MINISTRY OF ENVIRONMENT AND FORESTRY

Climate Change Directorate

National Climate Change Action Plan (2018-2022)

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Abbreviations

AFR100	African Forest Landscape Restoration Initiative
ASAL	Arid and Semi-Arid Land
BAU	Business as usual
CBIT	Capacity Building for Transparency
CCD	Climate Change Directorate
CDM	Clean Development Mechanism
CEC	County Executive Committee
CFA	Community Forestry Association
CIDP	County Integrated Development Plans
CIS	Climate Information Services
CO_2	Carbon dioxide
COG	Council of Governors
COP	Conference of the Parties
CPEBR	Climate Public Expenditure and Budget Review
CS	Cabinet Secretary
CSA	Climate Smart Agriculture
CTCN	Climate Technology Centre and Network
EDE	Ending Drought Emergencies
ERC	Energy Regulatory Commission
FAO	Food and Agriculture Organization
FEWSNET	Famine Early Warning Systems Network
GCF	Green Climate Fund
GDC	Geothermal Development Corporation
GDP	Gross domestic product
GEF	Global Environment Facility
GHG	Greenhouse gas
GNI	Gross national income
ha	Hectare
ICAO	International Civil Aviation Organisation
IC-FRA	Improving Capacity in Forest Resources Assessment in Kenya
ICRAF	World Agroforestry Centre
ICT	Information and communication technology

ILRI	International Livestock Research Institute
IMO	International Maritime Organisation
IPCC	Inter-Governmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
KAA	Kenya Airports Authority
KALRO	Kenya Agriculture and Livestock Research Organization
KAM	Kenya Association of Manufacturers
KBNS	Kenya Bureau of National Statistics
KCAA	Kenya Civil Aviation Authority
KCIC	Kenya Climate Innovation Centre
KenGen	Kenya Electricity Generating Company Ltd.
KENTRACO	Kenya Electricity Transmission Company
KCIC	Kenya Climate Innovation Centre
KEBS	Kenya Bureau of Standards
KEFRI	Kenya Forest Research Institute
KENHA	Kenya National Highways Authority
KES	Kenya Shilling
KERRA	Kenya Rural Roads Authority
KFS	Kenya Forest Service
KIRDI	Kenya Industrial Research and Development institute
KMA	Kenya Maritime Authority
KMD	Kenya Meteorological Department
KNBS	Kenya National Bureau of Statistics
KPA	Kenya Ports Authority
KQ	Kenya Airways
KRC	Kenya Railways Corporation
KURA	Kenya Urban Roads Authority
m^3	Cubic metres
M&E	Monitoring and evaluation
MAI	Ministry of Agriculture and Irrigation
MCM	Million cubic metres
MEF	Ministry of Environment and Forestry
MENR	Ministry of Environment and Natural Resources
MITC	Ministry of Industrialisation, Trade and Cooperatives
MOE	Ministry of Energy

MOTIHUD	Ministry of Transport, Infrastructure, Housing and Urban Development
MRV	Measurement, Reporting and Verification
MSME	Micro, small and medium enterprise
$MtCO_2eq$	Million tons of carbon dioxide equivalent
MW	Megawatt
MWS	Ministry of Water and Sanitation
NAMA	Nationally Appropriate Mitigation Action
NAMATA	Nairobi Metropolitan Area Transport Authority
NAP	National Adaptation Plan
NCA	National Construction Authority
NCCAP	National Climate Change Action Plan
NCCC	National Climate Change Council
NCCRC	National Climate Change Resource Centre
NCCRS	National Climate Change Response Strategy
NDA	National Designated Authority
NDC	Nationally Determined Contribution
NDE	National Designated Entity
NDEF	National Drought Emergency Fund
NDMA	National Drought Management Authority
NEMA	National Environment Management Authority
NGO	Non-governmental organisation
NIE	National Implementing Entity
NMT	Non-Motorised Transport
NPBM	National Performance and Benefit Measurement
NTSA	National Transport and Safety Authority
REA	Rural Electrification Authority
REDD+	Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
SEZ	Special Economic Zone
SGR	Standard Gauge Railway
SLEEK	System for Land-based Emissions Estimation in Kenya
StARCK+	Strengthening Adaptation and Resilience to Climate Change in Kenya
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme

UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
WFP	World Food Programme
WRA	Water Resources Authority

Preliminary Information

The preliminary information will include:

- Preface from His Excellency, the President of the Republic of Kenya.
- Acknowledgements from the Cabinet Secretary for Environment and Forestry.

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Executive Summary

The executive summary will provide an overview of the main adaptation and mitigation actions for 2018-2022.

Chapter 1: Introduction and Situation Analysis

1.1 Introduction

Climate change has caused extreme weather events in Kenya that have led to loss of lives, diminished livelihoods, reduced crop and livestock production, and damaged infrastructure. An example is the torrential rains and severe flooding from March to May 2018 that devastated communities that were already struggling to recover from a prolonged drought. Climate change is likely to negatively impact Kenya's future development and achievement of the goals of *Kenya Vision 2030* – the long-term development blueprint – and the Government's Big Four agenda for 2018-2022 with priority areas of ensuring food security, affordable housing, increased manufacturing and affordable healthcare.

Kenya takes climate change seriously, as demonstrated by the enactment of the Climate Change Act (Number 11 of 2016). This legislation, the first in Africa, provides a regulatory framework for an enhanced response to climate change and provides mechanisms and measures to transition to a low carbon climate resilient development (see Box 1). This pathway emphasises sustainable development and prioritises adaptation, recognising the importance of increasing the climate resilience of the poor and marginalised groups, including women, youth, people with disabilities and indigenous groups.

Box 1: Kenya's low carbon climate resilient development pathway

A low carbon climate resilient development pathway for Kenya emphasises:

- **Sustainable Development** – Achieving sustainable development is at the forefront of all climate actions; climate change and development are intricately linked.
- **Adaptation** – Reducing vulnerability to avoid or cushion the impacts of climate change, and to enable people to respond to climate risks by moving toward a climate resilient society.
- **Mitigation** – Taking actions, where possible, to encourage greenhouse gas emissions that are lower than business-as-usual practice; and to reduce the human causes of emissions by moving toward a resource efficient economy that is as low carbon as possible. Mitigation or low carbon actions should only be considered as priority climate change actions if they also have climate resilience or significant sustainable development benefits.

Source: Kenya's first National Climate Change Action Plan, 2013-2017, page 25.

Section 13 of the Climate Change Act (No. 11 of 2016) provides for the development of National Climate Change Action Plans (NCCAP) to prescribe measures and mechanisms to mainstream adaptation and mitigation actions into sector functions of National and County Governments. The Act requires that the Cabinet Secretary responsible for climate change affairs review and update the NCCAP in every five-year period.

This NCCAP (2018-2022) is Kenya's second action plan on climate change. This plan builds on the first action plan (2013-2017) where considerable progress was made including expanding establishing climate change funds in five Counties, expanding geothermal power, establishing the National Climate Change Resource Centre, and improving the legal and policy framework (described in Section 1.4).

Climate change is a shared responsibility between the National and County Governments. While the National Government led and guided the process to develop this second NCCAP

(2018-2022) and coordinates its implementation, the development and implementation of the plan is coordinated by the two levels of government in line with the Constitution of Kenya (2010). This second NCCAP (2018-2022) coincides with the second generation of County Governments, who are responsible for several devolved functions where action will contribute to the achievement of this climate change action plan and the Big Four agenda. This second NCCAP (2018-2022) highlights the role of both the National and County Governments in achieving climate change results.

1.2 Goal of the NCCAP

Kenya's National Climate Change Action Plan (NCCAP) is a five-year plan that helps Kenya adapt to climate change and reduce greenhouse gas emissions. **This second NCCAP (2018-2022) aims to further Kenya's development goals by providing mechanisms and measures to achieve low carbon climate resilient development in a manner that prioritises adaptation**.

This climate change action plan helps further Kenya's development aspirations, and seeks to:

- Align climate change actions with the Government's development agenda, including the Big Four.
- Encourage participation of the private sector, civil society, youth, and marginalised groups and major groups, including women, people with disabilities and indigenous groups.
- Serve as the implementation plan for Kenya's Nationally Determined Contribution (NDC) and Kenya's National Adaptation Plan 2015-2030 (NAP) for the five-year period 2018-2022.
- Provide a framework for mainstreaming climate change into sector functions at the national and county level.

In order to achieve climate change action that simultaneously advances economic and sustainable development objectives, the NCCAP is guided by the following principles:

- Apply a human rights-based approach to ensure that the interests of youth, the poor and vulnerable, and marginalised communities are prioritised through an inclusive approach to climate change action.
- Effect implementation of actions through consultation and cooperation between the National Government and County Governments as well as unique linkages, including with civil society and local government institutions and through public-private-partnerships.
- Achieve national growth objectives through a qualitative change in direction that enhances climate resilience and leads to mitigation of greenhouse gas emissions.
- Deploy appropriate technologies for both adaptation and mitigation at an accelerated pace.

This second NCCAP (2018-2022) is comprised of this document, and the Adaptation Technical Analysis Report (ATAR) and Mitigation Technical Analysis Report (MTAR) that provide the substantive technical analysis. The NCCAP was developed through an extensive consultation process to ensure that it reflects the priorities of all Kenyans (see Box 2).

Box 2: Development of the NCCAP (2018-2022)

The NCCAP Task Force that was appointed by the Cabinet Secretary and supported by the Climate Change Directorate, Ministry of Environment and Forests (CCD-MEF) led the development of this NCCAP. Technical analysis and input was provided by the Adaptation and Mitigation Thematic Working Groups that developed the Adaptation Technical Analysis Report (ATAR) and Mitigation Technical Analysis Report (MTAR) that are part of this NCCAP.

The climate change actions in this NCCAP were identified through extensive consultations coordinated by the CCD-MEF. Over XX[1] stakeholders were consulted from:

- County Governments and Council of Governors (CoG);
- National Government sector ministries and state departments;
- Civil society;
- Youth;
- Women;
- Marginalized and minority communities, including people living with disabilities, pastoralists, fisher folk and indigenous groups; and
- Private sector.

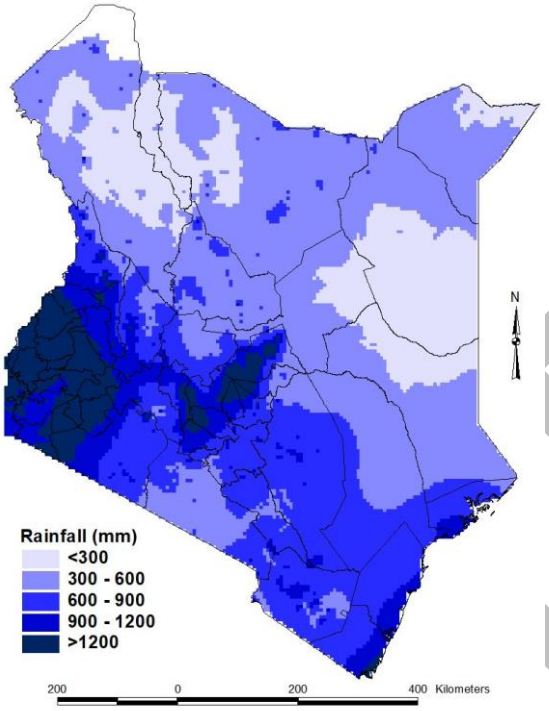
1.3 Situational Analysis

Kenya is a commercial, transportation and communications hub for eastern Africa. An estimated 50 million Kenyans (about 52% women) live in a country that has experienced moderate economic growth over the past five years and seen improved indicators of human development in such areas as education and declining birth rates.[2] Kenya is the ninth-largest economy in Africa and a lower middle income country with a gross national income (GNI) per capita of US$1,380 in 2016.[3] About 45% of the population lives below the poverty line; with poverty slightly higher in female-headed households.[4] 54% of rural and 63% of urban women and girls are estimated to live below the poverty line, making them more vulnerable to the impacts of climate change.[5]

Kenya is an equatorial county in East Africa with a complex and variable climate ranging from warm and humid in the coastal regions to arid and very arid in the interior. The central and western highlands, bisected by the Rift Valley, have a temperate climate with medium to high rainfall and are the productive zones with high to medium agricultural potential (about 18% of Kenya's land area). Low and unevenly distributed rainfall over much of the country means about 82% of Kenya receives less than 700 mm of rain per year (see Figure 1). Twenty-nine of Kenya's 47 Counties are considered as arid or semi-arid lands (ASALs).[6] The arid Counties are predominantly pastoral; and the semi-arid Counties are mainly agro-pastoral with integrated crop/livestock production systems.[7]

[1] CCD to provide information on numbers consulted.
[2] Worldometers (2018), Elaboration of data by United Nations, *World Population Prospects: 2017 Revision*.
[3] World Bank Group (2018), *Data for Lower middle income, Kenya*.
[4] Kenya National Bureau of Statistics (KNBS) (2015), *Spatial Dimension of Well-Being in Kenya: Where are the Poor?* Nairobi: KNBS.
[5] Kaudia, A. (2015), *Gender mainstreaming*. https://www.slideshare.net/agroforestry/4-kenya-gendermainstreaming
[6] Kenya News Agency (2018), *Government increase ASAL areas* (10th April).
[7] Njoka, et al. (2016), *Kenya: County situation assessment (Nairobi: PRISE)*.

Figure 1: Map of Kenya showing annual rainfall across the 47 Counties



Source: Government of Kenya, 2016, Kenya Meteorological Department.

Kenya is frequently affected by weather-related disasters, particularly droughts, which occur cyclically and have a profound impact on Kenya's economy and people's well-being. Floods are seasonal and more localised, mostly affecting areas around the Lake Victoria Basin and Tana River drainage basin, and coastal settlements. Flooding can occur across the country in years of above-normal rainfall and heavy rainfall storms, such as 2018 that recorded the highest level of rainfall totals in the long rain season (March-April-May).[8] The changed rainfall patterns in 2018 were described as a mini El Niño phenomenon.[9]

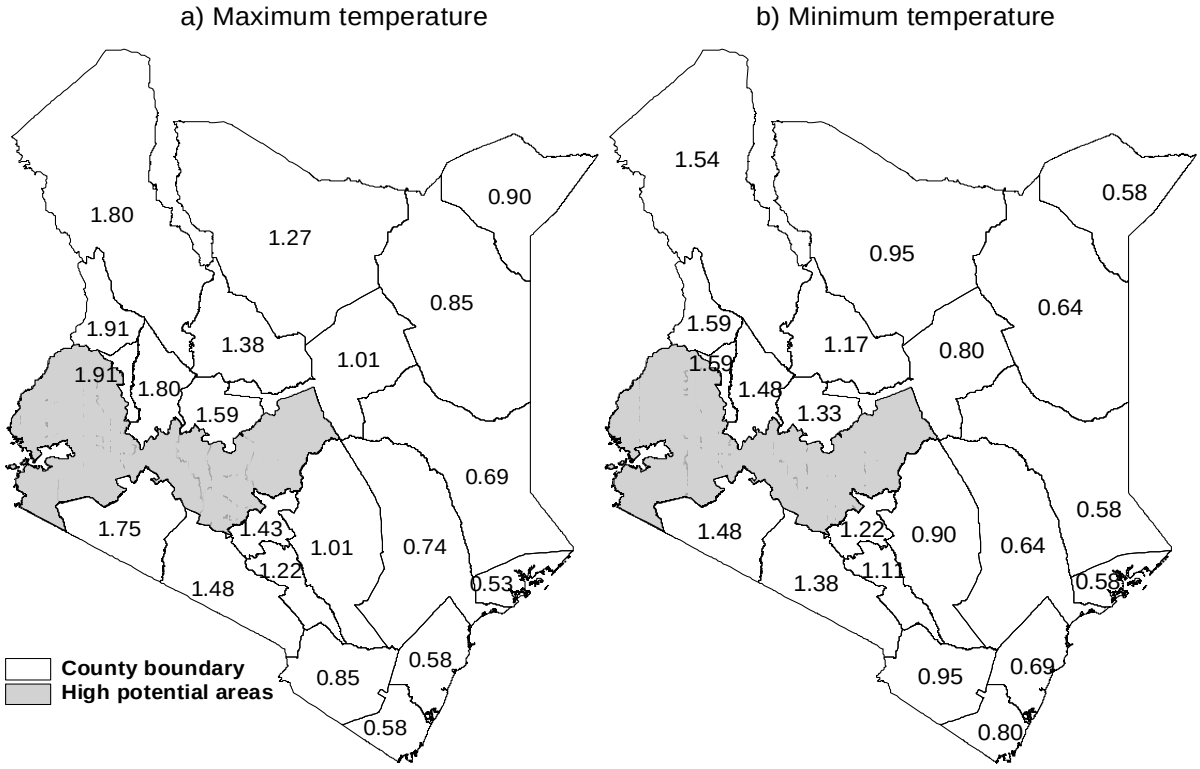
1.3.1 Kenya's Changing Climate

Kenya's climate is already changing. The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) presented strong evidence that surface temperatures across Africa have increased by 0.5-2°C over the past 100 years, and from 1950 onward climate change has changed the magnitude and frequency of extreme weather events.[10] Since 1960, Kenya has experienced a general warming trend, reported as being about 1°C, or 0.21°C per decade. This temperature increase has been observed across all seasons, but particularly from March to May. Variation between locations has occurred, with a lower rate of warming along

[8] Kenya Metrological Department (KMD) (2018). *Review of Rainfall during the March to May 2018 "Long Rains" Season and the Outlook for the June-July-August 2018*. Nairobi: Ministry of Environment and Forestry.
[9] KMD (2018).
[10] Niang, I. et al. (2014). Africa. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, page 7.

the coast.[11] Surface temperature trends of Nairobi and its environs show warming of more than 2.5°C in the past 50 years.[12]

Figure 2: Temperatures changes in the Kenya 21 arid and semi-arid Counties between 1960 and 2013



Source: Said, M.Y., et al. (2018) Climate projections for Arid and Semi-arid lands of Kenya based on RCP 2.6, RCP 4.5 and RCP 8.5. PRISE Research Brief.

Rainfall patterns have also changed. The long rainy season has become shorter and dryer and the short rainy season has become longer and wetter, while overall annual rainfall remains at low levels. The long rains have been declining continuously in recent decades, and droughts have become longer and more intense and tend to continue across rainy seasons. The frequency of rainfall events causing floods has increased in East Africa from an average of less than three events per year in the 1980s to over seven events per year in the 1990s and 10 events per year from 2000 to 2006, with a particular increase in floods.[13] Droughts and heavy rainfall have become more frequent in eastern Africa in the last 30-60 years.[14]

[11] Daron, J.D. (2014), *Regional Climate Messages: East Africa*, Scientific report from the CARIAA Adaptation at Scale in Semi-Arid Regions (ASSAR) Project, December 2014.

[12] Funk, C. et al. (2017), *Climate Change Vulnerability, Impacts and Adaptation Assessment for East Africa: Summary for Policy Makers (Arusha: East African Community).*

[13] Masih, et al. (2014), A review of droughts on the African continent: a geospatial and long-term perspective, Hydrology *and Earth System Sciences*, *18*: 3635-3649.

[14] Intergovernmental Panel on Climate Change (2014) *Climate Change 2014: Impacts, Adaptation and Vulnerability*. Cambridge: Cambridge University Press.

The current trend of rising annual temperatures is expected to continue in Kenya in all seasons. The IPCC Fifth Assessment Report noted that during this century, temperatures in the African continent are likely to rise more quickly than other land areas, particularly in more arid regions. Climate modelling for the East Africa region using a high-emissions scenario suggests that mean annual temperatures will increase by 0.9°C by 2035, 2.2°C by 2065 and 4.0°C by 2100.[15]

The IPCC reports that precipitation projections are more uncertain than temperature projections, and suggest that by the end of the 21st century East Africa will have a wetter climate with more intense wet seasons and less severe droughts. The proportion of rainfall that occurs in heavy events is expected to increase. Regional climate model studies suggest drying over most parts of Kenya in August and September by the end of the 21st century.[16]

1.3.2 Climate Change Impacts in Kenya

Climate change is causing an increase in average global temperatures and sea levels are rising, causing significant environmental and economic disruption. Heat, drought and floods are impacting Kenyans, and human health is increasingly at risk. Kenya's economy is very dependent on climate-sensitive sectors such as agriculture, water, energy, tourism and wildlife, and health. The increasing intensity and magnitude of weather-related disasters in Kenya aggravates conflicts, mostly over natural resources, and contributes to security threats.

Historically, extreme climatic events have caused significant loss of life and adversely affected the national economy. In the 1997-2016 period, the country experienced an average of 57.95 deaths per year and GDP losses of 0.362% per year due to the extreme weather events.[17]

Table 1: Climate risks and sources of vulnerability

Climate risks	• Rising temperatures • Uncertain changes in rainfall patterns • Rising sea levels and stronger storm surges • Greater risk of extreme weather events (droughts, floods and landslides) • Melting glaciers • Ocean acidification	**Key sources of vulnerability**	• High levels of multi-dimensional poverty, particularly in the ASALs • Gender inequality • Environmental degradation, including loss of forest cover • High reliance of the national economy and local livelihoods on rain-fed agriculture • High level of water scarcity and mismanagement of water resources • Insecure land tenure and land fragmentation • Population growth and migration to urban areas • Heavy disease burden and limited access to quality health care, particularly in rural and remote areas • Increased insecurity

[15] Christensen et al. (2013), Climate Phenomena and their Relevance for Future Regional Climate Change. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change,* Cambridge: Cambridge University Press.

[16] Niang, et al. (2014), page 1210.

[17] Eckstein et al., (2017), *Global Climate Risk Index 2018: Who Suffers Most from Extreme Weather Events? Weather-related Loss Events in 2016 and from 1997 to 2016*. Bonn: Germanwatch.

Social Impacts

Floods have led to the greatest loss of human lives in Kenya. The floods in early 2018 claimed over 183 lives and displaced more than 225,000 people.[18] The floods led to cholera outbreaks in at least five Counties, and people experienced an upsurge of mosquito-borne diseases such as malaria and dengue fever.[19] Between 1990 and 2015, a total of 43 flood disasters were recorded in Kenya, which is equivalent to an average of 1.65 flood disasters per year. On average, each flood disaster affected 68,000 people.[20] Over 145,000 children were displaced, and 700 schools were closed as a result of the 2018 floods.[21,22]

An estimated 267,000 Kenyans will be at risk of **coastal flooding** by 2030 because of sea level rise; an increase of 30 centimetres is capable of submerging Mombasa and 17% of coastal areas [23] The coast area has the largest seaport in East Africa and supports tourism and fishing industries.

Droughts in Kenya affect about 4.8 million people on average.[24] Recurrent droughts – including the 2014-2018 drought – have destroyed livelihoods, triggered local conflicts over scare resources and eroded the ability of communities to cope. The 2014-18 drought was declared a national emergency in February 2017 and at that point in time affected 23 of 47 counties in the ASALs. At least 3.4 million Kenyans were severely food insecure and an estimated 500,000 people did not have access to water.[25] An estimated 482,882 children mainly from 23 ASAL Counties required treatment for acute malnutrition,[26] and school attendance figures dropped in Counties impacted by drought. Changes in migratory patterns of animals may increase conflicts between people and large mammals such as elephants, particularly in areas where rainfall is low.

From a geographical perspective, Kenya's **ASALs** are particularly vulnerable to the impacts of climate change. The highest incidence of poverty is found in these areas and they experience greater competition over resources, rising populations and in-migration from the densely-populated highlands, and lower access to infrastructure such as potable water, electricity and telecommunication facilities.[27] The ASAL economy is highly dependent on climate sensitive activities, supporting more than 70% of the national livestock population and 90% of the wildlife that is the mainstay of the tourism sector.[28]

Cross-border and cross-county conflict can be exacerbated by climate change. As temperatures rise and rainfall patterns change, some areas become less conducive for livestock, particularly cattle, leading to a reduction in herd numbers. Those counties with favorable conditions, such as Laikipia, could enter into resource use conflicts as pastoralists

[18] KMD (2018).
[19] Reliefweb (2018). *Kenya: Drought – 2014-2018.*
[20] Emergency Events Database (2015). *The International Disaster Database.* Brussels: Centre for Research on the Epidemiology of Disasters – CRED, University of Louvain.
[21] KIPPRA (2018). Daily Conference Summary Report of Proceedings: Day 1. *KIPPRA Annual Regional Conference: Building Resilience to Mitigate the Impacts of Drought and Floods, 5-7th June*, Nairobi.
[22] WRA / ICPAC to provide information on flood events history
[23] https://www.standardmedia.co.ke/lifestyle/article/2000123960/mombasa-and-other-coastal-islands-threatened-by-sea-level-rise-cautions-cs-wakhungu Obura to provide Kenya statistics
[24] Emergency Events Database (2015).
[25] Reliefweb (2018).
[26] Reliefweb (2018).
[27] Njoka, et al. (2016).
[28] County Government of Isiolo (2014) 'Isiolo County Integrated Development Plan 2013-2017'. Nairobi: Republic of Kenya.

from other counties move their animals to water and better pasture conditions.[29] Cross border conflicts could increase with other countries, such as Ethiopia and Tanzania, as pastoralists complete for food, water and grazing lands.

Vulnerable and marginalised groups include remote and pastoralist communities, hunters and gatherers, and fisher communities that are affected by climate change because of environmental degradation and growing competition for land and water.[30] Many artisanal fisher folk suffer from severe poverty and are impacted by more severe storms and rainfall causing rough sea, especially in the May-June-July period when they are unable to fish or risk their lives attempting to earn income. Concern has also been expressed regarding the vulnerability of the poor who live in urban slums.

Women are more vulnerable to climate change. Their role as primary caregivers and providers of food and fuel makes them more vulnerable when flooding and drought occur. Drought compromises hygiene for girls and women as the little water available is used for drinking and cooking, and has a negative effect on women's time management in the household. When nearby wells and waters sources run dry, women have to travel long distances to search for water. Longer dry seasons mean that women work harder to feed and care for their families. In both urban and rural areas, women have multiple demands in the home, workplace and community that leave less time for political involvement and active participation in decision-making processes. Women in traditional communities may be subject to cultural beliefs that deny equal opportunities and rights. Women are more likely to experience poverty, less likely to own land and have less socioeconomic power than men. This makes it difficult to recover from climate disasters that affect infrastructure, jobs and housing.[31]

Environmental Impacts

Droughts are typically large-scale disasters in Kenya. The International Disaster Database reported that a total of ten droughts occurred in Kenya between 1990 and 2015, or one every 2.5 years. An assessment of the 2017 long rain season in ASAL counties conducted by the Kenya Food Security Steering Group found that spatial and temporal distribution of rain was poor across the country. The rains began late across most of the country, resulting in a shortened rainy season, and most areas received 50-90% of normal rainfall.[32]

Rising sea temperatures in the Western Indian Ocean influence the coastal conditions associated with Kenya. The IPCC reports that sea temperatures have increased by 0.60°C over 1950-2009, triggering mass coral bleaching and mortality on coral reef systems over the past two decades. This is likely to change the abundance and composition of fish species, with a negative impact on coastal fisheries.[33]

[29] Said, M., et al. (2018), Livestock trends in Kenya's Arid and Semi-arid counties between 1977 and 2016. Nairobi: PRISE.
[30] Njoka, et al. (2016).
[31] Mary Nyasimi to guide this paragraph – at request of Dr. Pacifica
[32] Government of Kenya (2017), *The 2017 Long Rains Season Assessment Report*. Nairobi: Kenya Food Security Steering Group.
[33] Hoegh-Guldberg, et al., (2014), The Ocean. Chapter 30 of the *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change,* page 1688.

Rising sea levels are a concern for Kenya's 1,586 km coastline consisting of mangroves, coral reefs, sea grass and rocky, sandy and muddy shores.[34] The IPCC reports that over the period 1901-2010, global mean sea level rose by 0.19 metres, a result of thermal expansion of the ocean due to warming plus the addition of water from the loss of mass by melting glaciers and ice sheets. The annual rise over the past 20 years has been 3.2 millimeters per year, roughly twice the average speed of the earlier 80 years. Globally, sea levels are projected to rise from 26 to 82 cm by the 2080s.[35] The rate of sea level rise along Africa's coast along the Indian Ocean is projected to be greater than the global average, and will lead to erosion of shorelines and increased salinity of coastal aquifers .[36] This sea level rise will result in greater levels of and more frequent coastal flooding and changing patterns of shoreline erosion. Changes to sea level are very likely to modify coastal ecosystems such as beaches, coral reefs and mangroves, and cause inundation of coastal aquifers by saltwater.[37]

Ocean acidification refers to a reduction in the pH of the ocean over an extended period of time caused mainly by the uptake of CO_2 from the atmosphere. The IPCC reports that the ocean has absorbed about 30% of the emitted anthropogenic CO_2, causing seawater to become more acidic.[38] Ocean acidification is expected to impact many ocean species, leading to declines with negative impacts on fisher communities that rely on these species for food and livelihoods. Marine species that are dependent on calcium carbonate to build their shells and skeletons, such as corals, are highly vulnerable. Little is actually known about ocean acidification in the Western Indian Ocean because long-term observations and relevant experiments have not been carried out.[39] Research is underway to determine the economic and social impacts of ocean acidification on coastal communities and fisheries in Kenya.[40]

The **glaciers of Mount Kenya are declining** and are expected to disappear in the next 30 years – largely because of climate change. The Lewis Glacier shrunk by 23% in the six years from 2004 to 2010, and the Gregory Glacier disappeared. [41] The ice volume of Lewis Glacier decreased from about 7.7 km^3 in 1978 to about 0.3 km^3 in 2004 with an average thickness loss of almost one metre of ice per year.[42] The glaciers are melting because East Africa is getting drier, with a lack of precipitation (diminished snowfall on the mountain peaks) to sustain the glaciers. Mount Kenya is one of the country's water towers and a source of numerous rivers and streams.

Desertification in the ASALs can be attributed to climate change impacts, in addition to human activities. It is intensifying and spreading, reducing the productivity of the land and

[34] Brown, S. Kebede, A.A. And Nicholls, R.J. (2011). *Sea-Level Rise and Impacts in Africa, 2000 to 2100*. Southampton, UK: University of Southampton.
[35] Christensen, et al. (2013).
[36] Schaeffer et al., 2015 *Africa's Adaptation Gap 2: Bridging the gap – mobilizing resources*. African Ministerial Conference on the Environment, United Nations Environment Programme, Climate Analytics and the African Climate Finance Hub.
[37] Hoegh-Guldberg, et al. (2014), page 1666-1670. Obura to provide Kenya statistics- at request of Dr. Pacifica
[38] Portner, H.O. et al. (2014), Ocean systems. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.*
[39] Intergovernmental Oceanographic Commission (2017), *Development of regional capacity for ocean acidification observation in the Western Indian Ocean in support of the Sustainable Development Goal 14.*
[40] Coastal Oceans Research and Development – Indian Ocean [CORDIO] (2018). *Ocean acidification and small-scale fisheries*. Mombasa: CORDIO East Africa.
[41] Prinz, et al. (2016), Climate controls and climate proxy potential of Lewis Glacier, Mt. Kenya. *The Cryosphere* 1: 133-148.
[42] Hastenrath and Polzin (2004). 2004. Dynamics of surface wind field over the equatorial Indian Ocean. *Quarterly Journal of the Royal Meteorological Society* **130**: 503–517

negatively affecting communities.[43] Restoration of degraded land aims to achieve land degradation neutrality that maintains or enhances the land resource base – or the stocks of natural capital associated with the land resources and the ecosystem services that flow from them. Restoration of degraded land has important climate benefits, including the sequestration of CO_2 and improved climate resilience by recovering lost ecosystems. Kenya launched an ambitious land restoration programme in 2016 that targets restoration of 5.1 million hectares of degraded and deforested landscapes by 2030.[44]

Climate change is contributing to a loss of Kenya's **biodiversity**. The Inter-Governmental Science-Policy Platform on Biodiversity and Ecosystem Services reported that climate change is likely to result in significant losses of many African plant species, some animal species, and a decline in the productivity of fisheries in inland waters of Africa during the twenty-first century.[45] Dozens of animals died in 2017 as a result of lack of water and pasture in national parks and reserves, a direct impact of the ongoing drought. KWS reported that in some years, more animals die from drought than poaching in Kenya.[46] Climate change has the potential to alter migratory routes and timings of species that use seasonal wetlands (such as migratory birds) and track seasonal changes in vegetation (such as herbivores). Climate change significantly affects marine ecosystems and will lead to large-scale shifts in the patterns of marine productivity, biodiversity, community composition and ecosystem structure.[47]

Climate change is a major factor contributing to **land degradation**, which encompasses changes in the chemical, physical and biological properties of the soil. However, human activities pose the greatest threat through unsustainable land management practices such as destruction of natural vegetation, over-cultivation, over grazing and deforestation.[48]

Deforestation and forest degradation in Kenya is largely a result of human activities, although climate change is likely to affect the growth, composition and regeneration capacity of forests resulting in reduced biodiversity and capacity to deliver important forest goods and services. Rising temperatures and long periods of drought will lead to more frequent and intense forest fires, rising temperatures will extend the ecosystem range of pests and pathogens with consequences on tree growth, survival, yield and quality of wood and non-wood products, and rising sea levels could submerge mangrove forests in low-lying coastal areas. The negative impacts that result from deforestation (such as soil erosion, impacts on water cycles, increased flooding) are exacerbated by climate change. Deforestation is a major cause of climate change because clearing forests for farming, charcoal production and other uses releases huge amounts of greenhouse gases.

Other climate-related hazards in Kenya include landslides and forest fires. Landslides are largely associated with heavy rainfall in regions with steep slopes, such as Murang'a County, the western Counties, and the north Rift Valley.[49]

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[43] Mwenda et al. (2016). *Desertification as an impact of Climate Change Arid Areas in Kenya*. Presentation at the 11th Esri Eastern Africa User Conference, Nairobi, 2-4th November 2016.

[44] MyGov (2016), *Kenya initiates programmes to counter desertification.* MEF to provide information on the rate of desertification from Kenya's position under CRIC and UNCCD

[45] Archer et al. (2018). Summary for policymakers of the regional assessment report on biodiversity and ecosystem services for Africa of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. *Report of the Plenary of the Inter-Governmental Science-Policy Platform on Biodiversity and Ecosystem Services on the work of its sixth Session.* 23 April.

[46] Daily Nation (2017). Why we should not allow poachers to drive our elephants to extinction. Daily Nation (4th August).

[47] Portner, H.O. et al. (2014), page 451

[48] Ministry of Environment and Natural Resources (2016), *Land Degradation Assessment in Kenya*. Nairobi: Kenya Agricultural Productivity and Sustainable Land Management Property.

[49] UNDP (n.d.), *Kenya natural disaster profile*. Enhanced Security Unit.

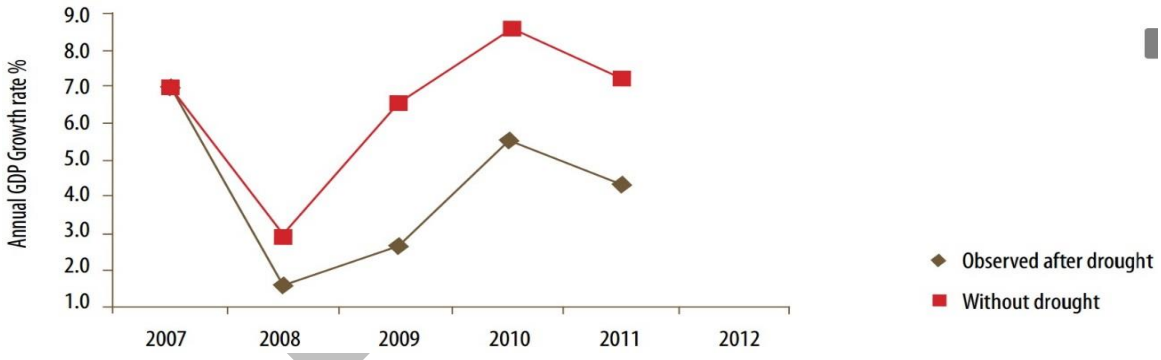
Economic Impacts

The economic cost of floods and droughts is estimated to create a long-term fiscal liability equivalent to 2%-2.4% of GDP each year.[50] Specifically, estimated costs of floods are 5.5% of GDP every 7 years, while droughts account for 8% of GDP every 5 years.[51]

The economic impacts of floods are severe; in 2018, rain and flooding wiped out resources worth billions of shillings. Roads and infrastructure were destroyed, seasonal crops across an estimated 21,000 acres of land were destroyed and over 20,000 livestock drowned. The Government allocated over KES 75 billion to combat floods and fix roads destroyed by the rains.[52] The El Niño induced floods in 1997/1998 caused losses and damages of between US$ 800 million and US$ 1.2 billion.

Droughts have had the greatest economic impact – on average, a 0.6 percentage point decline in GDP growth is observed in Kenya in years of poor rains.[53] The agriculture sector grew by 1.6% in 2017, compared to 4.7% in 2016, because drought suppressed production of crops and adversely affected livestock production.[54] This drought also led to depressed generation of hydroelectricity, leading to an increase in generation of electricity from thermal sources that are more costly and produce GHG emissions. Over the past decade, losses in livestock populations due to drought-related causes amounted to nearly US$1.08 billion.[55]

Figure 3: Growth rate in GDP in Kenya in 2007-2011, with and without drought



Source: Government of Kenya (2012), Post-Disaster Needs Assessment.

The 2008-2011 drought was estimated to have cost the Kenyan economy KES 968.6 billion: KES 64.4 billion for the destruction of physical assets and KES 904.1 billion for losses in the flows of the economy (see Figure 3). Along with other internal and external shocks, the severe droughts between 2008 and 2011 contributed to the reduction in Kenya's GDP growth rate from an average of 6.5% in 2006/2007 to an average of 3.8% between 2008 and 2012.[56]

[50] Stockholm Environment Institute (2009), Stockholm Environment Institute (SEI). (2009). *Economics of climate change in Kenya: Final report submitted in advance of COP15.*
[51] Government of Kenya (2018). *Disaster Risk Management Policy*. Nairobi: National Treasury
[52] Omondi, D. (2018). State at a loss as floods wash away costly infrastructure. *Standard Digital* (5th May).
[53] World Bank Group (2015).
[54] Kenya National Bureau of Statistics (2018), *Economic Survey 2018* (Nairobi: KNBS).
[55] The World Bank (2018), *NEDI (The North and North Eastern Development Initiative): Boosting Shared Prosperity for the North and North Eastern Counties of Kenya*. Nairobi: World Bank.
[56] Government of Kenya (2012), *Kenya Post-Disaster Needs Assessment (PDNA): 2008-2011 Drought*. With technical support from the European Union, United Nations and the World Bank.

The impacts of drought are felt at the household level and are particularly devastating for pastoralists in the ASALs where livestock production – and specifically, semi-nomadic pastoralism – is the key income source. The share of livestock income in total household economic income ranges from 25% to 80% in Mandera, Marsabit, Turkana, and Wajir (with the share larger for poorer families).[57] Drought can weigh heavily on pastoralists because animals often perish: over 70% of livestock mortality in the ASALs is caused by drought. As a result, droughts cause significant disruptions in income streams and loss of assets. Kenya risks losing about 1.7 million cattle, or 52% of the total cattle population in ASALs in the next ten years because of drought and the effects of climate change. Livestock farmers risk losing between KES 34 to KES 68 billion in the ten-year period, with the largest impacts felt in Garissa, Wajir, Tana River and Turkana.[58]

Sea level rise is impacting coastal towns and communities. The National Museums of Kenya is constructing a KES 500 million sea wall to protect Fort Jesus in Mombasa from erosion.[59] Coastal flooding from sea-level rise is projected to affect 10,000–86,000 people a year as well as lead to coastal erosion and wetland loss at an annual cost of $7–58 million by 2030, rising to $31–313 million by 2050.[60]

The expected impacts of climate change by sector are elaborated in the ATAR and summarised in Table 2 below.

Table 2: Summary of climate change impacts by sector in Kenya

Sector	Likely impacts of climate change
Agriculture	▪ Greater food insecurity ▪ Decline in overall crop yields in most of the country due to insufficient availability of water, excessive moisture conditions, more pest, diseases and weed ▪ Lower production in the ASALs due to temperature increases and lower precipitation leading to reduced soil moisture ▪ Uncertainty regarding the impact of production of specific crops, but likely reduction on yields of maize and beans, and potential reductions of export cash crops (tea, coffee, horticulture) ▪ Higher temperatures in highland areas may have a positive impact on agricultural production ▪ Evapotranspiration rates are more than twice the annual rainfall in many areas ▪ Greater reliance on irrigation due to reduced precipitation
Livestock	▪ Livestock deaths caused by drought ▪ Decline in production due to lack of pasture, reduced access to water and heat stress ▪ Expected changes in disease patterns, and potential for re-emergence of Tsetse and African Trypanosomiasis in the highlands
Fisheries	▪ Thinning of species and biomass abundance owing to the effects of temperature increase on the nesting and feeding grounds. ▪ Increased risk of alien invasive species
Coastal Zones / Blue Economy	▪ Submergence of low-lying areas and increase in water logged areas ▪ Increase in salt water intrusion, particularly if accompanied by lower rainfall ▪ Destruction of coral reefs ▪ Negative impact on economic benefits of blue economy investments, including declining fisheries, damage to coastal ecosystems and tourism, and damage to ports ▪ Declines in fisheries and livelihoods dues to ocean acidification ▪ Damage to critical infrastructure due to sea level rise and storm surges

[57] Hunger Net Safety Programme
[58] Said, M. et al. (2018).
[59] Otieno, B. (2018), Sh498m Fort Jesus wall to stop erosion of World Heritage Site. *The Star*. (17th January).
[60] Stockholm Environment Institute (2009).

Sector	Likely impacts of climate change
Drought and Flood Management	▪ Increased frequency and intensity of droughts, especially in the ASALs, decrease ability to cope ▪ Increased frequency and intensity of flooding decrease ability to cope ▪ Increased number of food insecure and malnourished people. ▪ Increased number of people without access to water. ▪ Declines in school attendance and rising dropout rates.
Energy	▪ Decline in forest productivity restricts availability of fuelwood ▪ Reduction of hydroelectric power production capacity as water flows in rivers decline (particularly in the dry season) and reservoir siltation potentially increases ▪ Increased demand for energy as high temperatures encourage the use of air conditioners and refrigeration ▪ Damage to infrastructure
Environment	▪ Increases contestation and the likelihood of conflict over diminishing natural resources. ▪ Increases in invasive species, new pests and diseases. ▪ Increase in stagnant air days leading to worse air pollution
Forestry	▪ Increased exposure to fire, pathogens and invasive species ▪ Reduced provision of environmental resources and economic activity
Health	▪ Shift in the geographic range of malaria to higher altitudes ▪ Increase in the incidence of malaria, Rift Valley fever, malnutrition, scabies, chiggers and lice infestations ▪ Increase in water-borne diseases such as cholera and typhoid
Housing and Buildings	▪ Increase in risk of collapse, declining health of buildings, and loss of value as a result of more frequent and heavier rain events, water encroachment, and storm surges in coastal areas ▪ Safety risk in existing buildings that do not meet standards and codes
Manufacturing	▪ Energy fluctuations or blackouts because of energy supply interruptions because of reductions in the hydro-electricity generation. ▪ Greater resource scarcity (e.g., water and raw materials) for inputs to manufacturing processes ▪ Greater risk of plant, product and infrastructure damage and supply chain disruptions from extreme weather events ▪ Higher costs to companies, including for insurance
Security	▪ Political and financial instability through supply line disruptions and increased risks of doing business ▪ Increased likelihood of conflict within and between countries, counties and communities
Tourism and Wildlife	▪ Tourist facilities affected by reduced water availability and lack of access due to damage to roads and infrastructure ▪ Adverse impacts on ecologically sensitive tourist destinations ▪ Potential for migration of wildlife populations, with implications for park boundaries ▪ Potential for species extinction
Transport	▪ Damage to port facilities from increasingly severe storm events and sea level rise ▪ Damage to infrastructure including roads and bridges during storms ▪ Interruptions to maritime, road, rail and air networks because of flooding and heavy rainfall events ▪ Softened and expanded pavement, creating rutting and potholes, and warping of rail tracks because of increased temperatures ▪ Disruption of access to work, markets, education and healthcare facilities, due to damaged infrastructure and transport services.
Water	▪ Reduced availability of surface water for activities such as irrigation, livestock production, household use, wildlife and industry ▪ Increased water loss from reservoirs dues to evaporation ▪ Salt water intrusion along the coast due to sea level rise, with implications for domestic, industrial and agricultural uses as well as coastal ecosystems ▪ Continued retreat of glaciers on Mount Kenya that feed the Tana and Ewaso Ng'iro Rivers, leading to lower water levels, particularly in the dry season

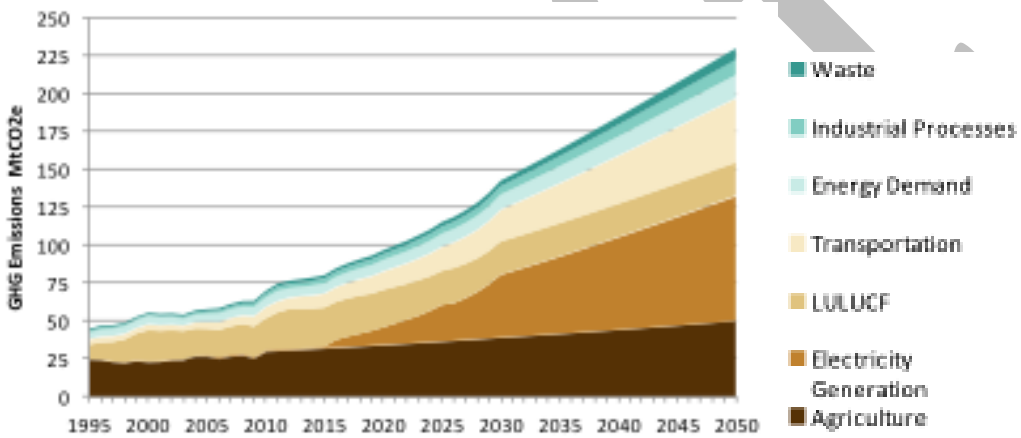
Source: Government of Kenya (2018), Adaptation Technical Analysis Report.

1.3.3 Mitigation in Kenya

Kenya is working to reduce its GHG emissions from the projected emissions trajectory. Kenya has little historical or current responsibility for global climate change and emissions are insignificant relative to global emissions, represent less than 1% of total global emissions. transitioning to a low carbon development pathway will ensure that the country's contribution to global emissions remains low. A low carbon pathway delivers benefits beyond GHG emissions reductions including sustainable development, green growth and resource efficiency.

While adaptation is the priority for Kenya, action to reduce GHG emissions is needed because emissions are projected to increase due to population and economic growth (see Figure 4).

Figure 4: Greenhouse gas emissions baseline projection for Kenya ($MtCO_2e$)

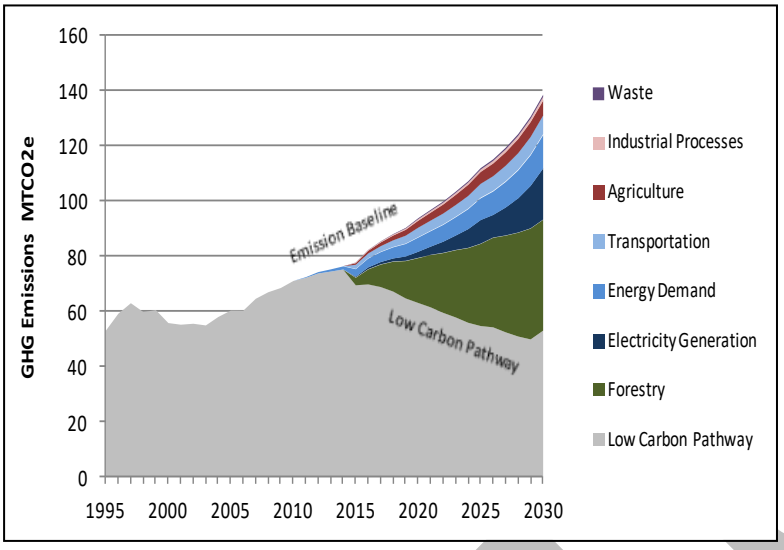


Source: Government of Kenya (2017), Update of Kenya's Emissions Baseline Projections. Derived from Kenya's Second National Communication (2015).

Actions in the six mitigation sectors set out in the UNFCCC – agriculture, energy, forestry, industry, transport, and waste – help Kenya keep emissions lower than the projections. The forestry sector has the largest potential to reduce GHG emissions because forests act as a "sink" by sequestering carbon and storing it for long periods of time. Forests also have important adaptation and sustainable development co-benefits, such as water purification, erosion control, and improved livelihoods. Women play a key role in managing forests, and are crucial to integrating forest conservation activities in livelihood activities.

The first NCCAP (2013-2017) and Kenya's Second National Communication identified the technical potential for GHG emissions reductions (illustrated in Figure 5). This represents what can be achieved if Kenya takes up all expected technology advances, introduces appropriate and enabling policies and regulations, and moves forward on all mitigation actions. It is aspirational and based on a best-case scenario. Kenya's Nationally Determined Contribution (NDC), submitted to the UNFCCC in 2015 as the country's' Intended NDC, adopts a doable and conservative mitigation contribution that is half the potential identified in the first NCCAP (2013-2017).

Figure 5: Composite abatement potential for all sectors for Kenya (technical potential) in $MtCO_2e$



Source: Government of Kenya (2015), Second National Communication, page 172.

Kenya's NDC sets out a contribution to abate GHG emissions by 30% relative to the business as usual scenario of 143 million tonnes of carbon dioxide equivalent ($MtCO_2e$)[61], or an actual reduction in GHG emissions of 42.9 $MtCO_2e$ (see Table 3). This contribution is subject to international support in the form of finance, technology development and transfer, and capacity development. This second NCCAP (2018-2022) serves as the implementation plan for Kenya's NDC and the actions will move Kenya toward its mitigation goals.

Table 3: Emission reduction potential by sector: Technical potential and NDC 30% GHG emission reduction targets

Sector	GHG Emission Reductions Potential ($MtCO_2e$)				NDC Target
	2015	**2020**	**2025**	**2030**	**2030**
Forestry	2.71	16.24	29.76	40.2	20.10
Electricity Generation	0.28	2.24	8.61	18.63	9.32
Energy Demand	2.74	5.16	7.92	12.17	6.09
Transportation	1.54	3.52	5.13	6.92	3.46
Agriculture	0.63	2.57	4.41	5.53	2.77
Industrial Processes	0.26	0.69	1.03	1.56	0.78
Waste	0.05	0.33	0.5	0.78	0.39
Total Emission Reduction Potential ($MtCO_2e$)				85.79	42.90
Total Emissions in 2030 ($MtCO_2e$)				**143.00**	**143.00**
% of Total Emissions in 2030				**60%**	**30%**

Source: Government of Kenya (2017). Nationally Determined Contribution Sector Analysis Report.

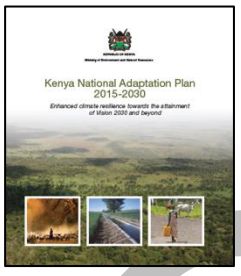
[61] $MtCO_2e$ is an abbreviation for million tonnes of carbon dioxide equivalent, or the amount of GHG emissions expressed as an equivalent amount or concentration of carbon dioxide. The main greenhouse gases that are measured in a GHG inventory are: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3).

1.4 Summary of Implementation of the First NCCAP (2013-2017)

The Government of Kenya made substantial progress in implementing its first NCCAP (2013-2017), helping the country deliver on domestic goals and international obligations under the UNFCCC. The first NCCAP identified 38 priority actions, which included nine mitigation actions and 29 enabling actions in the areas of climate finance, knowledge management, legislation and policy, and performance measurement. Nineteen actions were in progress as of May 2017, and many are carried over to this second NCCAP (2018-2022). Six actions did not progress, with five of these under the National Performance and Benefit Measurement subcomponent.[62]

In regard to enabling actions, a key accomplishment was the enactment of the Climate Change Act (No. 11 of 2016), which provides the regulatory framework for an enhanced response to climate change and provides for mainstreaming approaches for a low carbon climate resilient pathway. The National Climate Change Policy (2018) was approved by Parliament, the Climate Change Directorate was put in place, and the National Climate Change Resource Centre established.

1.4.1 Progress on Adaptation



Priority adaptation actions were elaborated in Kenya's National Adaptation Plan, 2015-2030 (NAP). Over the five-year period from 2013-2017 the Government of Kenya and its partners took action to reduce vulnerability and build adaptive capacity, with an emphasis on disaster risk reduction, humanitarian action, preparedness and response actions, and other priorities identified in the NAP.[63] Adaptation actions have not yet been reviewed in detail given that only two years have passed since the approval of the plan.

At the national level, many actions took place through the National Drought Management Authority (NDMA), including Ending Drought Emergencies, the establishment of the National Drought Emergency Fund, and initiatives in the ASALs to help the most vulnerable in times of drought. The coping strategies of the poorest people in Turkana, Wajir, Mandera and Marsabit Counties were improved through the provision of support during droughts.

Adaptation actions supported by Development Partners focused on adaptation within the agricultural sector, including irrigation projects, enhancing the climate resilience of pastoralists and sustainable land management. Considerable progress was made in improving access to climate information, providing loans for smallholder farmers to invest in resources to increase climate resilience, and establishing insurance schemes for smallholder farmers.

Initiatives also improved climate risk management and natural resource-related knowledge in the ASALs, and built the capacity of government to enable adaptation. Kenya also made considerable progress on increasing availability of freshwater sources and improving the resilience of water towers.

[62] Murphy, D. & Chirchir, D. (2017). *Review of Implementation of the Kenya National Climate Change Plan 2013-2017.*

[63] For a description of actions, see: Government of Kenya (2016), *Addressing Climate Change: Success Stories from Kenya*. Nairobi: Ministry of Environment and Natural Resources.

Action at the community level was supported through the Integrated Programme to Build Resilience to Climate Change and Adaptive Capacity of Vulnerable Communities in Kenya, that was supported by the UNFCCC Adaptation Fund and implemented by the National Environment Management Authority (NEMA) in its role as NIE to the Adaptation Fund. The initiative focused on food security, water management, coastal ecosystem management and environmental management.

Many County Governments integrated climate change in their 2013 County Integrated Development Plans (CIDPs), acknowledging that climate change poses threats to sustainable development.[64] Makueni and Wajir County Governments passed regulations to establish county climate change funds (see Box 3), and other County Governments established institutional structures to mainstream climate change in plans and programmes. The Makueni County Climate Change Fund sets aside 1% of the County's annual budget for climate change,

The private sector was an active partner in adaptation, providing technologies, insurance products and climate information services, many of which are facilitated by smart phone applications. East Africa Breweries promoted the production of drought-resistant sorghum for a low-cost beverage, and the Kenya Tea Development Agency worked to improve the climate resilience of its farmers.

Box 3: County Climate Change Funds

Five County Governments – Garissa, Isiolo, Kitui, Makueni and Wajir – have established County Climate Change Funds (CCCFs) that identify, prioritise and finance investments to reduce climate risk and achieve adaptation priorities. Community-level planning committees identify adaptation needs, guided by transparent decision-making criteria. CCCF investments to build climate resilience have largely focused on livestock, water, natural resource governance and climate information services.

The CCCFs work through the government's established planning and budgeting systems; and will be linked with the Climate Change Fund established under the Climate Change Act (2016). The County funds are structured to blend resources from international climate finance, development partners, the private sector, National Government and County budgets.

Climate change fund legislation was enacted in Makueni and Wajir Counties in 2015 and 2016, respectively. Makueni's regulations mandate that the County Government set aside 1% of its annual development budget for climate change; and Wajir's CCCF legislation requires an annual allocation of 2%. This amounts to approximately KES 85 million in the 2017/18 fiscal year for Wajir and KES 75 million in Makueni.

Murphy, D. & Orindi, V. (2017). sNAPshot: Kenya's County Climate Change Funds. County Brief 2B: NAP Global Network.

1.4.2 Progress on Mitigation

The first NCCAP (2013-2017) identified six priority action areas for emission reductions out to 2030, and identified quick-win actions required to begin the process of meeting the long-term goals. These short-term actions included the development of funding proposals and improving the measurement of GHG emissions and sinks. A key quick-win achievement was the approval of a grant of Euro 20 million from the International NAMA Facility for Nairobi's Bus Rapid Transit system that will be implemented under the second NCCAP (2018-2022). Another achievement

[64] Murphy, D. & Chirchir (2017). *Kenya County Integrated Development Plans 2013-2017: Review of Climate Change Mainstreaming*. StARCK+ Technical Assistance to the Government of Kenya.

was the development of Kenya's Second National Communication to the UNFCCC (2015) that included the country's second GHG inventory.[65]

While reducing GHG emissions is critical, Kenya prioritised mitigation actions that have adaptation and sustainable development benefits. An example is the forestry sector, where actions to sequester carbon such as reforestation bring development benefits including protection of watersheds and improved livelihoods. Actions under the first NCCAP (2013-2017) focused on building capacities to measure and report on forestry emissions and sinks, and establishing the System for Land-based Emissions Estimation in Kenya (SLEEK). The Kenya Forestry Service (KFS) worked with County Governments and private land holders to plant trees and develop REDD+ (Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries) actions. The forest cover in Kenya increased to 7.4% in 2018 from 7.2% in 2013.[66]

Electricity generation from geothermal energy reduced GHG emissions and lessened the vulnerability of the sector to climate change. Total installed geothermal capacity at the end of 2016 was about 630 MW, an increase of about 380 MW from Kenya Power's reported 250 MW of geothermal power generation in June 2013.[67] In 2016/2017, installed capacity was 2,333 MW, with geothermal accounting for 44% of the generation mix, hydro 33%, thermal 21% and imports 2%.[68] Renewable energy capacity was increased under the first action plan through geothermal projects in Olkaria, wind projects in Turkana and Ngong Hills, and several decentralized energy projects, such as mini-grids and solar photovoltaic systems for off-grid public schools.

The private sector was a critical partner, with companies generating electricity using renewable energy (such as solar, biogas and bagasse), manufacturing solar panels and establishing pay-as-you-go solar lighting systems for households. The Kenya Association of Manufacturers (KAM) supported energy audits and efficiency improvements to reduce GHG emissions, and the cement sector introduced energy efficiency and process improvements. Efforts to reduce energy demand at the household level included improved cookstoves, biogas and solar lighting.

Action to reduce emissions in the transport sector included the completion of the Mombasa-Nairobi Standard Gauge Railway (SGR) that encouraged a shift of freight from road to rail. The requirement for all containers for Nairobi and beyond to use the inland container depot at Embakasi is expected to move 40% of container freight from trucks to the SGR.

Kenya was an active player in the Clean Development Mechanism (CDM) and registered sixteen CDM projects and sixteen Programmes of Activities in such sectors as reforestation, energy efficiency, geothermal, wind and hydro. Kenya was active in the voluntary carbon market hosting the Kasigau Wildlife Corridor REDD project, the first activity to issue voluntary forestry carbon credits, and the Kenya Agriculture Carbon project, the first project in Africa to sell carbon credits for sequestering carbon in soil.

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[65] Murphy & Chirchir (2017).

[66] Ministry of Environment and Forestry (2018), *Taskforce Report on Forest Resources and Management and Logging Activities in Kenya* (Nairobi: MEF), page 20; and KBNS (2018), *Economic Survey 2018*, page 140.

[67] REN21 (2017), *Renewables 2017 Global State Report,* Paris: REN21 Secretariat, page 52; and Republic of Kenya (2015), *NAMA for accelerated geothermal electricity development in Kenya: Proposal*, Nairobi: Ministry of Environment and Natural Resources and Ministry of Energy and Petroleum.

[68] The Kenya Power and Lighting Company Limited (2017). *Annual Report and Financial Statements (Nairobi: KPCL),* page 41-42.

1.4.3 Lessons Learned

Key lessons learned while implementing the first NCCAP (2013-2017) guided the development of this second NCCAP (2018-2022).[69] These lessons include:

- **Focus on adaptation and mitigation actions**. The enabling actions underpin and support the achievement of adaptation and mitigation goals. Ensure that priority actions are identified for agriculture, clean energy, biodiversity conservation and use, and disaster risk reduction.
- **Ensure that the NCCAP addressed the issues of gender, youth, people living with disabilities and other vulnerable groups.** These groups are disproportionately impacted by climate change and efforts should be made to identify the role of these groups in Kenya's climate change response.
- **Ensure the process to develop the NCCAP includes adequate consultation.** Climate change is a cross-cutting issue with impacts on businesses and households, and across sectors. Consultations enable views and perspectives to be expressed by individuals and representatives of communities, Counties, businesses, associations, civil society and marginalised groups.
- **Engagement of County Governments** is critical to ensure ownership and buy-in. Many of the actions will be delivered at the County level, and the inputs of the Counties must inform the development of and be reflected in the updated NCCAP (2018-2022).
- **Prioritize a doable number of measureable priority actions that have real climate benefits.** The actions should lead to real adaptation or mitigation benefits that can be measured, with baseline information and SMART (specific, measurable, attainable, relevant and within a specific time frame) indicators. Use of climate data (such as rainfall or temperature) in conjunction with well-being indicators could help to determine if actions led to successful adaptation.
- **Draw on national-level indicators to provide an overview of progress on climate change**. Identify five indicators at the national level for which there is baseline information that can be used to provide a snapshot of progress on climate change (e.g., number of people receiving drought relief payments, percentage of renewable energy in the electricity mix).
- **Develop an appropriate monitoring system that can be introduced in a phased approach over 2018-2022**. The system proposed in the first NCCAP (2013-2017) was overly ambitious and difficult to implement. The monitoring of adaptation and mitigation actions needs to account for devolution and the role of the Counties, and reporting can be coordinated with established processes.

[69] The lessons are informed by: Murphy & Chirchir (2017); and Muok, B., Mwenda, M. & Wendo, H. (2018), *Kenya National Climate Change Action Plan (2013-2017): Review and Recommendations from Civil Society* (Nairobi: Pan-African Climate justice Alliance).

Chapter 2: Enabling Legal and Policy Framework

2.1 The International Context

Kenya's climate change response is informed by international and regional commitments and obligations. Climate change is a global problem which demands a global solution, and Kenya is an active player in international efforts. The international response to climate change is led by the **United Nations Framework Convention on Climate Change (UNFCCC)** that entered into force in 1994. Kenya signed the UNFCCC on 12th June 1992 and ratified the Convention on 30th August 1994. Kenya is a key player in the global climate change governance system and participates in the meetings of the Conference of the Parties (COP) to the UNFCCC, articulating the national interest and the country's position during international negotiations.

The objective of the UNFCCC is set out in Article 2, which states:

> *The ultimate objective of this Convention is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate systems. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.*[70]

The **Kyoto Protocol**, a greenhouse gas emissions reduction treaty linked to the UNFCCC, was adopted by the COP in 1997 and entered into force in 2005. The Kyoto Protocol is an international agreement that commits developed countries and counties in transition to market economics to reduce their overall GHG emissions. The Kyoto Protocol created the Clean Development Mechanism (CDM) under which developing country projects that reduced emissions and contributed to sustainable development earned credits that could be sold to countries or companies with a commitment to reduce emissions. More that 1.5 billion tonnes of CO_2 were avoided through the CDM, and USD9.5-13.5 billion in direct benefits to host counties from the sale of credits as of 2012.[71] The first commitment period started in 2008 and ended in 2012. Parties to the Kyoto Protocol adopted an amendment in 2012, which has yet to enter into force. Kenya ratified the Kyoto Protocol on 25th February 2005.

The **Paris Agreement** under the UNFCCC entered into force internationally on 4th November 2016, thirty days after 5th October 2016, the date on which the threshold for entry into force was achieved. As of May 2018, a178 Parties have ratified the Convention, surpassing the threshold for entry of at least 55 Parties to the Convention accounting in total for at least an estimated 55% of the total global GHG emissions.

The Paris Agreement was ratified by Kenya on 26th December 2016 and entered into force for Kenya on 27th January 2017. Kenya's ratification of the Paris Agreement included submission of its Nationally Determined Contribution (NDC) that sets out the country's actions to contribute to achieving the global goal set out in the Paris Agreement (see Box 5). This NDC was originally submitted to the UNFCCC in 2015 as Kenya's Intended NDC. As set out in

[70] United Nations, 1992, page 9.
[71] UNFCCC (2018). Achievements of the Climate Development Mechanism. Retrieved from: http://unfccc.int/timeline/

Article 2, Section 6 of the Constitution of Kenya (2010), the Paris Agreement now forms part of the law of Kenya.

Box 4: Kenya's Nationally Determined Contribution

- Adaptation contribution - ensure enhanced resilience to climate change towards the attainment of Vision 2030 by mainstreaming climate change into the Medium Term Plans (MTPs) and implementing adaptation actions.
- Mitigation contribution - seek to abate GHG emissions by 30% by 2030 relative to the business as usual scenario of 143 $MtCO_2eq$.

Achievement of the NDC is subject to international support in the form of finance, investment, technology development and transfer, and capacity development.

The Paris Agreement, which effectively replaces the Kyoto Protocol, aims to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels. Additionally, the Agreement aims to strengthen the ability of countries to deal with the impacts of climate change. To reach these ambitious goals, appropriate financial flows, a new technology framework and an enhanced capacity building framework will be put in place to support developing countries.

The **Green Climate Fund** is an operating entity of the Financial Mechanism of the UNFCCC that serves the Paris Agreement and supports projects, programmes and other activities in developing countries. The Fund aims for a 50:50 balance between mitigation and adaptation investments, and engage directly with the private sector through its Private Sector Facility. As of May 2018, 43 governments had made pledges to the GCF totally USD 10.3 billion.[72]

Kenya is signatory to the **Convention of Biological Diversity (1993)** (CBD) and the **United Nations Convention to Combat Desertification (1994)** (UNCCD). Kenya became Party to the CBD on 24th October 1994 and ratified the UNCCD on 25th June 1997. These two conventions plus the UNFCCC are known as the Rio Conventions and are intrinsically linked because they address interdependent issues such as sustainable land management and land degradation neutrality.

The Climate and Clean Air Coalition to Reduce Short-lived Climate Pollutants, founded in February 2012, is a voluntary partnership of 60 governments, intergovernmental organisations, businesses, scientific institutions and civil society organization committed to improving air quality the protecting the climate through actions to recue short-lived climate pollutants. These pollutants include emissions of black carbon (soot), methane, tropospheric ozone and some hydrofluorocarbons. Kenya became a partner of the coalition in 2012.

Kenya is a signatory to the **Montreal Protocol on Substances that Deplete the Ozone Layer**, a global agreement with universal ratification to protect the stratospheric ozone layer by phasing out the production and consumption of ozone-depleting substances (ODS). The Protocol was agreed on 16th September 1987 and entered into force on 1st January 1989. At the end of 2014 over 98% of controlled ODS had been eliminated. A very significant co-benefit

[72] Green Climate Fund (2018). *Status of Pledges and Contributions made to the Green Climate Fund.*

is reduction of cumulative CO_2e emissions by 135 billion tonnes from 1989 to 2013.[73] Kenya ratified the Montreal Protocol on 9th November 1988.

The **United Nations Convention on the Law of the Sea of 10th December 1982** (UNCLOS) aims to establish a comprehensive set of rules governing the oceans. Kenya ratified UNCLOS on 2nd March 1989.The interface between climate change and this international law include changes to the existing boundaries of maritime zones because of sea level rise, and requirements to regulate emissions from aircraft and marine vessels. There is discussion of around the dispute settlement mechanism established in UNCLOS eventually attracting claims relating to climate change.[74]

The **International Civil Aviation Organization Assembly** (ICAO) Resolutions A37-19 (2010) and A38-18 (2013) set global aspirational goals to ensure carbon neutral growth from 2020 and a 2% annual increase in fuel efficiency up to 2050. In 2015, Kenya set a target to achieve an annual average fuel efficiency improvement of 2% equivalent to 2.86 MtCO2eq until 2030 and an aspirational fuel efficiency improvement rate of 2% per annum from 2031 to 2050. Kenya ratified the Convention on International Civil Aviation on 1st May 1964.

Kenya has been a member of the **International Maritime Organization** (IMO) since 1973. The IMO adopted an initial strategy in 2018 to reduce total annual GHG emissions from ships by at least 50% by 2050 compared to 2008. Jomo Kenyatta University of Agriculture and Technology hosts the regional Maritime Technology Cooperation Centre for the Africa region, under a project funded by the European Union and implemented by IMO, to help mitigate the harmful effects of climate change. The Kenya Ports Authority has initiative a Green Port Strategy.

Kenya is committed to the **2030 Agenda for Sustainable Development** that was adopted by world leaders, including the President of the Republic of Kenya, in September 2015 at the UN Sustainable Development Summit. On 1st January 2016, the **17 Sustainable Development Goals** (SDGs) officially came into force (see Box 6 below). While the SDGs are not legally binding, government are expected to take ownership and establish national frameworks for the achievements of the goals. The SDGs include climate change (SDG 13) and protecting, restoring and promoting sustainable use of terrestrial ecosystems (SDG 15).

Box 5: Sustainable Development Goals

Goal 1: End poverty in all its forms everywhere

Goal 2: End hunger, achieve food security and improvised nutrition and promote sustainable agriculture

Goal 3: Ensure healthy lives and promote well-being for all at all ages

Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Goal 5: Achieve gender equality and empower all women and girls

[73] UNDP (2018). *Montreal Protocol.* Retrieved from: http://www.undp.org/content/undp/en/home/sustainable-development/environment-and-natural-capital/montreal-protocol.html

[74] Orellana, M. (2015), *Climate Change and the international Law of the Sea: Mapping the Legal Issues*. Oxford: Oxford University Press.

Goal 6: Ensure available and sustainable management of water and sanitation for all

Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Goal 10: Reduce inequality within and among countries

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

Goal 12: Ensure sustainable consumption and production patterns

Goal 13: Take urgent action to combat climate change and its impacts

Goal 14: Conserve and sustainability use the oceans, seas and marine resources for sustainable development

Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Goal 16: Promote peace and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Ca
n be accessed at: https://sustainabledevelopment.un.org/sdgs

2.2 The Regional Legal and Policy Framework

At the regional level, the **African Union's Agenda 2063** commits to climate change action that prioritizes adaptation and calls on countries to implement the Programme on Climate Action in Africa, including a climate resilient agricultural development programme. Agenda 2063 commits to building climate resilient economies and communities, and notes that participation in global efforts for climate change mitigation will support and broaden the policy space for sustainable development.

The **East African Community (EAC)** Secretariat developed a Climate Change Policy and Strategy (2010) to guide partner states and other stakeholders on the preparation and implementation of collective measures to address climate change in the region. The Policy prescribes statements and actions to guide adaptation and mitigation to reduce the vulnerability of the region, enhance adaptive capacity, and build socioeconomic resilience of vulnerable populations and ecosystems.[75]

[75] CCD (Lerenten) to provide additional information on regional agreements related to climate change.

2.3 The National Legal and Policy Framework

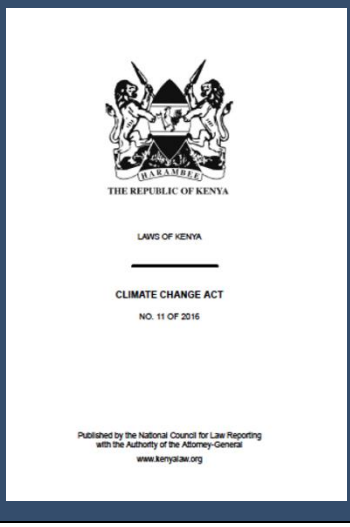
The Government of Kenya has progressively established a robust framework of policies, plans and institutions at the National and County levels to address climate change. The foundation of the institutional and legal framework for climate change action is the **Constitution of Kenya** (2010). Article 42 provides for the right to a clean and healthy environment for every Kenyan, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures.

The Constitution of Kenya (2010) created the devolved system of government comprised of the National Government and 47 County Governments. The concept of devolution goes beyond mere decentralisation of government services, providing a form of self-governance at the local level and a process of equitable sharing of resources. The County Governments have a key delivery role in implementing the Climate Change Act (No. 11 of 2016), having jurisdiction over sectors relevant for climate change such as agriculture, soil and water conservation, forestry, water and sanitation, and health. County governments are allocated at least 15% of national budget revenue, giving them considerable scope to influence climate change investments.

The Bill of Rights (Chapter 4) of the Constitution of Kenya (2010) advances gender equality, stating that "women have the right to equal opportunities in political, economic and cultural spheres." This commitment to gender quality is taken up in Section 8(2)(c) of the Climate Change Act (No. 11 of 2016) that obligates the Cabinet Secretary responsible for climate change affairs to formulate and implement a national gender and intergenerational responsive public education and awareness strategy.

Box 6: The Climate Change Act (No. 11 of 2016)

The Climate Change Act (No. 11 of 2016) is national legislation that provides for an enhanced response to climate change, and provides mechanisms and measures to achieve low carbon climate resilient development. The Government of Kenya, led by the Ministry of Environment and Forestry, worked with stakeholders from civil society, the private sector, and national and county governments to develop this climate change legislation. The Act adopts a mainstreaming approach that includes integration of climate change considerations into all sectors and in County Integrated Development Plans. The Climate Change Act (No. 11 of 2016) establishes the National Climate Change Council, chaired by His Excellency the President, which is responsible for overall coordination and advisory functions. The Act also establishes the Climate Change Fund – a financing mechanism for priority climate change actions and interventions.


THE REPUBLIC OF KENYA

LAWS OF KENYA

CLIMATE CHANGE ACT

NO. 11 OF 2016

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www.kenyalaw.org

The **Climate Change Act** (No. 11 of 2016) and the Environment Management and Coordination Act (No. 8 of 1999 and Amendment 2015) are key pieces of legislation guiding Kenya's climate change response and are the legal foundation of the NCCAP (Government of Kenya, 2016b). Kenya's first NCCAP (2013-2017) set out how the Government would operationalize the National Climate Change Response Strategy (2010). The strategy was Kenya's first climate change guide and provided a basis for strengthening and focusing nationwide action towards climate change adaptation and mitigation. This second NCCAP

(2018-2022) responds to provisions in the Climate Change Act (No. 11 of 2016) that require the updating of the NCCAP every five years (see Box 4).

The main policies, plans and frameworks that influence and guide our climate change actions are briefly described in Table 4, and elaborated in Chapter 2 of the Adaptation Technical Analysis Report (ATAR).

Table 4: Kenya's Climate Change Legal and Policy Framework

Policy / Plan /Framework	Description
Kenya Vision 2030 (2008) and its Medium Term Plans	*Kenya Vision 2030* – the country's development blueprint – recognised climate change as a risk that could slow the country's development. Climate change actions were identified in the Second Medium Term Plan (MTP) (2013-2017). The Third MTP (2018-2022) included a climate change as a thematic area and mainstreamed climate change actions in sector plans.
National Climate Change Response Strategy (2010)	Kenya's *National Climate Change Response Strategy* was the first national policy document on climate change. It aimed to advance the integration of climate change adaptation and mitigation into all government planning, budgeting and development objectives.
County Integrated Development Plans (2013)	County Governments are required to mainstream climate change in County Integrated Development Plans (CIDPs). All 47 CIDPs developed in 2013 mentioned the impacts of climate change and many identified actions to address these impacts. Adaptation actions were a priority for many County Governments.
National Climate Change Action Plan (2013-2017)	Kenya's *National Climate Change Action Plan, 2013-2017* was a five-year plan that aimed to further Kenya's development goals in a low carbon climate resilient manner. The plan set out adaptation, mitigation and enabling actions.
Makueni Climate Change Fund Regulations (2015)	The regulations establish the Makueni County Climate Change Fund. The aim is to provide funding for climate change actions identified in the Makueni CIDP. The regulations mandate the County Government to set aside 1% of its annual development budget for climate change.
National Adaptation Plan (2015-2030)	Kenya's *National Adaptation Plan, 2015-2030* was submitted to the UNFCCC in 2017. The NAP provides a climate hazard and vulnerability assessment, and sets out priority adaptation actions in 21 planning sectors.
National Spatial Plan (2015-2045)	The *National Spatial Plan 2015-2045* provides a national spatial design framework for the integration of social, economic and political policies. The plan indicates Kenya's intention to enhance disaster preparedness in all disaster-prone areas and improve the capacity for adaptation to climate change.
Wajir County Climate Change Fund Act (No. 3 of 2016)	The Wajir Climate Change Fund Act (No. 3 of 2016) established a Climate Change Fund to facilitate and coordinate finance for community-initiated adaptation and mitigation projects and for connected purposes. The Act mandates the County Government to set aside 2% of its annual development budget for climate change.

Kenya's Nationally Determined Contribution (NDC) (2016)	Kenya's NDC under the Paris Agreement of the UNFCCC includes mitigation and adaptation contributions. In regard to adaptation, "Kenya will ensure enhanced resilience to climate change towards the attainment of Vision 2030 by mainstreaming climate change into the Medium Term Plans (MTPs) and implementing adaptation actions." The mitigation contribution "seeks to abate its GHG emissions by 30% by 2030 relative to the BAU scenario of 143 $MtCO_2eq$." Achievement of the NDC is subject to international support in the form of finance, investment, technology development and transfer and capacity development.
Climate Change Act (No. 11 of 2016)	The *Climate Change Act (No. 11 of 2016)* is the first comprehensive legislative framework for climate change governance for Kenya. The objective of the Act is to "Enhance climate change resilience and low carbon development for sustainable development of Kenya." The Act establishes the National Climate Change Council (Section 5), Climate Change Directorate (Section 9) and Climate Change Fund Section 25).
Green Economy Strategy and Implementation Plan (GESIP) (2016-2030)	GESIP is Kenya's blueprint to advance toward a low-carbon, resource efficient, equitable and inclusive socio-economic transformation. The GESIP aims to integrate resource use efficiency into and minimize negative environmental impacts related to the country's economic development.
National Climate Change Framework Policy (2018)	The *National Climate Change Framework Policy* (2018) aims to ensure the integration of climate change considerations into planning, budgeting, implementation and decision-making at the national and county levels and across all sectors.
National Climate Finance Policy (2018)	The *National Climate Finance Policy* (2018) establishes the legal, institutional and reporting frameworks to access and manage climate finance. The goal of the policy is to further Kenya's national development goals through enhanced mobilisation of climate finance that contributes to low carbon climate resilient development goals.
Big Four Agenda (2018)	The President's Big 4 Agenda (2018) establishes priorities areas for 2018 to 2022 of ensuring food security, affordable housing, increased manufacturing and affordable healthcare. Sector plans and budgets are expected to be aligned to help achieve the Big Four priorities.

Several **national-level ministries and departments** have established climate change units and climate change-related plans and policies to guide and mainstream action in their sector, listed in Table 5.

Table 5: National Sector Climate Change-related Plans and Policies

Sector	Climate Change-related Plan	Ministry/Department
Agriculture	Kenya Climate Smart Agriculture Strategy (2017-2026)	Ministry of Agriculture and Irrigation
Blue Economy (fisheries, coastal zones, marine transport)	Blue Economy Strategy (2017)	Ministry of Agriculture and Irrigation Ministry of Transport, Infrastructure, Housing and Urban Development
Disaster Risk Management	Kenya's Disaster Risk Financing Strategy (2018-2022)	National Treasury
Drought Management	Climate Risk Management Framework (2017)	National Drought Management Authority
Energy	Energy Bill (2017) – Part 3, section 43; Part 4, section 74 (i), and Part 9 address climate change-related issues	Ministry of Energy
Environment	Environmental Management and Coordination Act (No. 8 of 1999 and Amendment 2015) Biodiversity and Climate Change Strategy (2016) Kenya Strategic Investment Framework on Sustainable Land Management (2017-2027)	Ministry of Environment and Forestry
Finance	National Climate Finance Policy (2018)	National Treasury
Forestry	National Forest Programme (2017) - chapter on climate change REDD+ Readiness Plan and analysis (2013-2018)	Kenya Forest Service, Ministry of Environment and Forestry
Health	New Health Act (No. 21 of 2017) - section on environmental health and climate change (Part VII, sections 68 and 69)	Ministry of Health
Transport	Kenya National Aviation Action Plan for International Civil Aviation Organisation (ICAO) and Mitigation plan for International Maritime Organisation (IMO) (2017) Action Plan to Reduce CO_2 Emissions from Aviation (2015) Executive Order: The Nairobi Metropolitan Area Transport Authority (2017)	Ministry of Transport, Infrastructure, Housing and Urban Development
Water	Water Act (No. 43 of 2016) – establishes National Water Harvesting and Storage Authority Draft Water Harvesting and Storage Policy (2018)	Ministry of Water and Sanitation

Chapter 3: Priority Climate Change Actions for 2018-2022

3.1 Identification of Priority Climate Change Actions

This second National Climate Change Action Plan (NCCAP) (2018-2022) responds to the fact that climate change is impacting Kenyans. It identifies strategic areas where action over the next five years will help achieve the Big Four (see Box 7 below), recognising that climate change is likely to limit the achievement of the Big Four agenda. Food security, a Big Four pillar, is threatened because of declines in agricultural productivity caused by climate change. The destruction of tens of thousands of hectares of crops and drowning of livestock in the floods of March-May 2018 are a very real example of the impacts on farmers and pastoralists. Other climate impacts that negatively impact the Big Four agenda are an increase in malaria, cholera and other diseases; damage to infrastructure, including homes, schools and hospitals; and high prices for electricity due to a reliance on hydropower.

Adaptation actions are prioritised because of the devastating impacts of droughts and floods, and the negative effects of climate change on the poor and the vulnerable who are often women, children and marginalised groups. These actions will be undertaken in as low carbon a way as possible to ensure that Kenya's contribution to global GHG emissions remains low; and that the country achieves it Nationally Determine Contribution (NDC) under the Paris Agreement to reduce GHG emissions by 30% by 2030 relative to the business-as-usual scenario of 143 $MtCO_2e$.

Box 7: The Big Four

Food and Nutrition Security - Never again should we allow the vagaries of weather to hold us hostage. Over the next 5 years we shall invest heavily in securing our water towers and river ecosystems to harvest and sustainability exploit the potential of water resources. We shall provide, together with other actors, key enablers within the farming process that will address distribution, wastage, storage and value-addition of agricultural commodities.

Affordable Housing - Over the next 5 years, we will create 500,000 new homes owners through the facilitation of affordable housing, and a home ownership programme that will ensure every working family can afford a decent home by injecting low-cost capital into the housing sector. Reforms will be undertaken to lower the cost of construction and improve accessibility of affordable mortgages.

Enhancing Manufacturing - Over the next five years, we will grow the manufacturing sector and raise its share of the nation's cake from 9% to 15% by reducing power tariffs charged to manufacture by 50% between the hours of 10:00 pm and 6am. This is in line with our 24-hour economy policy.

Universal Health Coverage - Over the next 5 years, we will target 100% Universal Healthcare Coverage for all households by ensuring that 13 million Kenyans and their dependents are beneficiaries of the NHIF scheme. This will be achieved through a complete reconfiguration of the NHIF and reform of the laws governing private insurance companies.

The Official Website of the President (http://www.president.go.ke) sets out the Big 4 Action Plan.

Priority climate change actions also contribute to achieving sustainable development benefits (see Box 8). These actions will empower and benefit the poorest and most marginalised communities through direct and indirect benefits for reducing inequalities (such as benefits from ecosystem-based solutions that boost agricultural productivity and improve water accessibility, leading to enhanced incomes, food security and human health). The NCCAP (2018-2022) actions provide benefits for women through access to clean cooking, and restoration and agroforestry actions that provide energy and water sources. The actions also promote gender equality by ensuring women have access to new practices and technologies.

Box 8: Climate Change-SDG Impact Assessment

MEF-CCD analysed the impact of climate change actions on the SDGs and Big Four pillars. Particular attention was given to the way the climate actions address the overriding objective of the 2030 Agenda to "leave no one behind". This objective involved prioritising the poorest and most vulnerable in the pursuit of sustainable development to end extreme poverty and curb inequalities by 2030. The analysis systematically assessed the impact of all climate actions on SDG 1 on poverty eradication, SDG 5 on gender equality, and SDG 10 on reducing inequalities.

The assessment found that climate change adaptation and mitigation actions in NCCAP II address x targets across the 17 SDGs. The greatest potential benefits are related to:

- Sustainable agriculture and food security (SDG 2 and Big Four Food Security)
- Sustainable and renewable energy (SDG 7 and Big Four Manufacturing)
- Ecosystem restoration and preservation (SDG 15 and Big Four Food Security)
- Water availability (SDG 6 and Big Four Food Security)
- Sustainable growth and industry (SDG 8 and Big Four Manufacturing)
- Sustainable transport (SDG 9)
- Sustainable waste management (SDG 11)
- Human health (SDG 3and Big Four)

Low-carbon energy sources; ecosystem-based solutions such as climate smart agriculture, rangeland restoration and agroforestry; and the development of clean public transport have sizeable win-win benefits for boosting employment and manufacturing capacity, protecting the environment and narrowing inequalities. These synergies are reflected in the selection of NCCAP (2018-2022) priority actions.

Government of Kenya (2018). Draft Sustainable Development Assessment of Climate Change Actions. Nairobi: MEF.

The priority climate change actions reflect input received from National and County Governments, marginalised and minority groups, youth, private sector, civil society, and sector experts through a participatory process led by the Task Force working with the Adaptation and Mitigation Thematic Working Groups (See Annex 1 for a list of TWG members) and the MEF-CCD. Further details on the priority actions, and all other climate change actions identified by stakeholders, are included in the Adaptation Technical Analysis Report and the Mitigation Technical Analysis Report, which are an integral part of this NCCAP (2018-2022).

These climate change actions will be mainstreamed in the Third Medium Term Plan and in Country Integrated Development Plans, ensuring that strategic climate change actions are taken up across the country.

3.2 Priority Climate Change Actions

This NCCAP outlines the programmes and strategies for adaptation and mitigation for 2018 to 2022. It is a comprehensive plan that:

- Supports achievement of the Big Four agenda and sustainable development goals;
- Enhances the adaptive capacity and resilience of communities, with an emphasis on marginalised and minority groups; and
- Undertakes actions in as low-carbon manner as possible to ensure that Kenya achieves its NDC under the UNFCCC Paris Agreement.

The priority climate change actions are summarised in Table 6 and described in this chapter. Information is included on the climate risk or issue being addressed, alignment with the Big Four Agenda, alignment with SDGs, opportunities that can be addressed through climate change action, priority climate change actions, relevant institutions to deliver the actions, and if the action is adaptation or mitigation. The NCCAP recognises that certain activities cut across the strategic priorities, such as technology and innovation, climate finance, capacity building and knowledge management, which are described in Chapter 4.

Table 6: Priority Climate Change Actions

Priorities	Objectives
1. Disaster Risk Management	Reduce risk of women and men to climate-related disasters (such as floods and drought); and reduce risks to communities and infrastructure
2. Food and Nutrition Security	Increase food and nutrition security through enhanced productivity and resilience of the agricultural sector in as low-carbon manner as possible.
3. Water and the Blue Economy	Enhance resilience of the water sector by ensuring access to and efficient use of water for agriculture, manufacturing, domestic, wildlife and other uses.
4. Forestry, Ecosystems, Wildlife and Tourism	Increase forest cover to 10% of total land area; rehabilitate degraded lands, including rangelands; increase resilience of the wildlife and tourism sector.
5. Health, Sanitation and Human Settlements	Reduce incidence of malaria and other diseases expected to increase because of climate change; promote climate resilient buildings and settlements, including urban centres, ASALs and coastal areas; and encourage climate-resilient solid waste management
6. Manufacturing	Improve energy and resource efficiency in manufacturing sector
7. Energy and Transport	Climate-proof energy and transport infrastructure; develop renewable energy development; increase uptake of clean cooking solutions; and develop environmentally sustainable transport systems

Climate Change Priority 1: Disaster (Drought and Flood) Risk Management

Climate-related disasters, such as drought and floods, could prevent the achievement of the Big Four agenda. The impacts of these disasters are felt at the household level through food insecurity, damage to property and increased prices of food and fuel; and at the national level, where scarce government resources are re-allocated to address the impacts of floods and

drought at the expense of social programmes such as health and education. Climatic shocks have significant impacts on national GDP.[76]

Prolonged and chronic droughts in Kenya are increasing due to poor or failed rains caused by climate change. Drought conditions in late 2017 and early 2018 left 3.4 million people severely food insecure and an estimated 500,000 people without access to water.[77] The cyclical nature of drought disasters and incomplete recovery from the climate-related impacts of drought means that some households have become increasingly vulnerable, losing their ability to spring back.[78]

Prolonged droughts lead to crop failure and shrinking of productive crop areas, reducing food security and increasing malnutrition. Droughts increase water scarcity with negative impacts for communities, especially for women and girls who have to travel long distances for water and have less water for hygiene. Droughts mean that women work harder to feed and care for their families, and women take up roles that used to be the preserve of men, who often migrate to take up paid work in urban areas.

Droughts have negative impacts on pastoralists in the ASALs, including livestock deaths due to lack of forage and water, and increases in insecurity and conflicts within Kenya and across national borders. Many pastoralists keep large livestock herds for cultural reasons, but also to cushion against the adversities of drought,[79] that can have negative impacts on rangeland management. A significant number of people in the ASALs rely on emergency assistance in times of drought.

Droughts negatively impact businesses through reduced water for manufacturing processes, increased costs of inputs in the agro-processing sector, and increased prices for electricity as hydropower declines replaced by diesel generators.

Floods have more immediate, and often large-scale impacts, such as the flooding in early 2018 that claimed over over 183 lives and displaced more than 225,000 people,[80] and the Solai dam disaster in May 2018 that claimed 47 victims, over half of them women and children. Persons with disabilities (who are often the poorest of the poor) are particularly at risk during floods and disaster as they may be left behind or abandoned during evacuation. Eleven flood-prone areas have been identified in Kenya (see Figure 13).

The priority climate actions promote a proactive, rather than reactive, approach to climate-related disasters that work to ensure that disasters are curtailed, do not result in emergencies and build the capacity of people to cope with the impacts of climate change. The actions include flood and drought early warning systems including at the community level, improved social protection programmes for chronically food insecure populations, implementation of flood management plans (that include water storage, drainage networks, reforestation and rehabilitation of riparian areas, construction of dams, land use restrictions[81]), County Climate Change Funds for locally-identified priority adaptation actions, and community-level capacity building to raise awareness and educate on disaster management and flood hazards.

[76] Add infographic, request Kenya map of PREPARED regional maps.
[77] UNICEF (2018).
[78] Njoka (2016, page
[79] Njoka (2016), page 24
[80] KMD (2018).
[81] Republic of Kenya (2012), *Isiolo River Basin Integrated Flood Management Plan*.

Figure 6: Flood-prone areas of Kenya

Source: Kenya El Niño Response Plan 2015–16

These actions will complement the National Drought Emergency Fund (NDEF) that was established in 2018 with an annual allocation of KES 2 billion from the Exchequer to support action against climate induced risks, including drought risk management, resilience and preparedness measures, response interventions and recovery interventions that include protecting the most vulnerable populations.[82] Some actions can be implemented through existing programmes such as Hunger Net Safety Programme, CCCFs, and the Kenya Cereal Enhancement Programme – Climate Resilient Agricultural Livelihoods.

The climate change actions to proactively manage climate-related disasters result in:

- Adaptation – increased number of households benefiting from social protection systems (reaching the poor, marginalised groups, persons with disabilities, and female-headed households) and County Climate Change Funds; and improved ability to cope with droughts and floods through early warning systems, water harvesting and storage, and implementation of integrated flood management plans.
- Big Four – progress toward the achievement of all four pillars by ensuring that climate-related disasters do not divert resources.
- Sustainable Development – Pro-poor actions that reduce the exposure and vulnerability of the poor and marginalised groups to climate disasters and shocks. In

[82] KIPPRA, https://kippraconference.org/wp-content/uploads/2018/06/DAY-2-Conference-Proceedings-A-Summary-Reviewed.pdf

particular, women, as community caregivers and central players in disaster response, are provided with resources and support to carry out these roles effectively.

Strategic Objective 1: Reduce the risk women and men to climate-related disasters (such as floods and drought) by proactively managing climate-related disasters through improved responsiveness of relevant institutions for enhanced resilience at all levels (national, county, community)		
Issue/problem: Floods and drought have national economic consequences and extensive socio-economic effects at the household and community level, especially for women, children and marginalised groups. Inadequate early warning systems, lack of disaster management coordination, and support to build disaster preparedness (current responses are reactive rather than proactive)		
Big 4 Pillars: Linked to Food Security, Health, Manufacturing		
SDGs: 1 – End poverty; 2 – End hunger; 5 – Gender equality		
Actions	**Expected Results by 2022**	**Adaptation/ Mitigation**
1. Increase number of households and entities benefiting from devolved adaptive services	▪ Number of beneficiaries of social protection mechanisms and other safeguards increased from 100,000 to 150,000 for regular beneficiaries; and from 90,000 to 130,000 for scalability beneficiaries. ▪ Number of households better able to cope with climate change because of receiving benefit from County Climate Change Funds from increased 300,000 households in 2018 to 800,000 households. Climate Change Funds address local adaptation priorities that are identified and monitored by community committees comprised of women and men.	Adaptation Climate risk: extreme weather events, including droughts and floods
2. Improve ability of people to cope with drought	▪ Drought early warning systems improved, and increase the number of climate information recipients factoring climate early warning information in their risk management decisions increased from 1,000,000 to 2,000,000. ▪ Water harvesting and storage (see expected results under Climate Action 3 - water).	Adaptation Climate risk: high temperatures and lack of rain leading to loss of crops and animals (livelihoods), water scarcity, low attendance at schools, hygiene issues especially for women and girls
3. Improve ability of people to cope with floods	▪ Flood early warning systems established in 10 communities. ▪ Actions implemented in the 11 integrated flood management plans. ▪ Dam Safety Control System established including a needs assessment, development of safety manuals and codes of practice. ▪ Capacity development of 50 Water Resources Users Associations (WRUA), which are community-based organizations that are rights-based groups with female and male membership. ▪ Water and flood control including dams/dykes, drainage systems, water storage (see expected results under Climate Action 3 - water).	Adaptation Climate risk: heavy rainfall and flooding leading to damage to and loss of infrastructure (houses, roads, health clinics, schools); loss of property and livelihoods, increase in water-borne diseases such as cholera

Enabling (legal)	Disaster Risk Management Act implemented, including the establishment of: ▪ Disaster Risk Management Authority to coordinate disaster response ▪ County Disaster Risk Management Committee to coordinate disaster response at the County level ▪ Disaster Risk Management Fund to provide funds for disaster preparedness, mitigation of disaster impacts, disaster rezone's and recovery measure.	Enabling
Enabling (technology)	▪ Expertise developed to customize and manage satellite-generated vegetation condition index used for drought early warning and response	Enabling
Relevant Institutions: County Governments, CoG, NDMA, National Treasury, MEF-KMD, Water Resources Authority (WRA), WRUAs.		

Climate Change Priority 2: Increase Food and Nutrition Security

Climate change has the potential to prevent the achievement of the Big Four goal of 100% food and nutrition security by 2022. Climate change is expected to negatively impact crop yields in Kenya, with up to 45% yield reductions expected for maize, rice and soybean cops by 2100; and up to 40% yield losses for tea and coffee because of the reduction of suitable areas for cultivation caused by temperature increase. Livestock numbers are expected to decline as water resources become increasingly scarce. The agriculture sector is highly susceptible to the vagaries of weather, including temperature increase, precipitation changes and extreme events.

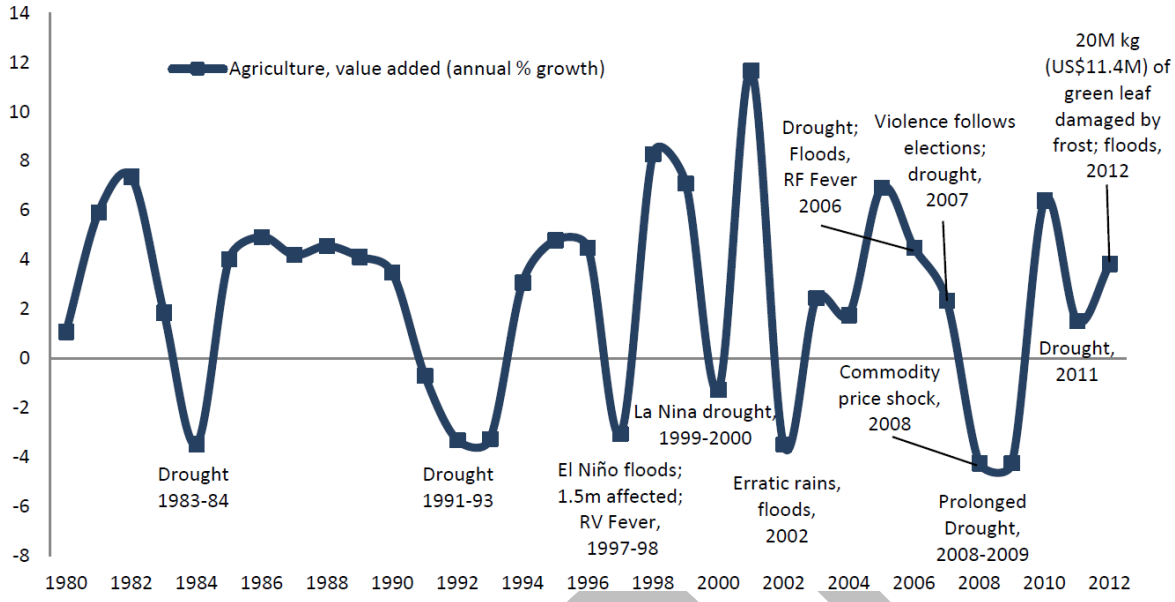
Climate shocks significantly impact the annual growth rate of the agriculture sector (see Figure 6); and this growth (or decline) has a large impact on the national economy.

Dry weather conditions in 2017 led to a decline in the production of most agricultural commodities, with real gross value added in the agriculture sector growing at a decelerated rate of 1.6% from KES 879.6 billion in 2016 to KES 893.3 billion in 2017.[83] The impacts of the 2017 drought included:

- Maize production declined by 6.3% in 2017 from 2016.
- Tea production decreased by 7% in from 2016, despite increases in the area under production.[84]
- The number of cattle slaughtered rose by 5.3% from 2016 to 2017, which was attributed to the drought as farmers and pastoralists slaughtered animals to cushion their losses.[85]
- The quantity of fish from fish farming decreased from 15.0 thousand metric tonnes in 2016 to 12.4 thousand metric tonnes in 2017 because farmers did not re-stock fish ponds in 2017 due to high prices of inputs and the drying up of ponds due to drought.[86]

[83] KNBS (2018), *Economic Survey 2018 (*Nairobi: KNBS), page 113.
[84] KNBS (2018), pages 118 and 121.
[85] KNBS (2018), page 126.
[86] KBNS (2018), page 139.

Figure 7: Historical timeline of major agricultural production shocks in Kenya, 1980-2012



Source: World Bank, 2016.

- The overall Import Dependency Ration of the Food Balance Sheet increased from 29.4% in 2016 to 42.7% in 2017 because of increased imports of vegetable products caused by food deficits that resulted from drought.[87]

At the household level, drought causes high food prices; in 2017 the prices of maize, sugar, rice and milk hit record highs.[88] The price of one kilogram of sugar increased from an average of KES 118 in 2016 to KES 138 in 2017.[89] These high prices particularly impact the rural areas of Kenya, where households spent more than 60% of their income on food in 2017, compared to 49% in core-urban areas.[90]

Pastoralists are impacted because extreme weather events lead to lead to reduced pasture and forage availability, degradation of the environment and an increase in poverty. Strong winds and dust storms contribute to the reduction of forage availability as they erode top soil, thus making grass and rangeland regeneration difficult even when it rains. Recurring droughts have caused heavy losses to livestock, forcing an estimated 30% of livestock owners out of pastoralism in the past 20 years.[91]

Fisher communities report that increasing temperature impact fish breeding and fish distribution. In the coastal areas, fish are moving from in-shore to deeper waters and artisanal fisher folk lack the technologies to safely fish in deeper waters. Climate change is also causing storms and rougher seas, preventing fisher communities from earning a living and obtaining fish for sustenance in the months of May, June and July.[92]

[87] KBNS (2018), page 130.
[88] Business Daily (2017, *Kenya not yet out of the woods over high food prices* (21st December).
[89] KBNS (2018), page 55.
[90] KNS (2018), page 295.
[91] Ministry of Agriculture, Livestock and Fisheries (2017). *Kenya Climate Smart Agriculture Strategy*: 2017-2026 (Nairobi: MALF), page 49
[92] Consultations with Marginalised Communities, Nakuru, May 2018.

Most climate actions to increase food security take place in the agriculture sector, which includes crops, livestock and fisheries. Agriculture is a priority of the people of Kenya because of the sector's importance to food security, rural livelihoods and poverty alleviation. The agriculture sector contributed 31.5% of GDP in 2017[93], provides about 75% of total employment in Kenya and supports over 80% of the rural population.[94]

Adaptation actions help to increase food and nutrition security by ensuring that agricultural yields are maintained or increased in a changing climate. Increasing production in a changing climate is necessary to achieve the Big Four goal of 100% food and nutrition security over the next five years by enhancing large-scale production, driving smallholder productivity, and reducing the cost of food.

The main action will be the implementation of the Climate Smart Agriculture Strategy, 2017-2026 that aims to enhance the adaptive capacity and resilience of farmers, pastoralists and fisher-folk; and minimise GHG emissions from agricultural production systems. Actions with measurable goals over the next five years are included in the table below, with other actions set out in the ATAR and MTAR, which are an integral part of this NCCAP.

To be successful, these actions will include focused interventions to address gender because women account for 75% of the labour in the agriculture sector.[95] Many impoverished women are farmers who suffer the impacts of climate change more than men because of lack of input to decision-making, insecure land tenure and limited access to land, and limited access to livestock and technology. Farmer field schools are a participatory and effective way to transfer knowledge to, and learn from, women farmers. Gender-aware agricultural extension services are essential to ensure that women receive, use and benefit from vital information, such as Climate Information Services (CIS).

CIS is also important for pastoralists, and the information needs to be available in local languages and on the radio, to reach those who are illiterate and do not understand the languages used by most radio and television stations. Actions to establish water sources for livestock and to effectively manage rangeland to set aside ungrazed areas to be used during drought emergencies.

Adaptation actions are the priority to improve food and nutrition security because climate change has the potential to negatively impact agricultural production, and food security takes precedence over mitigation of GHG emissions. That said, some actions that improve climate resilience can also reduce GHG emissions - such as agroforestry, sustainable land management and encouraging efficiency in livestock management. Reducing GHG emissions where possible is important because agricultural emissions accounted for approximately 40% of total national emissions in 2015.[96]

Some climate actions to increase food and nutrition security will be supported through on-going programmes, including the Kenya Climate Smart Agriculture (CSA) Strategy Implementation Framework and Project, National Agricultural Rural Inclusive Growth Project, National Safety Net Programme; and insurance pilot programmes.

[93] KBNS (2018, Page 19.
[94] Ministry of Agriculture, Livestock and Fisheries (2017). *Kenya Climate Smart Agriculture Strategy*: 2017-2026 (Nairobi: MALF), page 17.
[95] GoK (2018), ATAR, page 116.
[96] Government of Kenya (2015). Second National Communication to the UNFCCC.

The climate change actions to improve food and nutrition security result in:

- Adaptation – maintained production and enhanced resilience of the agricultural sector through livelihood and crop diversification, increased water harvesting and storage, increased irrigation, sustainable land management, reductions in post-harvest losses, and uptake of insurance.
- Mitigation –GHG emissions of 1.6 to 2.8 $MtCO_2e$ by 2030, through agroforestry, minimum tillage systems, manure management and efficiency in livestock management.
- Big Four – progress toward the achievement of food and nutrition security.
- Sustainable Development – improved food and water availability, and greater access to food. Improved incomes of pastoralists and small-holder farmers through increased productivity, and improved health with more healthy food available.

Strategic Objective 2: Increase food and nutrition security by enhancing productivity and resilience of the agricultural sector in as low carbon manner as possible without compromising productivity		
Issue/Problem: Climate change is negatively impacting agricultural productivity and resilience of value chain actors, including households (farmers, pastoralists and fisher folks). An increase in the severity and frequency of climate change-related disasters such as drought and floods poses threats to food security and negatively impacts small-scale and large-scale farmers, pastoralists and fisher communities.		
Big 4 Pillar: Food Security		
SDGs: 1 – End hunger; 2 – End poverty; 14 – Sustainable use of marine resources; 15 – Halt land degradation		
Action	**Results by 2022**	**Adaptation / Mitigation**
1. Improve crop productivity through the Implementation of priority actions in the Climate Smart Agriculture Strategy: 2017-2026	▪ Number of institutions/value chain actors and households harvesting water for agricultural use/production increased to 500,000 ▪ Acreage under irrigation increased from 202,000 ha to 486,000 ha ▪ Production efficiency from irrigated fields increased from 50% to 90% ▪ Number of institutions/value chain actors and households harvesting water for agricultural use/production increased to 500,000 ▪ Agricultural pre- and post-harvest losses from reduced 40% to 15%. ▪ Number of beneficiaries accessing climate-oriented crop insurance from increased from 2,800,000 farmers to 3,500,000 farmers. ▪ Number of farmers accessing appropriate agricultural inputs subsidies increased from 239,000 to 311,300 farmers.	Adaptation Addresses climate risk: increased temperatures and changes in precipitation lead to declines in crop production and yields Builds resilience: Improves access to food and increases commodities for the market
	▪ Number of households and acreage under sustainable land management (SLM) increased for agricultural production - 60,000 ha of degraded land reclaimed	Adaptation Addresses climate risk: land degradation Mitigation

	- Area under integrated soil nutrient management increased by 250,000 acres - Farm area under conservation agriculture increased to 250,000 acres, incorporating minimum/no tillage - Total area under agroforestry at farm level increased by 200,000 acres	GHG emission reductions of 4.4 $MtCO_2e$ by 2022 (conservation tillage) GHG emission reductions of 2 $MtCO_2e$ by 2022 (agroforestry)
2. Improve productivity in the livestock sector through the Implementation of priority actions in the CSA Strategy	▪ Number of customers/ beneficiaries accessing climate-oriented livestock insurance increased from 18,000 to 105,750 farmers. ▪ Productivity of pastoralists improved: - 10,000 hectares of rangelands re-seeded in 23 ASAL counties - Annual ASALs water harvesting and storage increased by 25% from 16 million cubic meters (MCM) to 20 MCM via small dams and pans and 700 MCM through large multipurpose dams.	Adaptation Addresses climate risk: land degradation Addresses climate risk: increased temperatures and changes in precipitation leading to water shortages
	▪ Dairy Nationally Appropriate Mitigation Action (NAMA) implemented to improve efficiency in dairy management for 267,000 households ▪ Manure management improved through the adoption of biogas technology use by 80,000 households and at least 200 abattoirs	Mitigation GHG emission reductions of 4.4 $MtCO_2e$ by 2022 (dairy) GHG emission reductions of 2.0 million tCO_2e by 2022 (biogas)
3. Improve productivity in the fisheries through Implementation of priority actions in the CSA Strategy	▪ Insurance packages piloted and developed for the fisheries sub-sector. ▪ Aquaculture production increased: - Number of cages for fish farming increased from 3,450 to 8,000 - Number of fish ponds increased by 16,000 - Number of farmers using low-carbon (recirculating) aquaculture systems increased from 20 to 180 by 2022 ▪ Coastal fisheries improved by addressing overcapacity of artisanal fishing vessels by increasing deep/offshore fishing fleet from 9 to 68 (linked to Action 3: Water and Blue Economy)	Adaptation: Addresses climate risk: Increased temperature impact fish farming by drying of ponds; and on-shore fish have moved into deeper waters. Increase in extreme weather events poses risk to fisher-folk
4. Diversify livelihoods to adjust to a changing climate	▪ At least 521,500 households supported to adopt diversified adaptive enterprises/value chains for sustained livelihoods and nutrition security. ▪ Small-scale famers, pastoralist and fisher folk are support to transition to specialised and market-oriented output in 13 priority value chains, including drought tolerant values chains (ASTGS).	Adaptation Livelihoods diversification
Enabling Action – technology and knowledge management	▪ Number of counties developing and implementing Climate Information Service plans increased from 9 to 47. - Linked to Action 1: Disaster Risk Management and Enabling Action T4	Enabling
Relevant Institutions: County Governments, CoG, Ministry of Agriculture and Irrigation (MAI), Ministry of Water and Sanitation (MWS), Water Resources Authority (WRA), MEF-KFS, MEF-KMD, Kenya Agriculture and Livestock Research Organisation (KALRO), Private sector, World Agroforestry Centre, International Livestock Research Institute (ILRI), Farmer Organisations, Fisher Organisations, Pastoralist Organisations		

Climate Change Priority 3: Water and the Blue Economy

Water scarcity, which is exacerbated by climate change, has the potential to undermine achievement of the Big Four agenda. Water is also linked to the Blue Economy, which refers to the "sustainable use and economic development of both aquatic and marine spaces, including oceans, coasts, lakes, rivers and underground water."[97]

Kenya is a water scarce country with per capita water availability of 647 cubic metres (m^3), which is well below the global benchmark of 1000 m^3 per capita. Water coverage in the country currently stands at 55%, meaning that approximately 45% of Kenyans lack access to clean and safe drinking water. Kenya's per capita surface water storage is estimated to be 103.1 m^3; with only 3.1 m^3 available for domestic, livestock, industrial and irrigation use with the balance being for hydroelectric power generation. [98] The water situation in Kenya is made worse by climate change and deforestation, and compounded by low storage capacity, a growing demand for water, and sharing of over half the rivers, lakes and aquifers with neighbouring countries. The rivers are drying up, lake levels are receding, dams and water pans are silting, and water quality is deteriorating.

Erratic rains due to climate change have affected water supply with impacts on food production. In early 2018, many cities faced acute water shortages following a prolonged dry spell, and many rivers dried up impacting rural and urban areas. Rural women are particularly affected because of impacts on their small-scale agribusinesses and the need to walk longer distances to obtain water.

Climate change also impacts the Blue Economy. Extreme weather events negatively impact maritime and shipping activities, and sea level rise and storm surges flood coastal settlements and damage coastal infrastructure, such as ports. In the longer term, ocean acidification could have negative impacts on fisher communities through declines of fish populations and their movement to deeper waters because of warming ocean waters. The economic cost of climate change impacts on fisheries and aquaculture is estimated to be 3% of GDP per annum by 2030 and possibly 5% by 2050.[99] Maritime transport is a contributor to climate change, accounting for approximately 2.7% of annual global CO_2 emissions in 2014, and potentially rising to 10% of total global GHG emissions by 2050 if other sectors make significant reductions.[100]

The climate change actions involve women, who help to reduce water wastage at household level and to some extent also support water agencies in reducing wastage. The fisher communities are also engaged because of their role in coastal communities. Many of the actions will be implemented under existing initiatives such as Ending Drought Emergencies, African Initiative for Combatting Desertification and Kenya Integrated Water, Sanitation and Hygiene Project; and some will be delivered through existing partnerships with World Agroforestry Centre (ICRAF), World Food Programme (WFP) and NDMA.

The climate actions to result in:

- Adaptation – increased water availability through water harvest and storage, improved water efficiency, and improved water availability.
- Big Four – Progress toward the achievement of food and nutrition security.

[97] Government of Kenya (2018). *Sector Plan for the Blue Economy*. Kenya Vision 2030. Page 3.
[98] World Bank (2012) …
[99] Government of Kenya (2018), page 19
[100] IMO (2014).

- Sustainable Development – Reduction in water scarcity, improved human well-being.

Strategic Objective 4: Enhance resilience of the water sector by ensuring adequate access to and efficient use of water for agriculture, manufacturing, domestic, wildlife and other uses.		
Issue/problem: Access to and quality of water is expected to decline because of climate change (drought, reduction of glaciers).		
Big 4 Pillars: Food Security, Health and Manufacturing		
SDG 6: Clean water and sanitation; 1 – Reduce poverty; 3 – Health; 9, 12 - 14 – Conserve and sustainably use the ocean		
Action	**Expected Results by 2022**	**Adaptation/ Mitigation**
1. Increase annual per capita water availability through the development of water infrastructure (mega dams, small dams, water pans, untapped aquifers)	▪ Increase annual per capita water availability (harvested, abstracted[101] and stored) from 647 m^3 to 1000 m^3 by 2022[102] by: - Construction of 12 multipurpose dams (Thwake, Thiba, Radat, Gogo, Thuci, Kaiti, Lowaat, Rupingazi, Thambana, Maara, Kithino, Kamumu) (under construction in 2018), accounting for expected climate impacts (climate-proofed infrastructure) - National hydrogeological survey undertaken to identify major strategic aquifers - Two locations identified and mapped for direct artificial groundwater recharge - Five ground water surveys to establish abstraction levels against recharge - 56 sub-catchment management plans developed, and 236 sub-catchment management plans implemented. - *Linked to Action 1: Disaster Risk Management*	Adaptation Addresses climate risk of high temperatures and changing precipitation patterns causing water shortages
2. Climate proof water harvesting and water storage infrastructure and improve flood control	▪ The annual number of climate-proofed water harvesting, flood control and water storage infrastructure increased from 700 to 2,000, through - Integrated catchment approach and ecosystem-based adaptation structural/ mechanical design, e.g. structural catchment protection, especially in the upper catchments - Development of flood early warning systems in areas susceptible to floods. Linked to Climate Action 1: Disaster Risk Management	Adaptation Addresses climate risk of high temperatures and changing precipitation patterns causing water shortages
3. Increase number of pro-poor water harvesting-based livelihood resilience programmes	▪ Enhanced household water access and food security through water harvesting through: - 300,000 farm ponds installed - Road water runoff captures. Linked to Action 7: Energy and Transport - Livelihood systems improved on 60,000 ha	Adaptation Addresses climate risk of high temperatures and changing precipitation

[101] Ensure that underground water abstraction is accompanied by aquifer recharge points
[102] Less than 1700 m^3 = regular water stress; less than 1000 m^3 = chronic scarcity; less than 500 m^3 = absolute scarcity

	- Water utility creditworthiness index developed as well as tool kits on commercial lending to the water and sanitation sector to attract Public-Private Partnerships	patterns causing water shortages
4. Promote water efficiency (monitor, reduce, re-use, recycle and modelling)	▪ Reduce water wastage and non-revenue water from the current 43% to 20% through, for example: - Innovation in water tracking and leakages identification and reporting - Awareness programme for water efficiency	Adaptation Addresses climate risk of water shortages
5. Improve access to good quality water	▪ Number of people and entities accessing good quality water for domestic, agricultural and industrial use from increased 58% to 65% - Large-scale installation of water meters - Regular inspection of water quality	Adaptation Increases resilience
6. Green the Mombasa port	▪ Implement the greening of Mombasa port plan, that will build resilience and mitigation GHG emissions, through: - Installation of solar panels - Waste management - Rain water harvesting	Adaptation Addresses climate risk of sea level rise and storm surges Mitigation
Enabling actions (policies and regulations)	▪ Development of Blue Economy Master Plan to provide a blue print to guide the long-term holistic development of the Blue Economy ▪ Zero rating taxes of water harvesting and storage equipment to stimulate household and institutional water harvesting in rural and urban areas ▪ Develop a water harvesting policy for institutions and households. Review by-laws that prohibit water harvesting in urban areas like in Nairobi ▪ Develop a national framework for waste water management ▪ Formulate policy for recycled water pricing and beneficiary sectors such as construction, watering flower beds, and car washes. ▪ Enforce laws on urban planning and storm water management in urban areas – desilting of drainage, riparian protection	Enabling
Relevant Institutions: County Governments, CoG, Ministry of Water and Sanitation (MWS), IMO, MOTIHUD, National Treasury, Attorney General, Ministry of Tourism and Wildlife, Kenya Wildlife Service, Water Harvesting and Storage Authority, WRA, NDMA, Civil society, Private sector, Fisher organisations		

Climate Change Priority 3: Forests, Ecosystems, Wildlife and Tourism

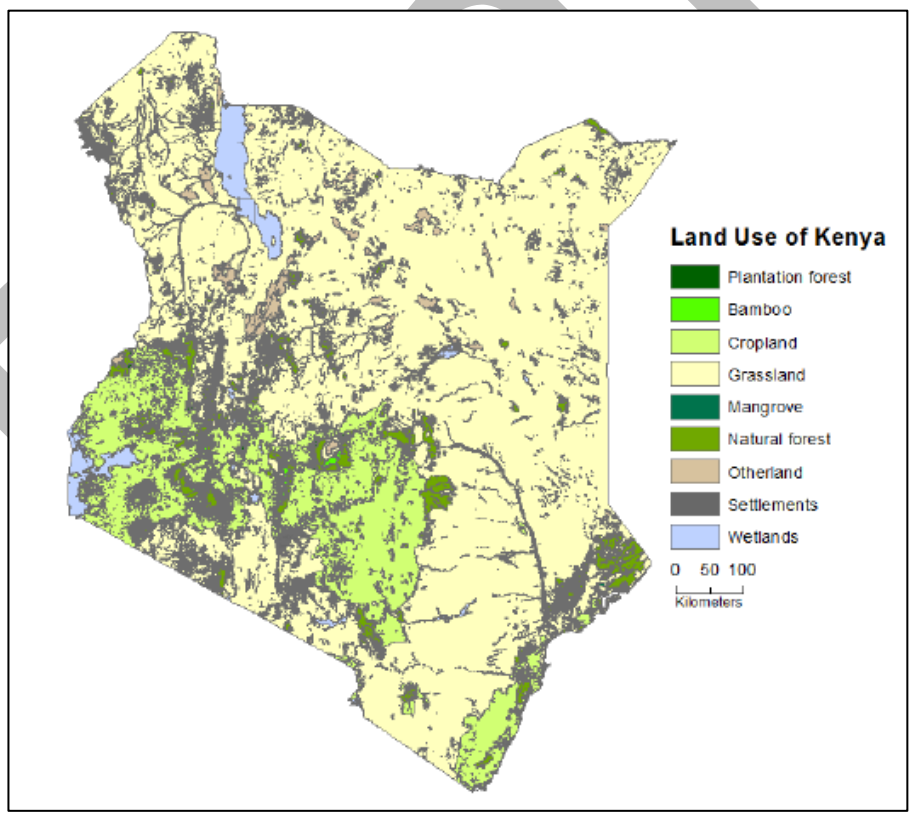
Sustainable and productive management of land and land resources are enshrined in Chapter 5 of the Kenyan Constitution, which among other things, stipulates that the state will work to achieve and maintain a tree cover of at least 10% of total land area.[103] Kenya is composed of seven different agro-ecological zones (Figure 7). The land consists of 82% arid and semi-arid

[103] Article 69(1)(b) of the Constitution of Kenya, 2010

land (ASAL) and 18% humid to semi-humid land, [104] meaning that several ecosystems, providing various services, exist across Kenya.

Kenya's forest area covered 7.4% of land area in 2018[105], comprised of natural forests, plantation forests, open woodlands and a small amount of mangrove forests on the coast. Grasslands are common in the ASAL area, although there are scattered natural forests that are small in area.[106] Kenya's forestry sector is central to its economy and its future. Forests are important national assets in terms of economic, environmental, social and cultural values. The forest sector is estimated to contribute about KES 7 billion to the economy annually and employs over 50,000 people directly and another 300,000 indirectly. Five forests in the main water towers regulate 75% of the country's renewable water supplies, and more than 80% of the energy generated in Kenya comes from wood.[107] Forests offer water catchments, biodiversity conservation functions and are home to and provide a variety of goods that support the subsistence livelihoods of many indigenous communities, including hunter-gatherers.[108]

Figure 8: Land use of Kenya



Source: Government of Kenya (2016), Improving Capacity in Forest Resources Assessment in Kenya (IC-FRA): Proposal for National Forest Resources Assessment in Kenya (NFRA).

[104] Government of Kenya (2016), Kenya Forest Service; Improving Capacity in Forest Resources Assessment in Kenya (IC-FRA): Proposal for National Forest Resources Assessment in Kenya (NFRA)
[105] KBNS (2018), *Economic Survey 2018*, page 140.
[106] Government of Kenya (2016), (IC-FRA).
[107] Government of Kenya (2018), *Kenya Forest Service*, http://www.kenyaforestservice.org/index.php/about-kfs/history-of-forestry-in-kenya (from MTAR - check).
[108] Ministry of Environment, Water and Natural Resources (2014). *Forest Policy, 2014*. Nairobi: MENR. page 1.

Deforestation and forest degradation is a significant problem in Kenya that releases large amounts of greenhouse gases, driven mainly by clearance for agriculture that is linked to rural poverty and rapid population growth, unsustainable utilisation of forest products (including timber harvesting, charcoal production, grazing in forests), and past governance and institutional failures in the forest sector.[109] The negative impacts that result from deforestation (such as soil erosion, impacts on water cycles, increased flooding) are exacerbated by climate change.

Climate change is likely to affect the growth, composition and regeneration capacity of forests resulting in reduced biodiversity and capacity to deliver important forest goods and services. Climate change also impacts biodiversity and wildlife, with subsequent impacts on tourism. In regard to wildlife, climate change is expected to shift species distribution, reduce population size and lead to extinction of some species.

Actions to increase forest cover and prevent deforestation have important climate resilience benefits. Forests provide ecosystem services that contribute to reducing the vulnerability of people, and wildlife. Mangroves protect coastal areas against storms and waves, which are projected to become even more intense with climate change and climate-induced sea-level rise. Forest products provide safety nets to local communities when climate variability causes crop failures. Forests also provide hydrological ecosystem services such as regulation of storm waters. Upper watersheds can increase infiltration of rainwater, reduce surface run-off and control soil loss, thus decreasing the destructive impacts of floodwaters. By storing run-off, forests can also act as natural water recharge areas by replenishing stream-flows. Any actions to combat deforestation and speed up restoration of degraded lands will contribute to economic growth, poverty reduction and greater food security as well as help communities adapt to climate change and secure the rights and livelihoods of indigenous peoples and local communities.

Forests also mitigate the harmful effects of GHG emissions by acting as a "sink" by sequestering carbon and storing it for long periods of time. The forestry sector is the second largest contributor to Kenya's GHG emissions after agriculture, accounting for 32% of emissions in 2015, largely a result of deforestation.[110] The sector offers the greatest potential of all mitigation sectors to reduce emissions (illustrated in the green wedge in Figure 5 on page 24). The calculation of the technical mitigation potential began with the assumption that Kenya's forest cover increases from 6% in 2013 to 10% by 2030, which would involve rehabilitating and protecting forests on 2.4 million hectares of land.[111] **If the forest sector were to achieve 10% tree cover, Kenya would meet its NDC target.**

While reducing GHG emissions is critical, mitigation actions that have adaptation and sustainable development benefits are prioritised in this NCCAP (2018-2022). Work is needed to measure the results and benefits of action in the forestry and land-use sector, requiring linking the SLEEK with the MRV+ and M&E systems (see Enabling action M3 on page 82). Actions in other sectors also contribute to an increase in forest cover and sustainable ecosystem management, including sustainable charcoal production (Climate Action 6) and the promotion of clean cooking (Climate Action 7).

[109] [109] GoK (2010), Kenya Forest Service; Kenya Forest Service Study Report 2010
[110] Government of Kenya (2015), Second National Communication.
[111] Government of Kenya (2013), Chapter 4, Forestry, Mitigation Analysis.

The climate change actions in the forests, ecosystems, wildlife and tourism sector result in:

- Adaptation – sustainability managed forests, increased forest cover, improved management of rangelands and grasslands, reduced coastal erosion (mangroves), maintenance of ecosystems for wildlife and linking of protected areas.
- Mitigation – GHG emission reductions of 18 $MtCO_2e$ by 2030, through REDD+, forest restoration, and afforestation and reforestation.
- Big Four – Progress toward the achievement of food and nutrition security.
- Sustainable Development – Improved food and water availability, improved livelihoods of hunter-gatherers, healthy wildlife populations and viable tourism operations.

Strategic Objective 3: Increase forest cover to 10% of total land area; Rehabilitate degraded lands, including rangelands; increase resilience of wildlife.		
Issue/Problem: Unplanned development (agricultural expansion, settlement and infrastructure development) and reliance on biomass for cooking leads to deforestation and forest degradation, with negative impacts on wildlife, and increases GHG emissions.		
Big 4 Pillar: Food Security		
SDG 15 – Life on land,5 – Gender Equality; 6 – Sustainable Water; 7 – Sustainable Energy		
Actions	**Results by 2022**	**Adaptation/ Mitigation**
1. Afforest and reforest degraded and deforested areas in Counties	▪ An additional 100,000 ha of land are afforested or reforested (including agroforestry), aiming to plant one million trees per County per year through such initiatives as: - Annual National Tree Planting Day - Revived Green Schools Programme – 10% of school land areas planted with trees - Increased tree nurseries and production and availability of seedlings - Tree planting (with appropriate species) - Expansion and protection of mangrove forest cover (for coastal adaptation and blue carbon sequestration) including implementation of the National Mangrove Ecosystem Management Plan (linked to Action 3: Water and Blue Economy) - Promotion agroforestry (linked to Action 1: Food and Nutrition Security	Adaptation Improves resilience Mitigation GHG emission reductions of 2.0 $MtCO_2e$ by 2030
2. Implement REDD+ Initiatives	▪ Deforestation and forest degradation reduced through rehabilitation and protection of additional 100,000 million ha of natural forests (including mangroves) through such initiatives as: - Community/participatory forestry management - Developing alternative technologies to reduce demand for biomass (e.g., clean cooking and efficient charcoal production) – Linked to Action 6: Manufacturing and 7: Energy	Adaptation Improves resilience Mitigation GHG emission reductions of 2.0 $MtCO_2e$ by 2030

	- Carbon stock enhancement (tree planting) in existing forests - Financial innovations including payments through REDD+ / carbon markets - Land use planning and zoning to segregate and identify forest areas for conservation	
3. Restore degraded landscapes (ASALs and rangelands)	▪ Restoration of up to 200,000 ha of forest on degraded landscapes (ASALs, rangelands), through such initiatives as: - GCF Dryland Resilience Project to enhance natural generation of degraded lands through conservation and sustainable management, and Ecosystem-based Adaptation through rangeland and forest landscape restoration and sustainable management. - AFR100 2016 commitment to restore 5.1 million ha to begin with analysis of priority landscapes, existing restoration successes, economic analysis of restoration options and identification of financing options.	Adaptation Improves resilience Mitigation GHG emission reductions of 13 $MtCO_2e$ by 2030
4. Promote sustainable timber production on privately-owned land	▪ Area under private sector-based commercial and industrial plantations increased from 71,000 ha to at least 121,000 ha	Mitigation GHG emission reductions of 1.0 $MtCO_2e$ by 2030
5. Conserve land area for wildlife	▪ Conserve at least 20% of terrestrial and inland water, and 15% of coastal and marine areas, especially areas of importance for biodiversity and ecosystem services. ▪ Conserve 30,000 hectares of wildlife habitats to support a broad range of wildlife and plants under changed conditions ▪ Human wildlife conflict reduced by 50% from 2018 baseline ▪ 20% of dispersal areas and migratory pathways secured for wildlife that have been identified in the National Wildlife Dispersal Corridor Report	Adaptation Builds resilience: increases area for wildlife Addresses climate risk: increased likelihood of human-wildlife conflict
Enabling action (technology)	▪ MRV technologies, including remote sensing and global positioning systems, computer tagging and tracking systems	Enabling
Enabling action (Policy and regulatory)	▪ Develop standards and regulations for sustainable forestry management (voluntary moving to regulated) ▪ Develop adaptation strategy for tourism sector ▪ Develop wildlife climate change strategy that identifies and maps locations suitable for harvesting flood water, drilling of boreholes, etc.	Enabling
Relevant Institutions: County Governments, CoG, MEF, MAI, National Treasury, Ministry of Tourism and Wildlife, MEF-KFS, KWS, NDMA, KEFRI, KWCA, Community Forestry Association (CFAs), Community Institutions, Tea industry, Farmer organisations, Private Sector		

Climate Change Priority 5: Health, Sanitation and Human Settlements

Sustainable human settlements and sanitation services are essential for human health, a Big Four pillar. Human settlements are impacted by climate change. Cities – like Nairobi, Kisumu and Mombasa – concentrate populations, economic activities and built environments, thus increasing their risk from floods, heat waves, and other climate and weather hazards. Coastal areas are vulnerable to sea level rise. The most affected populations are the urban poor who tend to live along river banks, on hillsides and slopes prone to landslides, near polluted grounds, in unstable structures vulnerable to collapse in heavy rains, and along waterfronts in coastal areas. This is especially true in informal settlements and other low-income areas, where high population density and lack of infrastructure aggravates these problems. Improving the resilience of the built environment in human settlements is needed, including flood control, green building technologies, and waste management.

Building the climate resilience of waste disposal systems and facilities is of great importance. Improperly managed solid waste can accumulate in areas otherwise intended for water runoff and flood control, and such conditions make cities and towns vulnerable to floods and contaminated water – from moderate rainfall, let alone intense and heavy rain expected with climate change. Solid waste dumping sites are open in Kenya and often exposed to run-off during heavy rains, leading to contamination of water resources and negative health impacts. The volume of solid waste generated across Kenyan urban centres increased from 4,950 tonnes per day in 2011 to 5,990 tonnes per day in 2014; a rate faster than the country's urbanisation rate.[112] The need for adequate waste treatment is accentuated by growing industrialisation of the economy, and inappropriately disposed of solid waste and wastewater that pollutes air, water and soil, causing significant health and environmental problems.

The waste sector contributes to climate change, accounting for about 3% of total national GHG emissions in 2015, an insignificant contribution in comparison to other sectors such as agriculture, forestry and energy.[113]

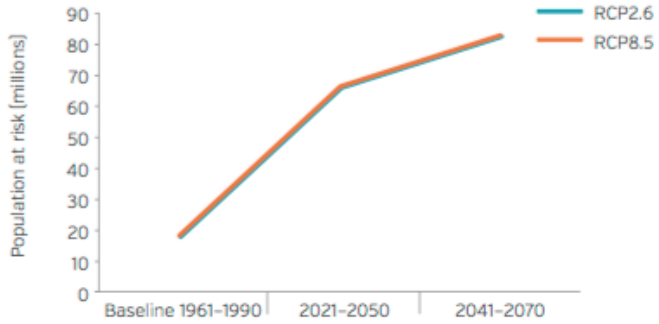
Studies into the effects of climate change on health in Kenya reported increases in acute respiratory infections for ASAL areas; emergence and re-emergence of Rift Valley fever; leishmaniasis and malnutrition. More severe and frequent flooding may displace communities and increase the risks of water-borne diseases, such as cholera, dysentery and typhoid which already affect large numbers of Kenyans.[114] Higher temperatures are projected to increase heat-related deaths in the elderly.[115] Short lived climate pollutants, including black carbon and methane are released through inefficient use and burning of biomass and fossil fuels. Household air pollution is a big health challenge, leading to 24,000 deaths annually in Kenya.

The risk of malaria and other vector-borne diseases is projected to increase due to changing climate conditions (see figure 8). Approximately 13 to 20 million Kenyans are at risk of malaria, with the percentage at risk potentially increasing as climate change facilitates the movement of malaria transmission up the highlands. Rising temperatures will likely lead to greater incidence of malaria at higher altitudes of the Kenyan highlands, and the number of Kenyans at risk could increase by to 89% by 2050.[116] In areas where malaria already occurs, transmission intensity is expected to increase along with the length of the transmission season.

[112] Soezer, A. and Owino, T. (2015). *A Circular Economy Solid Waste Management Approach for Urban Areas in Kenya*. Nairobi: UNDP.
[113] Government of Kenya (2015). Second National Communication.
[114] World Health Organization [WHO], 2017
[115] WHO & UNFCCC (2015).
[116] Dekens et al., 2013

Malaria is expected to spread into new locations, particularly the higher altitudes of the highlands. Communities living at altitudes above 1,100 meters are more vulnerable to malaria epidemics due to lack of immunity, lack of preparedness, climate variability and other factors. Pregnant women and children under 5 are the most vulnerable groups affected by malaria.

Figure 9: Population at risk of malaria in Kenya (in millions)



Towards 2070, under both high and low emissions scenarios about 83 million people are projected to be at risk of malaria. Population growth can also cause increases in the population at-risk in areas where malaria presence is static in the future.

Source: Rocklöv, J., Quam, M. et al. 2015.[d]

The climate actions in the result in:

- Adaptation – Reduced incidence of malaria, climate-proofed landfill sites, green buildings, and flood control in urban settlements.
- Mitigation – GHG emission reductions of 0.2. to 0.4 $MtCO_2e$ by 2030 through implementation of the Solid Waste NAMA and exploring options for methane capture and power generation.
- Big Four – Improved health services and affordable housing
- Sustainable Development – More sustainable communities, improved engagement of women as community health workers, reduced health impacts from inappropriate waste disposal and biomass cookstoves, and improved surveillance and monitoring of climate change-related diseases.

Strategic Objective: Mainstream climate change adaptation into the health sector; Increase the resilience of human settlements, including improved solid waste management in urban areas		
Issue/problem: Kenya's improvements in malarial control, water-borne diseases, respiratory diseases, infant mortality and malnutrition are vulnerable to set backs from climate change. Inappropriate waste management can have negative health impacts		
Big 4 Pillars: Linked to Health and Housing		
SDG 3: Good health and well-being, and 6, 13		
Action	**Results by 2022**	**Adaptation/ Mitigation**

1. Reduce the incidence of malaria and other vector-borne disease	▪ Scaled-up community level interventions, with an emphasis on women as community health workers, on malaria control countrywide (100% healthcare) ▪ Uptake and utilization of malaria treatment services increased in new malaria areas to reduce the incidence of malaria	Adaptation Addresses climate risk of increases in diseases
2. Strengthen community health workers and volunteers awareness of climate-related health risks	▪ Materials developed on climate-related health risks, including disaster risk management and the impacts on women, children and persons with disabilities, for training programmes for Community Health Nurses and Community Health Volunteers	Adaptation Addresses climate risk of increases in diseases and increases in disasters caused by extreme weather events
3. Promote recycling to divert collected waste away from disposal sites.	▪ Solid Waste NAMA implemented to achieve 30% waste recovery (recycling, land fill and composting) and 70% controlled dumping (tipping, compacting and recovery) in Nairobi. ▪ Explore options for methane capture and power generation at landfill sites (such as Eldoret).	Mitigation GHG emission reductions of 0.1 $MtCO_2e$ by 2030 (composting - NAMA)
4. Climate proof landfill sites	▪ Existing landfills in 2 major urban areas screened for vulnerability to climate change and develop plans that adapt to extreme climate patterns	Adaptation Increases resilience
5. Control flooding in human settlements	▪ Flood ways (manmade channels to divert flood water) constructed in Narok and Turkana	Adaptation Addresses climate risk of flooding caused by extreme rain events
Enabling Action (policy, plans and regulation)	▪ National policy developed to substantially reduce waste generation through prevention, reduction, recycling and reuse. ▪ Five County-based waste management plans and regulations developed that are consistent with National Waste Management Strategy and other relevant policies ▪ Green building codes and regulations developed that account for climate information ▪ National framework for waste water management developed	Enabling
Relevant Institutions: County Governments, CoG, Ministry of Water and Sanitation (MWS), MOTIHUD, MEF, Ministry of Health, MOE, MEF-NEMA, National Construction Authority, Kenya Institute of Highways and Building Technology, Private Sector, Civil society, Youth organizations, Women's Groups		

Climate Change Priority 6: Manufacturing

Climate change could prevent the Big Four goal of increasing manufacturing to 15 % of GDP by 2022. Manufacturing is capital intensive, with many long-life fixed assets, long supply chains and significant water requirements, which are negatively impacted by floods, droughts and extreme weather events. Climate change will increase resource scarcity (such as water and raw materials) that are inputs to the manufacturing process. Reduced crop production will

have impacts on the agro-manufacturing sector. An example is the 2017 drought that affected tea production and resulted in diminished turnover in processed tea.

While being impacted by climate change, manufacturing produces GHG emissions with the sector emitting about 7% of Kenya's total emissions in 2015.[117]

Climate actions to promote a green manufacturing sector need to focus on resource efficiency and sustainable production, and managing waste as a resource to create new product lines from waste recovery and re-use. The actions delivered under the Green Economy Strategy and Implementation Plan (GESIP) are critical to achieving green manufacturing and are complementary to the manufacturing actions in this NCCAP (2018-2022).[118]

Moving toward green manufacturing will require innovation and promoting the micro, small and medium enterprises started by youth entrepreneurs, including in the areas of urban and rooftop agriculture, and sustainable briquettes for cooking.[119]

The climate actions focus on improving energy and resource efficiency, including energy efficiency in the industrial sector and reducing process emissions from charcoal production, which uses very inefficient technologies. Actions to improve efficiencies of charcoal kilns and to formalise the sector help to reduce deforestation and forest degradation and are closely linked to NCCAP Action 4. These actions to formalise the charcoal can also draw on the innovation of youth and create roles for women in the value chain process.

These climate actions result in:

- Adaptation – Improved water use efficiency and industrial symbiosis.
- Mitigation – GHG emission reductions of over 5 $MtCO_2e$ by 2030, through energy efficiency in manufacturing companies, and sustainable charcoal production.
- Big Four – Progress toward the achievement of the goals of the manufacturing pillar.
- Sustainable Development – Reduced deforestation and forest degradation, sustainable production and green industries, promotion of innovation for youth and women.

Strategic Objective 6: Promote efficiency in the manufacturing sector		
Issue/Problem: Resource – water, inputs - scarcity because of climate change; and inefficient energy use in the manufacturing sector (such as charcoal production, cement production) increases GHG emissions		
Big 4 Pillar: Manufacturing		
SDG 9: Industry, innovation and infrastructure; 12: Responsible consumption and production		
Action	**Results by 2022**	**Adaptation/ Mitigation**
1. Increase energy efficiency	▪ Number of companies participating in energy efficiency initiatives is doubled to 1,000 (including 1,000 energy audits) ▪ Minimum Energy Performance Standards developed for 5 more appliances, and existing testing facilities up-scaled to include these 5 appliances	Mitigation GHG emission reductions of 1.1 $MtCO_2e$ by 2030 (energy efficiency)

[117] Government of Kenya (2015), Second National Communication.
[118] Government of Kenya (2016), Green Economy Strategy and Implementation Plan, pages 21-27.
[119] Consultation with Youth (2018). Nairobi, 2018.

2. Improve water use and resource efficiency	▪ Number of companies participating in water efficiency initiatives increased to 200 (including 200 water audits)	Adaptation Addresses climate risk: water scarcity caused by increased temperature and changing precipitation patterns
3. Optimize charcoal production processes	▪ Sustainable Charcoal NAMA implemented that promotes a sustainable supply of biomass, encourages uptake of efficient kiln technologies to increase yields to 30-42%, and establishes a charcoal certification and labelling scheme,	Mitigation GHG emission reductions of 5.0 $MtCO_2e$ by 2030
Enabling (capacity development) *Linked to Enabling Actions T4*	▪ Innovation promoted through a Sustainable Consumption and Production Networking facility for Micro, Small and Medium Enterprises, with an emphasis on women and youth (targets in Enabling Action T4)	Enabling
Relevant institutions and organisations: County Governments, CoG, Ministry of Industry, Trade and Cooperatives (MITC), Ministry of Water and Sanitation, KIRDI, Kenya Bureau of Standards (KEBS), MEF- NEMA, KIRDI, KAM, KEPSA, Private sector, Charcoal producers, Academia, Civil society, Youth organizations		

Climate Change Priority 7: Energy and Transport

Clean, sustainable and affordable energy and transportation systems are essential for Kenya's sustainable development and are infrastructure enablers for the Big Four agenda. Climate change, including temperature rise, sea level rise, and an increasing number and severity of extreme weather events – such as heavy rains resulting in floods – damage energy and transport infrastructure. These climatic changes increase the risk of delays, disruptions, damage and failure across land-based, air and marine transportation systems. The impact of drought on hydro-generated electricity is well understood in Kenya. Low water levels in the country's hydroelectric dams because of the drought in early 2017 led to the increased use of diesel-powered generators and an increase in the price of electricity.[120] The floods in early 2018 caused extensive damage to the road network.

Climate change impacts have consequences for the design, construction, location and operations of power and transport infrastructure. Climate-proofing, or proactive adaptation, can be cost-effective for energy and transport infrastructure with a long lifespan (most transportation and energy infrastructure is expected to last for 50 years or longer). Climate-proofing is a key recommendation of Kenya's NAP as a means of addressing infrastructure-related climate change impacts, and is necessary to maximize potential development benefits. Climate proofing of infrastructure requires factoring in an additional cost associated with the burden of climate change in the design, implementation and maintenance of infrastructure.

Reducing GHG emissions in these sectors is required to meet Kenya's NDC. The energy sector's contribution to GHG emissions is expected to increase sharply from 2015 to 2030. The energy sector (excluding transport and industry) accounted for 7.1% of total emissions in 2015 and is projected to rise to 29.7% of total emissions in 2030. The transport sector is a significant

[120] Otuki, N. (2017). Power bills forex levy hits 15-month high. *Daily Nation* (9th February), page 34.

source of GHG emissions, directly accounting for about 13% of Kenya's total GHG emissions in 2015. Transport emissions are increasing at a faster rate than other sectors – and are projected to rise to 17% of total national emissions in 2030.[121]

The draft 2015 Energy and Petroleum Policy indicates that rapid growth in Kenya's economy over the past decade is partly attributed to increased investment in the energy sector, particularly in the electricity sub-sector. In 2016/2017, installed electricity generation capacity was 2,333 MW, with geothermal accounting for 44% of the generation mix, hydro 33%, thermal 21% and imports 2%.[122] An estimated 6.7 million households comprised the off-grid and decentralized electricity market in 2013.[123] Supply consisted of micro and pico systems, mini-grids, and stand-alone systems – with solar, wind and hydro being the main resources in use.

Electricity generation based on renewable energy also has impacts for the transport sector, particularly the electrification of the Standard Gauge Railway that is expected to take place by 2022.

In regard to energy demand, the transition to clean cooking is a priority action that presents an opportunity for technological leapfrogging with greater energy and GHG savings, health and cost-saving benefits compared to the business-as-usual minor/incremental improvements. It is also an opportunity for investment in innovation and technology development in the biomass energy sub-sector. The actions include creating a market for clean cooking solutions through awareness to stimulate consumer demand. A key action is to develop programmes that encourage product availability and affordability through a robust pipeline of businesses to manufacture products, sell products and provide services at affordable prices

The transition to clean cooking – through the uptake of LPG, ethanol and other alternative fuels in urban areas, and improved biomass cookstoves in rural areas – is about more than energy. It improves the health of women and children, and protects forests. 70% of Kenyans rely on biomass (fuel wood and charcoal) energy for cooking, which is a main driver of deforestation and forest degradation.[124] The use of biomass fuels for cooking is a pressing health, social and environmental problem. More than 14,000 Kenyans die every year from health condition that can be traced back to indoor air pollution.[125] Use of LPG to replace charcoal can reduce 55 deaths per year per 25,000 households, and save up to 30 trees per household a year.[126] Clean cooking can also save money at the household level. Charcoal briquettes cost KES 3 to cook a meal of maize and beans for a family of five, compared to KES 26 for charcoal and KES 45 for kerosene.[127]

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[121] Government of Kenya (2015). Second National Communication.
[122] The Kenya Power and Lighting Company Limited (2017). *Annual Report and Financial Statements (Nairobi: KPCL),* page 41-42.
[123] Wasike, N. (2016). *A Decade of Energy Access Transformation (2006-2016): Is energy inclusion in Kenya on the Rise?* FSD Kenya (20th July). Accessed at: http://fsdkenya.org/blog/a-decade-of-energy-access-transformation-2006-2016-is-energy-inclusion-in-kenya-on-the-rise/
[124] Ministry of Energy (2018). Consultations with the energy sector.
[125] UNEP (2016). *Actions on Air Quality*. Nairobi: UNEP.
[126] Dalberg (2018). Scaling up clean cooking in urban Kenya with LPG and Bio-ethanol: Executive Brief (pending publication).
[127]Njenga, M., Yonemitsu, A., Karanja, N., Iiyama, M., Kithinji, J., Dubbeling, M., Sundberg, C., & Jamnadass, R. (2013). Implications of Charcoal Briquette Produced by Local Communities on Livelihoods and Environment in Nairobi, Kenya, *International Journal of Renewable Energy Development* 2 (1)

Women and children are disproportionally affected by this challenge, suffering from toxic smoke, time poverty, and the consequences of deforestation. The use of clean cooking technologies should be integrated into community development initiatives and activities involving women. They the most affected and have the potential to drive the achievement of the desired outcomes.

The climate actions result in:

- Adaptation – Climate-proofed energy and transport infrastructure.
- Mitigation
  - Electricity supply - GHG emission reductions of 15.6 to 20.7 $MtCO_2e$ by 2030, through development of geothermal and other renewable energy for electricity supply, energy efficiency, and use of clean coal technology.
  - Energy demand - GHG emission reductions of an estimated 7.3 $MtCO_2e$ by 2030, through uptake of alternative fuels and efficient cookstoves.
  - Transport - GHG emission reductions of 2.0 to 3.5 $MtCO_2e$ by 2030, through electrification of the SGR, extension of the SGR, construction of the Bus Rapid Transit system in the Nairobi metropolitan area, low carbon technologies in the aviation and maritime sectors, and pilot projects on electric vehicles.
- Big Four – Progress toward the achievement of the Big Four pillars through the provision of energy and transport services.
- Sustainable Development – Reduced deforestation and forest degradation, reduced stress on forests. sustainable production and green industries, promotion of innovation for youth and women, protection of water catchment areas, reduction of deaths from indoor air pollution from 49% of the total annual deaths (21,560 in 2017) to 20%.

Actions with significant emissions reductions are included in the table below; the full list of energy and transport actions are included in the MTAR.

Strategic Objective 7a: Ensure an electricity supply mix based mainly on renewable energy that is resilient to climate change, and promote energy efficiency; Encourage the transition to clean cooking that reduces the demand for biomass.		
Issue/Problem: Renewable (and affordable) electricity supply with low GHG emissions needs to increase to meet the demands of a growing population and industrializing nation. 80% of Kenyans depend on biomass for primary energy most of which is non-renewable. This leads to indoor air pollution, deforestation and GHG emissions.		
Big 4 Pillar: linked to Food and Nutrition Security, Manufacturing, Health and Affordable Housing		
SDG 7: Affordable and clean energy, 1 – End poverty; 2 – Food security; 3 – Health; 5 – Gender equality; 9 – Resilient infrastructure; 11 – Sustainable cities; 15 – Sustainable forests		
Outcome	**Actions and Expected Results by 2022**	**Adaptation/ Mitigation**

1. Increase renewable energy for electricity generation that is climate resilient and accounts for needs of rural areas	▪ 2,368 MW of new renewables developed, to include: - Geothermal – prioritized as baseload generation that is climate resilient - Biomass / Co-generation - Hydro - Solar - Wind	Mitigation GHG emission reductions of 8.00 $MtCO_2e$ per year by 2022 Adaptation Increases resilience of energy system to drought
2. Increase captive renewable energy generation capacity	▪ Captive renewable energy generation plants developed, where electricity is used by the developers, e.g., direct use of geothermal resources to power various industrial applications such as boilers and dryers.	Mitigation GHG emission reductions of 0.238 per year $MtCO_2e$ by 2022
3. Improve energy efficiency and energy conservation	▪ Losses in transmission and distribution reduced from 18% to 14% ▪ 3.3 million Compact Fluorescent Light (CFL) distributed to households through CFL initiative. ▪ Energy efficiency and conservation projects delivered that focus on: - Efficient lighting - Energy efficiency in buildings - Minimum energy performance standards - Distribution of clean lighting	Mitigation GHG emission reductions of 0.108 $MtCO_2e$ per year by 2022 (transmission) (Industrial energy efficiency mitigation included in manufacturing)
4. Climate proof energy infrastructure *Linked to Strategic Action 2 - Forestry*	▪ Concrete poles replace wooden poles. ▪ Existing hydropower plants optimized and water management and conservation improved. ▪ Conserve and rehabilitate 1000ha of water catchment areas by protecting water catchment areas feeding the hydro-power dams.	Adaptation Increases resilience of the energy system
5. Promote the transition to clean cooking with alternative fuels, such as liquefied petroleum gas (LPG), ethanol and other clean fuels in urban areas *Linked to Strategic Action 11: Health; and Strategic Action 2 - Forestry*	▪ Number of households using LPG, ethanol or other cleaner fuels for cooking increased to 2 million, through a programme that promotes: - Development of a depot with LPG storage tanks and bottling machines and stock cylinders of various sizes - Loan programme through micro-finance institutions to assist with up-front cost of cookers and cylinders - Local manufacture and servicing of clean cookers, e.g., tax-relief incentives for manufacturers; training and loans for local service - Local businesses stocking and delivering LPG to consumers - Engagement of women and youth groups to brand cooking cylinders procured by government - Increased production of non-forest biomass fuel briquettes (such as agricultural waste, sawdust and human waste) with an emphasis on women and youth	Mitigation GHG emission reductions of 1.19 $MtCO_2e$ per year by 2022

6. Encourage the uptake of clean biomass (charcoal and wood) cookstoves and alternatives in rural areas	▪ Number of households using improved biomass cookstoves increased by 4 million, through a programme that promotes: - Loan programme through micro-finance institutions to assist with the up-front cost of cookstoves - Local manufacture and servicing of clean cookstoves, e.g., tax-relief incentives for manufacturers; training and loans for local service - Local businesses to stock improved cookstoves, with an emphasis on women-led businesses ▪ Biogas technology scaled up to increase access to clean energy through the construction of 6,500 digesters for domestic use and 600 biogas systems in various schools and public facilities.	Mitigation GHG emission reductions of 9.0 $MtCO_2e$ per year by 2022
Enabling Actions (technology)	▪ Promote climate change resilient technologies, such as modern coolers and scrubbers ▪ Research into new and emerging energy technologies in the energy sector that will reduce GHG emissions.	Enabling
Enabling Actions (capacity development)	▪ Training and public awareness programmes on climate change adaptation and mitigation mechanisms ▪ Train 100 students per year by Kenya Power International (Institute of Energy Studies and Research) on renewable energy technologies. ▪ Train 60 participants per year at the United Nations University – Geothermal Training Programme	Enabling
Enabling Action (policy and regulations)	▪ Develop a policy to guide vegetation management, wayleaves acquisition and corridor for energy infrastructure ▪ Explore use of fiscal and tax policies and regulations to encourage uptake of clean cooking	Enabling
Relevant Institutions: Ministry of Energy (MOE), MITC, National Treasury, MoH, MEF-CCD, MEF-KFS, Attorney General, CoG, Country Governments, Kenya Power, Kenya Electricity Generating Company (KenGen), Geothermal Development Corporation (GDC), Kenya Power, Rural Electrification Authority (REA), Kenya Electricity Transmission Company (KENTRACO), KIRDI, Kenya Climate Innovation Centre (KCIC), UN University, KAM, Micro-finance institutions, Private sector, Civil society, Women's Groups, Youth Groups.		

Strategic Objective 6b: Establish efficient, safe world-class transportation systems and logistic services that can withstand the expected impacts of climate change		
Issue/Problem: Operational inefficiency, heavy traffic congestion, heavy fuels, and high fuel consumption lead to high levels of GHG emissions.		
Big 4 Pillar: Manufacturing, Food and Nutrition Security, Health		
SDG 9 - Industry, innovation and infrastructure, 3 -Health, 7 – Sustainable Cities, 12 – Sustainable Consumption		
Action	**Expected Results by 2022**	**Adaptation / Mitigation**
1. Develop an affordable, safe and efficient	▪ 13 of the Bus Rapid Transit (BRT) for Nairobi Metropolitan Area designed, constructed and implemented. ▪ Use of electric hybrid vehicles (buses) piloted and appropriate incentives provided for their use	Mitigation GHG emission reductions of 2.3 $MtCO_2e$ by 2030 (BRT)

public transport	▪ Standard Gauge Railway (SGR) extended from Nairobi to Naivasha ▪ Organized feeder public transport to BRT, commuter rail and SGR developed and provided for the public ▪ 150 km of Non-Motorised Transport facilities constructed, including pedestrian and bicycle access within and to town centres and transit stations	
2. Reduce fuel consumption and fuel overhead costs	▪ SGR (Nairobi to Mombasa) electrified ▪ 30% of freight from shifted from road to rail. ▪ Roadmap for the improvement of heavy-duty truck efficiency developed, including increased use of low-rolling resistance tyres, super structure fittings etc., vehicle standards.	Mitigation GHG emission reductions of 1.95 $MtCO_2e$ by 2030 (SGR) GHG emission reductions of 1.1 $MtCO_2e$ by 2030 (freight) Mitigation GHG emission reductions of 0.064 $MtCO_2e$ by 2030 (trucks)
3. Climate proof transportation infrastructure	▪ Climate information used in infrastructure planning and transport resilience plans developed ▪ Feasibility study in regard to constructing roads that systematically harvest water and mitigate floods (adds about 5% to total cost)	Adaptation Addresses climate risk of damage to infrastructure from extreme weather events
Enabling (capacity development)	▪ Train 100 officers on GHG emissions quantification and mechanisms of reduction, fuel consumption data reporting requirements and low carbon technologies	Enabling
Enabling (technology)	▪ Encourage domestic technology development for electric modes of transport ▪ Undertake research on the use of renewable energy for powering different modes of transport	Enabling
Enabling (policy and regulation)	▪ Review and implement the Integrated National Transport Policy (2021) ▪ Develop and implement standards for electric cars and two-wheelers by 2019 ▪ Update and implement planning and building control regulations to encourage compact development, mixed use, and reduced provision of parking near MRT stations.	Enabling
Relevant Institutions and Organizations: MOTIHUD, Ministry of Energy, MEF-CCD, County governments, Nairobi Metropolitan Area Transport Authority (NAMATA), Kenya Railways (KRC), National Transport and Safety Authority (NTSA), Kenya Civil Aviation Authority (KCAA), Kenya Airports Authority (KAA), Kenya Civil Aviation Authority (KCAA) , Kenya Airports Authority (KAA), KENTRACO, KENGEN, KEBS, Kenya Urban Roads Authority (KURA), Kenya National Highways Authority (KENHA), Kenya Rural Roads Authority (KERRA), National Construction Authority (NCA), Kenya Ports Authority (KPA),Kenya Maritime Authority (KMA), Kenya Airways (KQ), Private Sector, Academia, Research Institutions, Civil society		

3.3 Climate Change Priority Actions in the Counties

The success implementation of the actions in the NCCAP will be based on efforts in the 47 Counties (see Figure 9). The County Governments are the implementing agents of the national development agenda and are best placed to carry out programs and projects to address climate change. County Governments are responsible for agriculture, which is a fully devolved function; implementation of the natural resource and environmental conservation policies, including forestry; water management; county transport; water and sanitation; health; and other areas important to addressing climate change. Importantly, County Governments are responsible for putting in place the response measures to address drought, floods and other climate-driven disasters.

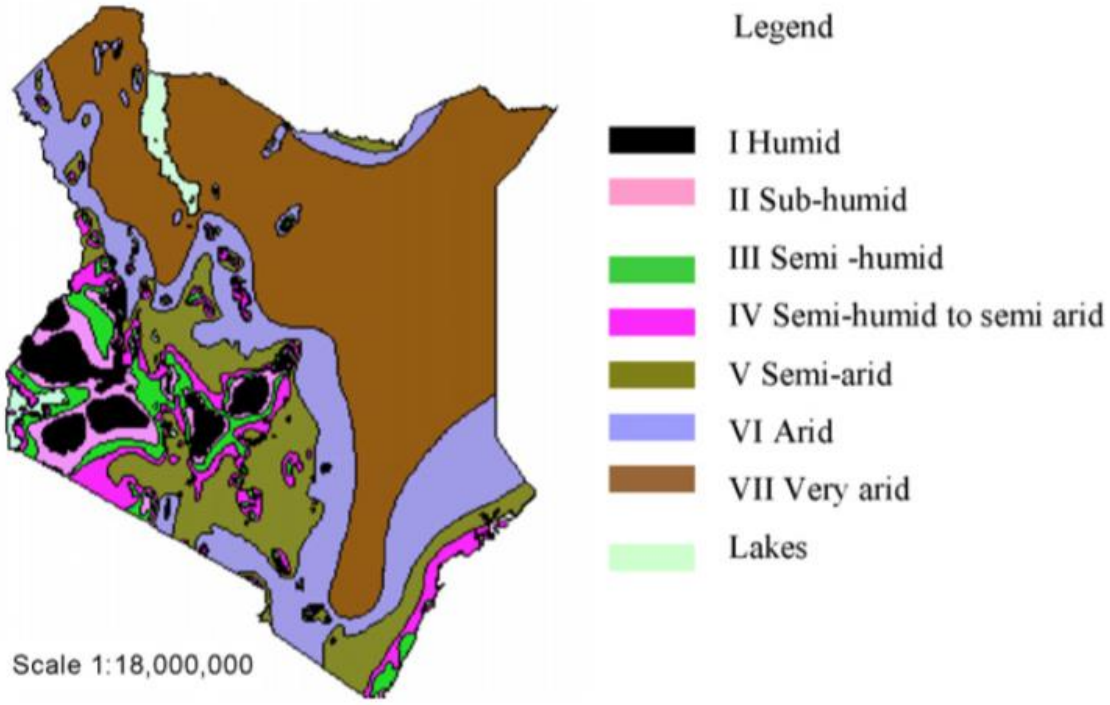
Figure 10: The Map of Kenya Showing the 47 Counties

Source:https://upload.wikimedia.org/wikipedia/commons/b/bf/Map_showing_Counties_underthe_new_kenyan_constitution..gif

The Climate Change Act (No. 11 of 2106) requires that County Governments mainstream climate change actions and interventions in the CIDPs, taking into account national and country priorities. In 2013, all 47 CIDPs mentioned the impacts of climate change and many identified needed actions to address these impacts. The main climate change impact was an increase in temperatures resulting in prolonged dry spells and drought. 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 increase conflict (human/human and human/wildlife).[128]

The agro-climate zones vary across Kenya from humid in the Lake Victoria region to very arid in the north and north-east regions (see Figure 10).

Figure 11: Agro-climate zones of Kenya[129]



Source: Kamoni, P. T. et al. (2007). Predicted soil organic carbon stocks and changes in Kenya between 1990 and 2030, page 106.

This means that the impacts of and responses to climate change vary across Counties, as noted during consultations with the following six County Economic Blocs carried in April 2018:

- Frontier Counties Development Council – Garissa, Isiolo, Mandera, Marsabit, Wajir
- Jumuiya Ya Kaunti Za Pwani – Kilifi, Kwale, Lamu, Mombasa, Taita Taveta, Tana River

[128] Murphy, D. & Chirchi, D (2017). Kenya CIDPs.
[129] Superimpose counties on top of map (graphics expert needed – check with MAI if better map).

- Lake Region Economic Bloc – Bungoma, Busia, Homa Bay, Kakamega, Kericho, Kisii, Kisumu, Migori, Nandi, Nyamira, Siaya, Trans Nzoia, Vihiga, Bomet
- Mount Kenya and Aberdares Counties Trade and Investment Bloc – Embu, Kiambu, Kirinyaga, Laikipia, Meru, Murang'a, Nakuru, Nyandarua, Nyeri, Tharaka-Nithi
- North Rift Economic Bloc – Baringo, Elgeyo-Marakwet, Nandi, Samburu, Trans Nzoia, Turkana and Uasin Gishu, West Pokot
- South Eastern Kenya Economic Bloc plus 3 – Kajiado, Kitui, Machakos, Makueni, Nairobi, Narok

All six economic blocs identified two main climate change issues requiring action in the NCCAP (2018-2022):

- **Drought** – a result of extreme temperatures and prolonged periods with little or no rainfall; and
- **Flooding** – a result of heavy rainfall (and exacerbated by deforestation).

Other impacts of climate change identified by the Counties are listed in Box XX below.

Box XX: Climate Change Impacts identified by the Counties

- Drought
- Flooding
- Declining agricultural productivity
- Declining livestock productivity
- Food and nutrition insecurity
- Negative health impacts for humans and livestock
- Land and ecosystem degradation
- Water scarcity
- Declining agricultural productivity
- Declining livestock productivity
- Food and nutrition insecurity
- Negative health impacts for humans and livestock
- Land and ecosystem degradation
- Water scarcity
- Displacement of populations
- Intra-and inter-community conflict
- Human-wildlife conflict
- Landslides and erosion

Counties also identified issues that are not caused by the impacts of climate change but can be addressed through mitigation actions to reduce greenhouse gas emissions. These include tree planting and addressing deforestation and forest degradation to achieve 10% tree cover. A coordinated approach to forest management includes priority actions identified by the Counties: protecting forests, planting trees, addressing charcoal production and unsustainable logging, and promoting clean cooking (including efficient jikos, biogas and LPG). Counties also identified the need to promote renewable energy, including wind and solar.

Improved waste management systems were noted as a priority for many Counties. Climate change actions to reduce emissions in the area of waste management include waste to energy, capture of methane from landfill sites and promotion of a circular approach to waste management that promotes recycling. Adaptation actions related to waste management

include proper siting of landfill sites to account for expected climate change (such as rainfall and flooding).

The actions identified by the Counties focus on the needs at the local level, reflecting the realities and priorities of communities. Most of the actions have sustainable development benefits that will improve the lives of women, youth, and marginalised groups. The actions address the needs of pastoralists, whose livelihoods are being severely impacted by climate change; smallholder farmers that form the basis of the agricultural sector; and the fishing folk that are the backbone of coastal communities.

A summary of priority climate change actions identified in the county consultations is provided in Table 8. The full list provided by the County Economic Blocs is in included in Annex 2.

Table 7: Adaptation, mitigation and enabling actions prioritized by County Economic Blocs

<table>
<tr><th colspan="2">Priority climate change actions: County Economic Blocs</th></tr>
<tr><td colspan="2">The priority actions of the six Economic Blocs are listed in the table, and identified by the following abbreviations:

F - Frontier Counties Development Council
J - Jumuiya Ya Kaunti Za Pwani
L - Lake Region Economic Bloc
M - Mount Kenya and Aberdares Counties Trade and Investment Bloc
N - North Rift Economic Bloc
S - South Eastern Kenya Economic Bloc plus 3</td></tr>
<tr><th>Priority adaptation actions</th><th>Priority mitigation actions</th></tr>
<tr><td>Drought
Establishment of early warning systems – L, M, N, S
Livelihoods diversification – F, J, M, N
Flood water harvesting - F
Food supplements – N</td><td rowspan="2">Forestry
Afforestation / Reforestation / Tree planting - F, J, L, M, N, S
Agroforestry – F, L, M, N, S
REDD – J, L, M
Establish tree nurseries – F, L, M
School tree planting programs – J, M, N
Regulations and laws for charcoal production – F, N, S
Promote briquette industry – L, S
Planned grazing and management of rangelands – F
Commercial wood lots – J
Promote non-timber forest products – L
National and county tree planting days – L
Introduction of new tree species – F
Introduce fast-growing trees for charcoal production – S</td></tr>
<tr><td>Flooding
Establishment of early warning systems – F, J, L, M, N
Protection of riparian areas along rivers – F, J, L, M, N
Strategic placement of dams / dykes – F., J, L, N
Drainage systems for storm waters / storm water harvesting – J, S
Insurance systems – S</td></tr>
<tr><td>Food security
Agriculture
Farm forestry / agroforestry - F, L, M, N, S
Drought tolerant crops – J, N, M, S
Climate smart agriculture – F, L, M</td><td>Energy
Renewable/green energy – F (wind and solar), J (solar), L, N (solar, biogas), S (solar, wind, biogas)
Promote efficient jikos – N, S</td></tr>
</table>

- Establishment of irrigation systems, such as construction of dams for irrigation and up-scaling drip irrigation – F, J, L, M, N
- Improved agricultural extension services – F, J, L
- Soil and water conservation / conservation agriculture – L, M, N
- Water efficient technologies – F, S
- Crop diversification – J, L
- Climate information services for farmers – M, S
- Urban agriculture – L, M
- Promote non-rain agricultural practices (greenhouse farming) – L
- Livestock
- Proper management of pasture lands / controlled grazing – F, J, N, S
- Fodder banks – F, N, S
- Drought-resistant breeds – N, S
- Adoption of new animal husbandry techniques – F
- Livestock insurance) – N, S
- Fisheries
- Fish harvesting – F, J
- Fish farming – J
- Controlled mangrove harvesting – J
- Research of coral bleaching – J
- Protect fish breeding sites – L

Water scarcity

- Water harvesting – J, L, N, S
- Dams, boreholes and water pans – F, L, N, S
- Spring / water catchment protection – L, S, M
- Water storage – L, M, S
- Water treatment – L, S
- Capture of water run-off on roads – M
- Management of ground waters – S

Ecosystem degradation

- Restore water catchment areas – J, L, M, N
- Soil conservation and erosion control (Terracing, gabions) – F, L, M, N
- Promote conservation of natural resources – J
- Protection of wetlands – L
- Rehabilitate degraded rivers – S

Health

- Vaccination / immunization campaigns – F, J
- Disease surveillance and reporting – F, M
- Mosquito nets – J, L
- Promote family planning – M

Infrastructure

- Climate proof infrastructure – M (concrete poles), N, S (bridges and dykes), J (roads)
- Construct raised ports and jetties – J

Waste Management

- Waste to energy – J, L
- Proper waste management – including recycling – L, S

Transport

- Legal and policy instruments to promote high efficiency vehicles – S

Priority enabling actions

Education

- Enhance community awareness – F, J, L, S
- Increase accessibility to learning materials and tools – F, L
- Improve network reception – F
- Synchronize school calendar with weather-related events – J

Disaster Management

- Establish disaster response unit – L, M, S
- Establish disaster management fund / recovery "kitty" for post-drought and post-flood – L, S, F

Human Settlements

- Proper planning of towns / county spatial planning / land use planning – F, M, N, S, J

Conflict Resolution

- Strengthening of conflict resolution mechanisms – N

Human/Wildlife Conflict

- Community sensitization, provision of water in national parks – S

Climate monitoring and information

- Weather monitoring infrastructure – J

Climate Change Framework

- Establish institutional and legal frameworks for climate change – L, S, N
- Establish climate change fund / ward development funds to address local problems – F, S

Chapter 4: Delivering the Action Plan

4.1 Enablers

Delivering this second NCCAP (2018-2022) requires implementation of cross-cutting enabling actions – defined as those actions that equip government and stakeholders with the knowledge, skills, technologies and finance needed to deliver adaptation and mitigation actions. The cross-cutting enabling actions described in this section include:

- Technology and innovation;
- Capacity development and knowledge management;
- Climate finance; and
- Measuring climate results.

This section provides brief descriptions of the priority actions to be completed from 2018 to 2022. The descriptions note if the actions are continued from the first NCCAP (2013-2017), describe the coordinating institutions and relevant partners, and set out process indicators to measure action. A separate table provides information on the estimated costs of the actions, committed funding and climate finance gaps.

The NCCAP (2018-2022) builds on the foundation established through enabling actions implemented under the first action plan (summarised in Box 4.1).

4.1.1 Technology and Innovation

Technology and innovation enabling actions encourage investments in and the development of climate-friendly technologies. Technology development and transfer is defined by the IPCC as a broad set of processes of covering the flows of know-how, experience, and equipment for mitigating and adapting to climate change amongst stakeholders such as governments, private sector entities, financial institutions, non-government organizations (NGOs) and research/education institutions. Technology development, transfer and diffusion are required to understand, utilise and replicate climate change technologies, including the capacity to choose and adapt technologies to local considerations and integrate with indigenous technologies. [130]

Kenya stands to benefit from the development, transfer and diffusion of appropriate technologies. Kenya is a leader in Information and Communications Technology (ICT) and smart phone technologies developed in Kenya help farmers monitor and manage climate risks. For example, individual farmers receive text messages about weather data, receive insurance payments and make loan payments through such applications as M-Pesa, a world-leading mobile money transfer service developed and widely used in Kenya.

Kenyan research institutions lead in the development of appropriate technologies, with KIRDI playing a critical role as the NDE for the Climate Technology Centre and Network (CTCN). The private sector is a critical player, with KEPSA and KAM leading efforts to promote sustainable production and consumption. Another example is the Kenya Climate Innovation Centre that

[130] IPCC (2000), Metz, B., Davidson, O., Martens. J., Van Rooijen, S., & Mcgroy, L. (eds.), *Methodological and Technological Issues in Technology Transfer*. Cambridge: Cambridge University Press.

promotes the development and deployment of locally-relevant climate change technologies through the provision of incubation and capacity building services and financing to Kenyan entrepreneurs.

Box 4.1: Highlights of Progress on Enabling Actions under the first NCCAP, 2013-2017

Technology Development and Transfer

- Technology Needs Assessment completed in 2013.
- Kenya Industrial Research and Development Institute (KIRDI) appointed as the National Designated Entity (NDE) for the Climate Technology Centre and Network (CTCN), the operational arm of the UNFCCC Technology Mechanism. Work included development of improved technologies for drip irrigation, biogas, clean cookstoves, charcoal kilns and drought-tolerant sorghum.
- Kenya Agriculture and Livestock Research Organization (KALRO), Kenya Forestry Research Institute (KEFRI) and other institutions supported the development and transfer of climate change technologies.
- Kenya Climate Innovation Centre (KCIC), KAM Centre for Energy Efficiency and Conservation, and Kenya National Cleaner Production Centre provide technology- and innovation-related services to the private sector.

Knowledge Management and Capacity Development

- National Climate Change Resource Centre (NCCRC) established in 2015
- Kenya Climate Information Portal, with sections for children and youth, launched in 2018
- KMD improved its climate observation network, including the installation of automated weather stations, and established National Climate Diagnostic Laboratory to improve climate knowledge and information management.
- Kenya School of Government, in collaboration with the COG and MEF-CCD, established a training program on climate change policy, planning and budgeting for National and County Governments.

Climate Finance

- National Climate Finance Policy approved by Parliament in 2018.
- The National Treasury appointed as the National Designated Authority (NDA) for the Green Climate Fund (GCF) and implemented a programme of GCF readiness and established budget codes for the tracking of climate finance.
- The National Environment Management Authority (NEMA) appointed as the National Implementing Entity (NIE) for the GCF and Adaptation Fund under the UNFCCC.

National Performance and Benefit Measurement Framework

- Prototype registry of climate change projects developed in 2017
- Kenya's Second National Communication, including an updated GHG inventory, submitted to the UNFCCC in 2015.
- MEF-CCD established a GHG inventory unit to manage data and reporting on GHG emissions and removals.
- National Forest Inventory developed and the System for Land-based Emissions Estimation in Kenya (SLEEK) established to improve estimations of land-based GHG emissions.
- Climate change indicators handbook developed to improve the monitoring and evaluation (M&E) of climate change actions.

Source: Government of Kenya (2016), Addressing Climate Change: Success Stories from Kenya, Nairobi: MENR; and Murphy, D. & Chirchir, D. (2017), Review of the Implementation of the Kenya National Climate Change Action Plan 2013-2017, Nairobi: StARCK+ Technical Assistance to the Government of Kenya Component.

The priority technology and innovation enabling actions include improving the capacity of KIRDI to promote and disseminate appropriate technologies consistent with its responsibilities as the NDE to the CTCN. Actions also assist the innovation role of the private sector and promote sustainable consumption and production. The identification of appropriate and effective policy and fiscal tools will be another action. Technology diffusion and uptake can be facilitated through policy and fiscal incentives, such as the regulation on solar water heaters and 0% import duties and value-added tax (VAT) exemption on renewable energy materials, equipment and accessories.

Another priority is assist KMD to improve provision of Climate Information Services (CIS), which includes immediate and short-term weather forecasts and advisories and longer-term information about new seeds and technologies and market developments. Climate information is important for farmers to manage risk, to establish planning standards and regulations, and to assess climate change risks in environmental assessments. Climate information is also a critical element of early warning systems, need to help communities and people cope with extreme weather events, like droughts and floods.

Table 8: Priority Enabling Actions - Technology and Innovation

	Action	Coordinating Institutions and Relevant Partners	Expected Results (Process Indicators)
T1	Improve the capacity of KIRDI to promote and upscale endogenous technologies, in their role as the NDE for the CTCN, the operational arm of the UNFCCC Technology Mechanism Endogenous technologies are based on locally available knowledge and cultures, and select eternal resources that best fit the local conditions	KIRDI KALRO KEFRI MEF-CCD Academia Research institutions	**By 2019** – Request to CTCN for technical assistance on climate technologies is approved for KES 25 million **By 2020** – Priority endogenous technology needs are identified in the agriculture and forestry sectors **By 2022** – Information on up to 10 endogenous climate technologies is disseminated to stakeholders
T2	Provide Climate Information Services (CIS) that inform decision making for governments, businesses and households	MEF-KMD MEF-CCD CoG County Governments Private sector	**By 2020** – 24 County Climate Information Service Plans developed **By 2022** – at least 100 clients (organisations, businesses and households) access CIS
T3	Establish a Sustainable Consumption and Production Networking facility for Micro, Small and Medium Enterprises (MSME), with an emphasis on women and youth	Switch Africa Green KEPSA KAM MEF-CCD Private sector Youth organizations Women's groups	**By 2020** – XX MSMEs, half led by youth and women, are trained in sustainable consumption in production **By 2022** – Trained MSMEs reduce resource (energy and water) use by XX[131]

[131] Information to be provided by KEPSA. Question: how does this link with KCIC's Sustainability Initiative and the Kenya Cleaner Production Centre?

T4	Promote climate technologies and innovation in the private sector through the provision of financing, capacity building and start-up/scale-up services. Support WESUSTAIN to encourage youth innovation through a university outreach programme.	Kenya Climate Innovation Centre (KCIC) MEF-CCD Private sector	**By 2020** – XX clients, half being women and youth, are supported to commercialise their clean technology businesses **By 2022** – Clean technology businesses increase the ability of XX people to cope with the impacts of climate change and reduce GHG emissions by XX[132]
T5	Identify policy and fiscal incentives to promote uptake climate-friendly technology (e.g., tax incentives, reduced-energy tariffs, low-interest loans, public-private partnerships) *(Action continues from NCCAP 2013-2017: Finance 7)*	National Treasury MEF-CCD CoG Other State Departments and Agencies KEPSA KAM	**By 2020** – Options identified and analysed, including development of baseline information and expected climate results **By 2022** – Two policies and fiscal incentives launched

4.1.2 Capacity Development (Information and Knowledge Management)

Knowledge management refers to the management, organization and sharing of climate change knowledge.[133] Capacity development is defined by the UNFCCC as enhancing the capacity and ability of counties to take effective climate change action.[134] Capacity development should be participatory, cross-cutting and gender responsive – which will be informed by the priority action to build awareness on gender and inter-generational responsive climate actions.

The priority capacity development actions emphasise establishing the coordination structures for MEF-CCD to effectively implement the Climate Change Act (No. 11 of 2016) and National Climate Change Policy and deliver on Kenya's NDC. The capacity building support will assist the MEF-CCD to develop regulations to implement the Act and Policy. The actions will also assist NEMA to incorporate climate change in environmental assessments and develop an enforcement role.

Importantly, a priority action is to build the capacity of County Governments to undertake and report on climate change actions. The second generation of County Governments take climate change seriously and will deliver most of the adaptation and mitigation actions. This action will include building the capacity of CECs responsible for climate change and officials assigned to the climate change desks in County Governments.

The operation of the National Climate Change Resource Centre. (NCCRC) is a priority action to promote climate information and knowledge management. This Centre provides a one-stop repository of climate change-related information and is equipped with an online climate change portal. This centre, located in Nairobi at Kenya Meteorological Department (KMD) headquarters, is a national facility complete with a library, amphitheatre and training facilities; and is open for public use.

[132] Information to be provided by KCIC
[133] Government of Kenya (2013), *National Climate Change Action Plan, 2013-2017*, Nairobi: Ministry of Environment and Mineral Resources. pages 105-106.
[134] UNFCCC (2017), *Focus: Capacity Building*.

The integration of climate change in education curriculum and the development of a public engagement strategy are priority actions required under the Climate Change Act (No. 11 of 2016).

Table 9: Priority Enabling Actions: Capacity Development (Information and Knowledge Management)

	Action	Coordinating Institution and Relevant Partners	Expected Results (Process Indicator)
C1	Operate a publically accessible National Climate Change Resource Centre that includes a robust and up-to-date climate change knowledge management system, and an updated climate change information portal that has focused information for youth, women and marginlised groups. Use *Knowledge Harvesting* techniques to capture and share climate change information, including information on National Traditional Knowledge. *(Action continues from NCCAP2013-2017: Knowledge Management and Capacity Development 1, 2, and 5)*	MEF-CCD	**By 2020** – XX clients use the NCCRC, XX% are women **By 2022** – XX clients use the NCCRC, XX% are women[135]
C2	Establish Community Education, Business and Information Centres in ASAL Counties, building on the model established in Samburu County, to improve access to information and reduce climate vulnerability. The Centres will be managed by local management committees with representation of youth, women's groups, village development committees and local leaders. The Centres will provide focused services for women and youth.	MEF-CCD CoG Country Governments University of Nairobi Arid Lands Information Network	**By 2020** – Samburu Community, Education, Business and Information Centre established. **By 2022** – 5 Community, Education, Business and Information Centres established in select ASAL Counties[136]
C3	Strengthen the capacity of Government institutions to implement the Climate Change Act, including: training of climate change units; support to National Climate Change Council; and support to MEF-CCD for its coordination role, including compilation and analysis of climate change reports to inform progress on climate change, international reporting and policy/programme development. *(Action continues from NCCAP 2013-2017: Knowledge Management and Capacity Development 3 and 4, and Enabling Policy and Legal Framework 5)*	MEF-CCD CoG County Governments (Climate Change Desks) State Departments (Climate Change Units)	**By 2019** – Climate change is mainstreamed in MTP sector plans and CIDPs **By 2020** – Five relevant state departments reporting **By 2022** – All state departments providing annual reports **By 2022** – CCD compiles information and provides three concrete examples of how climate change reporting has impacted policy and programme development

[135] CCD/LECRD to provide input from NCCRC business plan.
[136] CCD/LECRD to confirm.

C4	Build the capacity of County Governments, including: - Strengthening of Climate Change Coordination Units - Supporting alignment of Counties to Climate Change Act 2016 - Setting up functional Climate Change Units, gazettement of County Environment Committees and other supportive structures - Coordination of climate change programmes across Counties - Financing, monitoring and reporting impact of climate change programmes (on harmonized indicators provided by National Government) - Developing appropriate County legislation - Representing Counties in global forums as part of Kenya country delegation	MEF-CCD CoG County Governments	**By 2020** – Five counties reporting on a pilot basis **By 2022** – All county governments providing annual reports on climate change **By 2022** – CCD compiles information and provides three concrete examples of how climate change reporting has impacted policy and programme development
C5	Strengthen the capacity to NEMA to implement the Climate Change Act, including integrating climate change in impact assessments; and enforcement.	MEF-NEMA MEF-CCD	**By 2020** – Climate change integrated in EIA and SEA guidelines **By 2022** – Role of NEMA in compliance and enforcement defined and capacity built
C6	Develop National Gender and Inter-generational responsive awareness plan and build capacity for effective gender integration in NCCAP and NDC implementation. Incorporate a knowledge harvesting approach to develop the strategy to capture knowledge and insights from the local level.	MEF-CCD National Gender and Equality Commission	**By 2020** – National Gender and Inter-generational plan delivered to the Council **By 2022** – Plan is operationalised at national and county level
C7	Prepare and publish a public engagement strategy, that highlights engagement of youth, women and marginalised groups, and includes these groups in the development of the strategy.	MEF-CCD	**By 2020** – Public engagement strategy delivered to the Council **By 2022** – Plan is operationalised at national and county level
C8	Integrate climate change in the education system, beginning with integration in existing curriculum for lower secondary grades 7, 8 and 9 (e.g., integrated science and social studies) *(Action continues from NCCAP 2013-2017 – Knowledge Management and Capacity Development 6)*	Ministry of Education Kenya Institute of Curriculum Development MEF-CCD	**By 2020** – Draft climate change curriculum developed for lower secondary grades **By 2022** – Climate change curriculum introduced for lower secondary grades

4.1.3 Climate Finance and Resource Mobilisation

These priority enabling actions implement the National Climate Finance Policy that was approved in February 2018. The actions emphasise the design and launching of the Climate Change Fund, developing a climate finance and resource mobilisation strategy, piloting the issuance of Green Bonds, improving access modalities and efficiency of climate finance, and ensuring that climate finance is available for actions in key sectors, including the Big Four.

The actions help the Government of Kenya effectively mobilise, manage and track climate finance actions. A priority is the operationalization of the Climate Change Fund that will be overseen by the National Climate Change Council and will allocate funding for priority mitigation and adaptation actions. The action includes the establishment of the regulations, and management and oversight functions. Work will also be undertaken to link the national fund with County Climate Change Funds. In early 2018, such funds were established in Wajir and Makueni Counties, and were in the planning and design stages in many other Counties.

Building the capacity of The National Treasury as the National Designated Authority to the Green Climate Fund is a priority action. Capacity is needed to track and report on sources, applications and impacts of climate finance. This will include an alignment of climate finance (tracked by National Treasury) and adaptation and mitigation results (tracked by MEF-CCD) to improve analysis, including identifying actions that provide value for money and determining how much climate finance reaches those most in need (such as women, youth and marginalised groups) and the climate impact of that finance. The capacity building will include supporting project and proposal development for government and non-government sectors to improve access to climate finance, and enhancing the implementation of public finance management in relation to climate finance.

Building the capacity of County Governments will be a priority. This will include support to County Governments to develop County climate finance policies that are linked to the Climate Change Act and the Climate Finance Policy. This legal and policy framework will guide utilisation of County Climate Change Funds and enable climate finance to address County-specific local issues. The National Treasury will develop a climate finance resource mobilisation strategy that will be cascaded to the Counties, recognising that action will take place at the County level, with climate finance reporting taking place at the national level.

Capacity building will also assist the private sector to access climate finance, including funding available through Green Bonds. The National Treasury will work with financial institutions to increase their understanding of climate finance, develop a climate risk index, and develop climate-related funding schemes in high-risk areas.

Kenya needs to be well positioned to act on emerging carbon market opportunities. This action will support engaging in the development of new market mechanisms under the UNFCCC, improving Kenyan capacity to engage in carbon asset activities, strengthening the viability of domestic carbon asset production, and increasing access to international carbon markets.

Table 10: Priority Enabling Actions: Climate Finance and Resource Mobilization

	By 2022, we will:	Coordinating Institution and Relevant Partners	Expected Results (Process Indicator)
F1	Operationalize the Climate Change Fund, including establishment of the management and oversight of the fund; annual budgeting and reporting; development of policies, guidelines and procedures; and capitalizing the fund through development partner and GCF contributions. *(continued from NCCAP 2013-2017 – Finance 1)*	National Treasury MEF-CCD Office of the Attorney General County Governments CoG	**By 2020** – Fund is operationalized, including establishment of secretariat and management board as set out in the Climate Fund regulations. **By 2022** – Climate finance being disbursed through identified funding windows; and national fund is linked with County Climate Change Funds.
F2	Enhance the capacity of the NDA to mobilize and manage climate finance, including the management of, access to and tracking of international climate finance; and development of funding proposals. Develop a climate finance resource mobilization strategy (including domestic allocations, international climate finance, access to carbon credits and markets, and allocations from the private sector, PPP for climate-friendly investments). *(continued from NCCAP 2013-2017 – Finance 1)*	National Treasury MEF-CCD MEF-NEMA State Departments County Governments	**By 2020** – Climate resource mobilization strategy developed. **By 2020** – Three county proposals developed with GCF readiness support receive climate finance. **By 2022** – Climate resource mobilization strategy cascaded to the Counties (5 Counties have developed strategies).
F3	Build the capacity of County Governments to mobilize, implement and track climate finance; including allocations through the County Climate Change Funds. This includes tracking of impacts using sex-disaggregated data.	National Treasury MEF-CCD County Governments CoG	**By 2020** – Allocations of climate finance through County Climate Funds are tracked and reported to National Treasury. **By 2022** – County Governments report on climate impacts of County Climate Funds.
F4	Build the capacity of the private sector to access, effectively use and report on climate finance. Build the in-house capacity of financial institutions to assess climate risk and to develop climate-related schemes.	National Treasury MEF-CCD KEPSA KAM Kenya Bankers Association Private sector	**By 2020** – Reporting framework for private sector access to climate finance developed. **By 2022** – Three financial institutions have developed climate-related lending schemes.
F5	Report on domestic and international climate finance flows through an improved tracking system (including building capacity of government to track climate finance), that is supported through improved coordination with	National Treasury MEF-CCD State Departments County	**By 2020** – Climate finance tracking system established at the national level. **By 2020** – Development Partners consultative forum on climate

	development partners. *(continued from NCCAP 2013-2017 – Finance 2 and 3)*	Governments	finance established and meeting on a regular basis. **By 2022** – Climate finance tracking system reporting on domestic and international climate finance flows.
F6	Pilot the issuance of Green Bonds. Through these bonds, the funds will be earmarked for green projects, many of which will have climate change benefits.	National Treasury	**By 2020** – Pilot the issuance of two green bonds **By 2022** – Assessment of the green bonds' impact on climate change (e.g., reduced emissions or built resilience).
F7	Participate in the design and implementation of market-based mechanisms; promote investor confidence and participation in market-based mechanisms; and enhance Kenyan capacity to engage in carbon asset activities, strengthen the viability of domestic carbon asset production and increase access to international carbon markets. *(continued from NCCAP 2013-2017 – Finance 4 and 6)*	National Treasury MEF-CCD MEF-NEMA CoG KenGen KEPSA KAM	**By 2020** – Submission to UNFCCC on development of market-based mechanisms. **By 2022** – Unit established to promote projects responsible for generating carbon credits.
F8	Update the Climate Public Expenditure and Budget Review (CPEBR).	National Treasury MEF-CCD State Departments County Governments	**By 2020** – Updated CPEBR complete. **By 2022** – Recommendations from CPEBR implemented by National Treasury and MEF-CCD.

4.1.4 Transparency: Measurement, Reporting and Verification (MRV) and Monitoring and Evaluation (M&E)

The Paris Agreement under the UNFCCC sets out an enhanced transparency framework for action and support. Under the Paris Agreement, Kenya will be expected to provide information on mitigation, adaptation and support received, including:

- National GHG inventory report to enable tracking of progress on implementing and achieving mitigation NDC.
- Information related to climate change impacts and adaptation.
- Information on financial, technology transfer and capacity building support received from developed countries.

Kenya's transparency framework will be based on an appropriate measurement, reporting and verification (MRV) system for mitigation and a monitoring and evaluation (M&E) system for adaptation. Preliminary actions were taken under the first NCCAP (2013-2017) to establish a National Performance and Benefit Measurement (NPBM) framework, defined as "an

integrated framework for measuring, monitoring, evaluating, verifying and reporting results of mitigation actions, adaptation actions and the synergies between them."[137]

MRV typically refers to the measurement, reporting and verification of emissions and removals of greenhouse gases. Countries report to the UNFCCC through National Communications that include inventories setting out GHG emissions and removals in the agriculture; energy (including transport); land use, land-use change and forestry (LULUCF); industrial processes; and waste sectors. Countries follow guidelines and protocols developed and approved by the IPCC to develop their inventories. GHG measurement and targets for the NCCAP (2018-2022) should be set at the sector level (i.e., six mitigation sectors) for the five-year period. Setting annual emission targets and measuring emissions at a project level or County/sub-national level would be extremely costly and resource-intensive. GHG emissions reporting at the County level would mean a bottom-up assessment that is time-consuming and likely would provide limited information to drive the transformative change needed for large-scale emission reductions.

Adaptation actions are typically tracked through M&E systems. Currently, there are no agreed indicators at the international level. Kenya is expected to identify relevant and appropriate indicators to track progress on adaptation and building resilience to cope with climate change.

Reporting to the National Climate Change Council needs to demonstrate that climate change action and spending on climate change leads to real results. For mitigation this means demonstrating that GHG emissions are lower than the projected baseline and Kenya is delivering on its NDC. For adaptation this means demonstrating that people are better able to cope with climate change. As an example, in the agriculture sector this means that production is maintained or increased as the climate changes; for infrastructure this means that capital investments are not damaged by extreme weather events (flooding, sea level rise and storm surges) and maintain their value over time.

Kenya's MRV system for emission reductions and M&E system for adaptation will be developed in a phased approach over 2018-2022. Actions to 2020 will take place under established projects, including the US$2.2 million project to help Kenya meet the transparency requirements of the Paris Agreement supported by the Capacity Building for Transparency (CBIT) initiative of the Global Environment Facility (GEF), and support for the third GHG inventory from the Low Emission Climate Resilient Development (LECRD) project managed by UNDP and funded by USAID.

Initial work to improve the measurement of adaptation outcomes includes the identification of key indicators to measure climate-related impacts and the collection of baseline data. In regard to mitigation, the actions include the establishment of an appropriate process to collect, collate and analyse GHG emissions; and improvements to and embedding of the SLEEK process. The actions will be elaborated under the CBIT project that is implemented by Conservation International in cooperation with the MEF-CCD.

[137] Government of Kenya (2013), *National Climate Change Action Plan, 2013-2017*, Nairobi: Ministry of Environment and Mineral Resources, page 129.

Table 11: Priority Enabling Actions: MRV and M&E

	Action	Coordinating Institution and Relevant Partners	Expected Results (Process Indicators)
M1	Establish a monitoring and evaluation (M&E) system to report on adaptation actions and benefits, including identification and measurement of adaptation indicators (including collection of baseline information and development of sex-disaggregated data and gender indicators); and reporting on how adaptation actions have contributed to development goals. *(continued from NCCAP 2012-2017: NPBM 1,2,3,4, 6, 7, 8)*	MEF-CCD County Governments State Departments	**By 2020** – M&E system (with institutional roles defined) for adaptation actions established **By 2020** - Climate registry for adaptation actions established, with information publically available **By 2022** – Adaptation M&E system fully functional
M2	Establish a functional system to develop Kenya's GHG inventory and an MRV system for tracking GHG emissions for NDC reporting. To include strengthening the capacity of the private sector and government sub-sectors to report on GHG emissions, using a voluntary phased approach to reporting; and establishing government processes to compile, analyse and use the information (in a way that protects private sector confidentiality) to inform domestic and international reporting and policy/programme development. To include a Climate Business Information Centre to support centralised reporting requirements of private entities. *(continued from NCCAP 2013-2017: NPBM 5)*	MEF-CCD MEF-NEMA MEF-SLEEK MOE MOTIHUD MAI MEF-KFS KBNS State Department of Planning KEPSA KAM	**By 2020** – Third National Communication submitted, including third National GHG Inventory **By 2020 –** Climate registry for mitigation actions established, with information publically available **By 2020** – Framework for large emitter reporting established **By 2022** – All private and public sector large emitters are reporting to CCD on a voluntary basis **By 2022** – CCD has established systems to collate, analyse and report on GHG data
M3	Establish a system to track and report on land-based emissions using through the development of a monitoring and reporting system for transparent accounting of emissions and removals	MEF-KFS MEF-CCD MEF-SLEEK	**By 2020** – Six working groups under SLEEK established to provide data and information to the national GHG inventory and MRV systems

	in the forestry and land-use sectors *(continued from NCCAP I – Mitigation 8)*	Conservation International	**By 2022** – Reporting on land-based emissions fully integrated in GHG inventory
M4	Establish a system to analyse the SDG benefits of climate change actions	MEF-CCD State Department of Planning	**By 2020** – Analysis of SDG benefits of climate change actions undertaken.

4.1.5 Costs of Enabling Actions

The costs to deliver the enabling actions are set out in the Table 11 below. The information includes, the cost estimate, source of the cost estimate (in italics), known funding and source of the funding, and the climate finance gap. Gaps remain in the information because the amounts allocated by Development Partners are not always clearly stated.

Table 12: Estimated Costs, Funding and Climate Finance Gaps of Enabling Actions

	Action ***Source of Cost Estimate***	**Budget (KES)**	**Funding (KES) and Source of Funding**	**Climate Finance Gap (KES)**
Technology and Innovation				
T1	Improve the capacity of KIRDI *up to KES 25 million /US$250,000 potentially available from the CTCN*	25,000,000	0	25,000,000
T2	Provide Climate Information Services *KMD*	450,000,000	0	450,000,000
T3	Establish a Sustainable Consumption and Production Networking facility *Switch Africa Green budget for Kenya*	100,000,000	0	100,000,000
T4	Promote climate technologies and innovation in the private sector through KCIC *CCTWG -MTP III budget*	1,000,000,000	**0**	1,000,000,000
T5	Identify policy and fiscal incentives to promote uptake of climate-friendly technologies *NCCAP 2013-2017 action*	40,000,000	0	40,000,000
		1,615,000,000	**0**	**1,615,000,000**
Capacity Building and Knowledge Management				
C1	Operate the NCCRC *CCTWG MTP Sector report*	300,000,000	0	300,000,000
C2	Community Education, Business and Information Centres in ASAL Counties			

	LECRD [138]			
C3	Strengthen the capacity of the CCD-MEF and climate change units *CCTWG MTP Sector report - including 500 million for Council, 3,750 million for capacity building, and 1,300 million for regulations (less amount for county capacity building in C3)*	4,950,000,000	GCF-FAO 300,000,000 USAID 80,000,000 UNDP[139] ? GNI Plus 950,000,000	3,620,000,000
C4	Build the capacity of County Governments *Based on budget for UK-supported devolution support programme for climate change*	600,000,000	Gov't of Sweden[140] ?	600,000,000
C5	Strengthen the capacity of NEMA *NEMA*	20,000,000	0	20,000,000
C6	National gender and inter-generational responsive awareness plan *UNDP NDC Gender Programme*	45,000,000	UNDP 45,000,000 NDC Gender	0
C7	Public engagement strategy *NCCAP 2013-2017 action*	60,000,000	0	60,000,000
C8	Integrate climate change in education system *NCCAP 2013-2017 action*	150,000,000	0	150,000,000
		6,125,000,000	**1,375,000,000**	**4,750,000,000**
Climate Finance				
F1	Operationalisation of the Climate Change Fund Operational costs *Climate Finance Policy*	500,000,000	GoK/TNT 500,000,000	0
F2	Capacity building of the NDA, including development of funding proposals *Amount available from GCF readiness fund*	150,000,000 ? ?	GCF 150,000,000 NREL/LECRD ?[141] World Bank ?[142]	150,000,000 0 0
F3	Capacity building of County Governments			
F4	Capacity building for the private sector[143]			
F5	Tracking system for climate finance *NCCAP 2013-2017 action*	60,000,000	0	60,000,000
F6	Pilot Green Bonds		Internal Treasury resources	

[138] Require information from LECRD on budget for Samburu Centre.
[139] Require information from LECRD on UNDP NDC/USAID funding for capacity building.
[140] Require information from CCD on support from Sweden.
[141] Require information from LECRD/UNDP.
[142] Require information from World Bank; or UNDP can provide a cost estimate based on first CPEBR
[143] Budget estimate required from Treasury

F7	Market-based mechanisms *NCCAP 2013-2017 action*	106,000,000	0	106,000,000
F8	Climate Public Expenditure and Budget Review *No budget information available*	?	World Bank ?[144]	0
		816,000,000	**650,000,000**	**166,000,000**
Transparency				
M1 M2	M&E system for adaptation MRV system for mitigation and third inventory *NCCAP 2013-2017 action* Climate Business Information Centre *KEPSA*	927,000,000 350,000,000 Sub-total: 1,277,000,000	**Funding allocation to 2020** GEF/CBIT 72,450,000 GoK 100,000,000 co-funding ICAT 12,500,000 LECRD 14,000,000 NAP 1,500,000 Global Network TraCS 60,050,000 GEF 25,000,000 (inventory) Sub-total: 285,500,000	429,500,000
M3	System to track land-based emissions *CCTWG -MTP III budget*	183,000,000	33,000,000	150,000,000
M4	Analysis of SDG Benefits *No budget information available*	?	Netherlands Gov't (WRI)[145] ?	0
		1,460,000,000	**318,500,000**	**1,141,500,000**

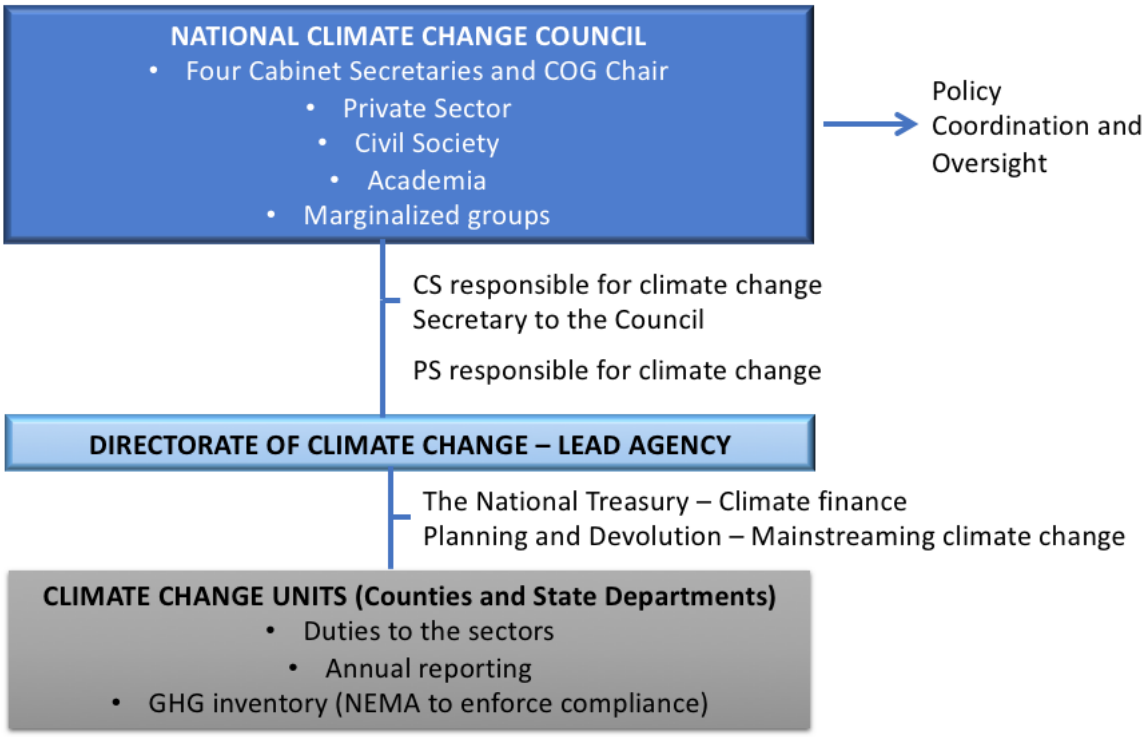
4.2 Delivery and Coordination Mechanisms

4.2.1 Institutional Roles and Responsibilities

The Climate Change Act (No. 11 of 2016) sets out institutional structures and responsibilities that guide the oversight and management of this second NCCAP (2018-2022). The responsibilities of main institutions engaged in the oversight, implementation and monitoring of the second NCCAP (2018-2022) are described below and illustrated in Figure 11.

[144] Require information from World Bank
[145] Information needed from WRI

Figure 12: Climate Change Institutional Structures in the Climate Change Act[146]



The **National Climate Change Council, chaired by His Excellency the President of Kenya,** is responsible for overall coordination and advisory functions, including guiding the implementation of this second NCCAP (2018-2022). The Council shall, among others, "ensure the mainstreaming of climate change functions by the national and county governments", and "approve and oversee the implementation of the National Climate Change Action Plan (NCCAP)." Members of the Climate Change Council are set out in Section 7 of the Climate Change Act (No. 11 of 2016) and are listed below:

- Cabinet Secretary responsible for environment and climate change affairs;
- Cabinet Secretary responsible for the National Treasury;
- Cabinet Secretary responsible for economic planning;
- Cabinet Secretary responsible for energy;
- Chairperson of the Council of Governors;
- Representative of the private sector;
- Representative of civil society;
- Representative of the marginalised community; and
- Representative of academia.

The **Cabinet Secretary (CS) responsible for environment and climate change affairs is the Secretary to the Council**. The CS formulates and periodically reviews climate change policy, strategy and the NCCAP, and submits to the Council for approval. The

[146] Figure being revised to relocate NEMA.

CS provides, through the Directorate, technical assistance on climate change actions and responses to County governments, based on mutual agreement and needs identified by County governments. The CS reports biennially to Parliament on the status of implementation of international and national climate change obligations.

The **Climate Change Directorate, established in the ministry responsible for environment and climate change affairs** is responsible for the overall implementation of this second NCCAP (2018-2022), including coordination of climate change actions and related MRV. The MEF-CCD is the Secretariat for the Council and coordinates the technical implementation of climate change functions. This includes providing analytical support and technical assistance on climate change, and coordinating the implementation of and reporting on the second NCCAP (2018-2022). The responsibilities of the MEF-CCD are described in greater detail below in Section 4.2.2.

In regard to implementation of climate change actions and implementation of the second NCCAP (2018-2022), the Climate Change Act (No. 11 of 2016) sets out roles and responsibilities for government entities:

- **County Governments** are responsible for integrating and mainstreaming climate change into CIDPs, designating a County Executive Committee (CEC) member to coordinate climate change affairs, and reporting on the implementation of climate change on an annual basis. County governments are expected to establish Climate Change Units, led by the CEC member responsible for climate change, that will oversee the implementation of climate change actions stipulated in the 2018-2022 CIDPs [Section 19].[147]
- **State departments** and national public entities are to establish Climate Change Units responsible for integrating the NCCAP into strategies and implementation plans; and reporting to the Council on an annual basis on performance and implementation. All state departments and public entities will be required to report, even if they did not implement climate change actions [Section 15(5)].
- **National Treasury** is responsible to develop a strategy and make regulations setting out procedures and powers to identify sources of climate finance and to monitor use, and to work with the Cabinet Secretary responsible for climate change affairs to develop incentives for the promotion of climate change initiatives [Section 25(9) and Section 26]. The Climate Change Fund is vested in National Treasury [Section 25(2)].
- The **National Environment Management Authority (NEMA)** is responsible, on behalf of the Council, for monitoring and enforcing compliance of climate change interventions [Section 17]; and for integrating climate risk and vulnerability assessment into all forms of assessment [Section 20].
- **The Kenya Institute of Curriculum Development** is to integrate climate change into the national education curricula at all levels; and advise tertiary institutions on the integration of climate change into their curricula [Section 21].

Mainstreaming and reinforcing climate change disaster risk reduction into strategies and actions of public and private entities [Section 3 (2)(d)] will require participation of the following government entities:

[147] Will be updated based on new engagement framework with Counties.

- The **National Drought Management Authority (NDMA)** coordinates drought management and disaster risk reduction actions in the 23 ASAL counties. NDMA will play a critical role in mainstreaming and reinforcing climate change disaster risk reduction into strategies and actions of public and private entities [Section 3 (2)(d)], including reporting annually to the Council on the status and progress of climate change actions in the ASAL Counties.
- The **National Disaster Operations Centre (NDOC)** is the focal point for disaster management and response in Kenya, including drought, floods and landslides. NDOC will play a critical role in mainstreaming and reinforcing climate change disaster risk reduction into strategies and actions of public and private entities [Section 3 (2)(d)].

Various stakeholders have roles in implementing the second NCCAP (2018-2022) and addressing climate change, including:

- **Public**: The public will play a role in the planning, implementation and monitoring of climate change interventions, with an emphasis on enhancing adaptive capacity and improving ability to withstand climate shocks.
- **Private sector:** Action on climate change and implementation of the NCCAP and Act can be supported by the private sector in two ways: 1) Adaptation – making sure businesses can adjust as well as possible to any consequences of climate change by managing risk and exploiting opportunities; and 2) Mitigation – reducing greenhouse gas emissions from business operations to minimise the impacts of climate change in the future. The Council may impose climate change obligations on private entities 9Section 16 of the Climate Change Act), likely to be reporting requirements that would be introduced in a phased manner and developed in consultation with the private sector.
- **Public Benefit Organisations:** This includes non-governmental organisations, civil society organisations and faith-based organisations, amongst others. They have been involved in climate change activities in Kenya, and the UNFCCC acknowledges the role of civil society in Paragraph 1(i) Article 4 in the areas of education, training and public awareness related to climate change. In Kenya, civil society is known to be a powerful agent of change through public awareness creation, and policy research and analysis, and advocacy on key socio-economic issues including climate change.
- **Youth:** Engagement of youth, who comprise the majority of the population in many Counties, will be encouraged through schools, post-secondary institutions and youth-focused organisations. Youth are agents of change and have influence on the broader community through their parents, relatives and families. They will be engaged through planning, implementation and monitoring of climate change interventions.
- **Special interest groups including women, persons with disabilities and other minority groups:** Due to inequities and disparities, these groups face a disproportionate climate impacts. Climate change actions will be delivered in a way that accounts for the unique needs of these groups.
- **Pastoralists, hunter gatherers and fisher communities:** These groups are a critical constituency. Article 56 of the Constitution of Kenya, read together with Article 260, recognises these groups as marginalised communities for whom efforts must be put in place to ensure they participate and are represented in governance and other spheres of life. The livelihoods of these communities are at risk because of climate

change, and adaptation actions will engage these communities in implementation and monitoring. These communities will also be involved in reviews of implementation of NCCAPs.

- **Academia and research institutions:** Researchers help to provide the evidence and science for knowledge-based decision making by national and county governments, private sector, development partners and civil society. They conduct research on different aspects of climate change, including improving the understanding of climate change attribution in Kenya and developing appropriate technologies for reducing greenhouse gas emissions.
- **Media:** The media provides vital information at times of emergency — from warning of imminent floods to explaining how to deal with disease outbreaks. The media helps to disseminate information about climate change. Accurate, timely and relevant information is a critical component of resilience and appropriate climate change action.

4.2.2 Coordination of the NCCAP

Role of the Ministry of Environment and Forestry through the Climate Change Directorate

The MEF-CCD is responsible for the overall implementation of this second NCCAP (2018-2022), including coordination and reporting on implementation of actions by partners. Section 9(8) of the Climate Change Act (No. 11 of 2016), provides guidance on the role of the MEF-CCD, described below:

- **Provide analytical support on climate change** – for the various ministries, agencies and county governments.
- **Provide technical assistance** – based on needs identified by County Governments.
- **Establish and maintain a national registry** – for both mitigation and adaptation actions.
- **Serve as the national knowledge and information management centre** – for collating, verify, refining and disseminating knowledge and information on climate change.
- **Coordinate adherence to the country's international obligations** – including reporting on NDCs, developing national communications, including Kenya's GHG inventory.
- **Coordinate implementation of the gender and intergenerational plan** – at the National and County Government levels.

Additionally, the MEF-CCD is to work in collaboration with other agencies at the National and County Government levels to:

- Identify **low carbon development strategies** and coordinate related MRV;
- Develop strategies and coordinate actions for **building resilience to climate change** and enhancing adaptive capacity; and
- Optimise Kenya's opportunities to **mobilize climate finance.**

The MEF-CCD is delivering on these roles, including the establishment of a pilot registry, launching the NCCRC, and providing analytical support; but much work remains and will be supported by the enabling actions set out in Section 3.3.

The MEF-CCD will establish an inter-governmental platform to improve its climate change coordination function. This platform will include key players in the climate change response, including sector ministries, CoG, private sector, civil society, youth, marginalised groups and academia. The members of this platform will assist the MEF-CCD in accessing required information, in mainstreaming climate change in plans and policies, and guiding the actions of the Climate Change Units in state departments and Climate Change Desks in County Governments. This platform will play a role in M&E of the second NCCAP (2018-2022), described below in Section 4.2.3.

Two sub-platforms – adaptation and mitigation – will report to the inter-governmental platform for climate change coordination. These technical sub-platforms will track mitigation and adaptation actions, advise on gaps in implementation of the NCCAP, and propose solutions to enhance mainstreaming across the National and County Governments.

Role of the County Governments[148]

The County Governments will support the MEF-CCD in its coordination role by:

- Nominating a County Executive Committee (CEC) Member to be in charge of coordinating implementation of climate change actions. The CoG will work closely with the MEF-CCD to ensure that County Climate Change Units are established, strengthened and functional, leading to effective implementation of the NCCAP 2018-2022.
- Mainstreaming climate change actions in their respective CIDPs, and implementing and reporting on these actions over the next five years.
- Generating best practices, including development of County legislation that supports climate change action. These best practices, together with those documented by the National government, will be shared in Kenya and through global platforms.
- Reporting annually, at the end of every financial year, to the County Assembly on progress achieved on the implementation of climate change actions. A copy of the report will be sent to the CCD-MEF, which is responsible for compiling reports and submitting a summary report to the Cabinet Secretary and the National Climate Change Council.

4.2.3 Monitoring and Evaluation (M&E) of the NCCAP

The MEF-CCD is responsible for monitoring and evaluation (M&E) of the second NCCAP (2018-2022). Consistent with Section 13(7) of the Climate Change Act (No. 11 of 2016), the implementation of the NCCAP will be reviewed every two years. The review will utilise reports from County Governments and state departments, as well as inputs from relevant stakeholders. Important stakeholders in the review process include women, youth, and marginalised groups including pastoralists, hunter gatherers and fisher communities, private sector and academia.

[148] To be updated with information in Draft TORs.

M&E of the NCCAP will focus on demonstrating that investment in adaptation and mitigation actions leads to real climate results and development benefits that are linked to the Big 4 agenda. The M&E system will track implementation and results of the second NCCAP (2018-2022) to provide the evidence base for planning and implementing future actions, for seeking support, and for domestic and international reporting.

The M&E system to report on implementation of the second NCCAP (2018-2022) will be developed and introduced in a phased approach over 2018-2022 and linked to SDG reporting. This will include the development of reporting frameworks for County Government and state departments, and processes to compile, analyse and report on actions and results. The key to success is a workable M&E structure that is appropriate for a devolved governance system and for the available resources. The M&E system should:

- **Link with the National Integrated Monitoring and Evaluation systems (NIMES) and County Integrated Evaluation Systems (CIMES)** to draw on established reporting processes and ensure efficient reporting processes for the County Governments.
- **Identify a limited number of key indicators that have baseline data** and are tracked by the Ministry of Planning to measure climate-related impacts at the national level. Potential indicators are set out in Table 13.Use sex-aggregated data where possible and prioritise collection of this data if it is not available.
- **Track and measure GHG emissions on a sector basis at the national level**. Measuring GHG emissions on a per project/programme/action basis is costly. Measuring GHG emissions at a County level will be difficult, expensive and unlikely to generate robust information that is aligned with GHG inventory national approach.
- **Align the tracking and measurement of co-benefits with the Government's Big 4 agenda and SDGs**.

Table 13: Potential indicators to measure progress on climate action at the National level

Priority Action	National-level Indicators
1. Disaster Risk Management	*Adaptation* ▪ Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population. ▪ Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national strategies.
2. Food and Nutrition Security	Adaptation ▪ GDP growth of agricultural sector ▪ Livestock deaths from drought / number of livestock slaughtered attributable to drought ▪ Agricultural land under irrigation (acreage) ▪ Number of households receiving food aid and cash transfers Mitigation ▪ Area under agroforestry (acreage)
3. Water	Adaptation ▪ Water storage per capita
4. Forestry, Ecosystems,	Adaptation /Mitigation ▪ Forest cover as a % of total land area

Wildlife and Tourism	Adaptation ▪ Proportion of land that is degraded over total land area ▪ Coverage of protected areas in relation to marine area ▪ Elephant deaths as a result of drought
5. Health, Sanitation and Human Settlements	Adaptation ▪ Malaria incidence per 1,000 population ▪ Proportion of the rural population who live within 2 km of an all-season road ▪ Proportion of urban population living in slums, informal settlements or inadequate housing Mitigation ▪ Freight moved by rail (from road) - %
6. Manufacturing (including Energy and Clean Cooking)	Mitigation ▪ Renewable energy share in the total electricity generation mix - % ▪ Households using biomass for energy - % ▪ Proportion of households using LPG - %

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Annex 1: Thematic Working Group Members

Adaptation Thematic Working Group

Rose Akombo	Kenya Forest Service
Lolem Lokolile Bosco	Ministry of Health
Esther Gacanja	Ministry of Transport, Infrastructure, Housing and Urban Development (MOTIHUD)
Erustus Kanga	Ministry of Tourism and Wildlife
Anne Kariuki	Kenya Association of Manufacturers
Kelvin Khisa	Kenya Industrial Research and Development Institute
David Kiboi	State Department of Planning
Andrew Kinyua	Ministry of Water and Sanitation
Suada Ibrahim	Kenya Red Cross
Joseph Muhwanga	Kenya Private Sector Alliance
Brian Muthoka	Council of Governors
Veronica Ndetu	Ministry of Agriculture and Irrigation
Francis Nyambariga	Ministry of Agriculture and Irrigation
Peter Odhengo	The National Treasury
Victor Orindi	National Drought Management Authority
Maurice Otieno	National Environment Management Authority
Sayianga Parsanka	Indigenous Groups
Ayub Shaka	Kenya Meteorological Department
Susy Wandera	Civil Society
Joab Osumba	NDC Partnership Consultant
Deborah Murphy	NCCAP Consultant

Mitigation Thematic Working Group

Mitchel Paula Akute	Ministry of Energy
Betsy Bowen	Kenya Industrial Research and Development Institute
Esther Gacanja	MOTIHUD
Alfred Gichu	Kenya Forest Service
Peninah Karomo	Rural Electrification Authority
Robin Mbae	Ministry of Agriculture and Irrigation
Michael Mbaru	Kenya Maritime Authority

James Metto	Ministry of Energy
Brian Muthoka	Council of Governors
Francis Mwangi	Kenya Civil Aviation Authority
David Njugi	Kenya Association of Manufacturers
Hezekiah Okeyo	Ministry of Industry, Trade and Cooperatives
Michael Okoti	Kenya Agricultural and Livestock Research Institute
Walter Omondi	Ministry of Environment and Forestry
Francis Opiyo	Geothermal Development Company
Silas Sanga	Ministry of Energy
Kennedy Thiongo	Kenya Meteorological Department
Tom Owino	NDC Partnership Consultant

Annex 2: Climate Change Issues and Actions in the Counties

Participants from government and civil society identified priority climate change issues and actions at County consultations held in April 2018. The input is summarised by County Economic Bloc in the tables below. The full reports are available on the NCCAP (2018-2022) website at:

Frontier Counties Development Council: Garissa, Isiolo, Mandera, Marsabit, Wajir

Issue	Priority Actions
Drought / extreme temperatures	▪ Renewable energy (solar and wind) ▪ Flood water harvesting ▪ Livelihood diversification ▪ Dryland agroforestry ▪ Introduction of new tree species
Floods	▪ Fish harvesting ▪ Seed dispersal agenda ▪ Soil fertility ▪ Regeneration through natural vegetation ▪ Deliberate protection of riparian areas along the rivers ▪ Strategic placement of dams ▪ Ward development funds to address local problems
Health / diseases (human and livestock)	▪ Vaccination campaign ▪ Establishment of research centres ▪ Adoption of new animal husbandry technologies ▪ Change in animal feeding plans ▪ Provision of essential drugs ▪ Disease surveillance and reporting
Destruction of forests / environmental impacts	▪ Afforestation programmes ▪ Establishment of tree nurseries and greenbelts ▪ Farm forestry protection and conservation of natural springs, watersheds ▪ Proper siting and design of water investments ▪ Planned grazing and management of rangelands ▪ Strict regulations and laws to govern charcoal production
Crop productivity	▪ Water efficient technologies/ water harvesting /utilization of sand dams ▪ Climate smart agriculture ▪ Provision of certified seeds; drought resistant seeds, ▪ Fodder farming to improve pastoral resilience ▪ Improve agricultural extension services ▪ Conservation action ▪ Short cycle fruit trees
Livestock productivity	▪ Reseeding/rehabilitation of rangelands ▪ Fodder banks ▪ Legislation and regulation to manage pasture lands ▪ Establishment of recovery" kitty" for post-drought and post-flood ▪ Well-planned settlements ▪ Wet and dry season grazing areas ▪ Livestock marketing value change. ▪ Alternative livelihoods

Education	▪ Work on security and sensitize locals ▪ Enhance community awareness ▪ Improve network reception ▪ Increase accessibility to learning materials and tools
Livelihoods	▪ Capacity building for youth on business skills ▪ Enterprise development ▪ Banking schemes, such as village and community banks, revolving funds for women and youth
Human activities	▪ Proper planning of towns ▪ Prioritization of development projects ▪ Implementation of CIDPs ▪ Environmental audits for development projects ▪ M&E of development projects ▪ Stakeholder involvement and engagement
Structural/ institutional frameworks	▪ Mainstreaming of climate in sectoral plans ▪ Increase availability of climate change information

Jumuiya Ya Kaunti Za Pwani: Kilifi, Kwale, Lamu, Mombasa, Taita Taveta, Tana River

Issue	**Actions**
Air pollution	▪ Tree planting ▪ Policies and regulations to reduce air pollution ▪ Clean Energy ▪ Weather monitoring infrastructure ▪ Develop weather inventory
Floods	▪ Damming ▪ Construction of gabions ▪ Land use planning ▪ Water harvesting (dams) ▪ Irrigation ▪ Fish farming
Drought	▪ Tree planting ▪ Controlled grazing ▪ Proper farming methods ▪ Solar energy
Land degradation	▪ Afforestation ▪ Land reclamation ▪ REDD +; LDN programmes on land conservation
Sector	**Actions**
Waste management	▪ Waste management regulation ▪ Awareness creation ▪ Waste disposal management site ▪ Waste to energy ▪ Income generation
Fisheries	▪ Research on coral bleaching

	▪ Promote proper methods of fish harvesting ▪ Promotion of fish farming ▪ Controlled mangrove harvesting, capitalize on mangrove ecosystem services (sea food) for nutritional health ▪ Enforcement of maritime laws ▪ Sensitization on marine conservation
Agriculture	▪ Value addition ▪ Planting drought tolerant crops ▪ Proper farming methods ▪ Sensitization on proper farming methods ▪ Crop diversification ▪ Enterprise development ▪ Increase funding for green house and irrigation ▪ Support of balcony farming
Deforestation	▪ Awareness promotion on conservation of natural resources ▪ Implementation of existing regulation on economic use of resources ▪ Commercial woodlots
Livestock	▪ Irrigation ▪ Research (tolerant breeds) ▪ Proper land use ▪ Proper ranch management ▪ Regulation of animal movement ▪ Enterprise development in livestock feed and diseases
Mining	▪ Improve mining and crashing technologies ▪ Land reclamation ▪ Public sensitization ▪ protection of water resources from interference ▪ Legislation and regulation to control mining activities
Energy	▪ Promotion of utilization of green energy ▪ Research and innovation on alternative energy sources
Infrastructure	▪ Construction of climate-proof road network ▪ Restore water catchment areas ▪ Move people to higher areas ▪ Construction of river dykes/dams ▪ Reconstruction of raised ports and jets ▪ Reconstruction of climate-proof railway lines ▪ Special programmes under the county and National Government funding to reconstruct the roof tops ▪ Construction of modern silos ▪ Modern communication technologies eg fibre optic cables
ICT	▪ Development of modern irrigation ▪ Development of industrial parks in the counties ▪ Mechanization to improve efficiency
Industrialisation	▪ Construction of climate-proof road network
Health	▪ Provision of nets ▪ Immunizations ▪ Sensitization and creation of awareness ▪ Planting of trees ▪ Creation of drainage systems for storm water ▪ Proper waste management ▪ Development of sanitation infrastructure like drainage ▪ Increase service delivery

	▪ Development of county enforcement legal framework ▪ Development waste management infrastructure ▪ Incorporate climate change in designing of infrastructure ▪ Awareness to the public ▪ Have a polluter pay framework concept for local polluting companies ▪ Increase in budget allocation in the counties ▪ Have mobile camp programs. Fit the medical institution with facilities. ▪ Train more personnel ▪ Have early warning systems
Education	▪ Synchronize the academic calendar with climate change related events ie floods, droughts, heat-waves ▪ Tree planting activity in schools ▪ The county government to have feeding programs in the ECDs ▪ Build boarding schools
Climate change awareness	▪ Train the public on environmental resilience ▪ Develop awareness and education department ▪ Conduct awareness on climate change talks

3.3 Lake Region Economic Bloc: Bomet, Bungoma, Busia, Homa Bay, Kakamega, Kericho, Kisii, Kisumu, Migori, Nandi, Nyamira, Siaya, Trans Nzoia, Vihiga

Issue	Priority Actions
Bomet and Kericho Counties	
Ecosystem degradation, food and nutrition insecurity, drought – Increase forest cover	▪ Increase forestry cover from the current 12.7% to above 20% ▪ Promotion of Afruitation, ongoing by the County Government ▪ Adhere to water Tower acts in protection of water catchment areas
Food and nutrition insecurity – sustain food accessibility	▪ Increase food crops diversification ▪ Sensitization of households on food nutrition ▪ Reinforce research an adoption of new technologies
Drought – sustain water accessibility	▪ Irrigation ▪ Construction of dams, water pans, boreholes ▪ Water harvesting from roof tops ▪ Water storage tanks
Enhance proper solid waste management	▪ Reinforce the policies and laws on ban of plastics career bags ▪ Education and awareness on the minimizing, reuse and recycling of solid wastes ▪ Acquisition of modern efficient technologies for handling wastes in major towns like Kericho, Bomet, Sotik, Litein and other big towns in the regions
Enhance environmental education	▪ Organizing forums in grassroots in order to enhance environmental awareness ▪ Increase environmental topics on the programs aired on the local channels ▪ Create environmental communication centers in Bomet and Kericho Towns where all environmental issues and concerns are tabled ▪ Newspapers channels should at all bring informative information on environmental matters rather than focusing on politics only

Bungoma and Busia Counties	
Alleviate effects of flooding and prolonged dry spell (displaced population, erosion, water contamination, increase in water-borne diseases)	▪ Prioritize in the CIDPs and CFSPs ▪ Early detection and warning systems ▪ Disaster management Fund ▪ Put in place Disaster Response Unit – DRU ▪ Construction of dykes ▪ Construction of dams ▪ Treatment and distribution of mosquito nets
Environmental degradation (soil erosion, deforestation, encroachment, unsustainable sand harvesting)	▪ Construct gabions ▪ Construct terraces ▪ Planting of trees ▪ Sensitize and train individual farmers ▪ Enforcement of the riverine laws ▪ Soil conservation ▪ Tree nurseries
Promote access to clean and safe water (water-borne disease, long distance to water, resource use conflict, saline ground water)	▪ Spring protection ▪ Pipe extensions ▪ Borehole drilling ▪ Water treatment ▪ Bottling water
Address encroachment into fragile ecosystems (degraded wetlands, poor agricultural practices, fires, sand harvesting)	▪ Law enforcement, protection and conservation
Address cross-border conflict on wetlands	▪ Law enforcement, protection and conservation
Attain 10% tree cover	▪ Plant trees ▪ promotion of non-timber forest products ▪ Sensitization campaigns ▪ On farm afforestation ▪ Organizing National and County tree days
Kisii and Nyamira Counties	
Water scarcity	▪ Uprooting Eucalyptus along River Gucha 30 metres from the river. ▪ Spring Protection; 2 springs per ward for Kisii County, 5 springs per ward Nyamira County annually. ▪ Sinking boreholes; 1 per ward. ▪ Rain water Harvesting; distribution of two 10,000 litre tanks to schools in each ward in Kisii County and two 10,000 litre tanks to schools and health centres in Nyamira County. ▪ Riparian and wetland protection; Gazettement of Sironga as a wetland in Nyamira County and mapping of environmental significant areas e.g. Manga ridge. ▪ Kisii County sensitization and planting environmental friendly tree species in Chirichiro wetland and River Getare. ▪ Capacity Building; sensitization on replacement of Eucalyptus with Bamboo. ▪ Empowering WRUAs. ▪ River clean up – Nyakomisaro Kisii County
Ecosystem degradation	▪ Increase tree cover; distribution of seedlings per sub county and establishing tree nurseries.

	▪ Rehabilitation of Quarries; closing and rehabilitation of quarries in both counties which are abandoned e.g Tabaka Soapstone, Nyakoe, Gesonso, Sironga and Ikonge. ▪ Protection of wetlands as water towers; Sironga, Bonyunyu and Chirichiro wetlands. ▪ Protection of forests ▪ Capacity building
Pollution	▪ Recycling waste to useful products e.g. proposed electricity generation at Sironga site; Precious plastic energy centre at Agricultural Training Center grounds. ▪ Capacity Building
Low productivity	▪ Non-rain dependency agricultural practices (green house farming –e.g. ATC green house, Borabu). ▪ Agroforestry ▪ Capacity building ▪ Agricultural Extension Officers; each ward to at least have one.
Kisumu and Siaya Counties	
Low forest cover	▪ Planting of trees to increase cover (Kisumu forest cover from 0.44 to 5%; Siaya from 0.42 to 5%) ▪ This could be done in Public institutions, riparian areas, farms and homesteads-fruit trees
Poor waste management	▪ Policy enforcement (Kisumu Solid Waste Act 2016) ▪ Increase of budget to address the issue ▪ Filling of mining pits with inert solid waste e.g., in Barding,Uranga etc in Siaya and Kajulu,Migosi ,Nyawita in Kisumu. ▪ Awareness creation on solid waste management on both large and small scale
Water scarcity	▪ Construction of dykes and pans ▪ Protection of wetlands ▪ Protection of riparian areas ▪ Establishment of water pipelines ▪ Establishment of other water projects ▪ Such as boreholes, shallow wells, etc. ▪ Strengthening WRUAs in the counties
Encouraging 'dryland farming'	▪ Planting of trees to curb desertification ▪ Encouraging irrigation farming throughout Kisumu and Siaya Counties. ▪ Digging of water pans to supply water during dry periods in Usonga in Siaya and Lower Nyando in Kisumu
Migori and Homa Bay Counties	
Awareness raising	▪ Domesticate national legislation in the counties, set institutional framework on climate change, creation of awareness, creation of climate change policy and action plan
Climate finance	▪ Capacity building on how to access the funds, county climate change fund regulation,
Develop alternative livelihoods	▪ Renewable energy promotion ▪ Conversion of waste to energy ▪ Briquette industry. (training program on briquette making) ▪ Sony sugar in Migori county ▪ Ndhiwa Sub- County in Homa-Bay County ▪ Incentive for investors, creation of awareness on clean energy ▪ Sensitize on green jobs and businesses ▪ Create market linkages, encourage green entrepreneurship

	▪ Value addition of products to increase prizes (potatoes in Migori)
Irrigation and water harvesting	▪ Expand the irrigation schemes to other areas ▪ Sensitize on the use of the scheme ▪ Promote water storage through tanks, water pans and dams ▪ Increase clean water supply
Gender equality	▪ Implement the 30% rule of the procurement act ▪ Engage these groups in climate change policy making, implementation and monitoring
Conservation and rehabilitation of degraded natural springs	▪ Conservation of 7 springs in Homabay and Migori ▪ Reforestation ▪ Protection of fish breeding sites ▪ Afforestation ▪ Sustainable waste management
Climate smart agriculture	▪ Value addition, horticulture development, promotion of climate resilient crops and cattle, introduction of climate change resistant crops and animals, early maturing crops
Drought management	▪ Carry out a vulnerability survey ▪ Distribution of drought resistant crops and animal breeds, expansion of irrigation schemes, increase number of boreholes and solar powered pumps to run them. (Migori and Homabay has begun doing this)
Health	▪ Sustainable health care (improved health facilities, preventive measures, ▪ Control of climate related diseases through sensitization (T.B, Malaria, Bilharzia)
Partnerships	▪ Hold multi-sectoral forums to coordinate climate change programs ▪ Create an enabling environment for partners ▪ Facilitate research on emerging environmental issues (army worms)
Vihiga and Kakamega Counties	
Sustainable wetland conservation	▪ Reclaim and restore through a legal framework ▪ Conserve using the right species of plants, such as bamboo ▪ Mobilization and sensitization of communities on the importance of wetlands ▪ Planting appropriate indigenous tree species to act as carbon sinks ▪ Protection of riparian land ▪ Delineation through fencing of wetland areas
Forest conservation	▪ Afforestation ▪ Community sensitization ▪ Legal framework and enforcement ▪ Public participation ▪ Agroforestry ▪ Community empowerment ▪ Genetic resource sharing
Uncontrolled mining activities	▪ Development of legislative framework and enforcement of legal framework ▪ Mapping mineral sites ▪ Community sensitization ▪ Training of miners
Water harvesting and management	▪ Sensitization ▪ Support ▪ Rain water harvesting, including policy ▪ Construction of water harvesting reservoirs ▪ Afforestation
Flood control	▪ Afforestation

	▪ Terracing ▪ Construction of dams and water pans ▪ De-silting of existing dams ▪ Early warning systems ▪ Metrological alerts
Agriculture	▪ Climate smart agriculture ▪ Increase farm forestry/agroforestry to 10% ▪ Practice climate smart agriculture
Spatial planning	▪ Creation of waste management centres to support circular economy ▪ Capacity building
Invasive species	▪ Research ▪ Multi-stakeholder approach ▪ Early warning ▪ Conservation agriculture

Mount Kenya and Aberdares Counties Trade and Investment Bloc: Embu, Kiambu, Kirinyaga, Laikipia, Meru, Murang'a, Nakuru, Nyandarua, Nyeri, Tharaka-Nithi

Issue	Priority Actions
Industrialisation	▪ Water recycling ▪ Subsidies for drip irrigation ▪ Zoning of industrial areas (undertaken by County Governments)
Infrastructure	▪ Green building technologies and regulations ▪ Climate proofing of infrastructure – such as concrete poles for powerlines ▪ Water harvesting / Capture of road run-off – e.g., Isiolo-Moyale road ▪ Regulations for water harvesting - roof tops ▪ Invest in riverbank conservation and on-farm soil and water conservation to prevent silt runoff from poor farming methods that impact effectiveness of dams (e.g., Seven Falls Dam in Thika) ▪ Discourage open canals for irrigation ▪ Enforce existing regulations – such as Environmental Impact Assessment
Information and Communications Technology (ICT)	▪ Early warning systems, information centres for farmers, introduction of digital data programs, packaging of Climate Information Services (CIS) for farmers (such as Digi-farm in Kirinyaga County) ▪ Explore tax and fiscal incentives for use ICT to reduce greenhouse gas (GHG) emissions ▪ Invest in electronic waste management through partnerships
Gender	▪ Promote gender-friendly water conservation measures ▪ Promote gender-friendly agroforestry – fruit and fodder trees ▪ Provide livelihood options/diversification for women and men, both on- and off-farm and options that extend across seasons ▪ Address land ownership issues ▪ Invest in high-value crops ▪ Consider how to involve both genders in climate change action ▪ Empower women through information; improve women's access to training; improve women's input to decision making ▪ Consider gender-based budgeting

Agribusiness	▪ Use of climate data and information from Kenya Meteorological Department (KMD) – increase coverage of meteorological stations and awareness creation/training ▪ Conservation of water catchment areas ▪ Technology innovations such as climate-smart agriculture, hydroponics, dairy goats, pest and disease resistant crops ▪ Promote urban agriculture
Tourism	▪ Promote REDD+ and purchase of credit credits ▪ Develop clear boundaries between human habitats and wildlife ▪ Broaden tour packages and products ▪ Promote ecotourism
Health	▪ Promote family planning methods ▪ Promote forestry and afforestation ▪ Disaster management and preparation ▪ Research the link between health and climate change
Forestry	▪ Counties have surpassed or working toward 10% tree cover ▪ Ensure trees are growing in secure places that can be protected/ enclosed to ensure accountability such as schools and public areas ▪ Tree planning – support for seedlings, consider partnerships, e.g., Findlays. ▪ School greening programmes; twin program officers with schools so that children work alongside environmental officers to plant trees, form environmental clubs in primary schools, provide County awards for best survival percentage of tree seedlings, provide water so that schools can maintain trees, hold an environment day. ▪ On-farm forestry by issuing farmers with seedlings; recruit farmers to plant trees, work with Association of Small-scale Farmers (¼ hectare); provide incentives to farmers for tree planting, monitor and track progress; work in partnerships, such as tea factories ▪ Provision of seedlings from KEFRI and Kenya Forest Service (KFS) and Kenya Forestry Research Institute (KEFRI) ▪ Promote youth-based planting of certified seedlings. ▪ Ensure contractors for tree planting maintain trees for at least 6 months and report on survival rate. ▪ Provide water tanks. ▪ Partner with CBOs to promote tree planting. ▪ Rehabilitate rivers and conservation of riparian areas

North Rift Economic Bloc: Baringo, Elgeyo-Marakwet, Nandi, Samburu, Trans Nzoia, Turkana and Uasin Gishu, West Pokot

Issue	Priority Actions
Baringo and Elgeyo Marakwet Counties	
Floods	▪ Early warning systems ▪ Disaster proof structures ▪ Construction of dykes ▪ Catchment protection
Landslides	▪ Develop county spatial plans
Drought	▪ Plant drought tolerant crops

	▪ Promote early warning systems for disaster preparedness ▪ Drill boreholes ▪ Establish livestock management initiatives like; off take programmes, livestock insurance funds ▪ Embrace traditional indigenous knowledge e.g. preservation methods or prediction methods
Deforestation	▪ Increase vegetation cover through tree planting initiatives such as agroforestry and green school programmes ▪ Protect and conserve water catchment areas
Soil erosion	▪ Construct check dams ▪ Catchment protection
Turkana and Samburu Counties	
Drought and famine	▪ Develop drought early warning systems ▪ Provide food supplements ▪ School feeding programs ▪ Provide drugs related to tropical diseases
Floods	▪ Early warning systems ▪ Soil erosion control - Construction of gabions, silt traps ▪ Afforestation
Deforestation	▪ Afforestation ▪ Law enforcement
Intra and inter- community conflict	▪ Peace dialogue (Both intra and inter- community) ▪ Community empowerment programs to end gender-based violence ▪ Human Rights Watchdogs
Overstocking and overgrazing	▪ Share drought warning systems/information ▪ Fodder production at community level ▪ Grazing patterns ▪ Community resources management programs (community land use, water resources, forest management) ▪ Introduction of grazing patterns ▪ Value addition practices e.g. bee keeping, poultry, drought resistant crops
Uasin Gishu and Nandi Counties	
Increase access to clean and safe water	▪ Need to desilt the dams and increase water harvesting. Ban illegal activities that cause desilting of dams
Recover and increase forest cover	▪ Plant trees to cover areas that have been affected in allocated forest land- At least one million trees annually. ▪ Enhance of existing policies. ▪ Amend the forest Acts to give mandate to counties to manage forests. ▪ Increase awareness among the public through public forums to empower the public to participate in tree planting.
Sustainable protection and conservation of water bodies	▪ Strict implementation of policies that protect water catchment areas. ▪ Eviction of individuals that have encroached in protected/riparian areas. ▪ Monitor waste disposal in water bodies. ▪ Plant trees along the riparian areas.
Trans Nzoia and West Pokot Counties	
Floods	▪ Tree planting and construction of smart climate bridges/dykes on major rivers e.g., suam, kongelai, kachaliba- bridge,weiwei, sighya in west pokot and sabwani Trans Nzoi

	▪ Strengthen early warning system both ITK and conventional science ▪ Sensitization and awareness to the public ▪ Protection of river banks, wet lands and riparian sections
Unwarranted logging	▪ Enforcement and compliance of environmental laws (EMCA 1999) and regulations ▪ Re-afforestation
Landslides/mudslides/Rock falls	▪ Mapping out landslide prone areas for planning purposes ▪ Awareness creation on weather extremes ▪ Tree planting in affected areas ▪ Resettlement of affected residents living on landslide prone areas: Prone areas in West Pokot are:ortum, sonday, muino, kapatet, lomut, annet,tapach, upper chepareria, sook and seker in west pokot and in Tran-Nzoia county slopes of Cheranganyi hills.
Charcoal burning	▪ Control of charcoal burning ▪ Promotion of green energy and technology, such as solar, biogas, improved "jikos"/ "kilns" ▪ Community sensitization and empowerment on use of their natural resources ▪ Promotion of agroforestry ▪ Establishment and strengthening of county environmental committees, CFA's
Perennial Droughts (Pokot north, Pokot central and Parts of Kipkomo and West pokot towards Turkwel	▪ Awareness creation on changing weather extremes and its severity ▪ Promotion of fast and maturing drought tolerant crops (orphan crops) and drought resistant animal breeds such as camels, galla goats ▪ Construction of water harvesting structures e.g. dams, water pans, solar powered wells etc. ▪ Irrigation in ASAL Zones where there is availability of water (along non-seasonal rivers
Inter community conflict over limited natural resource (water and pasture)	▪ Strengthening of conflict resolution mechanisms ▪ Equitable distribution of resources (construction of dams and pasture establishment on dry lands
Poor land tenure system	▪ Provision of legal land documents (Title deeds) ▪ Law enforcement to protect community land
Development of deep gully erosion	▪ Soil conservation structures ▪ Proper agricultural practices ▪ Tree planting
Lightning strikes	▪ Encourage residents living in lightning strike areas to construct flat roofed houses ▪ Install lightning arrestors in schools and homes ▪ Strengthen early warning systems ▪ During rainy days people are encouraged wear shoes to break the electric circuit.

South Eastern Kenya Economic Bloc Plus Three: Kajiado, Kitui, Machakos, Makueni, Nairobi, Narok

Issue	Priority Actions
Kajiado County	
Water scarcity due to prolonged drought	▪ Rehabilitation of most degraded rivers in Kajiado County which is Olkeriai, Olkejuado and Toroka rivers ▪ Development of a climate change policy in Kajiado County ▪ Advocacy for harvesting of rain water ▪ tree planting and nurturing
Inadequate pasture for livestock and wildlife	▪ Pasture management (zoning, timing of hay production ▪ Introduction of drought resistant crops and grasses ▪ Introduction of Quality drought resistant breeds ▪ Policy Development
Forest Degradation due to unsustainable charcoal burning	▪ Tree planting and nurturing ▪ introduction of fast growing trees for charcoal production (charcoal Plantations) ▪ controlling of charcoal production such as charcoal banning ▪ Completion and Implementations of existing policies ▪ Establish, Map and support the Charcoal Producers Associations
Degradation of river sources	▪ Construction of sand dams ▪ Mapping and rehabilitation of sand harvesting sites ▪ Completion and implementation of sustainable sand harvesting policy ▪ Enforcement of sand operations and activities ▪ Community empowerment and mobilization ▪ empowerment of sand harvesting SACCOs
Environmental Pollution due to emission from industries, poor solid and liquid waste management	▪ Construction of a modern land fill ▪ Construction of sewerage systems ▪ Enforcement of County Environmental Management ▪ Privatization of garbage collection
Machakos County	
Food insecurity/ Crop failure	▪ Sourcing, using, managing, recharging and distribution of water to the community. ▪ Use of water efficient technology ▪ Information, education and communication strategy. ▪ Efficient waste management
Inadequate water supply / poor water quality	▪ Bamboo production along the river beds to help in cleaning of waters. ▪ Rain water harvesting through dams, water pans, rock water harvesting, terrace water harvesting and any other possible technique. ▪ Water treatment techniques ▪ Come up with mitigation measures on floods like development of dykes and redesigning of the infrastructure. ▪ Come up with inter county management plan on water harvesting, conservation of water resource and water ways (drainage system) ▪ Have a disaster management kitty. ▪ Implementation of sand harvesting Act ▪ Sand is plenty because of low
Logging in gazetted forests	▪ Consumers to partner with other institutions in reforestation and Afforestation. ▪ Information education and communication to consumers ▪ Energy efficient cooking awareness.

	▪ Government to provide alternatives on other sources of energy. ▪ Plant drought resistant trees
Lack of designated disposal sites	▪ Create awareness on proper waste management system. ▪ Development of a sanitary landfill. ▪ Formation of County Environment Committee ▪ Creation of awareness on waste management
Over reliance on wood fuel	▪ Encourage industries and factories to go green energy ▪ Promotion of energy efficient technology i.e. solar, wind and biogas
Increased illness	▪ Information, education and communication strategy. ▪ Promotion of alternative nutritional medicinal plants
Makueni County	
Drought	▪ Re-forestation ▪ Afforestation – trust lands ▪ Rain water harvesting ▪ Energy conservation – energy saving jikos ▪ The R-Principal (reduce, re-use, recycle, reject/refuse, respond/re-act) ▪ Agroforestry – private lands ▪ Disaster management programmes - Early warning, CIS
Environmental degradation	▪ Soil and water conservation – terraces, gabion construction ▪ Mixed farming ▪ Reducing number of livestock
Illegal sand harvesting	▪ Strict policy on sand conservation ▪ Strengthen community structures ▪ Provide alternative income generating activities
Illegal logging and charcoal burning	▪ Use of alternative sources of renewable energy – biogas, briquettes (a block of compressed coal dust or peat used as fuel)
Floods	▪ Restoration of degraded lands - Planting trees and grass ▪ Disaster management programmes - Early warning, CIS
Human/Wildlife Conflicts	▪ Community sensitization ▪ Electric fencing ▪ Provision of water in national parks ▪ Diversification of livelihoods
Nairobi (?)	
Low water supply	▪ Rain water harvesting ▪ Create water storage systems i.e. dams, tanks. ▪ Ground water recharge ▪ Protection of water catchment areas ▪ Expand water storage capacity ▪ Reduce wastage through recycling ▪ Rehabilitation of water basins ▪ Management of ground water
Flooding	▪ Sustainable urban designs for storm water harvesting ▪ Early warning systems ▪ Disaster preparedness ▪ Insurance ▪ Drainage systems ▪ Tree planting ▪ Construction of dikes and earth dams ▪ Planned settlements

	▪ Potential for constructed wetlands and bio retention
Energy / Power rationing	▪ Use of alternative energy sources (e.g., wind), technology and equipment
Clean cooking	▪ Mass production and development of cheaper biogas production technologies ▪ Promote Production of briquettes ▪ Promotion of bio fuels jikos ▪ Give tax incentives /subsidies for development of green technologies
High efficiency vehicles	▪ Policy and legal instruments
Education	▪ Curriculum reforms
Circular economy	▪ Policy and legislative instruments ▪ Monitoring ▪ Enforcement ▪ Awareness creation ▪ Partnerships ▪ Regular Baseline surveys
Re and afforestation/ greening the city/ urban agriculture	▪ Partnerships, review of policies and planning ▪ Enforcement ▪ Environmental education and awareness ▪ Re- and afforestation ▪ Regular baseline surveys
Narok	
Flooding	▪ Expanding the storm water drainage channel within Narok Town ▪ Enhance soil cover through tree planting and contour farming at Olopito Catchment area ▪ Enhance afforestation and water harvesting in Suswa ▪ Construct dams and check cams at Olopito Catchment Area and in Suswa ▪ Implement the Narok County Spatial Plan ▪ Implement the Narok Town Plan ▪ Reclaiming back riparian reserves along Narok River that has been encroached by human settlement ▪ Regulate sand harvesting in Suswa ▪ Upgrade bridges in Maasai Mara- Sekenani, Oloshapani, Oloolaimutia
Frequent, prolonged and unpredictable droughts	▪ Development of early warning systems and information ▪ Promote of drought resilient breeds ▪ Develop fodder banks in the rangelands ▪ Livestock insurance ▪ Build a modern abattoir for value addition at Ewaso Ngiro centre ▪ Establish and Operationalize Disaster Risk reduction unit in the County
Deforestation	▪ Demarcation of clear boundaries and registration of the Mau Forest and the Loita Forest ▪ Establish and operationalize Narok County Climate Change Fund ▪ Fast-track the gazettement of Nyakweri Forest as an Ecologically Significant area ▪ Empower Community forest association ▪ Enforce Farm Forestry Laws of 10% tree planting on private farms
Poor solid and liquid waste management	▪ Relocate the current dumping site to an appropriate site ▪ Promote waste segregation and recycling ▪ Develop a sewerage treatment system for Narok Town
Climate change policy	▪ Adopt the Climate Change Act ▪ Establish and operationalize Narok County Climate Change Fund

Annex 3: PESTEL Analysis

A PESTEL analysis is an analytical framework used for strategic business planning and understanding external influences on a business (e.g., new laws, tax changes, demographic changes). The framework is used to analyze and monitor the macro-environmental factors that have an impact on an organization. The framework has been adapted to help the government understand the environment in which the NCCAP will be implemented. This version draws heavily on the PESTEL analysis in the CSA Strategy.

Political

- Increased awareness and support to address climate change in general
- Inadequate appreciation by the political leaders of the linkages between climate change and development
- Low interest by political leaders on long term investments and delayed returns/benefits from investments in climate change actions
- Increased political role in the counties in implementation of policies, strategies and programmes e.g. distribution of resources for climate change actions
- Political goodwill that encourages policy, legal and institutional reforms.
- Increased political role in formulation and implementation of policies, legislations and strategies from National and County Governments (up to the Ward level).
- Possibility of conflict of laws due to different legislating bodies (Parliament and County Assemblies).
- Political interests in the management of natural resources.
- Weak regulatory enforcement.
- Political goodwill that addresses issues of Women, Youth and Vulnerable Groups

Economic

- Bureaucratic procedures in accessing international climate financing
- More funds for development in the county under devolved system of governance. More funds assigned to developing countries under the Paris Agreement.
- Growing private sector interest in investing in climate change technologies.
- The economic effects of extreme weather events on the economy.
- Inadequate mechanisms for risk management e.g. early warning systems and insurance.
- Limited access to capital constrains up-scaling of mitigation actions.
- High cost of technologies for emission reduction and development of MRV system.
- Provision of contingency funding and disaster risk management interventions (insurance, food and feed reserves).
- Programmes targeted to recovery from impacts of climate change (irrigation, cash transfer, etc.).
- Provision of climate change fund in the Climate Change Act, 2016

Social

- Existence of indigenous knowledge for climate change adaptation.
- Conflicts in natural resource use due to competition for declining resources.
- Demographic challenges e.g. high population growth puts pressure on existing natural resources.
- Unresolved historical issues on natural resources e.g. land and water.
- Cultural norms and beliefs towards resource ownership and access.
- Lack of legal framework for indigenous knowledge.

▪ Cultural mind-sets limit mitigation options. ▪ Women and marginalized groups are particularly vulnerable to climate change
Technology ▪ Use of inappropriate technologies and practices leading to low productivity and greater susceptibility to climate change. ▪ Increased use of ICT-based weather forecasting and early warning and information generation and sharing. ▪ Inadequate private sector engagement. ▪ Limited technology and knowledge in addressing MRV. ▪ Lack of legal framework for indigenous knowledge. ▪ Inadequate knowledge management system to collect, store, process and disseminate developed knowledge. ▪ Fragmented research. ▪ Need for knowledge harvesting with marginalized and vulnerable groups
Legal ▪ Adequate legal instruments available at the local and international levels to address climate change challenges e.g. the Constitution of Kenya, the Climate Change Act 2016, the Climate Change Framework Policy and the Paris Agreement, 2015. ▪ Bill of Rights in the Kenya Constitution 2010 which supports inclusivity and equity and Chapter 5 of the constitution that supports sustainable natural resource management. ▪ Kenya is a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and other related multilateral climate change agreements. ▪ Kenya has submitted its Nationally Determined Contribution (NDC) and other documents providing measures and actions on mitigation and adaptation. ▪ Lack of standardization, quality assurance and quality control mechanisms for green products and services ▪ Lack of clear land tenure rights, tree tenure/user rights and carbon rights jeopardize implementation of mitigation actions. ▪ Lack of guidelines on carbon trading ▪ Absence of structures and mechanism for monitoring emissions.
Environment ▪ Shift in the seasonal rainfall patterns, distribution and reliability. ▪ General rise in the average temperatures and changes in temperature ranges leading to loss of agricultural land due to the rise of sea level. ▪ Shift in agro-ecological zones for agriculture production due to changes in temperature and rainfall regimes. ▪ Abundant and unexploited solar and wind energy. ▪ Increased encroachment of water catchments leading to land degradation. ▪ Unsustainable use of natural resources. ▪ Rapid land use change and desertification. Overfishing, overstocking, deforestation and wetland degradation. ▪ Existence of policies and legislations for the protection and conservation of the environment. ▪ Conversion of forest land for agriculture and human settlement.

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