lives of both animals and human, loss of shelter and severe degradation of the environment. Uncontrolled charcoal burning and sand harvesting is prevalent thus damaging natural environment. Inter-tribal conflicts arising from cattle rustling and banditry among the neighbouring tribes (Boran, Turkana, Samburu) have always led to severe fights in the County. Support from NGOs such as World Vision, Red Cross, and Catholic Diocese of Isiolo in carrying extensive disaster prevention awareness and early warning system through seminars, trainings and mapping; Existence of District Disaster Management Committees (DDMC).
Environmental Degradation	Charcoal burning, sand harvesting, overgrazing and overstocking in most parts of the County has been rapidly depleting the vegetation cover leaving land exposed to soil erosion. Much of the soil erosion is also caused by strong winds which lead to massive environmental destruction. The County is classified as arid with scant vegetation cover. This makes it vulnerable to wind and water erosion. In 2006, a severe flood led to loss of human lives and livestock and massive destruction of property contrasted the following year by a drought in 2007.

CLIMATE CHANGE	
Impact	Isiolo is one of the most vulnerable counties to climate change in Kenya. Some of the key vulnerabilities emanating from climate change include drought and unpredictable rainfall, floods, and spread of water and vector-borne diseases, loss of forests and wetland ecosystems, land degradation and desertification and scarcity of portable water. Drought and unpredictable rainfall will impact negatively on the economy of the County leading to reduced crop yield, low livestock productivity, high livestock mortality, loss of income for farmers, famine and malnutrition. These impacts will be exacerbated by unsustainable use of ground water. Merti and Sericho, the County's most arid areas, are expected to be most affected by famine and malnutrition in the absence of mitigation measures. Dangers of climate change experienced include drought, unpredictable rainfall, floods, and spread of water and vector borne diseases, loss of wetlands ecosystems, land degradation, desertification, and scarcity of potable water. Vulnerability is depletion of underground water. Climate change will be worsened by deforestation, unsustainable land use practices and intensified grazing. Being an arid area, the farmers and pastoralists are exposed to various vulnerabilities occasioned by climate change. These include: drought and un-predictable rainfall, floods, spread of water-borne and vector-borne diseases, loss of forests and wetland ecosystems, land degradation and desertification and scarcity of potable water. Drought and unpredictable rainfall impacts negatively on the County's economy. It leads to reduced crop yield, loss of income for farmers, famine and malnutrition.
Mitigation	Promotion of agroforestry. To achieve this objective, the KFS and stakeholders will promote tree planting in schools, institutions and private farms. Further, Green employment opportunities in organic product industries, organic farming, clean production systems and renewable energy will be prioritized. Initiate afforestation and reforestation programmes. Construct hydro power micro-stations, diversification of energy sources to wind, solar, and biogas, as well as promoting energy efficiency. As a mitigation measure, rehabilitation of degraded lands will be prioritized.
Adaptation	Some of the adaptation strategies to mitigate against the impact of unpredictable drought are: introduction of drought resistant crop varieties, use of community irrigation, and use of water saving irrigation, and putting more land into production. The other risk due to drought and unpredictable rainfall is loss of income to farmers. There is need for improved weather forecasting, introduction of better adapted livestock, food processing and preservation techniques as well the establishment of food banks so as to adapt and cope with the effects of climate change. Diversification of food production is also necessary. Some of the adaptation strategies to mitigate against the impact of reduced crop yield are: the

	introduction of drought resistant crop varieties, use of community irrigation, and use of water saving irrigation, and putting more land into production. To be able to control landslides and erosion, infrastructure planning is needed. It is also important to come up with integrated land use plans. In order to mitigate the effects of climate change, agricultural extension officers and veterinary officers will train farmers on issues of climate change, adaptation strategies and building resilience. The County government will also collaborate closely with The National Drought Management Authority (NDMA) in putting in place appropriate mitigation and adaptation measures. There is further need for an early warning systems and raising awareness, planning settlements in low risk areas, construction of shelters for displaced population, resettlement of communities at risk, and construction of water gates and culverts. Forest fire management and prevention, Forest conservation and promotion of other construction materials will be prioritized so as to ease pressure on the County's forests. Programmes such as supporting natural production of fodder for livestock and enabling traditional grazing patterns that have low impact on the environment and are adaptable to climate change will further be supported.
Ongoing Projects	Rehabilitation and Expansion of Irrigation schemes along Ewaso Ngiro River (Rapsu and Malka Daka Irrigation schemes).
Climate Change Mainstreaming	The County was ranked 4 as they identify climate change mitigation and adaptation actions, and budget allocation.

KITUI

It is the sixth largest County in the country, covering an area of 30,496.4 km^2, and located between latitudes 0° 10′ and 3° 0′ South and longitudes 37° 50′ and 39° 0′ East.

The County experiences high temperatures throughout the year, ranging from 14°C to 34°C. The rainfall pattern is bi-modal with two rainy seasons annually. The rest of the year is dry and the annual rainfall ranges between 250 mm-1,050 mm per annum. The County has eight sub-counties. The CIDP seeks to address the myriad development challenges of the County that include: food insecurity; water scarcity; low prioritization of preventive health care, low education standards; low access and adaptation of modern ICT; low electricity and power connectivity among others (p.ii)

SECTOR SUMMARY	
Agriculture	Most farmers in the County are smallholders and the family is the source of labour in the agricultural production system. Majority of residents, that is 87.3%, derive their livelihoods from agriculture. Crop farming therefore plays a key role in poverty reduction, food security, and creation of employment opportunities in the County. The main food crops produced are cereals; maize, millets and sorghum; legumes; green grams, beans, cowpeas and pigeon peas; root crops; cassava and sweet potatoes. It is therefore estimated that in a good season, 292,830 acres of land are put under food crops and 6,520 acres under cash crop.
Forestry	Kitui County has 14 gazetted and 15 un-gazetted forests. Taking all forms of forests into account, there are about 34,544.1 ha of forest in the County, under different ownership. Forest cover is crucial for climate change, water resource management, control of soil erosion, and boosting agriculture in the County. Farm forestry is important as it diversifies farm production and provides both subsistence and incomes through such products as timber, fuel wood and fodder, and improves community livelihoods and income.
Water	Provision of adequate clean water for agriculture, industrial and domestic use is vital to spur economic development in the County. Access to clean and safe water is a major challenge in the County. Water quality needs to be checked by the Public Health department especially the level of fluoride.
Energy	The main sources of energy are: Fuel wood which is mainly in the form of firewood in the rural areas while in urban centres it is sold and used as charcoal; Petroleum products such as Paraffin/paraffin, liquefied petroleum gas (LPG), motor gasoline, diesel oil and fuel oil; Electricity of which only a small part of the County is connected to the national grid; and alternative sources of energy such as solar power, biogas and wind power whose potential is yet to be harnessed. The County has an electricity network that spreads through its main towns and centres.. However the electricity connection is very low with only 74 trading centres having electricity and only 5% of households projected to have electricity connection in 2015.
Disaster Preparedness	The County will establish a County Disaster Management Centre, increase funding and supportive legislation, training and awareness programmes. The County will take into consideration the following five priorities for action (under the Hyogo Framework of Action): Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation. Identify, assess and monitor disaster risks and enhance early warning. Use knowledge, innovation and education to build a culture of safety and resilience at all levels. Reduce the underlying risk factors. Strengthen disaster preparedness for effective response at all levels. For effective DRR, strategies must be put in place to limit the occurrence of hazards. Also, early warning and monitoring systems and preparedness are necessary especially the task of assessing, planning and management of disasters within the County. Participatory strategies include identification of alternative areas of settlements, coordination of relief supplies, effective rescue services, and promotion of flood control mechanisms.
Environmental Degradation	Adverse impacts of environmental degradation occur as a result of the main human activities that degrade the environment as mentioned above. The following are the key effects of the environmental degradation: deforestation and destruction of watershed areas, barren land leading to soil erosion, declining soil fertility and resultant low farm yields, loss of biodiversity and alteration of the natural tropical habitat, land subdivision into small uneconomic size and reduced productivity, outbreaks of pests and diseases, river bank erosion due to poor farming practices, seasonality of rivers and emergence of dry river beds, inadequate policy, legal and institutional frame work and poor implementation of laws and poor infrastructure. Apart from the above main hazards, others are water pollution, pest infestation such as locusts, livestock disease epidemics causing death, inter-tribal conflicts along Tana River border, land degradation, road traffic accidents and soil erosion leading to poor crop production, uncontrolled sand harvesting leading to low water catchment along the main rivers, human wildlife conflict.

CLIMATE CHANGE	
Impact	There are numerous effects in the County brought about by climate change. These include unreliable, erratic and inadequate rainfall, persistent and more frequent drought and imminent famine leading to food insecurity, and high and increasing temperatures. All these effects of climate change have aggravated incidences and levels of poverty in the County. Climatic vulnerability further reduces the capacity of land to support existing and emerging livelihoods thus further

	aggravating environmental degradation. This is evidenced by increased reduction in pasture and vegetation cover, soil erosion, food insecurity, increased conflicts and insecurity – all contributing to increased poverty. Floods are not a common occurrence in the County; however, flash floods have devastating impacts on communities, who are often caught off-guard. Outbreaks of wild fires are often as a result of human-related and natural factors which include uncontrolled charcoal burning, bush and farm clearing by burning done unattended by farmers, and extremely dry weather and vegetation conditions.
Mitigation	Carbon trading. This trade is in its nascent stage in Kenya but the County needs to make efforts so that they become one of the first counties to embrace this trade in Kenya. Develop County renewable energy master plan, support public institutions with renewable energy systems and equipment. Formulation of policies geared towards climate change mitigation; promotion of renewable energy and energy saving devices; and use of modern charcoal burning technology (p32). Increase forest cover. There is also need to embrace renewable energy strategies in Kitui County as this will improve energy access to most households within the County. Biogas, Biofuel, Biomass, Wind power and solar energy have great potential to be harnessed since the climate of the County is windy and hot throughout the year.
Adaptation	Several measures are intentionally geared towards climate change and subsequent adaptation strategies. These are: promotion of reforestation and afforestation by establishing tree nurseries for exotic and indigenous tree species; use of drought resistant seed varieties for food, fodder crops, and trees; environmental conservation, education and awareness programmes; sensitization and enforcement of environmental law; harmonization of environmental conservation laws. Water and irrigation – Construct 40 boreholes by 2017; Construct 20 more dams and shallow wells by 2015; Rehabilitation of 75% of the existing water supplies by 2017. To address food insecurity, promote adoption of modern agricultural practices; encourage farmers to adopt drought tolerant and escaping crops; promote proper postharvest handling of farm produce; promote soil and water conservation; promote value addition cottage industries.
Ongoing Projects	Disaster Management and Emergency Response Programme Athi Kilawa Irrigation Project (500 Ha); Construction of Sub-Surface Dams; Develop Water and Irrigation Master Plan for Kitui County Construct Earth Dams, water pans; (Roof catchment Water harvesting project; Irrigation projects.
Climate Change Mainstreaming	The County was ranked 4 as they identified actions for mitigation and adaptation and have budget allocation

MACHAKOS

The County covers an area of 6208.2 km^2. It lies between latitudes 0° 45′ South and 1° 31′ South and longitudes 36° 45′ and 37° 45′ East. Generally, the annual rainfall is unevenly distributed and unreliable. The average rainfall is between 500-1300 mm. The short rains are expected October and December while the long rains are expected March to May. Temperature varies between 18-29°C throughout the year. Since the County does not experience rain throughout the year, there are months that experience dry spells. These months are mainly February to March and August to September.

SECTOR SUMMARY	
Agriculture	Out of the 6,028 km^2 covered by the County, approximately 3,720.2 km^2 is arable land while approximately 2,436 km^2 is non-arable land and approximately 124 km^2 is under water mass. Because the propensity to engage in commercial activities as opposed to farming, the County has seen a consistent decline in arable land as farmers opt to engage in other commercial activities while abandoning agriculture. The average farm size under small scale farming is 0.756 ha while that under large scale farm is 10 ha. There are thirty (30) ranches in the County categorized on basis of ownership of which two are company owned, three are group ranches while twenty-five are individual ranches.
Forestry	The forests cover an area of 477.617 km^2 which is 7.6% of the County's total land. The forests are categorized as gazetted and un-gazetted. The gazetted forest covers 6. 06 km^2 while the un-gazetted cover 17.74 km^2. These forests are distributed in various parts of the County. The main forest products are firewood, charcoal, timber for building and construction, poles and posts. Other forest products include production of honey both for domestic and commercial purposes and wood carving. Agroforestry and green economy is promoted in the County for various benefits. The forest cover in the County is 7.6%. To achieve the 10% cover, the County through the forestry department has been encouraging farmers to plant trees especially in water catchment areas. Afforestation is also being done in the degraded forests.
Water	The main water sources are rivers, dams and boreholes. The average distance to the nearest water source in the County is 5 km. Fetching of water is mainly done by women especially in the rural areas who end up spending so much of man-hours on this activity as witnessed in the photo below. Water resources in the County are under pressure from agricultural chemicals and urban and industrial wastes, as well as from use for hydroelectric power. The County has two permanent rivers namely Athi and Tana. Tana River is mainly used for hydroelectricity generation while Athi River is used for domestic and industrial uses. There are also several dams that serve as water resources and springs which are found in the hilly areas. Underground water sources supplement surface water sources.
Energy	Masinga dam is one of the seven forks dams which produce hydroelectricity for the National Electricity Grid and it is located within the County. The connection to the national grid across the County is commendable since, 77% of all trading centres have power. Though connection to individual homes is low and there is need for up scaling the rural electrification programme, the County is keen on cooperating with the Rural Electrifications Authority to ensure that there is energy access across the County. Wood, paraffin, charcoal, solar, gas and electricity are the main sources of energy across the County. Though wood is the main source of cooking energy accounting for 81.6%, while the main source of lighting energy is paraffin accounting for 88.1%. From the foregoing it is apparent that diminishing forest coverage within the County can be attributed to the high use of wood as the main source of fuel.
Disaster Preparedness	County disaster risk reduction (DRR), and the Hyogo framework of action (HFA) to build resilience of the nation and communities to disaster risks.
Environmental Degradation	Machakos County has had its share of degradation. For example, sand harvesting has resulted in the drying up of some rivers. This has caused surrounding communities to encounter water supply scarcity because of the substantial reduction of water. Most locals use firewood and charcoal as the source of fuel. This has led to deforestation in various areas thus leading to expansive soil erosion.

	The most affected areas are Kibauni forest, Yathui, and Mumandu hills.

CLIMATE CHANGE	
Impact	Climate change threatens to adversely affect economic growth in the County and endangers it from becoming a prosperous County with a high quality of life for all its citizens. The cumulative impacts of climate change have the potential to reverse much of the progress made towards the attainment of the Millennium Development Goals (MDGs) and Vision 2030. The effect of the climate change has been increased periods of drought, erratic rainfalls and increase in temperatures which have led to low agricultural productivity.
Mitigation	Agroforestry and green economy is promoted in the County for various benefits. The forest cover in the County is 7.6%. To achieve the 10% cover, the County through the forestry department has been encouraging farmers to plant trees especially in water catchment areas. Afforestation is also being done in the degraded forests. The County has taken cognizance of the fact that climate change impacts have to be mitigated as such various strategies to address this issue have to be adapted. In view of this, the County will launch several tree planting programmes. The County will also put in place sand harvesting regulations. The County will also put in place sensitization programs across the entire County to sensitize residents on the measure and strategies' that the County has adapted to mitigate climate change.
Ongoing Projects	Njaa Marufuku Kenya, Waterharvesting (GIZ,Constiuency,D10), Small Holder Horticulture Development Project (SHEP UP), Urban and Peri-Urban agriculture (UPAP), Agricultural Sector Development Support Programme (ASDSP), GIZ pasture establishment and reseeding, Ponds rehabilitation, subsidized fertilizer, Pig production development project, Reseeding of denuded land.
Climate Change Mainstreaming	The County was ranked 2 as they identified mitigation actions

MAKUENI

The County lies in the arid and semi-arid zones of the eastern region of the country. The major physical features in Makueni County include the volcanic Chyulu hills which lie along the southwest border of the County in Kibwezi west Constituency, Mbooni hills in Mbooni Constituency and Kilungu and Iuani hills in Kaiti Constituency. The County terrain is generally low-lying from 600 metres above sea level in Tsavo at the southern end of the County. The main river in the County is Athi River, which is perennial and fed by tributaries such as Thwake, Kaiti, kikuu, Muuoni, Kiboko, Kambu, and Mtito Andei, which drain from various parts of the County. A few other streams flow from the Mbooni, Iuani and Kilungu hills but their flow becomes irregular as they move to the low-lying areas. These rivers provide a high potential for both large and small-scale irrigation. Tsavo National Park which lies in the southern part of the County, in Kibwezi west Constituency is considered as one of the world's biodiversity strongholds. It is home to diverse wildlife species which include the famous 'big five' consisting of lion, black rhino, buffalo, elephant and leopard. The park also has a great variety of bird life such as the black Kite, crowned crane, lovebird and the sacred Ibis among others.

The County is largely arid and semi-arid and usually prone to frequent droughts. The lower side which is very dry receives little rainfall ranging from 300 mm to 400 mm. The depressed rains in the lower part of the County hardly sustain the major staple food of maize and beans. Unfortunately, the traditional crops which are drought tolerant have largely been abandoned. This means livestock rearing remains the most common viable economic activity being undertaken by the local people in the lower region. The condition has negatively affected agriculture which is the main economic activity in the County. The County experiences two rainy seasons, the long rains occurring in March /April while the short rains occur in November/December. The hilly parts of Mbooni and Kilungu receive 800-1200 mm of rainfall per year. High temperatures of 35.8°C are experienced in the low-lying areas causing high evaporation which worsens the dry conditions.

SECTOR SUMMARY	
Agriculture	The main crops produced in the County are: maize, green grams, pigeon peas and sorghum. Mangoes, pawpaw and oranges are also being produced. Grafted mangoes are vastly gaining momentum due to the high demand and favorable conditions. The total area under cash and food crop is 23,356 ha and 65,453 ha respectively which is 2.9% and 8.1% respectively of the total County area. The average farm size is 3.44 ha for small farmers and 30.4 ha for large-scale farmers. Small farms are the common one. Livestock production is a major economic activity in the County. The main breeds reared include livestock (dairy cattle, beef cattle, sheep, goats and donkeys, poultry farming, pig farming, bee keeping and fish). The County has 12 ranches with a total area of 45,916 ha. Kima estate and Kiu ranches are owned by cooperatives while Aimi ma Kilungu and Malili ranches are owned by companies. There are eight ranches owned by individuals which include Stanley and sons, Sultan Estates, Uathimo Farm, Mwaani, Muiu farm, Nzai farm, Kalima and New Ashtra. Fish farming was introduced recently through the Economic Stimulus Programme, where more than 825 fish ponds were established and stocked with Tilapia fish. Despite the effort, water shortage and high temperatures are the major challenges facing fish farming.
Water	Makueni is a water-scarce County. Catchment degradation is undermining the limited sustainable water resources base in the country. Degradation of both surface and ground water resources through over-abstraction and illegal abstraction, among other factors has led to serious degradation of the water resources in terms of quantity and quality. Assessment and monitoring of the water resources base in the County is inadequate. The inadequacy of actionable data and information makes it increasingly difficult to make informed and transparent decisions on development and sustainable management of water resources in the country. Through Integrated Water Resources Management (IWRM) and promotion of WRUAS there a chance to reverse catchment degradation to ensure coordinated development and management of water, land and other related resources to maximize economic efficiency, social equity and welfare while ensuring ecological sustainability of the vital environmental systems. IWRM will ensure coordinated development and management of water, land and other related resources to maximize economic efficiency, social equity and welfare while ensuring ecological sustainability of the vital environmental systems. The County has one permanent river; Athi river. Semi-permanent rivers include Kibwezi and Kiboko rivers. There are two major rivers; Athi which is permanent and which is semi-permanent. Other major rivers include Kaiti, Muooni and Kikuu all of which are seasonal. There are four protected springs and 117 boreholes. There are 289 water pans and 159 surface dams. There are 278 earth dams with a storage capacity of 3,265,543 m^3 while the sand dams are 118. There are four protected springs and 117 boreholes. There are 159 water supply schemes with a production capacity of 1360.7 m^3/ hour. Households with piped water are 12,671 while 27,752 households have access to potable water while there are 289 water pans.

	The average distance to nearest water source is eight kilom indicating that there is need for initiating more water projects. The water demand in the County is 22,113 m^3/day and the developed sources have an average production of 13,607m^3/day. Athi River which is perennial passes through the County and can be used for development of major water supply schemes. Sand and earth dams are used in water harvesting. Due to perennial water shortages, the local community has picked up the practice of roof catchments and installation of and storage tanks to harvest rain water.
Forestry	The total area under forest cover in the County is 191 km^2, which includes 151 km^2 of the five Gazetted forests and 40 km^2 of the three non-gazetted forests. The Gazetted forests are Nthangu, Makuli, Mbooni, Kilungu and Kibwezi forests. The main forest products are timber, poles and fencing posts. The other notable forest products are charcoal, wood carvings, seedlings, firewood, pastures, resins and medicinal products. The high demand of firewood and charcoal has led to depletion of the existing forest. There is therefore need to ensure the forest cover in the County is increased. To address this environmental issue and at the same time provide for the community energy needs, farm forestry (woodland) will be encouraged. The on-going interventions by Kenya Forests Service such as the Economic Stimulus Programme have raised the community awareness. Likewise, the agro-forestry programme has enabled the community to embark on tree planting. This will ensure that the community is able to generate income from fruit trees and woodlands in the farm forests will be used as a source of fuel (firewood). This will supplement the existing fuel wood demand thus reducing the crisis. Increased forest cover will reduce soil erosion while protecting the water catchment areas, improving soil fertility in addition to beautification of institutions and major urban centres. Agro forestry will there be a major source of animal feeds which will reduce cases of overgrazing and hence soil erosion. Animal diseases will also be reduced due to limited movements in search of grazing areas (p30). To reverse this and at the same time provide for the community energy needs, farm forestry (woodland) should be encouraged. The farm forestry is expected to help in provision of the much needed forest products for domestic use which includes firewood and timber.
Energy	Electricity coverage within the County has been expanded through the rural electrification programme. More than 2,000 households have been connected. Electricity is mostly used in the households for lighting purposes. There is need to upscale connections particularly in the upcoming markets and institutions. Firewood is the major source of cooking fuel accounting for 84.8% of households, followed by charcoal at 11.1%. However, this poses a great danger to the environment. Paraffin is the most used source of energy for lighting in the households at 69% followed by electricity and solar at 5.9% and 3.8% respectively.
Disaster Preparedness	Disaster is a serious disruption in the functioning of a society, resulting in wide spread human, social, economic or environmental losses which exceed the ability of the affected society to cope using its own resources. Disaster Risk Reduction (DRR) aims to reduce the damage caused by natural hazards like floods and droughts through an ethic of prevention. Disasters often follow natural hazards. A disaster's severity depends on how much impact a hazard has on society and the environment. Disaster risk reduction includes focusing on disaster management, disaster mitigation and disaster preparedness and is also part of sustainable development. In order for development activities to be sustainable they must also reduce disaster risk. On the other hand, unsound development policies will increase disaster risk and disaster losses. All the sub counties have disaster management committees in place and meet regularly to spearhead disaster preparedness. This has been done with the help of organizations such as the Kenya Red cross who provide disaster relief services and first aid trainings for volunteers throughout the County.
Environmental Degradation	The reduced agricultural production due to drought and dry being experienced in the County has immensely contributed to environmental degradation as residents seek an alternative source of livelihood. These include sand harvesting and charcoal burning which have reduced the vegetation and forest cover. Industrial effluent into Athi River at the upstream and plastic materials and poor farming methods has also contributed to environmental degradation. The degradation has reduced the vegetation cover and also negatively affecting agricultural productivity. The sand harvesting has led to conflicts among groups involved in sand harvesting. Reduced forest cover in the County due to charcoal burning which have resulted to soil erosion affecting soil fertility and the crop production. Sand harvesting has also contributed to soil erosion of river banks. To protect the environment, the County has embarked on protection of hill tops, regulating sand harvesting, and charcoal burning their exploitation increasing surveillance. Due to the high poverty level and limited range of economic activities, there is need to initiate alternative economic activities to mitigate against environmental degradation.

CLIMATE CHANGE	
Impact	There is reduced forest cover in the County due to charcoal burning which have resulted to soil erosion affecting soil fertility and the crop production. Sand harvesting has also contributed to soil erosion of river banks. The County continues to experience dry spells which are worsening by the day a situation where environmental degradation may have contributed.
Mitigation	To protect the environment the County has embarked on protection of hill tops, regulating sand harvesting, charcoal burning their exploitation increasing surveillance. Due to the high poverty level and limited range of economic activities, there is need to initiate alternative economic activities to mitigate against environmental degradation
Adaptation	NOT CAPTURED
Ongoing Projects	Development of Agricultural Training Centers/Agricultural Technology Development centres and Agricultural Mechanization Services stations; Promotion of Traditional High Value Crops (Sorghum, Millet, P/Peas, C/Peas G/Grams, Ground nuts) etc. through seed bulking and banking.
Climate Change Mainstreaming	The County was ranked 2 as they mentioned climate change impacts and governance framework.

MARSABIT

The County of Marsabit in Kenya has a total area of 70,961.2 km^2 and occupies the extreme part of Northern Kenya. It has an international boundary with Ethiopia to the north, borders Lake Turkana to the west, Samburu County to the south and Wajir and Isiolo Counties to the east. It lies between latitudes 02° 45′ and 04° 27′ North and longitudes 37° 57′ and 39° 21′ East.

The main physical feature is the Chalbi Desert which forms a large depression covering an area of 948 km^2 Most parts of the County are arid, with the exception of high potential areas around Mt. Marsabit such as Kulal, Hurri Hills and the Moyale-Sololo escarpment. The County experiences extreme temperatures ranging from a minimum of 10.1° C to a maximum of 30.2°C, with an annual average of 20.1°C. Rainfall

ranges between 200-1,000 mm per annum and its duration, amount and reliability increases with increase in altitude. north Horr (550m) has a mean annual rainfall of 150 mm; Mt. Marsabit and Mt. Kulal 800 mm while Moyale receives a mean annual rainfall of 700 mm.

SECTOR SUMMARY	
Agriculture	Crop farming in the County does not thrive well because of erratic climatic conditions. There are however some regions around Mt. Marsabit and Moyale where crop farming does well during rainy season. The population working in agriculture is estimated to be about 2%. Main cash crops grown in the County include vegetables and fruits whereas food crops include maize, teff, beans and millet. Only 2% of the County population practice crop farming. The total area under food and cash crop production is 5,060 ha. However the County has great potential of crop production with an area of 1,582,750 ha being arable. Much of the area is underutilized due to erratic climatic condition. Main storage facilities include bags and wooden granaries with few modern stores found in Moyale and Marsabit town and other urban centres. The other common storage facilities are gallons and guards which are used to store milk. Livestock keeping is the main economic activity in the County. The main livestock bred include: Cattle which are approximately 424,603, goats 1,143,480, sheep 960,004, camels 203,320, donkeys 63,861, and poultry 50,690. There are 2,691 beehives/apiaries in the entire County. The main livestock products are: Milk, beef, mutton and camel meat. There are no registered group or company ranches, however different communities have their own grazing areas. This contributes to resource based conflicts especially in drought season where community competes for grazing fields. Lake Turkana is the main source of fish in the County supporting 1,400 of fishermen and 400 fish farming families. The main species of fish caught are: Tilapia, labeo and nile perch. The County has 10 landing beaches but only four are gazetted. There are 2,000 fishing nets, 500 hooks, 10 motor boats and 20 canoes.
Water	Most parts of County experience acute shortage of water and only 4% of the household use piped water. There are no permanent rivers in the County and 60% of the households rely on boreholes, springs and wells. Most parts of County experience acute water shortages. There are nine dams, 853 shallow wells, 18 protected springs, 17 unprotected springs, 53 water pans and 60 boreholes which serves as the main sources of water in the County. The piped water is treated at the water supply plant but the others are not treated and are saline. There is no established water supply services board in the County due to the limited water resources. The water projects in Moyale and Marsabit are government and community initiated either through Ministry of Water or the Constituency Development Fund (CDF). There is need to establish water management boards to manage water supply in the County. The mean distant to the nearest water point is 25 km. Most parts of County experience acute shortage of water and only 4% of the household use piped water. There are no permanent rivers in the County and 60% of the households rely on boreholes, springs and wells. Most parts of County experience acute water shortages. There are nine dams, 853 shallow wells, 18 protected springs, 17 unprotected springs, 53 water pans and 60 boreholes which serves as the main sources of water in the County. The piped water is treated at the water supply plant but the others are not treated and are saline. There is no established water supply services board in the County due to the limited water resources. The water projects in Moyale and Marsabit are government and community initiated either through Ministry of Water or the Constituency Development Fund (CDF). There is need to establish water management boards to manage water supply in the County. The mean distant to the nearest water point is 25 km. This distance is big and therefore a lot of time is wasted to fetch water which could be used for other productive activities.
Forestry	The County has one indigenous forest known as Mt. Marsabit, with a size of 152.8 km^2. This is the only gazetted forest in the County. There are two non-gazetted forests, Mt. Kulal and Hurri hills, with a total area of 750 km^2. Main forest products are: Charcoal, grass, plants, stones, firewood and water. Non timber forest products include: Water, medicinal herbs and grass. Seedlings production per year amount to 100,000Kgs and are controlled by the government. The main tree species includes oleaAfricana, croton spp, leucaena spp, cassia spp, moringa spp, jacaranda, and acacia spp and cordia spp. There are 2,160 tonnes of fuel-wood obtained per year, engaging 300 fuel-wood collectors from Marsabit. Annual seedlings production by the community is 400,000Kgs although there are no community forest associations in the County. Agro-forestry activities are limited by the harsh climatic conditions with less than 1% of the population practicing farm forestry in areas around Marsabit and Sessi in Moyale. Crop trees grown include: oranges, avocados, mangoes and miraa in Moyale and parts of Saku constituency. Miraa is grown for commercial purposes while fruit trees are mainly small scale and consumed in domestic circles.
Energy	Main source of energy is firewood while the electricity coverage is only found in urban centres of Marsabit and Moyale towns. The County is not served by electricity from the national grid but by diesel generator and a small wind plant to supplement it. Moyale town is connected with electricity from Ethiopia and plans are at an advanced stage to connect Sololo and neighbouring market from the same grid. The total numbers of households with electricity connection are 1,273. The proportion of households using firewood as main source of cooking fuel is 92.6%, charcoal is 5.6%, paraffin is 1.4%, and biomass residue is 0.2%. Household using firewood for lighting comprises 57.2%, paraffin 27.5% and those using electricity stands at 3.6%.
Disaster Preparedness	The main disasters facing the County are drought and floods. The County has been experiencing prolonged drought which has resulted in shortage of food, loss of livestock and shortage of water. The pattern of drought has changed drastically with more frequent occurrence resulting in scarcity of water leading to reduced livestock fodder and less crop production. This at times leads to over 50% of the population depending on relief food. Due to persistent drought, livestock and human diseases are frequent and development resources are diverted to take care of emergencies arising from these disaster occurrences. Floods make roads such as those crossing the Chalbi Desert impassable, thus disconnecting transport.
Environmental Degradation	Environmental degradation in the County is mainly as a result of deforestation and forest encroachment due to dependency on firewood and overgrazing. Inadequate solid waste collection and its disposal coupled with lack of sewerage system and unsustainable management practices of ecosystems and their inherent biodiversity are major contributors to environmental degradation in the County. Other contributors to environmental degradation include non-compliance of law due to weak enforcement of the environmental provisions, inadequate disposal of non-biodegradable materials like plastics and polythene and low levels of environmental awareness, low social responsibility at individual and community levels on environmental matters. The environmental degradation has led to increased land degradation and desertification. Population on Mt. Marsabit has increased precipitating further degradation of natural resources, environmental

	health problems have been reported due to pollution of the ecosystem, energy demands for domestic use has increased resulting in natural resources depletion and degradation. The degradation has also increased slum settlements in urban areas due to rapid rural-urban migration resulting in environmental problems of overcrowding, poor garbage disposal and environmental diseases such as cholera, dysentery and typhoid.

CLIMATE CHANGE	
Impact	In recent times, there has been increased concern and discussion on the changing world climate and its consequences. In the County, many old people say that there has been tremendous change in climate since their childhood days especially on and around Mt. Marsabit. Many scientists concur that the world climate has been changing. This has been attributed to the increased gases in the atmosphere especially carbon dioxide, methane, nitrous oxides, chlorofluorocarbons among many other gases. These gases commonly known as green-house gases (GHGs) are largely the products of human activities arising from burning of fuels (oils, gas, coal) and destruction of forests, while methane come from waste landfills & wet rice cultivation. Climate change has affected the County's bimodal rainfall pattern. It's now difficult to predict the onset of the short and the long rains. This has affected farmers timing in regard to land preparation hence affecting agricultural productivity. Water resources have also been affected with many springs flowing from the forest drying up due to effects of climate change. Prolonged and recurrent drought has led to reduced forage availability, degradation of the environment and an increase in destitution. The 2006 to 2009 drought caused devastation to the livestock sector.
Mitigation	Mitigation measures that have been put in place to check on environmental degradation include increased use of alternative carbon free fuels e.g. solar, wind energy and hydropower, increased use of energy efficient technologies e.g. efficient cook stores, lighting bulbs and greater use of public transport rather than use of private vehicles to reduce emission of GHGs. There is need to encourage recycling, maintenance/conversion of forests for carbon sequestration, organic farming as well as encourage agro forestry in existing agricultural systems in order to increase size of the forest cover that would sequester carbon dioxide.
Adaptation	The adaptation strategies include improving water harvesting techniques, exploration and utilization of other sources of energy that are reliable like solar, wind and geothermal establishment of suitable tree plantations, planting of drought resistant and fast maturing seedlings and strengthen linkages between community education and awareness.
Ongoing Projects	Food security project, Soil and water conservation, Irrigation infrastructure development, Agro-Processing – value addition for fruits and vegetables, Natural resources management and drought resilience project.
Climate Change Mainstreaming	The County was ranked 3 as the identify priority actions for climate change mitigation and adaptation

MERU

The County lies to the east of Mt. Kenya whose peak cuts through the southern boundary of the County. It shares borders with Laikipia County to the west, Nyeri to the southwest, Tharaka Nithi to the east and Isiolo to the north. It straddles the equator lying within 00 6′ North and about 00 1′ South, and latitudes 37° West and 38° East. The County has a total area of 6,936.2 km^2 out of which 1,776.1 km^2 is gazetted forest.

The County's position on the eastern slopes of Mt Kenya and the equator has highly influenced its natural conditions. Altitude ranges from 300m to 5,199 metres above sea level. This has influenced the atmospheric conditions leading to a wide variety of microclimates and agro-ecological zones. The drainage pattern in the County is characterized by rivers and streams originating from catchment areas such as Mt. Kenya and Nyambene ranges in the north. The rivers cut through the hilly terrain on the upper zones to the lower zones and drain into the Tana and Uaso Nyiro Rivers. The rivers form the main source of water for both domestic and agricultural use.

Ecological Conditions The County has varied ecological zones ranging from upper highlands, lower highlands, upper midlands and lower midlands. This has greatly influenced the major economic activities. Climatic Conditions The County receives moderate amounts of rainfall except for the lower parts of Buuri area bordering Isiolo County which are arid. The distribution of rainfall ranges from 300 mm per annum in the lower midlands in the north to 2500 mm per annum in the southeast. Other areas receive on average 1250 mm of rainfall annually. There are two seasons with the long rains occurring from mid-March to May and short rains from October to December. Temperatures range from a low of 8°C to a high of 32°C during the cold and hot seasons respectively.

SECTOR SUMMARY	
Agriculture	The average land holding size per household is 1.8 ha for the small scale and 18.25 ha for the large scale land owners. The area which is potential for irrigation is 81,262 ha with only 2,131 ha under irrigation. The major land use in the County is farming for both subsistence and commercial purposes. In the recent past, most farmers have been shifting from traditional cash and food crops to horticultural production which fetches relatively high prices in the market. 'Miraa' (khat) farming is the major agricultural cash crop in the Nyambene ranges area with most farmers specializing in it as the major source of income. The County has a wide range of agro-ecological zones and untapped water for irrigation which support the production of a variety of crops such as mangoes, citrus, coffee, maize, beans, Bananas, pigeon peas, cow peas and horticultural crops. Acreage under Food Crops and Cash Crops The major economic activity in the County is agriculture with the major cash crops being tea, coffee, miraa and bananas. The total acreage under food and cash crops is 161,907.2 ha and 15,773.4 ha respectively. Land subdivision has significantly reduced the average acreage to 1.8 ha. Average Farm Sizes. The average farm size in the County currently ranges from 1.8 ha for small scale to 18.25 ha for the large scale farmers. Kisima farm in Buuri Constituency is the largest in the County. Other large farms include Protea, Lobelia and Ibis – all located in Timau of Buuri Constituency. Main Storage Facilities The main storage facilities are traditional and modern cribs, which are used by most small scale farmers while large scale farmers uses the traders stores and National Cereals and Produce Board depots (NCPB). There are two NCPB depots in the County, namely Maua and Meru. The main purpose of the depots is to receive produce from the farmers and market them on their behalf. The stores also play a key role in the distribution of various farm inputs to the farmers such as the subsidized fertilizer. The main livestock are goat, cattle, sheep, pig, rabbits and poultry which are reared in small scale since most land is used for farming of food and cash crops. Livestock are mainly used for domestic purposes e.g. bulls are used for cultivation of small farms and cows for dairy milk.

	Number of Ranches. There are four company ranches with an average of 100 ha and four group ranches. The major activities carried out include cattle and sheep rearing. The Lewa ranch, one of the company ranches, is also a wildlife conservancy. Main Fishing Activities and Types of Fish Produced. The County has over 2,000 fish pounds which are evenly distributed in all areas of the County.
Water	The County has 11 permanent rivers with major one being the Kathita River which is a tributary to River Tana. The County also has 12 shallow wells, 30 protected springs, two water pans, 16 dams and 105 boreholes. These form the major sources of water for domestic use and irrigation. The quality of water in the County is good for domestic use as it originates from sources like Mt. Kenya and Nyambene hills. However, the land use practices and increase in use of chemicals in agriculture sector tend to pollute the water as it flows downstream. 1.16.2 Water Supply Schemes Meru Water and Sewerage Company (MEWASS) is the only company licensed to supply water and sewerage services in Meru town while Thuura-Giaki is the biggest community water scheme in the County. Imetha Water Company supplies water to all other towns of the County. Other small water projects have been started through community initiatives due to high demand for irrigation water especially in arid areas of the County. Water Sources (Distance to Nearest Water Points). Average distance to the nearest water point in 2009 was 1.5 km.
Forestry	The County forest cover totals 1,776.1 km², which is 25.6% of the total County area. There are ten gazetted forest, with Mt Kenya and Imenti forest being the major ones and occupying 63,358 ha in the County. The ungazetted forests are 19 with 345 ha coverage. Encroachment of forested areas has resulted to major human wildlife conflicts in the region such as destruction of farm crops by elephants. The aspect of agro-forestry is highly practiced within the County, with the Forest department giving permits to farmers to ensure they get their livelihood as well as conserve the forest. The squatters in Timau area are major beneficiaries of agro-forestry activities in the Mt. Kenya forest. Main Forest Types and Size of Forests. The two broad categories of forest are natural forest and manmade forests. The County has Mt Kenya and Imenti forests which are natural forests with rich biodiversity. Conventional tree planting is mainly incorporated in the farms and along the river banks. The main forest products are timber, firewood, charcoal, seedling production and poles. The high demand of these products has resulted in deforestation and hence need for policy measures to conserve the forests. The Mt Kenya region is the major source of main forest products. Farm agroforestry and green economy is promoted in the County.
Energy	The main source of energy for cooking by household is firewood and charcoal which accounts for 86.1% and 6.6% respectively. The number of household connected to electricity is 13.6%; those using paraffin are 4.5%, gas 2.4%, biogas 0.1% and solar 6.6%. Major public and private institutions are connected to national grid but the major challenge is how to connect the over 85% households with electricity.
Disaster Preparedness	A disaster is a catastrophy that is beyond the capacity and resources of the affected community to respond adequately in order to save lives and property. The first step in addressing disaster is to understand the nature of the hazard, risk, or vulnerability (economical, physical, environmental). Environmental disasters include forest fires, Technological disasters include chemical spills, and toxic substances. Natural disasters include floods, drought, earthquakes, landslides and tornadoes. Biological disasters include invasive plant species. Possible measures to prevent and mitigate disasters include: Risk assessment; Early warning systems, Capacity building, Institution and policy frameworks, and Regulatory framework.
Environmental Degradation	The main causes of environmental degradation are human activities such as farming, mining, road construction, human settlements and overstocking of livestock. Other causes of environmental degradation include changing weather patterns that affect soil cover such as forests and all other forms of vegetation. Human activities such a cultivation, overgrazing, mining as well as settlements disturb the ecological setup and expose soil to erosion, reducing its ability to sustain natural regeneration of soil cover. Effects of Environmental Degradation. The major effects include soil erosion which also contributes to loss in soil fertility, drying of rivers is also been experienced due to encroachment in wet land areas and also prolonged periods of drought. Wildlife in the forest areas are also migrating to other areas due to logging of the forests leading to human wildlife conflicts. The quarrying is causing a health hazard to the surrounding communities especially during the rainy seasons posing both landslides dangers to the populace and breeding sites for mosquitoes.

CLIMATE CHANGE	
Impact	Environment refers to the aggregate of the surroundings, conditions, or influences of the surroundings. Climate encompasses the statistics of temperature, humidity, atmospheric pressure, wind, precipitation, atmospheric particle count and other meteorological elemental measurements in a given region over long periods. Climate can be contrasted to weather, which is the present condition of these elements and their variations over shorter periods. Climate change refers to significant and lasting change in the statistical distribution of weather patterns over periods ranging from decades to millions of years. It may be a change in average weather conditions or the distribution of events around that average (e.g. more or fewer extreme weather events). It may be limited to a specific region or may occur across the whole Earth. The County is experiencing increased periods of drought, erratic rainfalls and increase in temperatures as a result of changing climatic conditions.
Mitigation	Reforestation and reclamation of wetland through planting of trees and community sensitization
Adaptation	The key measures being taken include; reforestation and reclamation of wetlands through planting of trees and community sensitization. Implementing of the various Acts of Parliament that have been passed to enhance forest and natural resource conservation measure e.g. Environment Management and Coordination Act, Kenya Forest Service Act, Water Act.
Ongoing Projects	Disaster management, KAPAP
Climate Change Mainstreaming	The County was ranked 3 as the identify priority actions for climate change mitigation and adaptation.

THARAKA NITHI

Tharaka-Nithi County is one of the forty-seven counties in Kenya created by the Kenya Constitution in 2010. It borders the Counties of Embu to the south and southwest, Meru to the north and northeast, Kirinyiga and Nyeri to the west and Kitui to the east and southeast. The County lies between latitudes 00° 07′ and 00° 26′ South and between longitudes 37° 19′ and 37° 46′ East. The total area of the County is 2,662.1 km²; including

the shared Mt Kenya forest estimated to have 360 km^2 in Tharaka Nithi County.

The County has two main ecological zones. The highlands (upper zone) comprise of Maara and Chuka which receive adequate rainfall for agriculture. The semi-arid (lower zone) covers Tharaka and receives less rainfall suitable for livestock production. Poor methods of farming and soil conservation, charcoal burning and overgrazing have left the earth bare and rocky.

SECTOR SUMMARY	
Agriculture	The main occupation of the people in the County is agriculture, which include crop and livestock production. The main food crops include; maize, beans, cowpeas, sorghum, green grams, millet, black beans. The cash crops include tea and coffee grown mainly in Maara and Chuka/ Igambang'ombe constituencies. However, farmers from Tharaka grow especially green grams as a food and cash crop. An estimated 80% cent of the County population is engaged in agricultural activities. Approximately 43,799 ha is under food crops while cash crops cover 14,839 ha. Crop farming is characterized by frequent crop failures especially in Tharaka. A better infrastructural support service is required to increase agricultural output.PP21 Poor methods of farming and soil conservation, charcoal burning and overgrazing have left the earth bare and rocky. The sloping areas have experienced uncontrolled soil erosion, which has resulted in deep gullies across the landscape especially in Tharaka. The drainage pattern consists of rivers and streams that ultimately drain into the Indian Ocean through Tana River.
Water	The County is well endowed with water sources from rivers, springs, underground water. The County has nine main perennial rivers that drain into the Tana River namely: Maara, Thuci, Tungu, Nithi, Ruguti, Mutonga, Thangata, Thanantu and Ura. Despite the abundance of water sources in the County, access to water points both domestic and irrigation remain a challenge.
Forestry	The gazetted forests stands at 44,617 ha and non-gazetted at 3,344 ha. There are a number of hilltops that were once forested but have since been cleared. Main products from the forests are timber, firewood, charcoals, herbs, fodder, beeswax and honey. The forest forms the water catchment for some of rivers. Logging has been a major drawback with deforestation being prevalent. There is need to ensure sustainable exploitation of forest products.
Energy	The main sources of energy are firewood, paraffin and charcoal. There is an increase in usage of solar energy especially by health and education institutions that do not have access to electricity lines. The rural electrification program by the National Government has been implemented in 10 trading centers in the County. Investment in alternative renewable energy sources will enhance reliability of power supply in the County, especially Hydro-electric power generation, solar and wind, biogas energy. The National Government plans to construct the High Grand falls multipurpose dam in Thraka Nithi which will be critical in generating hydropower for the nation.
Disaster Preparedness	Disasters like famine affect the ability of institutions to offer effective services. For example, the number of students in some schools can increase due to school feeding programmes. Health facilities cannot cope with the high level of malnutrition and disease outbreaks. The livestock keepers are not able to sell their livestock in the market due to quarantine. It is important to improve the agricultural productivity by providing farmers with high yielding drought resistant crops, fast maturing crops, better storage methods and facilities. The introduction of small and large scale irrigation schemes in the County will be of great benefit. There is need to prepare a disaster management framework if sustainable development is to be achieved in the County. This will be achieved through community managed disaster reduction structures where the community members identify risk and use their own capabilities to deal with the disaster or mitigate its effects.
Environmental Degradation	The forests have been encroached by human settlements with the intent to either farm or exploit some of the forest resources thus aggravating the degradation of the environment. Three gazetted forests and un-gazetted forests in the southern part of the County are under the trusteeship of the County Council. Some of the activities that pose risk to the environment include; charcoal burning, sand harvesting and quarrying. To divert the attention of communities from depleting the existing forests, commercial forest farming has been introduced. This is expected to replenish the forestry cover while at the same time improving household income. In Tharaka constituency, sand harvesting is over exploited although traditional methods of harvesting are used. Mining of building bricks and ballast also needs to be well regulated.

CLIMATE CHANGE	
	The Ministry of Forest and the National Environment Management Authority (NEMA) have been in the forefront in training the Tharaka Nithi Community on the importance of maintaining forest. Community Based Organizations (CBOs) are involved in development activities among them tree planting and establishment of tree nurseries. Tree seedlings are mainly sold to farmers in the County. Other groups have initiated bee-farming activities in the forests. The bee farmers maintain the forests by planting trees and ensuring that trees are not cut. This ensures that the bees have sufficient nectar. The farmers get economic benefits from these activities resulting in high motivation to establish new forests and protect existing forests in the County. The Ministry of Water and Irrigation, Ministry of Agriculture, and Kenya Forest Services in collaboration with NGOs in the County have been educating farmers on how to protect water catchment areas.
Impact	Climate change has led to an increase in the intensity and frequency of extreme weather conditions, floods and droughts. Extreme weather events, such as severe flooding has increased the spread of waterborne diseases, such as malaria and diarrhea.
Mitigation	Rainwater harvesting helps to combat the effects of drought and the water can be used for irrigation to ensure food security. Conservation agriculture, which involves ensuring soil cover, crop rotation and intercropping, promotes productivity and carbon sequestration. The County also promotes the use of clean energy like electricity, solar and biogas to reduce the over reliance on firewood which is also major source of pollution
Adaptation	Tharaka Nithi County is sensitive to climate change because agriculture, livestock and forestry, which are key drivers of its economy, are very vulnerable to climatic changes. The County has addressed the problem at the local level by promoting rainwater harvesting and conservation agriculture.
Ongoing Projects	Fish farming County wide, Turima-Tweru Irrigation In Tharaka Constituency, Trout Development in Mt Kenya Forest
Climate Change Mainstreaming	The County was ranked 3 as the identify priority actions for climate change mitigation and adaptation.

NORTH EASTERN REGION

GARISSA

Garissa County is one of the three counties in the north Eastern region of Kenya. It covers an area of 44,174.1 km^2 and lies between latitudes 1° 58′ North and 2° 1′ South and longitudes 38° 34′ and 41° 32′ East. The County borders the Republic of Somalia to the east, Lamu County to the south, Tana River County to the west, Isiolo County to the northwest and Wajir County to the north. Given the arid nature of the County, temperatures are generally high throughout the year and range from 20°C to 38°C. The average temperature is however 36°C. The hottest months are September and January to March, while the months of April to August are relatively cooler. Housing remains a big challenge in the County with a high percentage of the population living in manyattas.

SECTOR SUMMARY	
Agriculture	The total hectare under food crops in the County is 981 ha while that under cash crop is 1,800 ha. These are mainly found along River Tana. The average farm size in Garissa County is 1.3 ha. The main problem in this sector is the low agricultural productivity, lack of access to farm inputs such as fertilizers, improved seed varieties, acaricides, pesticides and machinery, and water shortage for effective irrigation are some of the bottlenecks to increased farm productivity. Lack of market access to where local farmers can sell their produce and earn income continues to place them in a vicious cycle of poverty. There is lack of processing plants for agricultural and livestock products. Such value addition is expected to provide additional income as products penetrate wider markets. Also poor Marketing and Storage Facilities. The County has immense potential of 894,000 ha of arable land but only 2,781 ha are under cultivation. Agriculture strategies include; support to small minor irrigation schemes; promote early maturing and drought tolerant crops; improve road network and marketing infrastructure in the rural areas; promote and strengthen the agricultural and marketing organization; intensification of extension services and use of integrated pests and disease control; promotion of orphan crops like cassava and millet; construction of storage facilities for agricultural produce; establish a link between a research and extensions; intensify extension services; encourage small scale irrigation intensify farmers training; establishment of marketing system for both cash and food crops; promotion of small-scale oil processing plant.
Forestry	There are two non-gazetted indigenous forests in the County, namely Boni and Woodlands. Most of the forests in the County are woody trees and shrubs which are mainly browsed by camels and goats and to some extent by grazers. The main forest products are Gum Arabica, Resins, Poles/Posts, Firewood, Charcoal and Herbal Medicine. Agroforestry and green economy is promoted.
Water	Garissa County has one permanent river (River Tana), 25 shallow wells, 65 boreholes, 177 water pans and one dam. The Garissa Water and Sewerage Company (GAWASCO) supplies treated water to the residents. Water from other sources is generally unsafe and as such it is treated at the household level by use of aqua tabs, water guard and other chlorine based purifiers supplied by the relevant government departments. Garissa County is water scarce with only 23.8% of the population having access to safe water.
Energy	About 78.8% of the County's population uses firewood as a source of energy for cooking while 18.2% of the population uses charcoal. Electricity is only available in Garissa, Ijara, Dadaab, Bura east and Modogashe, and their environs with only 0.7% of the population having access to electricity. The proportion of population connected to sustainable power source is 0.2%. Increasing household connectivity to sustainable power source such as solar and wind power is important.
Disaster Preparedness	Disaster Risk Reduction (DRR) is the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. The County is prone to a number of disasters. These include floods, animal diseases, drought, pests and agricultural diseases. Trained community members on DRR by organizations such as CARE International in Kenya, VSF Belgium, International Rescue Committee; presence of early warning systems; strong presence of CSOs; existence of disaster management committee.
Environmental Degradation	Activities that have contributed greatly to environmental degradation include: illegal encroachments and settlements, logging and over-grazing, mushrooming of settlements on grazing land, increase in population, climate change, influx of refugees and charcoal burning. Frequent floods during rainy season have also contributed greatly to environmental degradation. Various challenges experienced due to environmental degradation include: shift in rainfall patterns (more frequent, severe and prolonged droughts and flash floods at times), rising temperatures, extreme weather and unpredictable rainfalls. Possible impacts of climate change in the County include: increase in water demand by livestock due to increased temperature, decrease in the availability of feed for livestock due to the vegetation species composition and land use changes hence pastoralists are forced to trek long distances in such of both water and pasture for their livestock. There is a possibility of spread of both human and animal diseases as a result of changing climate conditions especially vector-borne diseases such as Rift-valley fever in animals and malaria.

CLIMATE CHANGE	
Impact	Climate change is evident in the County in a number of ways; the amount of rainfall is becoming less and unpredictable, there is occurrence of frequent and prolonged drought in the recent past and unpredictable floods. The adverse impacts of climate change are compounded by environmental degradation such as illegal encroachments and settlements, logging and livestock grazing.
Mitigation	This is done by planting trees to protect existing local vegetation. These trees will absorb the carbon dioxide produced hence purifying the environment and reducing global warming. The ecosystem in the County is quite fragile with the ever increasing number of refugees who have destroyed large hectares of vegetation for firewood. To manage and lessen the impacts of climate change, efforts should be geared towards adoption of renewable sources of energy, Afforestation, reforestation and environmental management. Surface run off harvesting Roof catchments Increase the forest cover from 2% to 2.5% and eventually to 10% as envisaged in the Forest act 2007, Vision 2030, MDGs and the constitution through afforestation. Rehabilitate 600,000 ha of land degraded by the refugees in Dadaab, Fafi and Lagdera Districts in five years pp106. Afforestation and tree planting for a clean and healthy environment.
Adaptation	Climate change adaptation will be critical to achieving sustainable development in the County. Households must pursue livelihood strategies that are resilient to changing climate. Community based adaptation has been

	recognized as part of an efficient, sustainable and effective response to climate change. Other adaptation strategies for the County include, identifying development principles to guide the utilization of natural resources in support of sustainable livelihood options, identifying strategic responses to address the challenges identified. Construction of small, medium and big dams and pans in the County; Rehabilitation and sinking of new boreholes/ wells; Harness water from Lag has for agricultural, livestock and domestic use; De-silt existing water points. Other measures include strengthening of the early warning system, afforestation programmes and sensitization of the community on Disaster Risk Reduction and Early Recovery. Adaptation strategies include, restocking and destocking of livestock, and rehabilitation of degraded sites within the County.
Ongoing Projects	Establishment of new irrigation schemes Rehabilitation and expansion of existing schemes.
Climate Change Mainstreaming	The County was ranked 3 as the identify priority actions for climate change mitigation and adaptation.

MANDERA

There are two ecological zones in the County namely arid and semi-arid. 95% of the County is semi-arid with dense vegetation mainly thorny shrubs and bushes along foots of isolated hills and 'mathenge' trees along river banks and gullies. Temperatures are relatively very high with a minimum of 24°C in July and a maximum of 42°C in February. Variation in altitude brings differences in temperatures across the County where places near Banissa constituency experiences low temperatures due to neighbouring highlands in Ethiopia. Rainfall is scanty and unpredictable averaging 255 mm. The long rains fall in the months of April and May while the short rains fall in October and November. Mandera County has an area of 25,991.5 km 2.

SECTOR SUMMARY	
Agriculture	Under irrigation 4000 ha is exploited but the potential area is 15,000-20,000 ha whereas under rainfed agriculture the exploited area is very low considering that reliability of rainfall is below 30%. There is need to focus on increasing area under irrigation by developing irrigation infrastructure and exploiting groundwater sources. There is also need for sustainable land use practices and environmental conservation. The range of crops that can be grown in the County includes cereals, pulses, horticultural crops, oil crops and fruit trees. The main challenge in the County is land degradation resulting in some areas rendered unsuitable for crop production. The available land for agriculture has not been fully exploited due to resource constraints. The main food crops grown are maize, sorghum and cowpeas. Horticultural crops, i.e. vegetables (sukuma wiki, cow peas, onions, spinach, tomatoes) and fruits grown are onions, watermelons, capsicums, mangoes, bananas, kales and tomatoes. Simsim is also grown as an oil crop. The acreage under food crops and cash crops is approximately 716.58 ha. The main cash crops are horticultural and oil crops (Sim sim, Sun flower and groundnuts). Kiliwehiri in Banisa Constituency; Rhamu and Guticha in Mandera north have potential for growing oil crops under irrigation. The main food crops grown are maize, sorghum and cowpeas. Horticultural crops, i.e. vegetables (sukuma wiki, cow peas, onions, spinach, tomatoes) and fruits grown are onions, watermelons, capsicums, mangoes, bananas, kales and tomatoes. Simsim is also grown as an oil crop. The acreage under food crops and cash crops is approximately 716.58 ha. The main cash crops are horticultural and oil crops (Sim sim, Sun flower and groundnuts). Kiliwehiri in Banisa Constituency; Rhamu and Guticha in Mandera north have potential for growing oil crops under irrigation. The average farm size ranges between 2.5-15 ha and these are dominantly found along river Daua. The common types of livestock reared are goats (galla breeds), cattle (boran breeds), camels Somali breeds), sheep (Somali black head breeds), donkeys (Somali breed) and chicken (indigenous breed).
Forestry	The main forest type is dry land forest which covers the whole County with Mandera north, Mandera west and Banissa constituencies having the largest share of the forest cover. Firewood, building materials, charcoal, Gum and resins, Aloe Vera and honey are some of the main forest products. The County has no gazetted forests. Promotion of tree planting is mostly done at household level. Agroforestry and green economy is highly promoted in the County.
Water	There is one main water supply scheme namely Mandera Water and Sewerage Company that serves Mandera town and its environs. The average distance to the nearest water point is 25kms. The distance reduces in rural areas during rainy seasons and vice versa. Presence of piped water in the constituency headquarters shortens the distance considerably.
Energy	The main source of energy is firewood, which is used by 95.6% of the house holds for cooking (KIHBS 2005/2006). Mandera east, Mandera north, Mandera south and Mandera west constituency headquarters have electricity supply. New electricity coverage is being extended to Lafey and Banissa constituencies. There is potential to develop a green and sustainable energy supply within the County by exploiting solar, wind, bio fuel and coal petroleum. Rural Electrification Programme (REP) is currently being implemented in Lafey, Banissa, Mandera west and Mandera north constituencies to increase the number of households with access to electricity. The use of renewable energy technologies such as wind and solar to supplement the energy supply is being promoted by putting up solar energy plant in Mandera town and setting up of wind mills across the County.
Disaster Preparedness	The County is prone to disasters such as droughts, floods and diseases. Disasters are expensive and usually divert development funds. There is need to allocate adequate resources to mitigate them and develop resilience mechanisms. The strengths towards this include: Presence of disaster management committees; County Steering Group, Presence of meteorological department, Devolved systems that promote coordination.
Environmental Degradation	Over grazing, charcoal burning, and quarrying activities are the leading environmental degradation causes in the County. Poor waste disposal in settlement areas and towns (especially polythene bags and plastic packages) is also a big menace. Some of the effects of environmental degradation experienced in the County are soil erosion, wind storms, formation of gullies, drought, climate change and floods during rainy season. Mandera County is already experiencing recurrent and prolonged droughts. The livestock sector, which is the economic mainstay, is dependent on favorable climate. There is need to carry out research to find ways to adapt to the changing climate and take advantage of benefits of climate change. The population pressure has seen creation of many new settlement centres, thus contributing immensely to environmental degradation.

CLIMATE CHANGE	
Impact	Prolonged droughts and flooding leading to severe famine, disease outbreaks, loss of livestock, and human-wildlife

	conflicts over resources are some of the effects experienced in the County due to climate change. The impact and economic cost of current climatic variability and events in Kenya is very high. The County is exposed to major floods and droughts, associated with El Niño and La Niña yearly in addition to other influential regional processes. The County will be affected significantly by climate change.
Mitigation	Agro-pastoralism, de-stocking and re-stocking, water trucking, tree planting, rain water harvesting, provision of relief food are some of the mitigation measures and adoption strategies undertaken to mitigate against climate change in the County.
Adaptation	NOT CAPTURED
Ongoing Projects	Irrigation, ISFM, energy projects
Climate Change Mainstreaming	The County was ranked 3 as the identify priority actions for climate change mitigation and adaptation.

WAJIR

Wajir County is located in the north Eastern region of Kenya. The County lies between latitudes 3° 60'N and 0° 20'N and Longitudes 39° E and 41° E and covers an area of 56,685.9 km^2. It borders Somalia to the east, Ethiopia to the north, Mandera County to the northeast, Isiolo County to the southwest, Marsabit County to the west and Garissa County to the south.

Wajir County is a semi-arid area falling in the ecological zone V-VI. Zone V receives rainfall between 300-600 mm annually, has low trees, grass and shrubs. On the other hand zone VI receives an annual rainfall of 200-400 mm. The County receives an average of 240 mm of rainfall per year. The rainfall is usually erratic and short making it unfavourable for vegetation growth. There are two rainy seasons that is short and long rains. The short rains are experienced between October to December and the long rains from March to May each year. The average temperature is 27.9°C. The range of average monthly temperatures is 35°C. The warmest months are February & March with an average of 36°C while the coolest months are June, July, August & September with an average low of 21°C.

SECTOR SUMMARY	
Agriculture	Agriculture is practiced in depressions and along drainage lines where there is more moisture due to seasonal flooding. Irrigation using underground water is limited in areas with permanent shallow wells. Due to the aridity of the County, food production is limited and contributes little to food security. Most people rely on livestock products like milk and meat which is their staple food. The acreage under food and cash crop is negligible with most of the farmers adapting the nomadic pastoralism due to the climatic conditions which are not favourable for crop farming. The acreage under food crops is approximate 3,823 ha with the total arable land being 1,024.06 km^2. Agriculture is practiced in depressions and along drainage lines where there is more moisture due to seasonal flooding. Irrigation using underground water is limited in areas with permanent shallow wells. Due to the aridity of the County, food production is limited and contributes little to food security. Most people rely on livestock products like milk and meat which is their staple food. The acreage under food and cash crop is negligible with most of the farmers adapting the nomadic pastoralism due to the climatic conditions which are not favourable for crop farming. The acreage under food crops is approximate 3,823 ha with the total arable land being 1,024.06 km^2. There are efforts to increase the acreage through irrigation where the National Irrigation Board is in the process of drilling boreholes to provide irrigation water in Wajir south constituency. Farms are small scale with average holding of 2.4 ha. Crop activities are carried out in Lorian swamp and along the drainage lines in Bute Ward in Wajir north Constituency. There are initiatives by NGO's and the department of agriculture to promote greenhouse farming in Wajir east Constituency. Main crops produced include sorghum, drought resistant maize, beans, melons, cowpeas, green grams and horticultural crops like kales, spinach, tomatoes, sweet and hot peppers. These activities are undertaken in small scale because there is no commercial farming registered so far. However, there are indications of huge potential in this sector as witnessed by the water melons flooding the markets across the County during rainy season.
Forestry	The County has no gazetted forests. However, most of the forest cover is comprised of woody trees and shrubs used for grazing camels, goats and wildlife. The dominant species is acacia trees. The main forest products include gum and resin, charcoal, firewood, posts, barks, honey, wood carvings and wild fruits. Firewood is harvested for individual household use and for sale to households living around town and food kiosks. Agroforestry and green economy is promoted in the County.
Water	There is the highly seasonal Ewaso Nyiro River and Lake Yahud. The County is prone to seasonal flooding during the rainy seasons which makes roads impassable. The County has seasonal swamps which together with drainage lines serve as grazing zones during dry season and for cultivation during the rainy seasons. Seasonal swamps are in the Lagboghol and in the western and southern part of Habaswein. The main source of water is the seasonal Ewaso Nyiro River. Other sources of water include boreholes, shallow wells, pans and dams for human and livestock consumption. Lake Yahud, which is an underground and permanent lake, situated on the periphery of Wajir town provides water for wildlife and quarry activities although the water is saline and not safe for drinking. There are 14,360 shallow wells, 206 water pans and 98 bore holes. The major users of water are livestock at 53% and domestic use at 30%. There are no permanent surface water sources as most of the water sources are subsurface such as boreholes, shallow wells and pans. Only 965 households in the County have roof catchment representing 1% of the households.
Energy	According to the KIHBS 2005/6, 98.4% of the County households depend on firewood (Firewood and Charcoal) for cooking and 31.5% depend on lantern for lighting. 96.6% of households use traditional stone fire for cooking. Wajir, Habaswein and Eldas centers are connected to the national grid where 3,039 (2009 KPHC) households are supplied with power. However, efforts are being made to connect Griftu and Bute market centers through the Kenya Rural Electrification Programme. The proportion of population connected to sustainable power source is 3.4%. Only Wajir, Eldas and Habaswein towns are connected to power and hence there is need to increase household and more market center connectivity to the national grid.
Disaster Preparedness	The major types of disasters include drought, famine, floods, terrorism, conflicts, fires, HIV/ AIDS and environmental pollution and degradation. There is urgent need for DRR measures to be put in place to ensure that all the above factors are looked to keenly and proper mechanisms are in place to avoid adverse effects of these disasters. Drought is a common occurrence that affects livelihoods and causes hunger, nutrition-related diseases, and even death. It leads to a decline in livestock production, affect the migratory patterns of pastoralists, exacerbate resource-based conflict, and cause substantial loss of

	assets, triggering acute food insecurity among vulnerable households and placing a heavy strain on the local economy. The frequency and severities of droughts hinder recovery as the herd growth is disrupted by new droughts before the recovery phase is completed. High levels of vulnerability and low adaptive capacity of the pastoralists erodes their ability to cope with and recover from shocks of the cyclic droughts which calls for deliberate disaster risk reduction mechanisms. Drought Risk Reduction interventions proposed in this County integrated plan will be the foundation stone of sustainable livelihoods that will go a long way in ensuring that the community is more resilient to shocks and hazards brought about by frequent drought and climate change related shocks.
Environmental Degradation	Continued charcoal burning, tree cutting, overgrazing and overstocking have led to massive environmental degradation. A proper waste disposal system is lacking in all towns and market centers. This has led to non-degradable waste accumulation in the market centers. High population growth has also led to strain on the available resources by creating new settlements. Environmental degradation is attributed to illegal encroachment, droughts, floods, deforestation, overgrazing and uncontrolled felling of trees for charcoal. Sanitation is also poor with only 23% of the population having access to toilets.
CLIMATE CHANGE	
Impact	Climate change effects are evident in the County in a number of ways including the amount of rainfall across the County becoming lesser and unpredictable, occurrence of frequent and prolonged drought which affects crop and animal production and outbreak of waterborne diseases. To manage and lessen the impacts of climate change, efforts should be geared towards adoption of renewable alternative sources of energy, afforestation, reforestation and proper environmental management.
Mitigation	Develop the proposed wind and solar energy firm off Wajir-Mandera road . Encourage green building to cushion the high temperatures, efficient use of energy, water and reduce environmental degradation. Introduce alternative sources of cooking energy to complement firewood and charcoal. Encourage community environmental awareness through electronic (e.g. Wajir community radio) and print media..
Adaptation	Plant variety of trees to increase vegetation cover to increase carbon sequestration capacity within the planning area. Increase public awareness on climate change through the early warning system.
Ongoing Projects	Rehabilitation of denuded rangelands, enhance early warning system by combining traditional and modern techniques
Climate Change Mainstreaming	The County was ranked 3 as the identify priority actions for climate change mitigation and adaptation.

NYANZA REGION

HOMA BAY

Homa Bay County lies between latitudes 0° 15′ South and 0° 52′ South, and between longitudes 34° East and 35° East. The County covers an area of 4,267.1 km^2 inclusive of the water surface which on its own covers an area of 1,227 km^2.The County is divided into two main relief regions namely the lakeshore lowlands and the upland plateau, There are two rainy seasons namely the long rainy season from March to June and the short rainy season from August to November. The rainfall received in the long rainy season is 60% reliable and ranges from 250-1000 mm while 500-700 mm is received in the short rainy season. The County receives an annual rainfall ranging from 700 to 800 mm. Temperatures in the County ranges from 18.6°C to 17.1°C, with hot months being between December and March.

SECTOR SUMMARY	
Agriculture	The main crops produced in the County include maize, beans, sorghum, millet, kales, sweet potatoes and peas. The vast majority (80%) of the farmers produce maize and beans Whereas 104,464 ha are under food crop in the County, only a paltry 12, 277 ha is under cash crops with about 6,000 ha being under horticulture. The main challenge for government will be to increase yield per hectare and acreage under crops especially those considered staple foods and high value cash crops in the County. The potential for irrigated agriculture stands at 8,966 ha with only 13.3% exploited. Major horticultural crop grown under irrigation include kales, tomatoes, onions, capsicum and water melon. The average farm size for small scale farmers is four acres while that of large scale farmers is 10 acres. Fishing remains a prominent activity in Homa Bay County engaging upwards of 18,300 people and 3,600 families. The main types of fish harvested include Nile perch, tilapia and clarias (Omena) Aquaculture is relatively underdeveloped in the County. In all, 1,801 fish ponds covering an area of 540, 300 M2 are in place.
Forestry	Homa Bay County has two gazetted forests covering 29.6 km^2. These forests are Gwassi and Wire hills. The County also has eight non-gazetted forests covering about 128 km^2. They are Ngorome hills, Ruri hill, and Gembe hills, Mfangano, Homa Hills, Asego Hill and Kodera Forest Agroforestry and green economy is being promoted.
Water	The water sources in the County include rivers, swamps, lakes, boreholes and hand dug wells. The only known water supply schemes that are operational with frequent breakdowns are those in major urban centres such as Homa Bay, Mbita, Kendu Bay and Oyugis. Whereas some investment has been made to deliver water to the other urban centres, the schemes have not been successfully completed. The average distance to the nearest water point stands at five km. This means majority of the residents have to lose more than 30 minutes to reach water points and queue for the service.
Energy	The main source of energy are still firewood (cooking) and paraffin (lighting). 57.6% and 94.6% of households depend on firewood for cooking and paraffin for lighting respectively. Whereas liquefied petroleum gas (cooking) is now available in many urban centres all over the County, gas remains unaffordable for the vast majority of County residents accounting for less than 1% of fuel usage in cooking and lighting. This is attributed to the low income levels of locals and the high cost of securing liquefied gas. The main source of energy in Homa Bay County remains firewood (cooking) and Paraffin (lighting). 57.6% and 94.6% of households in Homa Bay County depend on firewood for cooking and paraffin for lighting respectively. Whereas liquefied petroleum gas (cooking) is now available in many urban centres all over the County, gas remains unaffordable for the vast majority of County residents accounting for less than 1% of fuel usage in cooking and lighting. This is attributed to the low income levels of locals and the high cost of securing liquefied gas. All urban centres and most trading centres in the County have now been covered under the rural electrification programme and yet the vast majority cannot afford the cost of stepping down and connecting to the main electricity grid. For many, the homes are either too far from the grid or are inadequate for the service. This has led only to a paltry 3.3% of the homes in the County having connection and access to electricity.
Disaster Preparedness	Periodically, the County has experienced disasters that are either natural or man-made. Natural disasters experienced have included drought, floods and famine while man-made ones have included accidents, landslides and crop failure. Drought has become a common occurrence in the County and it has affected farming hence leading to famine. In order to manage disasters, the County has established a disaster management committee. There is also need to develop an early warning system to detect drought in good time so that coping mechanism are put in place to manage the impact. With the completion of Sondu-Miriu hydroelectric project, the problems associated with frequent floods will be minimized. The County will attempt to set up food reserves to assist those affected by drought. The health service providers will intensify their sanitation campaign to stem frequent outbreak of cholera, while the water providers will ensure that water is made accessible. The County will also attempt to increase the capacity of water dam and pans to ensure they store water for longer period. Disaster Risk Management already identified as a major evelopment Challenge in the draft County Development Profiles – Multi-sector wise.
Environmental Degradation	The County is faced with an array of environmental and climate change challenges. These include both natural and man-made forms of degradation that have adversely affected the carrying capacity of the local ecosystem including desertification and floods.

CLIMATE CHANGE	
Impact	Drought, erratic weather patterns, floods, famine.
Mitigation	Some of the measures proposed to mitigate, even reverse the effects of climate change and environmental degradation included cleaning up of Lake Victoria and protection of riparian reserves, increasing forest and tree cover, adoption of sustainable farming and settlement practices, rehabilitation of degraded lands and protection of wetlands.
Adaptation	The government has embarked on tree planting programmes of re-afforestation in hills such as Gembe, Gwassi, Ruri, Wire and Kodera Forest. In additional measures have been put in place to control and manage sand harvesting. NEMA is expected to enforce the Environment Management Act in ensuring that industries operating within the towns treat their effluents to the required standards so as to reduce pollution. All stakeholders will have to be sensitized to put proper and sustainable environmental conservation measures in place so as to keep the County's environment clean.
Ongoing Projects	Kenya Agricultural Productivity and Agribusiness Project, Constituency-Based Water Harvesting, Agriculture Sector Development Support Programme, and Promotion of Irrigated Agriculture.
Climate Change Mainstreaming	The County was ranked 3 as the identify priority actions for climate change mitigation.

KISII

Kisii County shares common borders with Nyamira County to the northeast, Narok County to the south and Homabay and Migori Counties to the west. The County lies between latitude 0° 30′ and 10° South and longitude 34° 38′ and 35° East and covers an area of 1,317.5 km^2. The County can be divided into three ecological zones comprising the upper midland (UM) 75%, Lower Highland (LH) 20%, and Lower Midland (LM) 5%. Approximately 78% of the County is arable of which 57% is under crop. 75% of the County has red volcanic soils (nitosols) which are deep in organic matter. Kisii County exhibits a highland equatorial climate resulting into a bimodal rainfall pattern with average annual rainfall of 1,500 mm. The long rains are between March and June while the short rains are received from September to November; with the months of January and July being relatively dry. The maximum temperatures in the County range between 21°C-30°C, while the minimum temperatures range between 15°C and 20°C. The high and reliable rainfall coupled with moderate temperatures are suitable for growing crops like tea, coffee, pyrethrum, maize, beans and bananas as well dairy farming.

SECTOR SUMMARY	
Agriculture	The main crops produced in Kisii County are maize, bananas, beans, potatoes, tea, sugarcane, coffee and horticultural crops. However, due to small land holdings, the production is mainly for subsistence and not for commercial purposes. The acreage under cash crops in Kisii County is approximately 17,800 ha while the area under food crops is about 72,500 ha. However, the land tenure is still in small holdings which cannot sustain the use of modern farming technology. There is a growing practice of converting more land into cash crop growing whereby more farmers have converted their farms from growing maize, a staple crop, into sugarcane to earn an income thus eroding the food security status the County has enjoyed over the years. The average farm sizes range from 0.2 ha to 2.1 ha of land. This small size of land holdings is as a result of the cultural practice of subdividing the land among each son in a family for inheritance purposes.
Water	There are numerous water supply schemes in Kisii County from rivers, protected springs and wells/boreholes. Not all the water is treated. The main schemes are the Kisii Water Supply, Nyakomisaro, and Birongo (covering an area of 60 km^2; a treatment capacity of 100,000 m^3; with 1,910 connections of which only 446 are active). It is estimated that out of 244,866 households in Kisii County, 9,844 households are connected to piped water of which 7,578 are communal systems. The County has several permanent rivers and streams which drain into Lake Victoria. River Gucha which rises from Kiabonyoru Hills in Nyamira County is the main river and has adequate water for the development of a mini hydro-electric station. Other streams are Mogonga, Mogusii, Riana and Iyabe. There are also numerous springs and boreholes which are sources of clean water for both human and livestock. It is important to note that sources of water in the County are varied ranging from, springs, streams and roof catchments. It is estimated that the average distance to the nearest water point is about 2 kilometer. This is as result of the numerous wells, springs and streams roof catchment and boreholes except along the Kisii/Transmara border where the distances are a little longer.
Forestry	The County does not have any gazzetted forests in spite of having several forests like Nyangweta, Ritumbe and Ndonyo forests in Gucha south Sub-county, and Keboye Hills in Kisii south, Sameta Hills in Sameta Sub-county, Nyacheki Hills in Nyamache Sub-county, Igorera and Ibencho Hills in Kenyenya, Taracha Hill in Kisii Central, Intamocha Hill in Gucha Sub-county and Emborogo forest in Masaba south. The total forest cover is approximated at 228.4 ha. The main forest products in the County are: timber, electricity poles, construction poles, firewood, honey and medicinal products. Owing to favourable climatic condition, the County has a high potential for growing of medicinal plants. Medicinal plants have a high demand in the current market due to its affordability compared to conventional medicine.
Energy	The main sources of energy in the County are firewood, paraffin, electricity, charcoal and biogas. The electricity coverage in the County is estimated at about 45%. This low level of electricity coverage is attributed to the high cost of acquisition and installation of transformers. There is need to lower this cost in order to enhance rural electrification and at the same time encourage the use of renewable energy sourced such as biogas, wind, and solar energy which are environment friendly.
Disaster Preparedness	Disaster Risk Reduction is the reduction of disaster risks through systematic efforts to analyze and manage the causal factors of disasters. It is intended to systematically avoid (prevent) and limit (prepare/mitigate) disaster risks with regard to losses in lives and the social, economic and environmental assets of communities within the County. The major disasters identified in the County are; lightning and landslide, droughts, floods, quarrying and mining especially in Tabaka, crop and animal diseases.
Environmental Degradation	The major contributor to environmental degradation in the County is population pressure. Unsustainable farming practices have resulted in destruction of water catchment areas like Nyansembe Forest in Gucha south Sub-county. The depletion of vegetation, together with the hilly terrain also contributes to soil erosion in the County. The application of farm chemicals has caused pollution on both surface and undersurface water sources. The coffee and tea processing factories contribute to water pollution through discharging the effluent into the rivers. Mining of soapstone has also led to land degradation. The main effects of environmental degradation are destruction of water catchment areas, increased spread of diseases like malaria due to uncovered quarry sites which provide breeding grounds for mosquitoes as well as landslides. The weather pattern has also significantly changed resulting to unpredictable planting seasons.

CLIMATE CHANGE	
Impact	Almost 45% of the County's population depends on natural resources both directly and indirectly for their livelihood. However, the population pressure on the environment with the subsequent continued degradation of the soil, water, forests and the ecosystem continues to constrain the County's efforts to sustain food production for the people and guarantee acceptable health standards for sustainable development. This underscores the need to effectively manage these resources. There is need to organize sensitization for the community to realize the importance of their participation in the process through the development of Community Action Plans (CAPs). This will have to be incorporated within the County Environment Action Plan and the County Development profile. Currently, various institutions including the Kenya Forest Service, NGOs and CBOs are encouraging the community to practice afforestation and agroforestry.
Mitigation	NOT CAPTURED
Adaptation	NOT CAPTURED
Ongoing Projects	Smallholder agriculture project, extension servicers in agriculture, smallholder irrigation project, Water harvesting, forest rehabilitation and restoration.
Climate Change Mainstreaming	The County was ranked 1 as they mentioned impacts of climate change only.

KISUMU

The County is bordered by Homa Bay County to the south, Nandi County to the northeast, Kericho County to the east, Vihiga County to the northwest and Siaya County to the west and it covers a total land area of 2009.5 km^2 and another 567 km^2 covered by water. It lies within longitudes 33° 20′E and 35° 20′E and latitudes 0° 20′ South and 0° 50′ South. The County can be divided into 3 topographical zones namely: the Kano Plains, the upland area of Nyabondo Plateau and the midland areas of Maseno. The area has two rainy seasons, with the long rains occurring in March and May while the short rains occur in September to November. During the short rains the average annual rainfall ranges between 450-600 mm. The mean annual maximum temperature ranges 25°C to 35°C and the mean annual minimum temperature ranges 9°C to 18°C.

SECTOR SUMMARY	
Agriculture	The total acreage under food and cash crops is estimated at 26,865 acres and 25,815 acres respectively. 62.10% of all households in Kisumu County depend on crop farming as a source of income. The mean farm holding in the County is 1.6 acres. A majority of farmers own the parcels of land and largely utilize them for subsistence farming. The main crops grown for subsistence include beans, maize, sorghum, finger millet, groundnuts, kales and cotton. The main cash crop grown in the County is sugarcane while some rice growing is practiced along Rivers Nyando and Awach, Chemelil, Miwani and Kibos. 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 pest. The main livestock kept in the County include; dairy cattle, beef cattle, pigs, goats, sheep, poultry, rabbits and bee keeping. On the overall, 92.5% of households rear chicken, 47.3% keep cattle, 38.7% and 23.6% keep goats and sheep respectively. Fishing is one of the key economic activities in Kisumu County. The County has more than 2,200 ponds with a potential to harvest 220 tonnes per year. The percentage of land with title deeds is 61.3%. The land in the County is largely owned by individuals (78.8%), 10.7% of it is rented or leased, 4.9% clan/family owned and 0.4% is communally owned. Others are owned by the various local authorities.
Forestry	The County has got no gazetted forest and few existing ones are on hill tops of Fort Tenan and Songoh for the purposes of soil and water conservation. 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 main forest products in the County are wood, timber, posts and poles and building materials. Agroforestry and green economy is being promoted.
Water	Kisumu County has a total of 10 gazetted water Supplies, 15 Community water supplies, 40 Boreholes, 70 Shallow wells and 7 water pans. These were done by the Government through various development partners. The major gazetted water supplies serve a total area of 956 km^2, with a total production of 5,010 m^3/d. The total population served directly by these water supplies is 25,000. The number of storage tanks in these water supplies range between 50-500 m^3. This gives a total storage Capacity of 3,752m^3 with a total pipe network covering 763 km. Each sub-county has its major Water Service Provider (WSP) and Community managed supplies with majority of these water supplies concentrated in Kisumu Sub County.
Energy	The main source of energy for cooking in Kisumu County is firewood which accounts for 60% of all energy sources. Charcoal comes second at 17.1% followed by paraffin at 6.9%, gas (LPG) accounts for 2.5%. For lighting, paraffin is the most commonly used source of energy in the County accounting for 79.3% of all energy sources followed by electricity at 18.3%. The positioning of the County vis-a-vis her natural resources is that there is a huge potential to produce enough energy to competitively anchor the expected economic growth within the County and even to release to the National Grid. With construction of two dams on River Nyando and one on River Awach, the County is poised to produce enough energy that should be able to sufficiently supply the proposed industrial zone. Electricity as a source of energy is becoming more important in the County with increase in coverage over the last few years especially through the Rural Electrification Programme. Currently, a number of trading centres and secondary schools in the County have been connected to the national grid. An increased number of households have also been connected to the national grid.
Disaster Preparedness	In Kisumu County, potential disasters that affect people's lives include: floods, drought, disease outbreaks, and accidents. Existence of Sub-county Disaster Management Committees tasked with overall responsibility of disaster management in the County. As the County advances on economic development, there is need for integration of Disaster Risk Reduction strategies into County planning. In Kisumu County, potential disasters that affect people's lives include: floods, HIV/AIDS, drought, disease outbreaks, and accidents. The HYOGO Framework of Action (HFA) stipulates five priority areas to be considered while undertaking Disaster Risk Reduction strategies. These include: Governance: organizational, legal and policy frameworks; Risk identification, assessment, monitoring and enhancement of early warning; Use of knowledge, innovation and education; Reducing underlying risk factors; Disaster preparedness for effective response and recovery.
Environmental Degradation	Waste management presents one of the key challenges to sustainable development. Specifically, poor solid waste management has been a big problem with most of the jurisdiction within the defunct local authorities characterized by uncollected waste leading to degradation of the environment. There is also the potential for production of bio-energy, bio-fertilizer and animal feed from the weed. Effects of environmental degradation include hazards posed by expanding gullies due to soil erosion which are found in Nyakach Sub-county. There is also continued loss of fertile soils and siltation of rivers and water ways leading to frequent flooding especially in the lowlands. Sand harvesting activities in some parts of the County is not organized and threatens to contribute to further soil erosion. Continued discharge of raw waste and industrial effluent into the Lake Victoria has promoted the growth of water hyacinth that has engulfed the lake.

CLIMATE CHANGE	
Impact	Some of the effects associated with climate change include; increased temperature resulting in increased algal blooms in the lake which favour invasive species such as the water hyacinth, increased amount and intensity of rainfall resulting in frequent flooding especially in the Kano Plains as well as frequent dry spells leading to droughts.
Mitigation	Some of the strategies will include; undertaking major environmental impact assessment, water catchments conservation and protection, improvement of information communication systems, intensify capacity building among stakeholders at all levels. In addition, there will be need to promote tree planting to increase the carbon sink level improve research programs on the assessment of climate change impacts, and changes in the climate system and enhance the linkage between research findings and the general population and stakeholder institutions on climate change.

Adaptation	Improvement of information communication system, intensify capacity building among stakeholders at all levels
Ongoing Projects	Agriculture Sector Development Support Programme (ASDSP), Lake Victoria Environmental Management Project (LVEMP) Phase II, NMK-Njaa Marufuku Kenya, Water harvesting for food security, Promotion of farm forestry, Flood control Drought mitigation
Climate Change Mainstreaming	The County was ranked 2 as they mentioned impacts of climate change.

MIGORI

It is situated in the South-Western part of Kenya. It borders Homa Bay County to the north, Kisii and Narok Counties to the east and the Republic of Tanzania to the south. It also borders Lake Victoria to the west. The County is located between Latitude 0° 24′ and 0° 40′ South and Longitude 3° and 34° 50′ East and covers an area of 2,596.5 km^2 including approximately 478 km^2 of water surface. Temperatures show mean minimum of 24°C and maximum of 31°C, with high humidity and a potential evaporation of 1800 to 2000 mm per year, Annual rainfall averages between 700 and 1,800 mm.

SECTOR SUMMARY	
Agriculture	The County has fertile soils with favourable conditions suitable for agricultural activities. As a result, about 80% of the total population is engaged in agricultural activities. The main food crops in the sub-county include maize, sorghum, beans, cassava, finger millet and sweet potatoes. The main cash crops are tobacco, sugarcane, potatoes (Kuria) and maize (Kuria). There exists huge potential for sunflower and Sisal in Nyatike sub-county. Approximately 60% of the arable land is under cash crop, 30% under food crop and 10% is left fallow. The average farm size for small scale farmers is 3 acres while that of large scale farmers is 7 acres.
Forestry	The total area under forest is 695.5 ha out of which 43% is woodland while the rest is plantation located on various hills. 435.5 ha is gazetted and 260 ha non-gazetted forest. Major challenge to conservation of forests in the County includes inadequate knowledge on importance of conservation, charcoal burning, and frequent outbreak of wild forest fire, illegal logging and firewood for tobacco curing. Agroforestry is also promoted in the County for the benefit associated with it.
Water	The main rivers in the County are Kuja, Migori and Riana all of which originate in the highland region of Kisii and Narok Counties.
Energy	77.4% of the households in the County use firewood as the main source of energy for cooking followed by charcoal at 18.8% and paraffin at 2.8% while 94.4% of the households use paraffin as the main source of energy for lighting. Other sources of energy for lighting include firewood at 2.9% and electricity at 2.1%. The County has the capacity to produce its own hydro-electric energy based on the available water supply from its rivers as is the case in the Gogo waterfalls. The County government welcomes potential investors to partner in the efforts to upgrade the generation of electricity from the Gogo falls and explore other alternative sources of energy supply to supplement the deficiency currently experienced in the County.
Disaster Preparedness	During the current period, measures shall be instituted to ensure that all disaster prone areas are mapped and necessary measures instituted to mitigate possible impacts that might arise.
Environmental Degradation	The major contributor of environmental degradation in the County includes overstocking, flooding, and deforestation. Environmental degradation has resulted in the loss of productivity of land leading to poor crop yields and food insecurity.

CLIMATE CHANGE	
Impact	Climate change has become too obvious in Migori County. With the worsening weather conditions, the local populations have not been able to sustain food production at a level commensurate with growth in the population. Without appropriate planning and intervention measures in place, many residents will lose their livelihoods especially in fishing, agriculture, and forestry which form the major source of income and employment.
Mitigation	Some of the measures proposed to mitigate, even reverse the effects of climate change and environmental degradation includes protection of riparian reserves, increasing forest and tree cover, adoption of sustainable farming and settlement practices, rehabilitation of degraded lands and protection of wetlands. The government has embarked on re-afforestation programme in hills such as Ranen, Nyatike, Ombo and Magina hills. Addition measures shall be put in place to control and manage sand harvesting, spring protection, afforestation and protection of catchment areas.
Adaptation	Several irrigation activities are carried out along the lake and Major Rivers aimed at enhancing food security and reducing reliance on rain fed agriculture. However the County has one major irrigation project at lower Kuja irrigation scheme which once complete shall form the food basket of the County and enhance food security.
Ongoing Projects	Rehabilitation of water dams/ponds, lake Victoria environment management programme, construction of disaster management facilities, conservations of ecosystems and wetlands, control of charcoal burning and tobacco industries
Climate Change Mainstreaming	The County was ranked 3 as they identified priority actions for climate change mitigation and adaptation.

NYAMIRA

Nyamira County borders Homabay County to the north, Kisii County to the west, Bomet County to the southeast and Kericho County to the east. The County covers an area of 899.4 km^2. It lies between latitudes 00° 30′ and 00° 45′south and between longitudes 34° 45′ and 35° 0′ East.

The County is divided into two major agro-ecological zones. The highland (LH1 and LH2) covers 82% of the County while the upper midland zone (UM1, UM2 and UM3) covers the remaining 18%. Although the vegetation in the County is evergreen, there is no gazetted forest. The County has a bimodal pattern of annual rainfall that is well distributed, reliable and adequate for a wide range of crops. Annual rainfall ranges between 1200 mm-2100 mm per annum. The long and short rain seasons start from December to June and July to November respectively, with no distinct dry spell separating them. The maximum day and minimum night temperatures are normally between 28.7°C and 10.1°C respectively, resulting to an average normal temperature of 19.4°C which is favourable for both agricultural and livestock production.

SECTOR SUMMARY	
Agriculture	Of the total land area 818 km^2 arable land, 40.5 km^2 non-arable land and 2 km^2 water mass. Land uses in the County include agriculture, forestry, construction, and cultural sites The acreage under food crops and cash crops in Nyamira County is 58,394 ha and 48,543 ha respectively. The average farm size for cash crops and food crops per household is 2.4 ha. The main storage facilities in Nyamira

	County are silos property of NCPB, Farm stores and warehouses. The major cash crops in the County include tea, coffee, pyrethrum and banana as well as the high potential in horticulture. The main storage facilities in Nyamira County are silos property of NCPB, Farm stores and warehouses. The major cash crops in the County include tea, coffee, pyrethrum and banana as well as the high potential in horticulture. The main food crops include maize, beans, cassava, sweet potatoes, vegetables, millet and sorghum. About 92% of land in the County is registered and owners have title deeds. For the rest of the land, the owners are at different stages of acquiring the title deeds. The main livestock bred in the County include: dairy cattle, beef cattle, pigs, goats, sheep, poultry, rabbits and bee keeping. Dairy farming under zero grazing is gaining popularity due to diminishing land size, conducive weather conditions and ready market for milk. There are no ranches in Nyamira County. The County lacks government fish farms that can be used to produce fingerlings. The up-take of fish rearing has been improving after government interventions through introduction of Economic Stimulus Programme (ESP) in 2009.
Water	Nyamira County is endowed with natural water resources, namely, rivers, shallow wells, springs, dams, pans and boreholes. The water resources availability varies significantly between seasons as well as across regions. The resources are plenty during the rainy season and scarce during the dry periods. Most parts of the County have two rainy seasons. The long rains are typically from March to May while short rains are typically from October to November without distinct dry spell. Communities in different parts of the County have formed groups and established vibrant water schemes in order to counter the problem of inadequate supply of clean drinking water. The schemes are funded through member's contribution and through sourcing of funds from government and donors. The water from the various sources has many uses including irrigation, domestic use by both human and animals as well as for use in industries. The County has 1,945 shallow wells, 2,521 protected springs, 694 dams as well as over 3,301 unprotected springs and 7 permanent rivers. The distance to the nearest water point in the County is from zero to four kilom. On average 7.8% of the population takes 1-4 minutes to fetch water, 2.4% of the population takes 5-14 minutes to fetch water, while 49.3% take 15-29 minutes and 30.5% take 30-59 minutes. Only 13.4 take more than 60 minutes to fetch water while 4,403 households, which represent 3.4% of the total households, are connected to piped water.
Forestry	The County has no gazetted forest. There are 10 non-gazetted forests covering 256.2 ha in the County. The un-gazetted forest includes the catchments areas and trust lands. Efforts are in place through on farm forestry to increase the tree cover of the County for provision of firewood and timber. Sensitization of the public is also being done to sustain conservation, management and protection of natural resources. The main forest products in the County include fuel wood, timber, charcoal, building poles, fruit and berries, transmission poles, logs and posts with a total of 7,616,091 m^3. There is also promotion of agroforestry in the County.
Energy	Firewood is the main source of energy with 50% of the population using it, while 0.4% of the population uses grass, 6% paraffin, 19.6% electricity, 0.5% LPG, 4.1% charcoal, 3.5% biomass residue and 0.1% uses other energy sources. The population that uses paraffin as the main cooking appliance is 38.6% while 18.5% use traditional stone fire. A total of 692 institutions use improved firewood cooking stove, 122 uses LPG gas, 207 use Paraffin 31 use solar energy while 537 have established woodlots. The 2009 Population and Housing Census indicates that 8,913 households have electricity connection constituting about 6.8% of the total households in the County. About 4,044 HHs representing 45% of the connections are in the urban areas with approximately 4,869 representing 55% of the connections are in the rural area. Lantern and tin lamp are a common source of lighting in the rural areas at 39% and 55% of the rural households respectively. The County needs to extend electricity to strategic trading centres to contribute to the industrial transformation of the economy and poverty reduction. This can be done through the Rural Electrification
Disaster Preparedness	The disasters/calamities in the County are mainly caused by lightning and thunderstorms. However, their impacts has gone down as a result of installation of lightning arrestors in most learning institutions, government buildings, health institutions and community awareness. Others include road accidents affecting the busy roads like Kisii-Sotik and Kisii-ngoina and potential industrial areas. The causes of disaster and factors that exacerbate them include climatic conditions, poor environmental management; road accidents; fires and epidemics due to poor sanitation. The County is generally unprepared to handle and manage most of these disasters due to limited information and preparedness. The County needs to develop strategies that will reduce the vulnerability of the populace and the magnitude of the effect of such emergencies.
Environmental Degradation	Increase in population has put immense pressure on the natural resources leading to degradation of the ecosystem balance. Climate changes whose impacts are aggravated by human activities have adverse effect on the environment and the livelihoods of a people. The impact hampers development by causing a strain in access to raw materials, poses a risk to food security and also increases conflicts among communities. Environmental degradation in Nyamira County is mainly a result of unsuitable farming methods, effects of climate change, poor solid waste management, soil erosion, inadequate sanitary facilities, cultural practices, massive cutting down of trees for firewood, timber and to clear land for agricultural use, poor physical planning in urban areas, quarrying activities, pollution and Effluents from agro-chemicals and alien and invasive species. Cultivation of land up to the river bank has resulted to surface soil erosion particularly the top soil into Lake Victoria. This leads to reduction of soil nutrients and hence low agricultural productivity. Quarrying activities lead to blockage of water ways, siltation in addition to threatening human safety especially when the quarry sites are left open and without perimeter fence. Lack of affordable housing in the major towns in the County has led to mushrooming of slums in these urban areas. This phenomena further cause brings in the challenge of poor sanitation and management of both solid waste and liquid waste. The environmental action plan for up to year 2015 gives specific actions for all sectors in environment; Government policy against non-biodegradable materials such as polythene bags; Planned urbanization, water and drainage systems; Environment management interventions; Environment; management and reforestation to increase water retention. Political goodwill for environmental actions in Kenya; Collaboration and networking between government and non-governmental agencies; An increasingly sensitized and supportive public on environmental matters; Independent operation of public complaints committee (PCC) and autonomous tribunal to enhance NEMA's effectiveness.

CLIMATE CHANGE	
Impact	Climate change has affected the County's bimodal rainfall pattern. It is now difficult to predict the onset of the short rains and the long rains. This has been affecting farmers timing in regard to land preparation resulting in poor harvests. Further, there have been widespread changes in extreme temperatures in the County. Hot weather conditions in the day have led to serious decline in water levels in running springs and rivers like Sondu Miriu.
Mitigation	Tree planting on destroyed forests
Adaptation	Measures to be taken to check on environmental degradation include enforcement of regulations on harvesting of indigenous forests and tree planting on the destroyed sections of the forests. Environmental sustainability cannot be achieved without community participation. Institutional structures and processes from the grassroots to the national level will influence greatly how poor communities are able to control, manage and access environmental resources. Poverty is related to the destruction of environment as there is massive destruction of forests to get firewood, clear land for agricultural production and settlement etc. This increases environmental destruction hence the need for economic empowerment of the poor people.
Ongoing Projects	Water project, agroforestry programme, soil and water conservation
Climate Change Mainstreaming	The County was ranked 2 as they mentioned impacts and governance framework.

SIAYA

Siaya County is situated in Western Kenya. It lies between latitudes 00° 26′ South to 00° 18′ North and longitudes 33° 58′ to 34° 33′ East. It has a land surface area of 2,530 km^2 and water surface area of 1,005 km^2. The County spreads across agro-ecological zones LM1 to LM5 and receives bi-modal rainfall. Temperatures vary with about 16.3°C along lake Victoria shores and maximum of 29.1° C.

Siaya CIDP, 2013-2017 highlights concrete strategies geared towards improving the standard of living of the community. The strategies aim at addressing issues of food insecurity, low fish production, poor access to clean water and sanitation, low education standards, healthcare and HIV/Aids, climate change and environmental degradation. To address the identified issues, the County intents to exploit its potential.

SECTOR SUMMARY	
Agriculture	Approximately 2059 km^2 of land is arable.pp15 Food crops cover a total land area of 150,300 ha while the cash crops occupy 2,500 ha. The average farm size for a small scale farmer is 1.5 ha and 7.0 ha for a large scale farmer. There are several livestock breeds in the County. The main activity in the fisheries sub-sector is capture fish in Lake Victoria. The County experience a major shortage of food for majority of residents in the County. Poor environmental practices including poor farming and fishing methods, deforestation, poor miming technologies and poor waste disposal as resulted to decline the agricultural and fisheries production.
Forestry	Currently, the County has two gazetted forests: Got Abiero and Ramogi Forests. The main forest products are timber, firewood, grazing and charcoal burning.
Water	The County has to major rivers namely: River Yala and river Nzoia. There are about twenty four existing water supply schemes. These water supply facilities provide water coverage of 42% serving about 396,000 people in the County. Majority of County residence do not have access to piped water and obtain water from open dams, water pans, and shallow wells and stream.
Energy	The main sources of lighting in the County include: tin lamps, lantern, electricity, pressure lamps, gas lamps, firewood and solar. While the main sources of cooking fuel used in the households include firewood constituting 82.5%, charcoal at 13.6% while 1.3% of the households use paraffin. This has negatively impacted on the forest cover within the County. By 2012, 4.3% of households were connected to the national grid as domestic users. Approximately 70% of the County lacks electricity supply.
Disaster Preparedness	Siaya County is prone to frequent disasters such as, disease outbreaks strong winds, floods, fires, and boat accidents in the lake resulting in loss of property and lives. The HYOGO framework of action points out five priority areas to be focused on while undertaking disaster reduction strategies. They include: Governance: organizational, legal and policy frameworks; Risk identification, assessment, monitoring and early warning; Knowledge management and education; Reducing underlying risk factors and Preparedness for effective response and recovery.
Environmental Degradation	Low compliance due to weak monitoring systems and weak enforcement of environmental provisions is cited as a cause of environmental degradation. The effect of environmental degradation is highly visible in the County. This is evident in the reduction of water levels, soil erosion and silting of the dams and water pans, low agricultural productivity due to prolong drought.

CLIMATE CHANGE	
Impact	Climate change effects in the County include: change and erratic rainfall patterns, reduction of water quantity and quality, occurrence of frequent fires, flooding, siltation of rivers, dams and lakes, temperatures increase and frequent diseases outbreaks and low agricultural productivity due to prolong drought. Erratic weather conditions have effects on physical infrastructure.
Mitigation	The National Climate Response Strategy (NCCRS) will guide the County's climate change mitigation and adaptation measures. County leadership should fast-track enactment of a climate change law in order to build on the momentum started by the National Climate Change Response Strategy (NCCRS) which provides a road map for integrating a series of mitigation and adaptation measures in all the County planning and budgeting processes in order to strengthen climate change resilience. Climate change mitigation measures and adaptation strategies which can be applied includes; formation of multi stakeholder platform, Combination of local and scientific knowledge, sensitization and capacity building, afforestation and reforestation construction of pans dams and other water harvesting measures, employment creation for the youths through accessing youths fund, use of proper farming methods (good farming practices) and zoning land use. Provision of carbon sinks (carbon trading): all trees sequester carbon depending on the density of the leaves they have. Carbon trading has just started in the County. To mitigate environment degradation, reducing tree logging and promoting the use of improved kilns for charcoal making are some actions to be taken. Energy mitigation-Introducing alternative source of energy e.g. solar, hydro power and promote use of bio-fuels and other generation technologies. Tree planting and trees nurseries in each County. On water sector, the water supplies systems will be expanded and campaigns on safe water/ sanitation and environmental conservation intensified.

Adaptation	Climate change adaptation strategies include: formation of multi stakeholder platform, Combination of local and scientific knowledge, sensitization and capacity building, construction of pans dams and other water harvesting measures. Run-off water can also be collected in small surface dams and earth pans. Promoting rain water harvesting Construction and rehabilitation of water systems. To address food insecurity adoption of drought resistance crop varieties and scaling up of irrigation projects have been taken into consideration (area under irrigation to be increased from the current 670 ha to 1800 ha.
Ongoing Projects	Lower Nyanza irrigation project, water harvesting initiatives, KAPAP and Afforestation project
Climate Change Mainstreaming	The County was ranked 4 as they identified climate change actions for and have budget allocation for mitigation and adaptation actions.

BARINGO

Baringo is situated in the Rift Valley region. It borders Turkana and Samburu counties to the north, Laikipia to the east, Nakuru and Kericho to the south, Uasin Gishu to the southwest, and Elgeyo-Marakwet and West Pokot to the west. It is located between longitudes 35° 30′ and 36° 30′ East and between latitudes 0° 10′ and 1° 40′ South. The Equator cuts across the County at the southern part. Baringo covers an area of 11,015.3 km^2 of which 165 km^2 is covered by surface water; Lake Baringo, Lake Bogoria and Lake Kamnarok. The rainfall varies from 1,000 mm to 1,500 mm in the highlands to 600 mm per annum in the lowlands, The temperatures range from a minimum of 10°C to a maximum of 35°C in different parts of the County.

SECTOR SUMMARY	
Agriculture	Baringo achieved 309 ha in 2012 that yielded 17,167 bags of rice worth KSh 108 million and is currently targeting 500 ha expected to produce 27,000 bags. The average farm size is 2.5 ha. Landholding varies by sub-county. Crops grown are: maize, finger millet, sorghum, beans, cowpea, green grams, garden pea, Irish potato, and sweet potato. Beans and maize cover the largest acreage while Irish potato and garden pea cover the lowest acreage. Maize and beans are mainly grown in the highlands while finger millet and sorghum are grown in the lowlands. Maize is the leading food and cash crop in the County, but its production has been low due to poor rainfall distribution and crop husbandry. Coffee has registered a decreasing trend in production due to high costs of production and erratic market prices.
Forestry	Baringo County has 65,280.4 ha of forests, which are gazetted. The established plantations cover an area of 13,940 ha, while the rest is natural forest. Cases of felling of cedar, podo and osyris lanceolata as well as sandal wood harvesting and charcoal burning are a threat to the forest cover in the County. The forest resources in the County are important assets for the provision of basic needs, conservation and improvement of physical conditions of the County. They supply essential wood products, employment opportunities, revenue collection base, control soil erosion and conserve of water catchment areas. Agroforestry is being promoted.
Water	The troughs of the rift that have a north-south alignment are occupied by Lake Baringo and Bogoria, which occupy 164 km^2, Lake Kamnarok covers 1 km^2. Baringo is amongst the most water scarce counties in the country. The County is also plagued by chronic cycles of flooding and drought that are increasing in frequency and severity. The situation is exacerbated by negative effects of climate change, high population growth, significant upland watershed destruction and non-equitable distribution of water resources. The government has recently taken steps to protect upland watersheds.
Energy	Electricity connections stand at 10,400 due to the rural electrification programme. Baringo County has a potential of geothermal energy production around Lake Bogoria and Silale in east Pokot. Government-owned Geothermal Development Company has also started drilling geothermal energy at Silale area in east Pokot Sub County. This new developments will spur development growth in the County. The County government shall also mobilize resources for research and development of alternative energy sources that will exploit existing and potential resources such as Prosopis julifera for electricity generation, Jatropha circus for bio-diesel, locally available biomass for biogas besides options in geothermal, solar and wind energy.
Disaster Preparedness	The County government through the County Disaster Risk Management Committee shall enhance community organization by supporting participatory processes for DRR mainstreaming and formation and capacity building of community DRR organizations and structures. This will lead to improved community capacities to manage disasters and spearhead implementation of programmes for resilience building. The main objective will be to end disaster emergencies in order to unlock resources for development initiatives.
Environmental Degradation	One of the greatest challenges facing the County is environmental degradation, including deforestation, desertification, pollution and climate change an issue of increasing concern for the local, national and international community. Overgrazing, overstocking, unregulated charcoal burning and cultivation of steep slopes among other factors degrade the environment. With frequent droughts occurring in the County, the effects are profound. Environmental degradation in the County is caused by overgrazing, indiscriminate cutting of trees for fuel, non-protection of water catchment areas and poor farming practices. The topography of the County accelerates soil erosion, as it is hilly in most places. When it rains, most of the soils are swept into Lake Baringo which exacerbates the problem of silting in the water storage facilities and the dams. Most farmers seem to be unaware of the importance of environmental conservation, and hardly take conservation measures seriously.

CLIMATE CHANGE	
Impact	Climate change leads to an increase in the intensity and frequency of weather extremes, floods, landslides and droughts. The greatest impact of the effects of climate change is borne by vulnerable segments of communities who lack the resilience or capacity to prepare, adapt and rebuild (recover). Extreme weather events, such as severe flooding, increase the risk of waterborne and vector-borne diseases, such as malaria and diarrhea.
Mitigation	Given the effects of environmental degradation and climate change, there is need for climate change mitigation. Outlined below are measures that' stakeholders can implement to mitigate effects of climate change. Community participation in climate change adaptation will be enhanced to curb environmental degradation. In addition, environmental education and awareness training in schools and colleges will be promoted. The County government shall support volunteer programmes and formation of ward/sub-county-specific thematic DRR action groups to implement climate change and other related disaster mitigation measures. Another measure is the intra- and inter-county collaboration with various climate organizations to better understand the causes and impacts of climate change.
Adaptation	A long-term solution to curb this problem is to improve irrigation in the dry areas. A classic example is the Perkerra irrigation scheme, which has resulted in improved yields of the farmers in the area, especially production of horticultural products.
Ongoing Projects	Expansion and establishment of irrigation schemes, water harvesting for food security projects, carbon credit grading
Climate Change Mainstreaming	The County was ranked 3 as they identified priority actions for climate change mitigation and adapation.

BOMET

Bomet County lies between latitudes 0° 29′ and 1° 03′ South and between longitudes 35° 05′ and 35° 35′ East. It is bordered by four counties, namely: Kericho to the north, Nyamira to the west, Narok to the south and Nakuru to the North-east. The County covers an area of 2037.4 km^2. Rainfall in the County is highest in the lower highland zone with a recorded annual rainfall of between 1000-1400 mm. The temperature levels range from 16°C to 24°C.

SECTOR SUMMARY	
Agriculture	A total of 1,716.6 km^2 of this land is arable land suitable for farming. Water shortage during dry periods and periodic water logging whenever there is excessive rain has also been affecting production especially in the lower parts of the County. About 80% of the farmers rely on on-farm grain storage which has contributed to high post-harvest losses.
Forestry	There are also gazetted forests which occupy about 483.1 km^2. There are two types of forests in Bomet: indigenous and plantation forests. Agroforestry is also promoted because of its benefits including, fuel, income, prevention of soil erosion, promoting soil fertility and carbon sequestration.
Water	There are abundant water sources and even distribution of rain almost throughout the year. This explains why agriculture and livestock production are main economic activities of the County. The main rivers within the County include Nyongores, Kipsonoi, Itare, Kiptiget, Chemosit Amalo, Mara and Sisei. These are permanent rivers although the latter is fast diminishing due to intensified cultivation along its banks and catchment area. Degradation and plenty of blue-gum along the river banks have also played a major role in fast diminishing of those rivers. Wetlands are numerous, but they are unprotected. Roof water harvesting is also practiced by the households that have corrugated iron roofs.
Energy	The main source of energy is electricity and firewood. Approximately 91% of households in the County use firewood compared to 64.6% at the national level. Electricity coverage in the County is over 60%, Other sources of energy include Paraffin and solar energy and lately there is a marked increase in use of biogas, especially in Bomet Sub-county. Other sources of energy include Paraffin and solar energy and lately there has been a marked increase in the use of biogas.
Disaster Preparedness	NOT CAPTURED
Environmental Degradation	The major contributors of environmental degradation are quarrying activities. People have also encroached on gazetted forests for grazing and illegal loggin. Environmental degradation has led to reduced and erratic rainfall, poor sanitation in urban centers, increased river siltation, low agricultural productivity and loss of biodiversity. This has led to lose of livelihoods in terms food security, water shortages and water borne diseases, hence escalating poverty. The main challenges facing the agribusiness sub-sector are low productivity and persistent food insecurity in some areas of the County. The challenges can be attributed to poor crop husbandry, use of uncertified seeds, and lack of planting materials, pests and diseases and low application of fertilizer Due to over reliance on rain fed agriculture which is unpredictable due to climatic variability.

CLIMATE CHANGE	
Impact	Climate change has resulted in unpredictable rainfall patterns (in terms of amount and distribution) and rise in temperatures over time, which has resulted in food insecurity as farmers are unable to prepare well for the planting and harvesting seasons.
Mitigation	Promote use of alternative sources of energy through identification and development of these sources and discourage widespread use of firewood through sensitization. Develop an affective agriculture information system; Review policies on agricultural IMS with reference to information sourcing, storage, disbursement & use. Encourage community to start tree nurseries; Community Sensitize on plant more trees on their farms for commercial purposes Construction of water conservation structures (i.e. dams/pans); Rehabilitation of existing water supplies. The government will promote development of renewable energy as an alternative source of energy in the County. This includes generation of energy from solar, wind, biogas (“Biogas for Better Life”) and development of bio-energy including bio-ethanol and diesel value chains. The use of improved cooking stoves and charcoal kilns, and re-afforestation of water towers will be promoted. National Renewable Energy Master Plan will be adopted and customized to fit the County requirements and an updated renewable energy database will be developed protection of 5 water towers, forest conservation and management, promotion and piloting of green energy, water harvesting and storage programme.
Adaptation	The County government needs to develop legislations to protect water catchment areas and enforce the existing laws fully. Adoption and enforcement of laws to protect gazetted forests. Identify and exploit opportunities for carbon-related projects and programmes in the County given the large vegetation cover in the Mau and Chepalungu forests and private forests. Develop policy and legal framework to encourage private investments in power Generation. Increase farmers’ knowledge on environmental management techniques by 75%.
Ongoing Projects	Electrification of all public health Centers -Electrification of all public learning. Institutions -Training on alternative sources of energy -Hydro power generation targeting 20MW in the next five years. (p156).
Climate Change Mainstreaming	The County was ranked 3 as they identified priority actions for climate change mitigation and adaptation.

ELGEYO MARAKWET

Elgeyo Marakwet County covers a total area of 3029.9 km^2 which constitutes 0.4% of Kenya’s total area. It extends from latitudes 0° 20′ to 1° 30′ North and longitude 35° 0′ to 35° 45′ East. It borders West Pokot to the north, Baringo to the east, Trans Nzoia to the Northwest and Uasin Gishu to the west. The variation in altitude from 900 m above sea level in the Kerio Valley to 2,700 metres above sea level in the highlands gives rise to considerable differences in climatic conditions.

Temperatures in the Highlands have a low of 15° C during rainy season and a high of 23°C during the dry season whereas on the Escarpment and Kerio Valley, temperatures can be as high as 30°C during the dry season and as low as 17°C during the rainy season. There is also marked variation in amount of rainfall in the three zones. The Highlands receive between 1200-1500 mm per annum while the Escarpment gets rainfall ranging between 1000-1400 mm per annum. Kerio Valley, on the other hand, receives between 850-1000 mm of rainfall per annum.

SECTOR SUMMARY	
Agriculture	Total arable land is 2,170.7 km^2. The main crops produced in the County vary with ecological zones. In the highlands,

	food crops such as maize, wheat, Irish potatoes and beans are produced. Further, cash crops here include tea, pyrethrum and coffee. In the Kerio Valley, mangoes, pawpaw, watermelon, oranges and bananas are produced together with high value cassava, millet and sorghum. Food crop acreage is 88,639.2Ha, with cash crops being 4003.74ha. Over 70% of this is found in Keiyo north and Keiyo south sub-counties while about 30% is found in Marakwet west and Marakwet east sub-counties. Through a number of programmes and project interventions in the County, key strategies as mechanisms for food security improvement will be adopted. Strengthening marketing programmes for crop and livestock produce and adopting modern agricultural technology will be undertaken while at the same time increasing the area under irrigation. Farm inputs subsidy programs like the National Accelerated Agricultural Inputs Access Project (NAAIAP) and subsidized fertilizer program through the National Cereals and Produce Board (NCPB), are aimed at cushioning farmers against increased costs of farm inputs thus increasing the area under crop cultivation. Storage facilities include Granaries, conventional stores, modern stores and silos are the main storage facilities. The National Cereals and Produce Board has a sub-depot at Kapsowar. Livestock kept Dairy breeds, Zebu, Boran and Sahiwals cattle types, Dorper sheep and Galla goats are the main livestock breeds with the majority being bred along the Kerio Valley and within the forests in the highlands but subject to agreement arrangements with the Kenya Forest Service.
Water	The County has abundant water catchment areas, rivers and protected springs. There are 16 permanent rivers, the major ones being Kerio, Embobut, Embomon, Arror, Moiben, Chepkaitit and Torok. Other water sources include 62 water pans and 18 small and medium reservoirs. New initiatives, however, need to be undertaken to tap these water sources for irrigation and domestic use so as to increase water access level in the County. The Cherang'any water tower is the source of water for all the major urban areas. These water sources include: Kipkunur and Kerer in the Cherang'any hills which are water sources for Kapsowar and Chesoi respectively. Kapchemutwa and Kessup water catchment areas are sources for Iten water supply and Tambach water supply systems respectively. Toropket and Kiptaber forests which are the sources of Chepkaitit River serve Kapcherop.
Forestry	Indigenous and exotic forests are the main types occupying a total of 93,692.48 ha. There are 16 gazetted forests in total with over 3,000 households settled as squatters, with the majority in Embobut forest. In 2005, 35 households were squatting in Kapkore forest and the number has since grown to 147 households. It is worth noting that livestock rearing is rampant in the forests as well as logging and encroachment being a menace in the highlands, just like charcoal burning in Kerio Valley. Main forest products include fuel wood, honey, grazing, building materials, water, medicinal herbs. Agroforestry and green economy is being promoted.
Energy	The main source of energy is firewood with about 91% of the population using it as a source of energy. The use of charcoal and paraffin is also another source of energy used by most families and this has led to destruction of vegetation and increase in health hazards. The County government will therefore embark on sensitization and awareness creation of alternative or renewable sources of energy like biogas, wind mills, hydro power and solar energy. Tapping into more sources of energy will open up the County to investors.
Disaster Preparedness	The County is currently faced with three key disasters. Landslides have become a life-threatening phenomenon along the Escarpment and the Valley. This has destabilized lifestyles of residents living along the valley especially those households without alternative forms of settlement. Frequent climatic and man-made disasters have been witnessed. These include drought, landslides and floods experienced particularly in the Valley and parts of the Escarpment. The unpredictability of the weather patterns makes it hard to contain the impacts of these disasters. However, measures have been put in place to discourage human settlement and economic activities along the Escarpment. Disaster preparedness, mitigation and prevention must also be integrated into development initiatives particularly in high-risk areas for natural disasters but there is need to capacitate the local people to deal with disasters.
Environmental Degradation	Serious environmental degradation challenges which include charcoal burning, human encroachment on gazetted forests and poor land use system are some of the factors leading to environmental degradation in the County. Charcoal burning is mainly carried out alongside the Kerio Valley which is already vulnerable thus contributing to further environmental degradation. High population pressure in the escarpment has resulted in farming on very steep and sloppy areas causing massive soil erosion and landslides. Effects of environmental degradation include Water supply to major rivers in the County has declined significantly, making the residents of the vast Kerio Valley experience a drastic reduction in water for irrigating their farms and thus threatening livelihood security in the County and adjacent highlands. This is as a result of deforestation in the highland areas especially at water catchment areas.

CLIMATE CHANGE	
Impact	Environmental degradation has resulted in severe climatic changes whose effects are currently being felt by the residents. These climate change effects include rain pattern changes, massive soil erosion in the Escarpment and the Kerio Valley, landslides at the Escarpment and prolonged drought seasons in the Kerio Valley. The above effects have resulted in reduced agricultural productivity which has in turn jeopardized the already vulnerable food security given that residents of the County are agriculture-dependent.
Mitigation	Climate change is significantly affecting livelihoods in the County especially in the ASAL parts associated with frequent drought, floods and landslides causing crop failure, livestock deaths, disease epidemics and loss of livelihoods. Various government institutions including KFS, NEMA and KWS together with NGOs such as Nature Kenya, KWAHO and World Vision have embarked on mitigation measures to reverse the adverse climatic change effects.
Adaptation	Adaptation strategies like afforestation and protection of catchment areas have been initiated and proper land-use practices including enforcements of the various Acts and Laws have been advocated and disseminated by agricultural and environmental practitioners in a bid to mitigate the climate change effects and prevent further.
Ongoing Projects	Agriculture Sector Development Support Programme (ASDSP), Zero Grazing dairy promotion, Establish Agricultural college and training centre at Cheptebo. Intergrated water projects along escarpment.
Climate Change Mainstreaming	The County was ranked 3 as they identified priority actions for climate change mitigation and adapation.

KAJIADO

Kajiado County is located in the southern part of Kenya. It borders Nairobi County to the northeast, Narok County to the west, Nakuru and Kiambu Counties to the north, Taita Taveta County to the southeast, Machakos and Makueni Counties to the northeast and east respectively, and the Republic of Tanzania to the south. It is situated between Longitudes 30° 5′ and 37° 5′ East and between Latitudes 10° and 30′ South. The County covers an area of 21,900.9 km2. The main physical features of Kajiado County are plains, valleys and occasional volcanic hills ranging from an altitude of 500 metres above sea level at Lake Magadi to 2500 metres above sea level in Ngong Hills. Topographically, the County is divided into three different areas namely; Rift Valley, Athi Kapiti plains and Central Broken Ground.

The County consists of three geological regions: quaternary volcanic, Pleistocene and basement rock soils. Alluvia soils are also found in some areas. Quaternary Volcanic soil is found in the Rift Valley. Basement System Rocks which comprise various gneisses, cists, quartzite and crystalline limestone, are found mainly along the river valleys and some parts of the plains. Pleistocene soils are found in the inland drainage lake system around Lake Amboseli. Quarrying of building materials is also done within the County. The County has a bi-modal rainfall pattern. The short rains fall between October and December while the long rains fall between March and May. There is a general rainfall gradient that increases with altitude. The bimodal rainfall pattern is not uniform across the County. The long (March to May) rains are more pronounced in the western part of the County while the short (October to December) rains are heavier in the eastern part.

SECTOR SUMMARY	
Agriculture	The short rains fall between October and December while the long rains fall between March and May. There is a general rainfall gradient that increases with altitude. The bimodal rainfall pattern is not uniform across the County. The long (March to May) rains are more pronounced in the western part of the County while the short (October to December) rains are heavier in the eastern part. The rainfall amount ranges from as low as 300 mm in the Amboseli basin to as high as 1250 mm in the Ngong hills and the slopes of Mt. Kilimanjaro. People have small farms which are irrigated in productive areas of Loitokitok, Isinya and Nguruman. Large farms of more than 50 acres are mostly for rain fed agriculture although this is slowly becoming unpopular because of irregular rainfall patterns.
Water	There are various sources of water namely, rivers, shallow wells, protected/unprotected springs, dams, water pans, and boreholes. The water is used for domestic, livestock and commercial use. Most of the rivers are seasonal hence not reliable and ground water is available although it contains high salt levels in some parts of the County. Tanathi Water Services Board is charged with the responsibility of developing water resources and maintaining infrastructure. Water Services Providers are in charge of direct provision of water and sewerage services to customers and ensuring efficient and economical provision of water and sewerage services in the County. Average distance people travel in search of water is 10 km from their homestead. Water access in urban centers is better than in rural areas because of high water connectivity by the service providers.
Forestry	The County has a total forest area of 16,866.88 ha comprising of indigenous and exotic forests. A total of 15,626.8 ha of the forest land is gazetted forest while 1,240 ha is trust land. Gazetted forest areas are found at the border areas of the County, mainly Ngong hills (3,077 ha), Loitokitok (765.8 Ha), and Namanga (11,784 Ha). Forest in trust land includes Embakasi (573 ha) and Oloolua (667 ha). Forest resources available include timber, firewood and charcoal. Trees and other plants are widely used in traditional medicine.
Energy	The main energy sources in the County are firewood, electricity, charcoal, solar and petroleum products. Out of 173,464 households across Kajiado County, only 69,098 households are connected to electricity accounting for 39.8% of the households, with highest number of households being in the urban areas. Other sources of energy underexploited include wind, solar and geothermal.
Disaster Preparedness	Disasters induced by natural and anthropogenic hazards have effects on development. Disaster concerns include: drought and famine, flash floods and winds, environmental pollution and degradation, accidents, spread of communicable diseases, population displacement, and climate exposure, damage to physical infrastructures, poor sanitation and human-wildlife conflict. Strategic interventions will be instituted to mainstream disaster risk reduction in all sectors.
Environmental Degradation	The impact of environmental degradation has already proven to be devastating on the social, economic, and environmental systems in the County. Environmental degradation has contributed to water pollution and worsened the quality of the already scarce water. Increasingly degraded areas have resulted in decreased livestock pastures and low productivity of agricultural land. This has led to resource conflict. Air pollution from industrial activities in Kitengela and flower farms in Isinya pose a health risk and has made Upper Respiratory Tract Infection a common disease in affected areas.

CLIMATE CHANGE	
Impact	The County is characterized by erratic rains, extreme temperatures and cyclic and prolonged droughts. Variations in intensity and frequency of the above conditions may be manifestations of climatic changes whose full impacts are yet to be understood. Traditionally, the County has had a bi-modal rainfall pattern whose integrity could be changing as seen in recent shifts mainly occasioned by increased unpredictability and unreliability. This has had devastating effects on people's livelihoods. Crop failure was reported at more than 90% in the drought year of 2009 while livestock losses were in the excess of 70% in most areas. Green house farming is gaining momentum with the sinking of boreholes, but this still poses a great challenge especially to underground water since it may not be sustainable in the long run. Strong winds are also experienced during the dry spells, accompanied by very high temperatures and flush floods during the short and long rains.
Mitigation	Measures to mitigate effects of climate change in the County are minimal. Most programs undertaken by the government include tree planting in all major public institutions and offices, and control of soil erosion through building of gabions.
Adaptation	The County government intends to scale up tree planting by involving all stakeholders and communities. The local pastoral communities continue to adjust to climate variability by maintaining mobility as they respond to spatial and time-related weather changes. In areas where crop farming has been practised, more farmers are planting drought resistant crops like cassava, sorghum, millet and early maturing maize varieties. Farm-forestry involves planting trees alongside crops. There are 54 farms involved in farm-forestry. Kenya Forests Service is promoting this concept in the County to increase forest cover and act as wind breakers. Farm-forestry in the County involves growing of fruit trees, wind breakers and tree species used for medicinal purpose.

Ongoing Projects	Amboseli ecosystem security program – Loitokitok
Climate Change Mainstreaming	The County was ranked 3 as they identified priority actions for climate change mitigation and adapation.

KERICHO

Kericho County is one of the 14 Counties in the Rift Valley region. It lies between longitude 35° 02′and 35º 40′ East and between the equator and latitude 0° 23′ South. The County is bordered by the Uasin Gishu County to the north, Baringo County to the northeast, Nandi to the northwest, Nakuru County to the east and Bomet County to the south. It is bordered to the southwest by Nyamira and Homa Bay Counties and to the west by Kisumu County. The County covers a total area of 2,479 km^2.

The County receives relief rainfall, with moderate temperatures of 170C and low evaporation rates. The temperature ranges between 29°C and 10°C. The rainfall pattern is such that the central part of the County, where tea is grown, receives the highest rainfall of about 2125 mm while the lower parts of Soin and parts of Kipkelion receive the least amount of rainfall of 1400 mm. The County experiences two rainy seasons: the long rainy season occurs between April and June whereas the short rainy season occurs between October and December every year. The driest season is mostly from January to February. The variations in the temperatures and rainfall are mainly determined by the altitude of the place. Between the periods July 2010 and June 2011, the County received an average rainfall of 1500 mm.

SECTOR SUMMARY	
Agriculture	Land resources in most parts of the County are utilized for farming, which comprises of food and cash crop farming and livestock rearing. Large tracks of land are mainly held by multinational companies such as tea and flower farms, mainly concentrated within Belgut, Kipkelion east and Kericho east sub-counties. A larger percentage of the land is held by private individual's livestock. About 80% of the County is arable. The average land holding size in the County is 0.9 ha for the small holders and 14 ha for large-scale holders. The large scale holders are mostly the multinationals which utilize the land for tea and flower farming. Small scale farms are under food crop and livestock production. Land holders with title deeds in the County stands at 76%. Kipkelion sub-county, which is a former white settlement scheme, has the largest percentage of holders without title deeds. As mentioned earlier, the County is endowed with fertile soils and receives reliable rainfall throughout the year hence making it conducive for agricultural activities. The County produces both cash and food crops. The main crops grown include tea, coffee, sugarcane, potatoes, maize, beans, pineapples, horticulture (tomatoes, vegetables among others). The total land under both food and cash crops is 79,200 ha consisting of 45,200 ha for food crops and 34,000 ha for cash crops. The size of land holding varies across sub-counties. The average farm size for small scale farmers is 0.9 ha while for large scale farmers is 14 ha. The large scale farms are dwindling due to land fragmentation. The main storage facilities include maize cribs, stores and warehouses. The County has three National Cereals and Produce Board (NCPB) centres. These centres are in Kedowa, Fort Ternan in Kipkelion Constituency and Kericho in Ainamoi Constituency. Dairy and beef cattle, sheep, goats and poultry are the types of livestock bred across the County. Bee keeping is an enterprise with a lot of potential. It is practiced in the drier lower zones of the County. Fish farming is not a common activity in the County.
Water	The County is well drained with a good number of rivers that include Chemosit, Kiptaret, KipsonoiTimbilil, Maramara, Itare, Nyando, Kipchorian and Malaget. Some of these rivers are characterizedvby rapids and falls which could be harnessed for hydro-electric power generation. Rivers with waterfalls include Maramara, Itare and Kiptaret.
Forestry	This section presents the main types of forest and their respective sizes and use of the forest products. It also covers the extent of promotion of agro-forestry and green economy, prevention of soil erosion, protection of water catchment areas, provisions of firewood and generations of energy for industries e.g. tea estates and improvement of soil fertility by growing fertilizer trees. The County has seven gazetted forests comprising of the southwestern Mau Forest Reserve that occupies a total area of 32,700 ha, Makutano Forest covers 5,474.09 ha, Tendeno Forest(723.80 ha.), Kuresoi Forest (7,366.80 ha.), Londiani Forest (9,015.50 ha.), Malagat Forest Station (3,137.90 ha.) and Sorget Forest Station (6,856.60 ha.). Private forests within the County are mainly owned by James Finlay Tea and Unilever Tea. The forests are situated in Londiani and within the tea estates. The main products from farm forests include timber, nursery soils, honey, firewood, building materials, herbal medicine, pottery clay, grass, and pine gum. Beneficiaries of these forest products are locals who live along the forests and farmers who practice agro-forestry. Apart from the direct products harvested from the forests, livelihoods are also supported through the water catchment areas, rainfall, environmental conservation and other income generating activities. Agro forestry is widely practiced in the County due to the reduced land sizes and the benefits that are accrued from the practice.
Energy	Kenya Power has played an important role in lighting up the rural areas in the County. This is mainly through the Rural Electrification Programme. Apart from electricity as a source of lighting both in rural and urban areas, there are other sources. The majority of the households use lantern (46.1%) and tin lamp (39.1%) as the main source of lighting fuel followed by electricity (11.8%) and solar (1.7%) while the rest constitute less than 1% each.
Disaster Preparedness	Disaster Risk Reduction (DRR) is a conceptual framework intended to systematically prevent and limit disaster risks with regards to losses in lives, social /economic and environment assets of communities and countries. DRR aims at reducing the damage caused by hazards like earthquakes, floods, droughts, and road and rail accidents. Disaster development realm clearly shows the inter-relationship between development and vulnerability to disaster, hence development projects/programs have an associated vulnerability to disasters. This calls for mainstreaming DRR in all sectors of the economy and at all levels of projects/programs. As a commitment to DRR, the County Government should have budgetary allocation and legislation to assist in implementation of DRR activities. The County should develop a disaster database and contingency plan to manage disasters.
Environmental Degradation	The County has several degraded hilltops especially in the lower altitude. The wetlands available in the County have problems of ownership and uncertainty thus causing encroachment and sub-segment destruction. Riverbanks more often than not are encroached by individual farmers to an extent of collapsing the banks. A few industries, mainly tea, have incorporated environmental costs in their management practices especially in the area of pollution, emission control and waste management. Packaging materials e.g. polythene

	bags and plastics are unfriendly to environment. Most urban centres have a challenge to handle the issue of waste paper, which has been used as a packaging material. People dispose of them in an unsafe manner leading to blockage of storm drains and act as breeding places for disease vectors. Over reliance on firewood is one of the major contributors of environmental degradation which deplete forest cover. 80% of residents rely on firewood for cooking while 14.4% use charcoal. Tree felling exposes soil which becomes susceptible to erosion. Due to encroachment and planting of eucalyptus trees along the rivers banks and their sources, reduction in water levels has been experienced. Cultivation on hilly areas in the County has predisposed the soils to soil erosion whose effects are creation of gullies and loss soil infertility resulting to poor harvest and reduction of soil cover.

CLIMATE CHANGE	
Impact	Rivers banks and their sources encroached; reduction in water levels has been experienced. Low agricultural productivity.
Mitigation	Reforestation and agroforestation programmes are being undertaken to increase forest cove. Information related to environment is readily available on the internet though more needs to be done to ensure vital information related to environment is availed in the sub County information and documentation centres.
Adaptation	Efforts are being made to enforce EMCA (1999), Water Act 2002 among other Acts on the requirement on river line protection through participatory approach. A number of institutions implementing this programme include Lake Victoria Environmental Management Programme II (LVEMP II), Forest Service, Constituency Development Fund, and the County Government. The government initiated programmes such as the Economic Stimulus Programme, and Kazi KwaVijana which incorporated tree planting. Due to water shortage for livestock, KSh 3 million was allocated during the 2011-2012 financial year to each constituency for the construction of dams. This acts as a reserve to harvest the runoff water mainly in the lowlands. This is being implemented by Ministry of Agriculture. There will be need to further decentralize the structures addressing environmental issues to the lower levels. Sub-county Environment Committees should be strengthened to enhance effectiveness in championing mitigation measures on environment.
Ongoing Projects	Agriculture and Livestock Development
Climate Change Mainstreaming	The County was ranked 3 as they identified priority actions for climate change mitigation and adapation.

LAIKIPIA

The County lies between latitudes 0° 18′ South and 0° 51′ North and between longitudes 36° 11′ and 37° 24′ East. It covers an area of 9,462 km^2 and ranks as the 15th largest county in the country by land size. The County is endowed with several natural resources. These include pastureland, rangeland, forests, wildlife, undulating landscapes and rivers among others. The high and medium potential land constitutes 20.5% of the total County's land area while the remaining 79.5% is low potential hence unsuitable for crop farming.

The County experiences a relief type of rainfall due to its altitude and location. The annual average rainfall varies between 400-750 mm though higher annual rainfall totals are observed on the areas bordering the slopes of Mt. Kenya and the Aberdare Ranges. north Marmanet receives over 900 mm of rainfall annually; while the drier parts of Mukogodo and Rumuruti receive slightly over 400 mm annually. The annual mean temperature of the County ranges between 16°C and 26°C.

SECTOR SUMMARY	
Agriculture	Agricultural potential is quite prospective as characterized by highly potential farming lands particularly in the southwestern parts of the County. Over 20% of the County's total land is arable. The total area under crops is about 1,984 km^2 of which 80% is under food crops. Over 60% of households derive their livelihood from agricultural activities. Majority of the farming households are small scale holders whose average farm land size is two acres mainly for food production. The farm size for large scale holder on average is 20 acres mainly for wheat and maize production. The average farm size for small scale holders is 2 acres while for large scale holders is 20 acres. The ranching community holds an average of 10,000 acres. Average land holding in the group ranches per household is 23 acres. Laikipia is dominantly a pasture land with 43 ranches registered by 2012.These ranches occupy over 50% of the total land area in the County. The average size of the ranches is 4,046.9 ha. The group ranches are mainly in the northern part occupying about 72,544 ha. The percentage of land wners with title deeds is 65.3%. This low percentage is partially attributed to absentee landlords and the long land adjudication and transfer process. The subsidized cost of fertilizers has improved crop production though there is need to continue with this and also compliment this effort with better seeds. Although facing challenges in delivery of services, extension providers have kept farmers informed on new farming technologies. In collaboration with the NGOs, CBOs and Micro Finance Institutions (MFIs), the County will continue to support farming operations through affordable credit.
Forestry	There are six gazetted and one non-gazetted forest. The gazetted forest area totals 580 km^2 comprising of indigenous and plantation forests. The main forest products are timber, poles, firewood and pastures. Agroforestry is supported in the County. Farm woodlots are a common feature in the southern parts of the County. Farmers also use woodlots for timber and pole production.
Water	There are two major swamps in the County namely; Marura swamp which runs along the Moyot valley in Ol-Pajeta Ranch and the Ewaso Narok Swamp around Rumuruti town. The swamps have some agricultural potential if properly protected and managed. The rivers determine to a large extent the settlement patterns, as they are a source of water for human and livestock consumption as well as irrigation activities. The distribution of water sources is uneven across the County with the northern parts experiencing serious water shortages. There are 41% of households accessing water from within their dwelling while 12.9% of the households take an average of 1-4 minutes to reach the nearest water point. Similarly 20.3% of households take an average of 5-14 minutes and 11.4% of the households take an average of 15-29 minutes. The remaining 4.6% of the households take over an hour to reach the nearest water point.
Energy	The national power grid serves 27 centres and is yet to reach 28 centres. The households using electricity for lighting constitute 18% of the total households. The Umeme Pamoja initiative has helped upscale access for the rural households. There are 39 health facilities and 50 secondary schools connected to electricity. Being a semi-arid County, reliable sunshine throughout the year provides unexploited natural resource for solar energy. The County has several institutions supported by the photovoltaic programme. Commercial wind electricity may also be generated with proper assessment along the escarpments towards the Rift Valley floor. Opportunities

	in production of Jetropha Carcus, Croton Megalocarpus (Mukinduri), castor oil and sweet sorghum already exist for production of bio-fuel.
Disaster Preparedness	Several actors have been involved in disaster management, the main one being the Kenya Red Cross Society. Other actors are the World Food Programme, Government Departments and Caritas Nyeri. It is important to operationalize the Disaster Management Committees at all levels in order to supplement the efforts of the existing actors. Disaster preparedness mechanisms also need to be intensified in order to mitigate the effects of the disasters. In addition, there is need to make the communities aware of their role in the management of disasters. The strengths towards DRR is the existence of disaster committees at the various levels, an existing pool of stakeholders and increased awareness on the need to address disasters.
Environmental Degradation	The fragile ecosystem has been devastated by heavy soil erosion, deforestation, charcoal burning and destruction of catchment areas thus reducing the carbon sink. Increased horticultural activities around the major water catchment areas (Mt. Kenya and Aberdare ranges) have led to drying up of most rivers downstream. Unplanned rapid expansion of major towns and market centres has constrained the ability of the town boards' sewerage and solid waste management facilities. There is need for NEMA to vigorously enforce the Environmental Management and Coordination Act to protect the environment. In addition, the County must make deliberate efforts to increase the vegetation cover in order to increase the carbon sink as a means of mitigation against the effects of climate change.

CLIMATE CHANGE	
Impact	While the County and the nation at large have contributed little if any to climate change, its impacts have been adverse in the County. The effect of climate change sometimes manifests itself in increased intensity and frequency of erratic weather patterns like floods and droughts. The resultant impacts of the erratic weather patterns in the County include; decreased volume of surface and ground water resources, reduced land productivity leading to loss of pasture and famine especially in areas within the vicinity of Daiga, Matanya, Ol Moran, Kimanju, Pesi, Kirimon and Dol Dol; increased conflicts (human/wildlife, human/human) arising from the competition of the inadequate resources like water and foliage leading to loss of life and livelihoods; the loss of forest cover, significantly compounding the issue of frequent fluctuations in temperature, wind speeds, increase humidity and reduced surface run offs.
Mitigation	Various measures are being put in place to address the effects of climatic change. These measures include: promoting energy efficiency and renewable energy resources which is manifested in the promotion of biogas, solar energy and wind energy, tree planting to enhance forest cover and increase carbon sink; promotion of integrated watershed planning and management for sustainableutilization of the water resources, introduction of drought resistant crops and diversification of crops varieties to mitigate against the shifting rainfall patterns, development of early warning signals within the systems using scientific and indigenous knowledge and the enhancement of effective communication of government policies to reduce the information gap between the locals and policy implementers.
Adaptation	Effects of the drought include promotion of high value drought resistant crops, conservation agriculture, water harvesting, livestock off-take programmes, school feeding programmes, establishment of low cost boarding primary schools and nutrition support to the severely malnourished. In addition, fodder conservation through community groups and at individual levels has been encouraged amidst the introduction of high value small livestock like dairy goats, rabbits, poultry and bees. Environmental degradation continues to pose a major development challenge in the County. The various ongoing efforts towards re-afforestation, investment in clean energy, catchment protection and access to water, slum upgrading and control of gully expansion are yet to realize desired impacts. Full conservation of major forests and water catchments is yet to be realized. Natural resource management and sanitation initiatives by stakeholders will be enhanced to improve on environmental sustainability.
Ongoing Projects	Subsidized fertilizer programme, Promotion of integrated production/systems. Enhancement of community emergency and risk reduction and preparedness, Promotion of commercial tree growing on farm land, Forest restoration and protection.
Climate Change Mainstreaming	The County was ranked 4 as they identified climate change mitigation and adaptation actions and have budget allocation.

NAKURU

Nakuru County lies within the Great Rift Valley and borders eight other counties namely; Kericho and Bomet to the west, Baringo and Laikipia to the north, Nyandarua to the east, Narok to the southwest and Kajiado and Kiambu to the south. The County covers an area of 7,495.1 km^2 and is located between Longitude 35° 28′ and 35° 36′ East and Latitude 0° 13′ and 1° 10′ South.

The County has a robust ecological system that the residents depend on for agriculture, tourism, water and many other benefits. The Mau Escarpment with an average altitude of 2,400 metres above sea level is very important as most of the forests are located on it. It is also the source of Njoro River that drains into Lake Nakuru which is inhabited with flamingos, making it one of the premium tourists attraction site in Kenya. The climate is strongly influenced by altitude and physical features. There are 3 broad climatic zones (II, III and IV). Zone II covers areas with an altitude between 1980-2700 metres above sea level and receives minimum rainfall of 1000 mm per annum. This zone covers Upper Subukia, Rongai and Mau Escarpment. Zone III receives rainfall of between 950-1500 mm per annum and covers areas with an altitude of 900-1800 metres above sea level. This zone covers most parts of the County and is the most significant for agricultural cultivation. Zone IV occupies more or less the same elevation (900-1800 m) as Zone III. However, it has lower rainfall of about 500-1000 mm per annum. This zone dominates Solai and Naivasha.

The County has a bimodal rainfall pattern. The short rains fall between October and December while the long rains fall between March and May. Temperatures in the County ranges from a high of 29.3°C between the months of December, January, February, and part of early March to low temperatures of up to 12°C during the month of June and July.

SECTOR SUMMARY	
Agriculture	Nakuru County has few large scale land owners holding approximately 263 ha (Ha) of land on average. On the other hand the County is dotted with many small scale land owners with mean landholding size of 0.77 ha. The bulk of the land holdings in the County are small-scale and are found mainly in the high potential agricultural areas. The medium and large scale farms account for a small percentage of the holdings, but cover the largest area under farming. Main food crops include maize, beans, Irish potatoes and wheat. Fruit and vegetable grown include tomato, peas, carrot, onion, French bean, citrus fruit, peach, apple, cabbage, kale, strawberry, asparagus and leek. Most

	are grown in Bahati, Njoro, Molo, Rongai, Olenguruone, Nakuru Municipality, Gilgil and Mbogoini divisions. The land area under food crops and cash crops in Nakuru County is 243,711.06 ha and 71,416.35 ha respectively covering approximately 3,151.240 km^2 of the total area of the County. A number of factors have contributed to the increase in land under cultivation namely; the rich volcanic soils of Nakuru County that give great potential for crops, reliable rainfall in most parts of the County, readily available labour force and the availability of ready market for crop produce both in the urban centres and the proximity to other major urban centres such as Nairobi, Naivasha, Gilgil and Narok which offers incentives for the sector to flourish. The main storage facilities are silos, farm stores and warehouses. Cumulatively, the storage facilities have a storage capacity of 5,808,592 bags of maize with the silos carrying capacity 2,000,000 bags, farm stores carrying 1,308,572 bags and warehouses carrying 2,500,020 bags. Livestock production is one of the major economic and social activities undertaken by communities living within Nakuru County. The main livestock reared, in order of economic significance, include: Dairy cattle, poultry, sheep, goats, beekeeping and rabbits. Among them, dairy production is a major livestock income earner.
Water	Nakuru County is endowed with natural water resources including four major lakes, Nakuru, Naivasha, Solai and Elementaita. In addition, there are rivers, shallow wells, springs, dams, pans and boreholes spread all over the County especially in drier parts of Naivasha, Gilgil, Molo, Njoro and Rongai. The boreholes have boosted water supply in the County. Some of the major rivers include, Malewa, Njoro, Molo and Igwamiti. The County is also endowed with springs found in Subukia, Nakuru north, Molo and Kuresoi areas. Rain water is another major source of water with about 80% of households harvesting. The distance to the nearest water point is from 0-6 km. 35% of the population takes 1-4 minutes to fetch drinking water. Estimates from KPHC 2009 indicate that about 150,608 households (36.8%) in the County have access to piped water. About 63% have access to potable water. 80% of households harvest rainwater.
Forestry	The forests in Nakuru County (Menengai Crater, Mbogoini, Solai, Mau, Bahati, Subukia, Eburru and Dundori forests) are a major source of timber and firewood as well as providing employment to high number of the County population. The same forests generate income for the government in form of revenue from saw millers. The forest and the high altitude also influences climate condition resulting in wet conditions suitable for agro-based economic activities. Climatic conditions are favourable for microorganisms that catalyse the decomposition of organic matter thereby enriching the soil that supports agricultural activities (especially dairy and crop farming) enabling the County to be almost food sufficient. Mau forest is home to the indigenous Ogiek community. Forests are classified into gazetted, non-gazetted and individual forestlands. There are 2 gazetted forests (Mau and Dondori forests)and 6 non-gazetted forests. The gazetted forests in the County cover 679.643 km^2. The individual forest land is estimated to be less than 1%. There is great need to promote afforestation and reforestation in the Mau Escarpment to improve tree cover and conserve the environment. Main forest products include: timber, poles, charcoal, firewood, and bamboo. These products are important in generating revenue for the government and income for saw millers and households.
Energy	The 2009 Population & Housing Census indicate that 139,430 in Nakuru County households were using electricity for lighting, which translate to 34% of the households. However, 85.7% of these connections are in the urban areas. It is also worth to note that lantern and tin lamp are a common source of lighting in the rural areas accounting for 36.1% and 25.3% of the rural households respectively. Underground hot springs in Olkaria are an important source of geothermal power that serves not only the County but also provides power supply to the national grid. Further explorations are underway at Menengai Crater and Ol Doinyo Eburru with a view to generating more electricity.
Disaster Preparedness	Disaster is a serious disruption of the functioning of a society, causing major human, property, socio-economic or environmental losses which exceed the ability of the affected society to cope using its own resources only. The emergency managers in the County will need to understand the disaster management cycles in order to adequately prepare and respond to disasters when they occur. The major types of disasters that occur are as follows: floods, drought, and wind. Presence of Kenya Red Cross, Ministry of Devolution and Planning (Special programmes Department), Drought management officers in Arid areas, Trained County planning officers, Trained disaster personnel.
Environmental Degradation	Environmental degradation in Nakuru County is mainly as a result of inappropriate farming methods, effects of climate change, poor solid waste and liquid waste disposal, soil erosion, inadequate sanitary facilities, massive felling of trees for firewood, timber and clearing land for agricultural use. In addition, poor physical planning in urban areas, quarrying activities, pollution and toxic from agro-chemicals contributes to environmental degradation. Cultivation of riparian reserve along major rivers and wetlands has led to siltation which causes reduction in water body mass. Chemicals like washing detergents and agro-chemicals when, Solid waste disposal in the upstream at the Nakuru's Gioto dumpsite is a major contributor of environmental pollution and degradation washed into rivers, destroy algae and increase water pollution thereby leading to loss of biodiversity. Quarrying activities lead to blockage of water ways, siltation in addition to threatening human safety especially when the quarry sites are left open and without perimeter fence. Quarrying is common in Subukia, Nakuru north Sub-county, Naivasha Sub-county and Rhoda Area in Nakuru Central Sub-county. In addition environmental degradation has resulted in extreme weather conditions as a result of overall climate change. This has a negative effect on small scale farm holders who depends on rain-fed agriculture. A change in climate also reduces the ability of the physical environment to support the flora and fauna. Ultimately, the County economy would be adversely affected hindering the realisation of Kenya Vision 2030 development goals under this sub-sector.

CLIMATE CHANGE	
Impact	Climate change has affected the County's bimodal rainfall pattern. It is now difficult to predict the onset of the short and the long rains. This has affected farmers timing in regard to land preparation hence affecting agricultural productivity. The widespread changes in extreme temperatures has had negative effects. Hot weather conditions during the day have led to serious decline in water levels in Lakes Nakuru, Elementaita and Naivasha as well as reduction in volume of river flows. Major tourist sites have also been affected by climate change. Lake Nakuru National Park, the home of flamingos, is experiencing unprecedented migration of the birds to other lakes including Lake Bogoria. If unchecked, the migration of flamingos will have a negative impact on attractiveness of the park as well as a slump on revenue.

Mitigation	Measures to be taken to check on environmental degradation include tree planting on the depleted forests sites, promoting community participation and enforcement of a ban to curb illegal logging, charcoal burning and harvesting of indigenous forests.
Adaptation	All stakeholders will be sensitized to put proper and sustainable environmental conservation measures in place so as to make the County environmentally clean. This can made be possible through the use of forums such as the National Soil and Water Conservation Programme that use individual farmer extension approach to train farmers on proper and sustainable farming methods to reduce soil erosion and pollution from chemicals. In particular, NEMA will enforce Environment Management and Coordination Act, 1999 (EMCA, 99) in ensuring that industries operating within towns treat their effluents to the required standards so as to reduce pollution to the environment. Poverty is related to the destruction of environment as there is massive destruction of forests to get firewood and clear land for agricultural production. This increases environmental degradation hence the need for economic empowerment of the poor. In order to be effective, poverty and environmental strategies have to be informed by the community needs and preferences. Successful community interventions should typically be locally driven, involve the private sector and safeguard the environment to sustain livelihood benefits in the long term.
Ongoing Projects	Enactment of the consolidated Agriculture Reform Bill, Creation of Disease Free Zone, Small Horticulture Development Project (SHDP, KAPAP (Kenya Agricultural Productivity and Agribusiness Project), NMK (Njaa Marufuku Kenya), Value addition for potato, tomato, maize and wheat through milling.
Climate Change Mainstreaming	The County was ranked 3 as they identified priority actions for climate change mitigation and adaptation.

NANDI

Nandi County is located in the north Rift region of Kenya. It occupies an area of 2,884.4 km^2, and it borders Kakamega County to the west, Uasin Gishu County to the northeast, Kericho County to the southeast, Kisumu County to the south and Vihiga County to the southwest. Geographically, the unique jug-shaped structure of Nandi County is bound by the Equator to the south and extends northwards to latitude 0° 34′ North. The Western boundary extends to longitude 34° 45′ East, while the Eastern boundary reaches longitude 35° 25′ East. Nandi County occupies 2,884.4 km^2 of land characterized by hilly topography that includes an outcrop of basement systems rocks. The dissected scarp at the Southern border of the Sub-county is another manifestation of rock exposure. The variation between the ecological zones is insignificant. Therefore, the altitude and rainfall are the main determinants of the agriculture activity in any given zone of the County.

The other determinants include the soils and topography. Generally the County receives an average rainfall of about 1200 mm to 2000 mm per annum. The rainfall distribution and intensity has a direct relationship to economic activities in the County. The regions that receive 1500 mm (and above) rainfall per annum constitute the extended Agro-Ecological zone that makes up the current and potential areas under tea cultivation (LH1 and UM1). The relatively drier areas to the east and northeast, which receive an average rainfall of 1200 mm per annum, are suitable for maize growing, sugarcane and coffee. Dairy activity is carried out across the County.

SECTOR SUMMARY

Agriculture

The farm sizes cover an average of 1.32 ha (Refer to Table 22). The main food crops produced in the region are maize, beans, cow peas, potatoes and cabbages which cover a total of 125, 756 ha. The main cash crops are tea, coffee and sugar cane. The cash crop covers a total of 26,290 ha. Cash crops cover a total of 26,290 ha.

Dairy and beef cattle are the main livestock bred in the County. Others are poultry, goats, sheep, pigs and bees. There are no ranches in Nandi County since most of the population is predominantly engaged in cash crop, food crop and dairy farming. The main fishing activities are fish farming which is done on individual farms or as a group activity. The main fish types produced are the African Cat fish and Tilapia. There are no landing sites in Nandi County.

Water

HHs with access to piped water	33,932
HHs with access to potable water	3,765
Permanent rivers	6
Shallow wells	3,038
Protected springs	67
Un-protected springs	1,358
Water pans	–
Dams	3
Boreholes	30
HHs with roof catchments	5,675
Avg. distance to potable water	0.5 km

Forestry

The largest area of forest cover is the south Nandi forest covering an area of 20,150 ha. The north Nandi forest covers a total of 16,004 ha and extends from Nandi Central to Nandi North. Both are tropical rainforests. Main forest products are timber, firewood, poles, grass, herbs and medicines. Forests are an important source of firewood which is used in tea factories and domestic use.

Herbal drugs are also obtained from some indigenous trees. It is envisaged in this plan that agro-forestry and green economy can be promoted for the following different purposes, including income generating activities including farm forests, and protection of water catchment areas, provision of firewood and generation of energy for industries, improvement of soil fertility by growing fertilizer trees, animal feeds production ventures, growing and processing for medicinal purposes/value plants and products, provision of carbon sinks and beautification of the environment.

Energy

Sub-county	*Nandi Central*	*Nandi South*	*Nandi North*	*Nandi East*	*Tindiret*	*Total*
Households with electricity	5,241	945	1,280	1,999	323	*9,788*
Trading centres on power grid	44	54	51	31	–	*239*
% Households using firewood	78.00	89.00	88.00	87.00	92.00	*88.00*
% Households using Paraffin	87.00	94.90	93.40	91.20	95.80	*92.46*
% Households using solar	1.20	1.19	1.60	0.99	1.22	*1.24*
% Households using biogas	0.2	0.16	0.19	0.1	0.06	*0.14*

Disaster Preparedness

Nandi County like other counties is vulnerable to one or more forms of disasters which need rapid response in order to avoid massive destruction of lives and property. The major disasters in the County are drought, lightning, landslides, conflicts, crop/animal diseases and forest fires. Cases of school fires have also been reported. Other disasters include malaria out breaks, typhoid and HIV/AIDS. The County is prone to hailstones, road accidents and army worms. Due to threats posed by the above mentioned possible disasters, there exists a Disaster

	Management Committee in the County to help in prevention and management of disasters. The committee which reports to the National Disaster Management Committee (NDMC) has widened its scope to include environmental management so as to address the issue of deforestation which is a looming disaster that can lead to desertification. Irregular dissected terrain in some areas that hinders rapid response to disasters, inadequate funds to employ more workers, poor infrastructure hindering the spray program coverage to all parts of the County especially during the rainy season, uncertainty due to changes in devolved government and artificial food shortages remain causes of disasters in the County.
Environmental Degradation	Deforestation is one of the major contributors to enviromemental degradation in the County. Fire wood forms the main source of energy with over 90% of the population (urban and rural) depending on it. Demand for agricultural land and wood products are high due to the ever increasing urban and rural population. This has led to exposure of land to agents of soil erosion and pollution of water bodies. This calls for appropriate interventions to meet the demands of the community, increase tree cover within the private farms and forest cover in the gazetted land. Another contributor to environmental degradation is poor waste management. The volume of waste generated especially in the urban environment has by far overstretched the existing waste management infrastructure. The councils lack the capacity (technical and physical) to effectively collect, transport and dispose of the waste. This has led to spread of landfills and disposal of waste in water bodies with serious effects on the environment. Varied effects of environmental degradation have been felt in wetlands, water systems and land.

CLIMATE CHANGE	
Impact	Climate change is gradually beginning to take a toll in the County. Signs of this include floods, unusually heavy rainfall with hailstones, rise in temperature, and change in rainfall patterns among others. These changes have had a negative implication on both agricultural output and general health of the population. Some of the negative implications include reduced agricultural output caused by damage on crops by hailstones and the unpredictable rain patterns leading to crop failure. The road network has also been destroyed by the heavy rains thus leading to high cost of maintenance.The rise in temperatures provides a conducive environment for mosquito breeding. This has led to increase in malaria cases. Biodiversity has also been affected as rare species of animals which could boost tourism have migrated to more favorable areas.
Mitigation	Clean, environmental friendly and renewable energy sources such as solar, biogas, natural gas, electricity and wind energy; recyclable materials like polythene and plastics to make PVC fencing, electric posts and roofing materials reduce over reliance on forests. Use of steel to construct roofs will also reduce reliance on forests for timber.
Adaptation	It is imperative that County management attracts donors and partners to aid in management and conservation of the forest resources. The County management will also need to come up with a policy that will promote and regulate use of Pest-resistant crop varieties to reduce use of harmful pesticides, given that pesticides increase greenhouse effects in the atmosphere, which in turn increases global warming and related effects. In agriculture, use of greenhouse technology to counter the effects of unpredictable rain patterns and increase production without necessary relying on rain fed agriculture. In health, adaptation measures mainly include Internal Residual spraying and mass net distributions to reduce the incidences of malaria and related illnesses occasioned by increase in mosquito breeding.
Ongoing Projects	Smallholder Horticultural Marketing Programme, Land adjudication on forest hived lands (Bonjoge land exchange programme in Aldai Constituency, Bonjoge Location, Plantation development programme in the whole County, Small holder Dairy Commercialization Programme (SDCP) in Emgwen and Mosop Constituencies.
Climate Change Mainstreaming	The County was ranked 3 as they identified priority actions for climate change mitigation and adaptation.

NAROK

The County Government of Narok lies between latitudes 0°′50′ and 1° 50′ South and longitudes 35° 28′ and 36° 25′ East. It borders the Republic of Tanzania to the south, Kisii, Migori, Nyamira and Bomet counties to the west, Nakuru County to the north and Kajiado County to the east. Temperatures range from 20°C (January-March) to 10°C (June-September) with an average of 18°C, Rainfall ranges from 2,500 mm in wet season to 500 mm during the dry season.

SECTOR SUMMARY	
Agriculture	The area under agriculture is approximately 5,821 km^2. There are three categories of farmers: small, medium and large scale owning 1-30 acres, 30-100 acres and above 100 acres respectively. The average small scale farm is 6.1 ha and large scale farm is 26.3 ha with barley, tea, sugarcane and wheat being grown as the major cash crops. There has been sub-division of land into uneconomic units in some parts of the County while some large scale farms remain unutilized.
Forestry	The County has an estimated 724 km^2 of gazetted forest, 930 km^2 of non-gazetted forest and 480 km^2 of County council trust forest. The total area under forest cover represents 11.9% of the total County surface area. The agroforestry is being promoted in the County for the benefits associated with it.
Water	The County has permanent and seasonal rivers which originate from major highlands. Rivers and streams are the major sources of water for domestic use. Dams and water pans are on the other hand used for livestock drinking. In the lowlands, such as Suswa and Osupuko, which are semi-arid, there is scarcity of water. Major rivers are Mara and Ewaso Nyiro. The main water supply comes from permanent rivers in Narok north and south sub-counties. The County has an estimated 1,436 ground water sources including dams, rivers, water pans and springs. In 2009 there were about 1,224 households with roof catchments systems for trapping rain water. The most affected are the people living in rural areas where only 5,661 households had access to piped water. In the whole County only an estimated 7% of households benefit from piped water (Census 2009). There is also lack of adequate, easily accessible clean water for domestic use and for livestock. The average distance to water point per household is 3 km in wet season. In dry seasons the distance increases to 10 km. This poses a great challenge particularly to women and girls who bear the responsibility of fetching water.
Energy	Electricity connectivity in the County is very minimal. In 2009, only 6% with 9,903 households had been connected to the electricity grid. Firewood was the main source of cooking fuel used by 83% of the County households. The use of solar energy in lighting was at 1.4% comprising of 2,301 households. Wind energy utilization has not been exploited in the County. Fire wood and charcoal are the main sources of energy for domestic use. About 83% of

	households use firewood as the main cooking fuel while approximately 13% use charcoal.
Disaster Preparedness	Natural disasters are manifested through natural occurrences of flood, drought, pest and diseases outbreaks, possible volcanic eruptions, landslides. Man-made disasters occur through, accidents, tribal clashes, fire outbreaks, wildlife menace, infrastructural collapse e.g. buildings. Any or all of these disasters can occur at any time. Unfortunately, the County is ill equipped to mitigate or manage disasters. Cases of flooding in Narok town that result in loss of lives and property are reported every year. The County government has set aside Ksh 50 million for emergency. However, the allocation is not adequate. There is also low awareness, poor drainage lack of properly trained personnel, roads, telephone, inadequate health facilities and resistance from stakeholders. Existence of early warning system on disasters; Presence of Drought Management Officers; Knowledge on risk prone areas; Indigenous knowledge on disaster trends.
Environmental Degradation	Environmental degradation is mainly as a result of unsuitable farming methods, effects of climate change, poor solid waste management, soil erosion, inadequate sanitary facilities, massive cutting down of trees for firewood, timber and clearing land for agricultural use, poor physical planning in urban areas, quarrying activities, pollution and toxic from agro-chemicals and alien and invasive species. Extreme weather conditions are likely to become more frequent and severe as a result of climate change. This is bound to lead to scarcity of resources such as firewood and generation of energy for industries.

CLIMATE CHANGE	
Impact	Climate change has affected the County's bi-modal rainfall pattern. It is now difficult to predict the onset of the short and long rains. This has affected farmers regarding land preparation hence affecting agricultural productivity. The widespread changes in extreme temperatures have had negative effects in the County. Hot weather conditions during the day have led to serious decline in water levels like River Mara which is vital for wildlife survival in Maasai Mara Game Reserve. The high temperatures have also resulted to reduction of the amount of water for livestock and domestic use.
Mitigation	As a mitigation measure, supportive public awareness on environmental conservation is currently on-going. NEMA, Kenya Forest Service and County administration are now engaged in public awareness campaign on environment conservation. There is also need to have good environmental management and conservation in line with the new Environmental Management and Co-ordination Act. Green house technology and irrigation farming have been adopted as adaptation strategies to climate change. About 12 institutions have established woodlots to avoid deforestatration. Expand rural electrification programme; Encourage the use of energy saving devices. Tapping the solar and wind energy. Charcoal burning control has been imposed by NEMA in conjunction with Kenya forest service to regulate felling down of trees. Green energy distribution.
Adaptation	Further measures to check on environmental degradation include enforcement of a ban to curb logging, charcoal burning, harvesting indigenous forests and tree planting on destroyed sections of forest. There are no known carbon trading ventures, however, the 2,134 ha of forest has great potential for carbon trading. The County government will develop initiatives to promote forest conservation with a view to tap the potential for carbon trading. Excavate more pans to increase funds; Drill more boreholes; Revive stalled water projects; Afforestation; Sensitize communities on catchment protection; Establish tree nurseries in sub catchments; Protect/conserve water sources. Put up and support green houses and open irrigation; At least one greenhouse per ward; Construction of water pans; Agroforestry programmes; and Tree nursery establishment.
Ongoing Projects	Improved Food Security for ASALs project – County wide. Provide subsidized and certified farm inputs (fertilizers, seeds) – County wide. Put up and support green houses and open irrigation; At least one greenhouse/ward. Conservation of Mau Forest region.
Climate Change Mainstreaming	The County was ranked 3 as they identified priority adaptation and mitigation actions.

SAMBURU

Samburu County lies within the Arid and Semi-Arid parts of Kenya and has an area of 21,022.1 km^2. It is situated in the northern part of the Great Rift Valley. Samburu is bordered by Turkana to the northwest, Baringo to the southwest, Marsabit to the northeast, Isiolo to the east and Laikipia to the south. The County lies between latitudes 0° 30′ and 2° 45′ North of the equator between longitudes 36° 15′ and 38° 10′ East of the Prime Meridian. Average annual rainfall is between 600-800 mm. Temperatures range from 21.0°C to 25°C making it too cold for growing crops and is more suited for sheep and cattle grazing.

Rainfall follows a fairly erratic pattern varying significantly both in temporal and spatial scale. The County experiences both short and long rains. Rainfall ranges between 500-1250 mm per annum while temperature is a mean of 29°C.

SECTOR SUMMARY	
Agriculture	The main crops grown are maize, beans, wheat, barley and millet. These crops are grown in the highlands of Poro. This is due to its fertile soils and adequate rainfall sufficient for rain fed agriculture. The average crop farm size in the small scale is less than 0.4 ha this is mostly found at Poro where farming and livestock activities are practiced while the large scale holder has an average of 20 ha and it is mostly for livestock rearing and wheat farming. The total area under crops is 4,000 ha and 3,200 ha for food and cash crops respectively. The main cash crops grown are barley and wheat grown in high altitude areas of Poro. To address this problem, the Government and WFP provide relief food under the school meal programme. In the long run, precautionary measures should be put in place to encourage pastoralists to dispose of their animals when an early warning alert is issued. Cattle rustling involves loss of livestock, displacement of families and loss of life. Various stakeholders including Government, NGOs and the communities are addressing this challenge. This is a long-term solution, while in the short run security is assured by arming the home guards and police reservists. Constant Barazas by the Provincial Administration from the surrounding counties have been undertaken. Wildfire is another concern, destroying grazing land and forests. However, NGOs involved in environmental conservation are training the communities on scouting and reporting of fire incidence.
Forestry	There is a total of 3,250 km^2 of gazetted forests translating to a 15.4% forest cover in the County. This mainly consists of indigenous forests uniformly distributed across theCounty. The main forest products include timber and firewood. These are mainly derived from the gazette forest and the County has no un-gazetted forest. Most of the land in the County is communally owned. Agroforestry is also promoted in the area for the benefits associated with it.

	Factors towards forest degradation: Overgrazing; Illegal forest settlement; Charcoal burning and fuel wood collection; Illegal timber harvest; Forest fires; Charcoal burners use traditional kilns and is illegal causing forest fires; High demand for forest products; Insecurity-led displacement of people; and Insufficient manpower. The number of forest rangers very low compared area to be covered. This is coupled with a lack of rangers camp in the forest.
Water	Samburu is generally classified as a water deficit region. The main sources of water for domestic and livestock use are from water pans, dams and shallow wells. Others water sources are protected and unprotected springs, boreholes and roof catchments. Water quality is generally poor. Most water sources are not protected hence contaminated. Human habitation along catchment areas, lack of proper sanitation and sewage services in major urban centres are major sources of water contamination.
Energy	The main source of domestic energy is firewood which is used by about 70% of the population. There are 11 trading centres connected with electricity while 20 are not connected. This is a major constraint in the growth of these centres. Continued use of firewood is a health and environmental concern contributing to forest degradation.
Disaster Preparedness	The Government and WFP do provide relief food under school meal programme. In the long run, precautionary measures should be put in place to encourage pastoralists to dispose of their animals when early warning alert is issued. Cattle rustling involve loss of livestock, displacement of families and loss of lives. Various stakeholders including Government, NGOs and the communities are addressing this challenge. This is a long-term solution, while in the short run security is assured by arming the home guards and police reservists. Constant Barazas by the Provincial Administration from the surrounding counties have been undertaken. Wildfire is another disaster concern, destroying grazing land and forests. However, NGOs involved in environmental conservation are training communities on scouting and reporting of fire incidence. Other measures include the improvement of livestock breeds through crossbreeding, establishing the early warning system, and restocking and destocking. Destocking and migration to highlands areas with fewer livestock is normally done during dry spells.
Environmental Degradation	Over 90% of Samburu County lies within the fragile Arid and Semi-Arid ecological zone. The County has witnessed repeated droughts, occasional floods, reduced vegetation cover and diminishing surface water over time. This has greatly affected crop farming and livestock rearing leading to complete loss of property, livestock and crops for majority of the population, thus worsening the poverty in the County. Given that over 80% of the population relies on land to support livelihoods, activities such as charcoal burning, overstocking and crop cultivation in the catchment areas and wetlands has contributed greatly to the destruction of the environment. Main forms of environmental degradation are soil erosion, loss of forest cover, invasive tree species, and poor disposal of waste.

CLIMATE CHANGE	
Impact	Evidence of climate change has been observed in terms of increase in variability of rainfall. Rainfall periods are becoming shorter and more unpredictable in areas which previously received adequate rainfall. Prolonged drought is more frequent and severe with time leading to massive loss of livestock, poor crop yields, increased vulnerability to food insecurity. High prevalence of malaria and outbreak of livestock diseases, migration and displacement severely affects livelihoods. This has worsened problems of resource conflicts and cattle rustling within the County and in neighbouring counties.
Mitigation	Climate change mitigation strategies which aim at reducing the emissions of greenhouse gases (GHGs) from human induced activities needs to be put in place. The strategies include: re-forestation to increase the forest cover which enhances carbon sinks, promotion of alternative clean energy sources that do not emit GHGs e.g., solar, wind and biomass energy sources.
Adaptation	Adaptation measures undertaken include promotion of drought resistant crops, construction of water pans, and diversification of livelihoods systems.
Ongoing Projects	Improved food security in ASALs project, traditional high value crop s that are drought tolerant.
Climate Change Mainstreaming	The County was ranked 3 as they identified priority adaptation and mitigation actions.

TURKANA

Turkana County is situated in north Western Kenya. It borders West Pokot and Baringo to the south, Samburu to the southeast, and Marsabit to the east. Lake Turkana is at an elevation of 360 m (1,181 ft) while the surrounding basin is anywhere from 375-914 m (1,230-3,000 ft). Turkana County is arid and semi-arid and is characterized by warm and hot climates. Temperatures range between 20°C and 41°C with a mean of 30.5°C. The rainfall pattern and distribution is erratic and unreliable with both time and space. There are two rainfall seasons; the long rains (akiporo) usually occur between April and July and the short rains between October and November and ranges between 52-480 mm annually with a mean of 200 mm. The driest periods (akamu) are January and September.

SECTOR SUMMARY	
Agriculture	The main crops produced are sorghum, millet, maize, and vegetables like kale. Farming is mainly practiced at household level through irrigation along the Rivers Turkwel and Kerio. The acreage of arable land is approximately 2,500,000 ha. Much of what is grown is food crops such as maize, sorghum, millet and vegetables. There are no cash crops currently being grown although previously cotton used to be grown at Katilu Irrigation Scheme.
Agriculture (cont.)	The main types of livestock bred in the County are cows, goats and sheep (shoats), camels, donkeys, poultry mainly chicken. Most of these breeds are indigenous. There is need to introduce high yielding and drought resistant breeds because livestock production is the main source of livelihood. The County does not have any ranches. However, it has one holding ground at Lomidat abattoir in Turkana west Constituency. The County also had a holding ground at Kainuk in Turkana south Constituency but due persistent cattle rustling, it collapsed. This holding ground had 4 boreholes, which was developed by Norwegian Agency for Development Cooperation (NORAD).
Forestry	There are no gazetted and non-gazetted forests in the County. However, there are palm trees along permanent and seasonal rivers and along the lake. There is need to increase forest cover through introduction of drought resistant tree seedlings and protection of indigenous vegetation/ trees. The main forest products include charcoal, wood carvings, fencing posts, firewood, aloe vera and herbal medicine. The wood from part of this indigenous vegetation is used to do fencing and erection and construction of local house units called manyattas. Agroforestry and green economy is promoted.

Water	The main water sources in the County are hand dug shallow wells, piped water and river water. The access to quality water is still a big problem for the County although through the GOK/UNICEF WASH Programme, the community has largely benefitted from water dug for school children because of the high yields experienced in some areas. The County has only one water supplying organization, LOWASCO. This organization is mandated to supply water within Lodwar town. The rest of the areas get water from the boreholes, and shallow wells dug which respective Water Users Associations manage. The main water sources in the County are rivers; hand dug shallow wells, water pans, boreholes and rock catchment. There also exists several springs. The distance to and from the nearest water points are varied depending on the areas but on average is between 5-10 km.
Energy	Hydro-electric power from the national grid only connects to Kainuk Centre in the south. However, power generation in Lodwar Town is through the diesel powered generators. Lokori, Lokitaung and Lokichoggio power generation projects stand at about 80% complete. 95% of the households use Paraffin and firewood for lighting. The main sources of cooking fuel are firewood, Paraffin and charcoal. Solar energy is an emerging source of energy currently being used in pumping water and lighting especially in most schools in the County. Kenya Power is piloting on solar energy and has installed solar panels at its Lodwar sub-station to complement the diesel generators set that serves Lodwar Town. The Ministry of Energy through the Department of Renewable energy has installed 98 solar panels in schools and government institutions. It has also acquired 40.ha of land for its Research and Development Centres. There is also a great potential in wind power. Data collected indicate the area has some of the best wind resources in Africa, with consistent wind speeds averaging 11 meters/second and from the same direction year round.
Disaster Preparedness	Disaster is a serious disruption of the normal operations of a community thus resulting in widespread human, material or environmental loss. It causes damage that goes beyond the ability of the affected community to cope with using its own means or resources. Turkana has faced serious disaster experiences including the flashfloods of 2006, serious livestock diseases and the recurring drought. All of these disasters have caused human suffering in addition to slowing the development in the recent past.
Environmental Degradation	Charcoal burning is a major contributor to environmental degradation in the County. Waste disposal in the County is a problem since the local authorities collects only 0.2% of the community waste. More so, 100,997 household use open defecation in the bush with only 20,214households using latrines. This situation contributes to water, soil and air pollution and poses a health threat to the communities. The effects of environmental degradation include; soil degradation and erosion, air pollution, garbage pollution, deforestation, desertification, climate change, wild fires, sand and dust storms and losses due to strong winds like blown roofs. The County is prone to climatic shocks and has a fragile ecosystem. The soils are loose and are easily washed away by flash rains and heavy winds. Charcoal burning activities, deforestation, overstocking and the effects of increasing aridity due to climate change do contribute to environmental degradation. Farming along river Turkwel and other rivers is a major environmental. This weakens the river banks making them prone to flooding. Unnecessary cutting of trees for burning of charcoal has had a negative impact in the County due destruction of vegetation cover.

CLIMATE CHANGE	
Impact	The County has experienced effects of climate change over time. The climate is hot and dry although it has worsened over time. There have been cases of continued drought which was not the case in the past. The effects of climate change are; cyclic spells of drought, high infant mortality rates due to poor nutrition and low sanitation, increased resource based conflicts, increased morbidity, increased government expenditure on healthcare, increased school drop-out rates, shifts of investments to emergency relief hence compromises development, increased vulnerability to floods and loss of biodiversity. Drought has become a common occurrence in the County. The County does not receive adequate and reliable rainfall therefore experiencing drought very often. As a result, pastoralism and agro-leading to famine. Domestic animals, which provide the main coping mechanism for the people, do not fetch enough prices to enable the families purchase food in the market hence much of the County population has a low purchasing power. The phenomenon has become cyclic such that, the County relies on relief food to sustain its people.
Mitigation	Specific Mitigation measures include; Improved veterinary healthcare service delivery, Livestock breeding through the exploitation of adaptive genotypes, Planting of drought resistant crops, Investing in water harvesting technologies and Irrigation, and Developing effective drought early warning/monitoring systems.
Adaptation	Adaptation strategies include; anticipatory adaptation that is done before the impacts of climate change are observed, Autonomous adaptation which is triggered by ecological changes in natural systems and market or welfare changes in human systems and Planned adaptation which is a result of a deliberate policy decision based on awareness that conditions have changed or are about to change and that action is required.
Ongoing Projects	Water development and utilization of surface and underground water sources for domestic and irrigated agriculture, Integrated food security master plan, food security programme
Climate Change Mainstreaming	The County was ranked 3 as they identified priority adaptation and mitigation actions.

TRANS NZOIA

Trans Nzoia County is one of the forty seven (47) counties in Kenya and it has three sub-counties. The County comprises five constituencies namely Endebess, Cherangany, Saboti, Kwanza and Kiminini. The County borders the Republic of Uganda to the west, Bungoma and Kakamega Counties to the south, West Pokot County to the east and Elgeyo Marakwet and Uasin Gishu Counties to the southeast. The County lies approximately between latitudes 00° 52′ and 10° 18′ North of the equator and longitudes 340° 38′ and 350° 23′ East of the great Meridian.

The County covers an area of 2,495.6 km^2 which forms 0.42% of the total land area of the Republic of Kenya. Trans Nzoia County is generally flat with gentle undulations rising steadily towards Mt. Elgon in the northwest with an altitude of 4,313 metres above the sea level. It is the second highest mountain in Kenya. Mount Elgon is an important ecosystem shared between Trans Nzoia and Bungoma Counties in Kenya and the Republic of Uganda hence it is a unique resource for environmental and wildlife conservation. On average the County has an altitude of 1,800 metres above sea level. The altitude varies from 4,313 metres above sea level in Mt. Elgon and gradually drops to 1,400 metres above sea level towards the north. Because of its hilly nature, especially the northwest and east, there are difficulties in communication especially during the rainy season when roads sometimes become impassable.

SECTOR SUMMARY	
Agriculture	The main crops produced in the Trans Nzoia County are maize, beans, wheat, tea and potatoes. Other crops include coffee and a variety of horticultural crops. The total acreage under food crops is 143,807.5 ha while that under cash crops is 1,477.12 ha. Most of the land being under cash crop production is in Kwanza Constituency. The average farm size in the County is 0.607. However, this varies across the constituencies within the County. For instance in Saboti Constituency, the average farm size is one and half ha for small scale farming and thirty ha for large scale farming. For Cherangany Constituency, the average farm size for small scale farming is 0.60705 ha and 80.94 ha for small and large scale farming respectively, while for Kwanza Constituency the average farm size for small scale farming is four ha and 30 ha for large scale farming.
Water	Trans Nzoia is one of the counties with adequate water supply and her waters are also very fresh. The average distance to water points within the County is one kilometer. According to the 2009 Census, out of the 170,117 households enumerated for water use, 19,702 had piped water as their main water source, 1,119 had ponds, and 34,441 depended on streams, 110,386 on spring/wells and boreholes. This situation has improved and in 2013, 28,855 households have access to piped water, while 5,813 households get their water from shallow wells. The County has 12 water supply schemes (Kitale water works, Kapolet, Saboti, Kiminini, Kwanza-Kolongolo, Kiboroa, Masaba, Kimondo, Endebess, suam-Orchad, Matumaini, Chepkoiyo). The water sources for the schemes are River Nzoia, Kapolet Forest and Mt. Elgon. The average distance to water points in the County is one kilometre where, 40.6% of the households have access to safe sources of water while 59.4% of the households have access to unsafe water sources. The main modes of human waste disposal by households are pit latrines, main sewer, septic tanks and cesspools.
Forestry	The County has over 18% of the total County surface area forest cover as compared to the country which has a cover of 1.7% (Kenya National Climate Change Strategy 2010). This places the County at an enviable position in Kenya as one of the top 10 forested counties. The main forest types in the County are natural (indigenous forests), plantation forests, bamboo, moorland and grass. The total area of gazetted forest is 45, 454.37 ha and the area of non gazetted forest is 252.53 ha. In addition, there are many other undocumented forest areas under private and institutional ownership including the Mount Elgon National Park. The Main forest products include; timber, electricity posts, raw materials for paper and pulp industries among others.
Energy	The main sources of energy in the County are firewood, Paraffin, charcoal and electricity. Access to energy however varies in different parts of the County (rural and urban access). In terms of usage, different sources of energy are used for lighting and cooking purposes. Lighting: According to the 2009 Population and Housing Census, in Trans Nzoia County, 84,035 of the 170,117 households comprising of 49.4% of the households use tin lamps for lighting, while 65,971 comprising of 38.8% of the households use lanterns, 977 (0.6%) of the households use pressure lamps, while, 15,121 that's 8.9% of the households use electricity, On the other hand, 914 that's 0.6% of the 18 households use gas lamps while 994 households which consist of 0.6% of the household use fuel wood. 1,291 households comprising of 0.9% of the households use solar while 489 household-that's 0.3% households use other sources of energy for lighting. Cooking Fuel: According to the KIHBS 2005/2006, 70.4% of the households interviewed use firewood for cooking, 18.4% use charcoal, 4.9% use paraffin, 3.7% use biogas residue, 0.8% use gas and 0.9% of the households use electricity. Another 1.0% uses other sources of energy for cooking. The above figures clearly indicate that majority of the residents use non-renewable sources of energy for lighting and cooking fuel. The biggest type of energy used for lighting and heating is firewood yet the County intends to increase her forest cover in the foreseeable future. This is a development challenge that needs to be addressed before it becomes a crisis in the future.
Disaster Preparedness	In the County, some of the disasters that are normally experienced include: floods during long rainy seasons between the months of April to August especially in Namanjalala area of Kwanza sub County, drought during dry season, conflict along boundary lines of Trans Nzoia and West Pokot counties due to cattle rustling, crop and animal diseases such as maize necrotic diseases and goat plague and also fire in Mt. Elgon forest and Cherangany Hills during the dry seasons. Existence of disaster management committees and institutions; and Awareness of possible disasters and areas prone to these disasters. Existence of partners; Availability of improved farming technologies; Availability of funding from international partners; and The existence of devolved governance.
Environmental Degradation	The main causes of environmental degradation in Trans Nzoia County are: Poor farming practices, including residues from fertilizers, poor disposal of chemical waste, farming that promotes soil erosion, farming along river banks, Destruction of forests; mainly for human settlement and firewood, Unplanned land use; the County does not have a comprehensive land use plan, Natural causes such as landslides; especially in the hilly mountain slopes. There is great need to discourage these activities which cause environmental degradation. In addition, there is need to address the already existing negative impacts that have already occurred. The effects of environmental degradation in the County include reduced forest cover, soil erosion, reduced agricultural productivity, landslides, frequent droughts, flooding and erratic rainfall patterns.

CLIMATE CHANGE	
Impact	Although a comprehensive study is yet to be conducted on the effects of climate change in the County, the following effects have already been experienced; more frequent and severe droughts, More and frequent floods and increased prevalence of malaria in an area where malaria was previously not considered as a major illness. It is now the leading disease in the County.
Mitigation	There are a number of farm forests within the County with plantations for commercial purpose. The CFAs collaborate with the Kenya Forest Service in the management of the forests. The County has two water towers namely Mount Elgon and Cherangany Hills. Conservation of these water catchments is crucial for the County's ecosystem. Conservation of forests is currently being under taken by various government agencies such as the Kenya Wildlife Service, Kenya Forest Service, departments of environment and agriculture, the surrounding communities and the Lake Victoria Basin Commission through the Mount Elgon Regional Ecosystem Conservation Program (MERECP). Increasing the tree cover in the water catchment areas of Mount Elgon and Cherangany Hills is a priority. In addition, the Water Resources Management Authority (WRMA) has facilitated the formation of Water Resource Users Associations (WRUAs) which are tasked with protection of the various water resources in their surrounding areas.
Adaptation	The National Environmental Management Authority (NEMA) has also enhanced water management compliance regulations. Regulations on protection of hilltops and slopes, and environmental audits are conducted continuously and these steps will help ensure the

	conservation of water catchment areas. A number of initiatives promote afforestation to encourage carbon sequestration. The Mount Elgon Ecosystem Conservation Program has greatly promoted tree planting as an income generating activity with emphasis on environmental conservation. There is great potential for investing in carbon trading especially around Mt. Elgon National Park and the Mount Elgon Forest Reserve that can be replanted with indigenous trees thereby restoring the natural forest and ecosystem connectivity which can be described as the carbon zone for sequestering carbon over a longer period of time. The County is currently undertaking the following measures to mitigate against the effects of climate change: Lake Victoria Basin Commission through the Mt. Elgon Regional Ecosystem Conservation Programme (MERECP) is preparing a strategy on climate change adaptation and disaster management. The MERECP is also developing a strategy to reduce production of greenhouse gases. Efforts are ongoing for increasing forest cover. The NGO VI Agro-forestry is encouraging communities to use solar for heating and lighting.
Ongoing Projects	Fertilizer cost-reduction investment Trans-Nzoia County Kenya Agricultural Productivity and Agribusiness Project Countywide Water harvesting project for food security
Climate Change Mainstreaming	The County was ranked 4 as they identified climate change adaptation and mitigation actions and have budget allocation.

UASIN GISHU

Uasin Gishu County lies between longitudes 34° 50′ East and 35° 37′ West and latitudes 0° 03′ South and 0° 55′ North. The County shares common borders with Trans Nzoia County to the north, Elgeyo Marakwet County to the east, Baringo County to the southeast, Kericho County to the south, Nandi County to the southwest and Kakamega County to the northwest. It covers a total area of 3,345.2 km^2. The County is physio-graphically divided into three zones: the upper highlands, upper midlands and lower highlands. These zones greatly influence land use patterns as they determine the climatic conditions. The geology is dominated by tertiary volcanic rock with no known commercially exploitable minerals. The average rainfall ranges between 624.9 mm to 1,560.4 mm with two distinct peaks occurring between March and September; and May and August. Dry spells occur between November and February. Temperatures range from 7°C to 29°C. Generally these conditions are favorable for livestock, crops and fish farming.

SECTOR SUMMARY	
Agriculture	Uasin Gishu has an average land holding of 5 ha in rural areas, and 0.25 of ha within Eldoret Municipality. The average farm size is 2-10 acres with a wide range of crop and livestock enterprises. The crop enterprises include food crops, cash/industrial crops and horticultural crops whereas the livestock enterprises include dairy, poultry, sheep, goats, pigs, bee keeping and fish farming, as shown in the following. There is very little on-farm or off farm processing of produce which translates to low incomes for farmers, Poor access to credit by farmers is a major constraint to the growth of agriculture in the County.
Forestry	There are two types of forests in Uasin Gishu: plantation and natural forests (indigenous). The population forests are dominated by exotic tree species like Cupressus, Lucitanica, Eucalyptus and Pine. The indigenous forests are dominated by species like Juniperus procera, Oleaafricana, Podocarpus gracillior among others. The County has a total of 29,802 ha of gazetted forests out of which 13,184 ha (or 44%) is under plantation while 16,618 (or 56%) are under indigenous forest cover. The gazetted forests are in Nabkoi, Timboroa Kipkurere, Lurenge, Singalo, and Kapsaret. There exists community forest associations involved in forestry as an income generating activity. The growing of wood lots is scattered across the County and is emerging as a significant carbon sink and income generating activity. There exists a big market both in the County and outside for forest products such as poles, timber and firewood.
Water	The main water resources include dams, rivers, boreholes, shallow wells and springs. The County is drained by 4 major rivers, namely; Moiben with its 3 tributaries; Sosiani also with its 3 tributaries; Sergoit with 2 tributaries; Kipkarren with 9 tributaries and Nzoia river. There are over 120 dams which were constructed by the colonial Government for recreation purposes but are now water sources for most households. There are also about 250 boreholes in the County of which 170 are registered. Most homes have shallow wells. The various sources of water now face challenges including reduced water tables due to the destruction of water catchment areas. The main water towers are Kaptagat, Timborwa and Kapchemu.
Energy	NOT CAPTURED
Disaster Preparedness	Disaster is a serious disruption in the functioning of a society causing widespread human, material, economic or environmental loses and impacts which exceed the ability of the affected community or society to cope using its own resources. Disasters can be manmade or natural. The natural disasters are known and therefore, appropriate DRR strategies to prevent, and reduce the disaster severity be adopted. In most cases, manmade disasters result from development projects/programmes that have not incorporated DRR in their design. Disaster and development are intertwined in that development can bring about disasters and disaster can bring about development. It's for this reason that now efforts are made to mainstream DRR. Uasin Gishu County is vulnerable to disasters such as floods, fires and road accidents which pose a challenge to achieving sustainable development. If not addressed adequately, the impacts of such disasters can be very devastating on the overall wellbeing of the County. It's important that a study is undertaken to profile the likely disasters in the County and an appropriate a Disaster Risk Reduction (DRR) plan is developed with clear strategies on prevention and mitigation.
Environmental Degradation	Environmental degredation results from poor solid waste disposal, industrial pollution and the overuse of insecticides and fertilizers. Soil erosion which is an aspect of environmental degradation is reducing productivity of the land in some areas. Deforestation has on its part led to unpredictable weather conditions greatly affecting farming. Rainfall patterns have become increasingly unpredictable and health is also affected due to increased survival of vectors and microbes.
CLIMATE CHANGE	
Impact	The County, just like others in Kenya, is now experiencing the effects of global warming. Increase in variability of rainfall patterns, prolonged droughts and flooding have become common occurrences in the County. As a consequence, the County has had reduced crop yields. In addition, infrastructure has been substantially damaged, which has impacted negatively on all other sectors of the County economy. There is need for concerted efforts in environmental conservation. This includes enforcement of the environmental laws to safeguard the water sources, forests and ecosystem in general. In addition, community participation in the conservation efforts through environmental education awareness among others should be promoted. Other measures include, developing

	strategies to reduce garbage, increase reforestation, and promote alternative energy sources that do not emit Green House Gases (GHGs). At the same time, possibilities of initiating projects that target carbon trading within the County should be explored. Climate change poses a serious threat to social and economic development. Rainfall patterns have become increasingly unpredictable, posing a challenge to the agricultural sector. Key areas affected by climate change include health due to the increase in survival of vectors and microbes; changes in rainfall patterns that has resulted in low agricultural yields, forest depletion, reduction in water resources within the County and in Lake Victoria and loss of habitat.
Mitigation	The County with the help of the meteorology department and other agencies will develop an early warning system to guide farmers on when to carry out farming activities such as planting and harvesting. Tree planting and conservation efforts will be intensified throughout the County. In addition, the County will explore the use of renewable energy systems thus contributing to the security of energy supply and protection of the environment. At the same time, there should be proper planning of infrastructure on garbage collection and disposal as well as proper enforcement of laws on pollution regulation.
Adaptation	The County will develop an early warning system together with meteorological department to guide farmers.
Ongoing Projects	Reducing the cost of farm inputs and Improving breeding services.
Climate Change Mainstreaming	The County was ranked 2 as they mentioned climate change impacts with mitigation actions only.

WEST POKOT

West Pokot is situated in the north rift along Kenya's Western boundary with Uganda border. It borders Turkana County to the north and northeast, Trans Nzoia County to the south, Elgeyo Marakwet County and Baringo County to the southeast and east respectively. The County lies within longitudes 34° 47′ and 35° 49′ East and latitudes 1° and 2° North. The County covers an area of approximately 9,169.4 km^2 stretching a distance of 132 km from north to south.

The County has a bimodal type of rainfall. The long rains fall between April and August while the short rains fall between October and February. There is, however, great variation in the total amount and distribution of the rainfall received in the County. The lowlands receive 600 mm per annum while the highlands receive 1,600 mm per annum. The County also experience great variations in temperature with the lowlands experiencing temperatures of up to 30°C and the highlands experiencing moderate temperatures of 15°C. These high temperatures in the lowlands cause high evapo-transpiration which is un-favourable for crop production.

SECTOR SUMMARY	
Agriculture	The total acreage under food crops and cash crops is 22,000 ha. This consists of 17,000 ha under food crops and 5,000 ha under cash crops. The main cash crops in the County are coffee and pyrethrum. Coffee is grown in West Pokot Sub-county while pyrethrum is grown in Pokot South Sub-county. Pyrethrum farms have however been neglected due to problems affecting the sector and this sector is in a sharp decline. Acreage under food crops continue to increase due to irrigation schemes such as the Weiwei irrigation scheme in Sigor. The average farm sizes for small farmers is 10 ha and 50 ha for large scale farmers. Land ownership in some parts of West Pokot Sub-county is adjudicated, while in Pokot north and Central Sub-Counties is still communally owned. The main storage facility is provided by NCPB with a capacity of storing 150,000 bags of cereals. The storage facilities are found in Sigor, Makutano and Kacheliba. Other storage facilities include traditional granaries which are prone to high post-harvest loss. The traditional zebu is the main breed in Pokot Central and north sub-counties for meat production while West Pokot and Pokot South ub-counties keep improved dairy cows such as Ayrshire and Friesian. There are 686,375 indigenous Zebu cattle, 460,327 sheep, 551,596 goats, 30,617 camels, 36,473 donkeys and 397 pigs. The annual production of beef stands at 3.6 million kg valued at Ksh.653 million while annual milk production is 4.7 million litres valued at Ksh.134 million. The livestock subsector has huge potential for generating household income and revenue for the County.
Water	The main rivers are Suam, Kerio, Weiwei and Muruny. Cherangani Hills are the main source of Muruny and Weiwei rivers, while Mt Elgon is the main source of river Suam. River Muruny, Kerio and Weiwei drain northwards into Lake Turkana, while other small rivers join and drain into River Nzoia which in turn drains into Lake Victoria. River Suam drains into Turkwel dam that generates hydro-electric power. The main water supplies in the County are Makutano-Kapenguria, Tartar-Keringet, Karas, Kabichbich and Chepareria Water supply systems and are largely gravity propelled. These schemes are nonetheless inadequate to serve the general population of the County. Water sources include streams, wells, boreholes, dams, roof catchment and piped water. The households with access to borehole/spring/well water stands at 26,259 which translate to 28% of the population. There are also 8,563 households with access to piped water while 1,210 households have access to piped water into their dwellings. However, majority of the households, 54,977 which is 59% of the population still use rivers/streams as their source of water. The average distance to nearest water point is 5 km. In summary, water resources in the County are unevenly distributed in both time and space.
Forestry	The main forests in the County are found in Cherangani Hills. The gazetted forest, which forms part of the Cherangani Hills in Lelan, covers an area of 20,857 ha. The un-gazetted forest covers 15,719 ha and consists of rain forests blocks scattered all over the County. These are natural forests dominated by tree species like cedar (Juniperous procera) and bamboo (Aredinaria alpina). Plantation forests cover an area of 662 ha of which approximately 34 ha are indigenous and the rest exotic. The gazetted forest covers an area of 20,857 ha. Natural forests are mainly found on the highland side of Pokot South and Pokot Central which forms Cherangani Hills. Forest cover is continuously being depleted due to human activities and deforestation is largely in areas of Kamatira, Sondany, Solion, Kawuk, Kuper, Seker, parts of Alale, and most parts of Pokot South. There are also exotic forests in West Pokot and Pokot South. Farmers also practice tree planting on their farms. The main forest products include firewood, timber, herbs, fruits, grazing fields and honey production. The quantities of these products and their value have not so far been determined. Agroforestry and green economy is promoted.
Energy	Energy is one of the infrastructural enablers of the three pillars of Vision 2030 and the level and intensity of commercial energy use is a key indicator of the degree of economic growth and development. The main source of energy in the County is fuel wood which accounts 90% of the energy needs of the County population. Petroleum energy is another source accounting for 5% energy needs. Despite the presence of Turkwel Dam, which generates

	electricity, connection is still low with only 2% of the population accessing electricity and only 10 trading centres connected with power. Electricity power outages are also prevalent in the County. Paraffin, which is another source of energy, is used by 8% of population. Other sources of energy in the County include charcoal and solar. The County has a high potential for solar energy which remains untapped.
Disaster Preparedness	A disaster is a serious disruption in the functioning of a society that results in widespread human, social, economic or environmental losses which exceed the ability of the affected society to use its own resources. Disasters can occur as a consequence of the impact of a natural or a human instigated hazard. Some of the common disasters in the County include: Drought, floods, landslide, conflicts, livestock diseases, lightning strikes, road accidents, deforestation, soil erosion and fire. Existence of Kenya Red cross, World Food Programme and National Drought Management Authority; Existence of an early warning system; Presence of County government.
Environmental Degradation	Some of the major contributors to environmental degradation in the County include: poor disposal of both solid and liquid wastes, unsustainable farming methods, charcoal burning, overgrazing, deforestation and human encroachment of the protected areas. The impact of poor waste disposal is evident in all centres, especially Makutano trading centre, where there is no sewerage system. Charcoal burning is largely prevalent in Kongelai, Marich and Sigor. Human encroachment to forest has adversely Pokot South Sub-county. The County has suffered the effects of the environmental degradation which include massive soil erosion, unpredictable weather patterns, resource based conflicts water pollution, air pollution, reduced agricultural outputs/yields, increased drought incidence/desertification, reduced and diminishing forest products and flooding.

CLIMATE CHANGE	
Impact	Global warming is the observed increase in the average temperature of earth's atmosphere and oceans that arise as a result of the increasing use of fossil fuels and other man's activities that release excessive greenhouse gases into the atmosphere. The greenhouse gases include water vapour, carbon dioxide, nitrous oxide, methane and chlorofluorocarbons. The greenhouse effect causes variation in weather patterns and intensity resulting in climate change. Temperatures have risen throughout the County. Rainfalls have become irregular and unpredictable, and when it rains, downpour is more intense. The impact of climate change in the County is mostly manifested by flooding, prolonged drought and landslides. Parts of Kongelai and Sigor divisions have experienced adverse soil erosions with huge gulley erosion, while landslides and flooding frequently affects parts of Muino, Sondany and Ptirap in Pokot Central Sub-county. Due to rising demand for forest products as well as poverty and urbanization, there has been an upsurge in encroachment in forest and water catchment areas, charcoal burning and deforestation. This has in effect led to increased desertification.
Mitigation & Adaptation	Various measures need to put in place to mitigate the effects of climate change These adaptation and mitigation measures include: agroforestry, reforestation, green energy development, proper management of agricultural waste, promoting planting of drought tolerant crops (such as cassava, sorghum, millet, green grams and cow peas), camel keeping, laws limiting charcoal burning, dams and water pan construction, construction of more health facilities, sensitization of the community through workshops and barazas to protect the environment and providing early warning information on floods, landslides and drought. Counties must implement these measures as part of their disaster risk reduction.
Ongoing Projects	National Accelerated Agricultural input Access Programme (NAAIAP), Kenya Agricultural Productivity and Agribusiness Project (KAPAP). , Rangeland Rehabilitation, irrigation and micro irrigation systems.
Climate Change Mainstreaming	The County was ranked 3 as they identified priority adaptation and mitigation actions.

WESTERN REGION

BUNGOMA

The County experiences two rainy seasons, the long-March to July and short rains-August to October. The annual rainfall in the County ranges from 400 mm (lowest) to 1,800 mm (highest). The annual temperature in the County varies between 0°C and 32°C. The County covers an area of 3032.4 km^2.

SECTOR SUMMARY	
Agriculture	The area used for food crops is 201,654.6 ha (70%), while that used for cash crops is 86,423.4 ha (29.9%). Most of the agricultural activities are rain-fed, meaning that farmers only Plant during the rainy seasons, Dependency on rain-fed agriculture exposes families to instances of food insecurity because of unpredictable weather patterns. The County has three National Cereals and Produce Board (NCPB) warehouses which are underutilized. The County suffers from low agriculture production due to overdependence on rain fed agriculture, use of uncertified seeds, high cost of farm inputs and soil poisoning due to overuse of artificial fertilizers.
Forestry	The County has one gazetted forest reserve in Mt Elgon covering an area of 618.2 km^2; main forest products in the County include logs, firewood, grass, fruits and herbs. Communities living around forests also participate in hunting and gathering of wild fruits, medicinal herbs and game meat. Agroforestry is being promoted in the County and there are different forms including Agrosilvifishery (Aquaforestry), Biomass transfer, Improved fallows,Fodder banks,High value fruit tree gardens/orchards, Hedgerow/Alley cropping, Home gardens and woodlots pp19/20. The Mount Elgon ecosystem has suffered considerably from overexploitation and depletion of resources, caused by unsustainable human activities, including illegal logging, charcoal burning, arsonist fires and clearance of parts of the forest for human settlement. The forest, which used to occupy more than half of the entire Mt Elgon sub-county, has now reduced to almost a third of the land surface. The current approach of Payment for Environmental Services (PES) schemes implies that forests can only be conserved when landowners are adequately compensated financially.
Water	Most households in rural areas depend on individual piped, roof catchment and communal water points such as boreholes, springs and wells. In some areas, schools with water sources also serve the neighboring communities. The County should support installation of rain water harvesting systems in all public institutions especially schools, health and market centers. The water department should address the issue of illegal connections, unaccounted for water, poor water treatment and mismanagement of water funds. There is also need to encourage every household to adopt rain water harvesting and conservation techniques for domestic and commercial purposes. There are four urban and six rural water supply schemes in the County Urban schemes are mainly piped and are operated by Lake Victoria north Water Services Board. The water service provider in Bungoma County is Nzoia Water and Sanitation Company. The main causes of river degradation include: Deforestation of watersheds or water catchments through illegal logging and riverbank cultivation. Population pressure which has led to encroachment on forest, especially in the once expensive indigenous forests in Chepyuk, Chepkitale and Cheptoror. Demand for fuel wood and timber has exacerbated charcoal burning and illegal logging-destroying water catchment areas. Unsustainable agricultural practices.
Energy	The main sources of energy in the County include: firewood (93.4%), charcoal (4.7%) and biomass residue (3.5%). the main sources of lighting fuel include: paraffin (96.65%), firewood (3.8%), and dry cells (2.3%). Electricity connectivity stands at a mere 1.5%. Efforts to increase the connectivity are ongoing through matching up facilities between Constituencies Development Fund and Rural Electrification Authority (REA). There is potential for wind energy, solar and hydro power plants along Kuywa and Nzoia rivers. Some of County intended projects Wind energy on Mt. Elgon. New generation sites like Teremi and Nabuyole falls, and on the Kuywa River. Solar energy use in homesteads and institutions for lighting and water heating. Encourage Nzoia Sugar Company to produce electricity from bagasse. Encourage investors in producing electricity from solid wastes.
Disaster Preparedness	A disaster is the serious disruption of the functioning of a community or a society causing widespread human, material economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources. Natural disaster risk can be considered to be a function of hazard, exposure, vulnerability and emergency response and recovery capability. Currently, the County does not have a properly established disaster management system that can get in rapid response whenever disaster occurs. Map showing zones prone to natural disasters in the County has been prepared.
Environmental Degradation	Degraded environments erode the ability of communities to produce and maintain the same level of environmental resources and functions. These include; reduced crop and animal yields, pest resistance, loss of biodiversity, erratic weather patterns which result into flooding and droughts. The other negative effects are reduced river volumes and extinction of species. In this regard, the County has experienced perennial reduction in most of its river volumes and water pollution. This situation has led to reduced fish stocks and reduced water for domestic use, irrigation activities, drying up of wetlands, springs, boreholes, dams and pans. The consequence is increased water borne illnesses such as diarrhea, dysentery, cholera and typhoid.

CLIMATE CHANGE	
Impact	Climate change has affected ecosystems, especially terrestrial and fresh water biodiversity. All these ecosystems have recorded declines in both volumes of species and quality of life hitherto supported indigenous fauna and flora. This has led to increased food insecurity and constant human-wildlife conflicts. It is important for the County to adopt and implement sustainable environmental conservation and management practices. There is a linkage between environment, land use patterns, poverty and climate change. Unsustainable utilization of environmental resources leads to unsustainable livelihoods characterized by poverty and climate change.
Mitigation	Shift to bio-fuels for domestic and industrial use. Adopt low carbon economic growth through agro-forestry and carbon trading. Promote green economy and agro-forestry through afforestation, reforestation, sustainable forest management and sustainable land use. Encourage mitigation through non-forestry activities such as fuel-switching and energy efficiency at the community level, and the use of bio-fuels. Enhance formal, non-formal and informal environmental and climate change education. Focus on sustainable farming practices,

	including adoption of drought/pest resistant crop varieties and seeds and controlling land fragmentation. Promote agri-business and value addition chains. Create awareness on rain water harvesting. Direct efforst towards diversification from agriculture to other economic activities, while also embracing irrigation and green house farming technologies to boost food productivity.
Adaptation	Carbon Offsets to Alleviate Poverty (COTAP-this programme will empower individuals, communities and businesses to fight deforestation, climate change, and global poverty. The strategy specifically advocates for a policy and legislative action to protect and conserve wetlands and water sources and promotion of green economy.
Ongoing Projects	Siritanyi Drainage/Irrigation project Namasanda Irrigation project, Mt Elgon Region Environment Conservation Project (MERECP), Njaa Marufu Keya.
Climate Change Mainstreaming	The County was ranked 4 as they identified priority adaptation and mitigation actions and have budget allocation.

BUSIA

Busia is situated at the extreme west of Kenya. The County borders three other counties: Bungoma to the north, Kakamega to the east and Siaya to the southwest. Part of Lake Victoria is in the County on the southeast and borders the Lake with the Republic of Uganda to the west. It lies between latitudes 0° and 0° 45′ north and longitudes 34° 25′ east. Busia County covers an area of 1,694.5 km^2.

Annual rainfall is between 760-2000 mm. 50% of the rainfall occurs in the long rainy season which is at its peak between late March and late May, while 25% falls during the short rains between August and October. The dry season with scattered rains is from December to February. The temperatures for the whole County are more or less homogeneous. The annual mean maximum temperatures range between 26°C and 30°C while the mean minimum temperature range between 14°C and 22°C.

SECTOR SUMMARY	
Agriculture	Crops, livestock and fish production constitute the main economic activities for most of Busia County. These are mainly carried out at subsistence level for local consumption and minimal commercial purposes. The main type of crops grown include: maize, cassava, finger millet, beans, sorghum, rice, sweet potato, cowpea, groundnut, banana, green grams, sesame, soya bean, cotton, tobacco, sugarcane, oil palm and pepper. Horticultural crops including pineapple, tomato, kale, cabbage, watermelon, papaya, amaranth, onion and mango. Total acreage under food crop cultivation (maize, cassava, finger millet, beans, sorghum, rice, sweet potatoes, cowpeas, groundnuts, bananas, green grams, sesame, soya beans) is 145,412.5 acres, while 33,652.5 acres are under cash crop cultivation (cotton, tobacco, sugarcane, oil palm, and pepper).
Water	The water resources in the County include rivers, streams, dams, pans, wells, springs, roof catchment and scattered boreholes. The County has several rivers criss-crossing it and large water mass of Lake Victoria which borders Budalang'i and Funyula sub-counties. Malaba and Malakisi rivers, whose source is Mt. Elgon traverses the County through the Teso Sub-counties, while the Sio River traverses Nambale and Funyula. River Nzoia originates from Trans Nzoia County through Bungoma County and empties itself into Lake Victoria. There are 237 springs, 458 shallow wells and 154 boreholes. All headquarters for the seven sub-counties in Busia County have operational water supply schemes including the major urban centers such as Sio Water Supply for Busia town and its environs and the Bunyala Supply Scheme for Port Victoria town.
Forestry	Natural forest covers the hills of Samia and Budalang'i while other parts of the County have woodlots integrated with agricultural farming. Busia County has two gazetted replanted forests mainly located in Budalang'i sub-county totaling to only 528.8 ha. The un-gazetted forest is not mapped since they are on individual holdings. The main forest products from the two types of forests include firewood and charcoal as fuel, medicinal plants, honey for commercial and domestic consumption, and timber for construction of houses. The commercial forests produce poles for sale to Kenya Power Company; among others. Agroforestry and green economy is promoted in the County. Forest Ecosystems provide goods in the form of fruits, edible roots, tubers, berries, medicinal herbs/ leaves, timber, firewood and fodder to both humans and animals and ecosystem services such as pollination, absorption of CO2 and nutrient formation. Forests are also recipients and partial recyclers of waste products from the environment, in addition to being a source of recreation, beauty, spiritual values and other cultural amenities. Agro-forestry systems integrate the cultivation of trees with food crops and animal husbandry in the same area of land. By developing positive ecological interactions between species, agro-forestry systems aim at providing a range of environmental, economic, and social benefits to farming communities such as reducing soil erosion, enhancing the water cycle and nutrients formation and supporting greater biodiversity (p. 13, p.14).
Energy	According to the 2009 Population and Housing Census, firewood remains the main source of energy with 97.85% of the households relying on it for cooking and heating. On the other hand, 1.9% of the households use Paraffin while 0.45% uses Liquid Petroleum Gas (LPG). The majority of the population (89.55%) in the County rely on Paraffin as the main source of lighting and 3% use electricity. Electricity is mainly used in the urban centres.
Disaster Preparedness	Establish and equip disaster management and response centres in disaster prone areas. Capacity building across all sectors.
Environmental Degradation	The main contributors to environmental degradation in the County include unsustainable use of forest and vegetation cover. As population grows, demand for firewood increases. This has increased pressure on available land for agriculture, creating competition between crop cultivation and conservation of tree cover and other vegetation. The effects of environmental degradation cut across both social and economic realms of the County. Degraded environments erode the ability of communities to produce and maintain the same level of environmental resources and functions. The major effects of environmental degradation include loss of quality and quantity of natural biodiversity, soil erosion and flooding in southern parts of Teso north and Budalang'i Sub-counties. The other negative effects are reduced river volumes and extinction of species. In this regard, the County has experienced perennial reduction in most of its river volumes and water pollution.

CLIMATE CHANGE	
Impact	Climate change has also affected eco systems in Busia County, especially terrestrial and fresh water biodiversity. All these ecosystems have recorded declines in both volumes of species and quality of life hitherto supported indigenous fauna and flora. Varying rainfall patterns have affected both land preparation and food production leading to lower yields. The occasional rise in temperatures affects moisture retention by soil which leads to wilting

	of plants, thus lower yields due to stress. This has led to increased food insecurity.
Mitigation	There are concerted efforts among stakeholders to use natural resources in a sustainable manner especially forest, water and land resources through reforestation and use of biodegradable material. Organizations such as International Centre for Research in Agro-forestry (ICRAF) are assisting farmers in agro-forestry farming in order to reduce the destruction of trees (for charcoal making or firewood).
Adaptation	National Environment Management Authority which is the government supervisory body on environmental matters, has taken the lead in enforcing the Environmental Management Coordination Act and ensuring that ESIAs are carried out by all developers before undertaking any project. The County government and Sub-Counties should set up designated waste material dumping sites and sewer ponds to manage both domestic and industrial waste. The County should adopt and implement the following strategies: Shifting to bio-fuels for domestic and industrial use. Adopt low carbon economic growth through agro-forestry and carbon trading. Promotion of green economy and agro-forestry through afforestation, reforestation, sustainable forest management and sustainable land use. Encouraging mitigation through non-forestry activities such as fuel-switching and energy efficiency at the community level, and the use of bio-fuels. Enhancing formal, non-formal and informal environmental and climate change education. Focusing on sustainable farming practices, including adoption of drought/ pest resistant crop varieties and seeds and controlling land fragmentation. Promotion of agri-business and value addition chain. Awareness creation on rain water harvesting.
Ongoing Projects	Construction of watering points in all wards, NMK, Tree nursery establishments.
Climate Change Mainstreaming	The County was ranked 3 as they identified priority adaptation and mitigation actions.

KAKAMEGA

Kakamega County is one of the four counties in the western region. It boarders Vihiga County to the south, Busia and Siaya Counties to the west, Bungoma and TransNzoia to the north, Uasin Gishu to the northeast and Nandi County to the east. The County covers an area of approximately 3051.4 km^2 (p3). The temperatures range from 18° C to 29°C. January, February and March are the hottest months with other months having relatively similar temperatures except for July and August which have relatively cold spells. The County has an average humidity of 67%.

SECTOR SUMMARY	
Agriculture	The main crops grown in Kakamega County are sugarcane, maize, beans, cassava, finger millet, sweet potatoes, bananas, tomatoes, tea and sorghum. Maize meal forms the staple food for the County. Maize and sugarcane are generally grown in large scale while beans, millets and sorghum are grown on small scales on the other hand maize, tea and sugarcane are the main cash crops grown in the County. The total acreage under food crops is 114,053.6 ha while the land under cash crops is 141,429.7 ha. The main cash crop is sugarcane while the main food crop is maize. The total hectare under food crops and cash crops is 255,483.30. The usage of land among the sub-counties is mainly driven by the land fertility and the need to make land an enterprise for generating family house hold incomes. There is need to formulate policies that boost food security through optimal land use. The average farm size is 1.5 acres for small scale holders while large scale holders have an average of 10 acres. Land holding tends to be bigger in the larger Lugari Sub-counties as compared to the larger Kakamega Sub-Counties. The livestock bred is cattle; which is being reared by 53.2% of the population. Another 22.2%, 11.2%, and 1.7% of the population rear sheep, goats and pigs respectively. Chicken rearing is pre-dominant with 92% of the households keeping them while 0.7% keep donkeys. About 19.15 million litres of milk and 364,000 kg of beef is produced annually.
Forestry	Kakamega County has three gazetted and one non-gazetted forest which occupy 244.25 km^2 and 26.5 km^2 respectively. The natural forest is within the vicinity of the County headquarters, while the other non-gazetted forest is at the outskirts of the headquarters. It is rich with indigenous trees and wildlife which forms a tourist attraction in the region. Kakamega County has a natural forest covering Shinyalu and Lurambi while other farm forests have been integrated with agricultural farming. The natural forest covering an approximate area of 244.25 km^2 is gazetted. The non-gazetted forests cover an approximate area of 26.5 km^2. Commercial forests are found in the northern parts of the County in Lugari constituency. There is need to conserve these forests and encourage on-farm afforestation and involve the community in these efforts for sustainability. Agroforestry and green economy is promoted in the County.
Water	There are eight main rivers in the County namely, Rivers Nzoia, Yala, Lusumu, Isiukhu, Sasala, Viratsi, Kipkaren and Sivilie. The main sources of water are the major rivers flowing through the County such as Nzoia, Sasala, Viratsi, Isikhu, Yala, Kipkaren and Lusumu Rivers among others. There are also several streams that provide water to the residents especially near major forests. Access to quality water remains a challenge with only 29.5% of the population with access to portable water while only 5.9% have access to piped water Western Water Services Company is the main water company in the County. It is supplemented by other water users associations which are mainly managed by the community members. The concept of Water Action Groups is slowly coming up which can complement community efforts. The World Bank in collaboration with the Ministry of Water and Irrigation is in the process of implementing a huge water project in Mumias at a cost of 1.4 billion. Tindinyo water project also provides water to Shinyalu and Kakamega town.
Energy	According to the 2009 Kenya Population and Housing Census,the main source of energy in the County is firewood with 88.1% of the population using firewood as their main source of energy for cooking. Zero point four (0.4)% of the population use grass, 2% paraffin, 0.3% electricity, 0.5% LPG, 4.1% charcoal, 0.5% biomass residue while 0.1% use other energy sources for cooking. Furthermore, 95.2% of the population use paraffin for lighting, 1.4% use solar, 0.2% LPG, 0.4 grass while 0.8% uses firewood. On the other hand 92.1% use traditional stone fire as the main cooking appliance while 0.4% use traditional improved Jikos, 2.4% use ordinary Jiko, 1.8% improved Jiko, 2.2% use improved stove, 0.6% use gas cooker, 0.3% electricity cooker while 0.3% use other appliances for cooking. About 630 institutions which are mainly schools, health centres, prison and colleges use improved firewood cooking stove while 67 institutions use LPG gas, 804 institutions use Paraffin, 30 institutions use solar energy while 17 institutions have established woodlots. Of the trading centres only, 23 are connected with electricity while 54 are without electricity connection. There is need to encourage use of environment friendly energy sources such as solar, biogas, biomass, wind and electricity.

Disaster Preparedness	The County faces several disasters some of which can be attributed to manmade and natural factors. Major disasters include road accidents from trailers transporting sugarcane to factories, motorcyle accidents, collapse of mines and quarries causing death, lightning, fires mainly in sugarcane plantations, floods along major rivers, and landslides in Shinyalu and Kuvasali. Regardless of the cause, disaster preparedness is an important element in development efforts. Creating feasible systems and structures and adapting to the guidelines of the Hyogo Framework of Action (HFA) would help reduce the effects of disasters. The HFA stipulates five priority areas while undertaking Disaster Risk Reduction strategies. These include: Governance: organizational, legal and policy frameworks; Risk identification, assessment, monitoring and enhancement of early warning; Use of knowledge, innovation and education; Reducing underlying risk factors; Disaster preparedness for effective response and recovery.
Environmental Degradation	The major contributors to environmental degradation include; lack of modern waste disposal and management systems, quarrying, poor land use practices, low degree of enforcement of the environmental laws and encroachment on the gazetted forest land, hilly tops and slopes. Environmental degradation has had adverse effects on the lives of the people of this County. This includes among others, declining water volumes/ levels and drying of many springs and streams, unreliable weather patterns resulting in reduced farm yields, frequent flash floods and general rise in temperature. In addition, there is increased recording of a number of vector diseases such as Malaria, Typhoid, and Upper Respiratory Tract Infections among others.

CLIMATE CHANGE	
Impact	Climate change has had a great effect on the change of weather patterns and reduced precipitation within the County. Flooding has been experienced in the County due to climatic changes leading to displacement of populations. As a result farming on the lower lands has been reduced due to regular destruction of the crops when it floods, affecting further the already low food production in the County. Human health has also been affected through reduction in the quality of water, air and food causing famine during some periods of the year. During heavy rains and flooding, human beings are exposed to waterborne diseases such as diarrhea, dysentery, cholera and typhoid. Reduced soil fertility has led to simmering disquiet and conflict linked to competition over natural resources. The occasioned effects of climate change have led to migrations in search of fertile land for agricultural production.
Mitigation & Adaptation	The mitigation measures employed to deal with climate change include provision of environmental education that addresses issues of sustainable utilization of natural resources, proper waste disposal systems, conservation and protection of catchment areas. Some of these environmental awareness sessions take place through public Barazas and field events. Environmental Impact Assessment (EIA) ought to be undertaken before any project or programme is implemented. Environmental management should also be enhanced with a focus on the conservation of hill tops and slopes so as to safeguard the water catchment towers. Enforcement of environmental laws by the government agencies such as National Environmental Management Authority (NEMA), Kenya Forest Service (KFS) and Ministry of Agriculture also come in handy to mitigate against notable climate change impacts.
Ongoing Projects	Environmental conservation measures, Establishment of weather stations across the County will assist to mitigate against preventable environmental destructive practices by developing strong early warning systems.
Climate Change Mainstreaming	The County was ranked 3 as they identified priority adaptation and mitigation actions.

VIHIGA

Vihiga County borders Nandi County to the east, Kakamega County to the north, Siaya County to the west and Kisumu County to the south. The County is made up of five constituencies namely Luanda, Emuhaya, Hamisi, Sabatia and Vihiga. Vihiga County lies between longitudes 34° 30′ and 35° 0′ East, and latitudes 0° and 0° 15′ North. The County covers a total area of 531.0 km^2. The equator cuts across the southern part of the County. The County is located on the western region of Kenya, in the Lake Victoria Basin. Its altitude ranges between 1,300-1,800 metres above sea level and slopes gently from west to east. Generally the County has undulating hills and valleys with streams flowing from northeast to southwest and draining into Lake Victoria. PP1.

The County experiences high equatorial climate with well distributed rainfall throughout the year with an average annual precipitation of 1900 mm. The rainfall ranges from 1800-2000 mm. Temperatures range between 14°C-32°C, with a mean of 23°C. Long rains are experienced in the months of March, April and May which are wettest while short rains are experienced in the months of September, October and November. The driest and hottest months are December, January and February with an average humidity of 41.75%. This climate supports a variety of crop farming such as coffee, tea, and horticultural crops and rearing of livestock.

SECTOR SUMMARY	
Agriculture	The hectare under food and cash crop production in the County is approximately 40,000 and 8,000 respectively. The main food crops produced are maize, beans, millet and sweet potatoes. Tea and coffee are the main cash crops grown. However coffee growing has been on a declining trend and efforts will be undertaken to promote it. The continuous planting of eucalyptus trees has not only reduced acreage under food crops but has had a deteriorating effect on the productivity of the land in the region. Efforts will be made to regulate the planting of eucalypts and farmers encouraged to plant other environmental friendly species of trees. The main storage facilities relied on by most households are silos, improved granaries, traditional stores and bags. The livestock sub-sector focuses on livestock production, development and promotion of animal health through veterinary services. The main types of livestock kept are zebu cattle, dairy cattle and poultry.
Water	The water sub-sector promotes and supports the integrated water resource management and development approach towards enhancing water availability and accessibility. Households with access to piped water comprise 2.7% whereas 64% of the households are served with protected springs and 25.3% are served with unprotected springs. There are 20 piped water supply schemes within the County some of which are operational while others are under rehabilitation. The major water schemes are Mbale, Maseno, Ebunagwe, Kaimosi and Sosiani water schemes. There are 20 piped water supply schemes within the County some of which are operational while others are under rehabilitation. The major water schemes are Mbale, Maseno, Ebunagwe, Kaimosi and Sosiani water schemes.

Forestry	The main forest type is the tropical rain forest covering a total area of 4,160.9 ha. These are Kibiri forest consisting of indigenous and exotic tree species on a 3,691.3 ha space and Maragoli Forest consisting of 469.3 ha of exotic tree species. However, the Maragoli forest has since been destroyed by human activities. There are community forests for cultural rites and private forests owned by individuals and churches. Due to the human encroachment, most indigenous forest species have been destroyed and exotic trees have now dominated most farms in the County. Eucalyptus form about 70% of the tree species grown in farms. Forest products found within the County include timber, fuel wood, construction poles and medicine. Other than the tropical rain forest which is gazetted, the rest is found on farm lands. Non gazetted forests cover an area of 48 ha. Agroforestry and green economy is promoted in the County.
Energy	The County has a total of 209 trading centres with 192 of them connected with electricity. 49 health centres and 164 schools have also been connected with electricity. Urban household access to electricity is 10.8% whereas the rural household access to electricity is 5.3%. The main source of cooking fuel is firewood which accounts for 84.8% of total cooking fuel whereas the main source of lighting fuel is paraffin accounting for 88.7% of total population. The County has a total of 209 trading centres with 192 of them connected with electricity. Some 49 health centres and 164 schools have also been connected with electricity. Urban household access to electricity is 10.8% whereas the rural household access to electricity is 5.3%. The main source of cooking fuel is firewood which accounts for 84.8% of total cooking fuel whereas the main source of lighting fuel is paraffin accounting for 88.7% of total population. Feasibility studies have been undertaken to revive a hydroelectric power station at Kaimosi dam meet the increasing demand for electricity. Efforts will also be made to promote solar as an alternative source of energy to minimize destruction of forests and environmental degradation.
Disaster Preparedness	The major disasters include lightning and heavy rains, deforestation, destruction of loose surface roads and bridges, and road accidents. The County has had occasional incidences of rocks falling at quarry sites, collapsing of buildings, fire outbreaks, especially during dry seasons caused by human activities such as clearance of farm lands through burning of bushes, electric faults and lightning strikes during raining seasons. This has led to loss of life and property. On the other hand the County does not have well defined measures or facilities to tackle such problems. Disease outbreaks have also been experienced and these have resulted in diversion of resources to address them thus affecting project implementation. Disaster Risk Reduction measures should therefore be factored in the design, implementation, monitoring and evaluation of all policies, projects and programmes.
Environmental Degradation	The major contributors to environmental degradation in the County are; increased population, unplanned urbanization, high level of poverty, unsustainable management of the ecosystem and low environmental awareness. The County will endeavour to comply with the Environmental Management and Coordination Act, 1999 to address these challenges. Poor land use, improper waste disposal, sand harvesting, and pollution of rivers and springs are some of the practices which have degraded the environment. The rising population has resulted in community invading the existing forest thereby destroying water catchments. Poor farming practices have led to soil erosion consequently depleting the soils fertility. This has resulted to low yield leading to food shortage. Strategies for addressing these effects will involve promotion and protection of riverbanks, soil conservation measures, afforestation, good farming methods and forming of environment protection committees to secure water sources.

CLIMATE CHANGE	
Impact	Climate change has been felt in the County as high temperatures are experienced with heavy and erratic rainfall. More dry spell that interfere with the soil and crop productivity and natural disasters like hailstorms have become a common feature during rain period and they do interfere with crop production. Wetlands are fast diminishing in size due to deforestation, siltation as a result of soil erosion and human livelihood activities including increased settlements. Sources of water such as rivers, springs and wells suffer reduced sizes and low water volumes with obvious pollution from car wash, refuse, raw sewage and garbage from homes, roads and plants. This has led to crop failure and increase in malaria cases. Climate Change is considered one of the most serious threats to sustainable development. Potential impacts of climate change are expected in many sectors such as; human health, food security, economic activities, natural resources and physical infrastructure. Changes in climate affect the average weather that people are accustomed to. Changes in climate will enhance the spread of some diseases. Changes in temperature and precipitation, as well as droughts and floods, will likely affect agricultural yield and production.
Mitigation	Proper waste disposal systems, conservation and protection of water catchment areas.
Adaptation	The County will strive to adopt environmentally sustainable methods that preserve and enhance soil and ground water. This will include, terracing to prevent soil loss and degradation through erosion, radically reducing tillage, rotating crops and applying natural fertilizers to improve soil structure and fertility. Farmers will be encouraged to monitor precipitation patterns to change crops or use different harvest and planting dates. Farmers will have to continually adjust cultivation and breeding practices to varying climate conditions. Early warning and management systems will be put in place to facilitate adaptation to climate variability and change.
Ongoing Projects	Promotion of better farm management and use, Natural forest conservation management and protection programme (Kibiri forest station and Maragoli Hills).
Climate Change Mainstreaming	The County was ranked 3 as they identified priority adaptation and mitigation actions.

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