REPUBLIC OF KENYA

MINISTRY OF ENVIRONMENT AND FORESTRY

NATIONAL CLIMATE CHANGE ACTION PLAN 2018-2022

Volume I

Correct Citation:
Government of Kenya (2018). *National Climate Change Action Plan (Kenya): 2018-2022*. Nairobi: Ministry of Environment and Forestry.

To obtain copies of this publication, please contact:

The Principal Secretary
Ministry of Environment and Forestry
Email: psoffice@environment.go.ke
Website: www.environment.go.ke

Preface

Photo

His Excellency Hon. Uhuru Kenyatta, C.G.H., President and Commander in Chief of the Defence Forces of the Republic of Kenya

Acknowledgements

Photo **Mr. Keriako Tobiko, CBS, SC, Cabinet Secretary, Environment and Forestry**

National Climate Change Action Plan Task Force

Mr Charles Sunkuli – *Chairperson; Principal Secretary, Ministry of Environment and Forestry*

Mrs Clara Busolo - National Gender and Equality Commission

Mr Martin Eshiwani – Ministry of Transport, Infrastructure, Housing and Urban Development

Mrs Lulu Hayanga – Office of the Attorney General

Mr Frank Msafiri – Kenya Climate Change Working Group

Dr Lucy Ng'ang'a – Ministry of Agriculture and Irrigation

Miss Faith Ngige – Kenya Private Sector Alliance

Mrs Joyce Njogu – Kenya Association of Manufacturers

Mr David Nyantika – Ministry of Water and Sanitation

Mr Philip Odhiambo – World Wildlife Fund - Kenya

Mr Stephen Osingo – Council of Governors

Mr Erastus Wahome – The National Treasury and Planning

Mrs Elizabeth Wamalwa – The National Treasury and Planning

Mrs Esther Wang'ombe – Minitry of Energy

Dr Pacifica Achieng Ogola – Ministry of Environment and Forestry, Joint *Secretary to the Task Force*

Mr Stephen King'uyu – Ministry of Environment and Forestry, Joint *Secretary to the Task Force*

Secretariat / Climate Change Directorate

Dr Charles Mutai

Eng Moses Omedi Jura

Mr Lerenten Lelekoitien

Mr Augustine Kenduiwo

Mr Peter Omeny

Mr Michael Okumu

Mr Samuel Muchiri

Mr David B. Adegu

Mrs Veronica Kioko

Mr Steve Reuben Muhanji

Mr Innocent Muriithi

Miss Fiona Oweke

Table of Contents

List of Figures

List of Tables

List of Boxes

Abbreviations and Acronyms

AFR100	African Forest Landscape Restoration Initiative
ASAL	Arid and Semi-Arid Land
ATAR	Adaptation Technical Analysis Report
BRT	Bus rapid transit
BUR	Biennial Update Report
CBD	United Nations Convention on Biological Diversity
CBIT	Capacity Building Initiative for Transparency
CCCF	County Climate Change Fund
CCD	Climate Change Directorate
CDM	Clean Development Mechanism
CEC	County Executive Committee
CFA	Community Forestry Association
CIDP	County Integrated Development Plan
CIS	Climate Information Services
CO_2	Carbon dioxide
COG	Council of Governors
COP	Conference of the Parties
CPEBR	Climate Public Expenditure and Budget Review
CSA	Climate Smart Agriculture
CTCN	Climate Technology Centre and Network
EAC	East African Community
EDE	Ending Drought Emergencies
ERC	Energy Regulatory Commission
FAO	Food and Agriculture Organization
GCF	Green Climate Fund
GDC	Geothermal Development Corporation
GDP	Gross domestic product
GEF	Global Environment Facility
GESIP	Green Economy Strategy and Implementation Plan
GHG	Greenhouse gas
GNI	Gross national income
ICAO	International Civil Aviation Organisation

ICT	Information and communication technology
ILRI	International Livestock Research Institute
IMO	International Maritime Organisation
IPCC	Inter-Governmental Panel on Climate Change
KAA	Kenya Airports Authority
KALRO	Kenya Agriculture and Livestock Research Organization
KAM	Kenya Association of Manufacturers
KCAA	Kenya Civil Aviation Authority
KCCWG	Kenya Climate Change Working Group
KCIC	Kenya Climate Innovation Centre
KenGen	Kenya Electricity Generating Company Ltd.
KEPSA	Kenya Private Sector Alliance
KETRACO	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
KR	Kenya Railways
KURA	Kenya Urban Roads Authority
LULUCF	Land use, land-use change and forestry
M&E	Monitoring and evaluation
MAI	Ministry of Agriculture and Irrigation
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
MTAR	Mitigation Technical Analysis Report
MTP	Medium Term Plan
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
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
NHIF	National Hospital Insurance Fund
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
SDG	Sustainable Development Goal
SGR	Standard Gauge Railway
SLEEK	System for Land-based Emissions Estimation in Kenya
StARCK+	Strengthening Adaptation and Resilience to Climate Change in Kenya
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea

UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WRA	Water Resources Authority
WRUA	Water Resource Users Association

Measurement Units

ha	Hectare
m^3	Cubic metre
MCM	Million cubic metre
$MtCO_2e$	Million tons of carbon dioxide equivalent
MW	Megawatt

Definition of Terms

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

Adaptive capacity refers to the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences (*IPCC, 2014, Fifth Assessment Report (AR5) Glossary)*.

The **carbon market** is a market that is created from the trading of units of GHG emissions. A carbon credit or offset is a financial unit of measurement that represents the removal of one tonne of carbon dioxide equivalent from the atmosphere. Carbon credits are generated by projects that deliver measurable reductions in GHG emissions.

Climate change means a change in the climate system which is caused by significant changes in the concentration of greenhouse gases as a consequence of human activities and which is in addition to natural climate change that has been observed during a considerable period.

Global warming refers to the gradual increase, observed or projected, in global surface temperature, as one of the consequences of climate change.

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).

Mitigation means human interventions that seek to prevent or slow down the increase of atmospheric greenhouse gas concentrations by limiting current or future emissions and enhancing potential sinks for greenhouse gases.

$MtCO_2eq$ or $MtCO_2e$ 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.

REDD+ is the acronym for reducing emissions form deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries. It is a mitigation mechanism that creates a financial value for the carbon stored in forests by avoiding deforestation and increasing the carbon stock in existing forests.

Resilience refers to the capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, learning and transformation (*IPCC, 2014, AR5 Glossary)*.

Vulnerability refers to the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. (*IPCC, 2014, AR5 Glossary)*.

The glossary of the IPCC's Fifth Assessment report can be retrieved from:
https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_Glossary.pdf

Executive Summary

Climate change has increased the frequency and magnitude of extreme weather events in Kenya causing loss of lives, diminished livelihoods, reduced crop and livestock production, and damaged infrastructure, among other adverse impacts. 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 that focuses on ensuring food and nutrition security, affordable and decent 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 Act requires the Government to develop five-year National Climate Change Action Plans (NCCAP) to guide the mainstreaming of adaptation and mitigation actions into sector functions of the National and County Governments.

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 plan builds on the first Action Plan (2013-2017) and provides a framework for Kenya to deliver on its Nationally Determined Contribution (NDC) under the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC). NCCAP 2018-2022 guides the climate actions of the National and County Governments, the private sector, civil society and other actors as Kenya transitions to a low carbon climate resilient development pathway. The NCCAP consists of this Volume I, the Volume II: Adaptation Technical Analysis Report, and Volume III: Mitigation Technical Analysis Report.

Kenya's Changing Climate

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. Twenty-three of Kenya's 47 Counties are considered as arid or semi-arid lands (ASALs). Kenya is frequently affected by weather-related disasters, particularly droughts, which have a profound impact on Kenya's economy and people's well-being.

Kenya's climate is already changing. 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. The frequency of cold days, cold nights and frost has decreased; while the frequency of hot days, hot nights and heat waves has increased. Temperature increase has been observed across all seasons, but particularly from March to May.

Rainfall patterns have also changed. The long rainy season has become shorter and drier, and the short rainy season has become longer and wetter, while overall annual rainfall remains low. 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. Droughts and heavy rainfall have become more frequent in the last 30 years.

The current trend of rising annual temperatures is expected to continue in Kenya in all seasons. The precipitation projections are more uncertain 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.

Climate Change Impacts in Kenya

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, 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.

The economic cost of floods and droughts is estimated to create a long-term fiscal liability equivalent to 2%-2.8% of GDP each year. Specifically, the estimated costs of floods are about 5.5% of GDP every seven years, while droughts account for 8% of GDP every five years.

Floods have led to the greatest loss of human lives in Kenya. The floods in early 2018 claimed over 183 lives, displaced more than 225,000 people including over 145,000 children, and closed over 700 schools. 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 8,500 hectares of land were destroyed and over 20,000 livestock drowned.

Droughts are typically large-scale disasters in Kenya destroying livelihoods, triggering local conflicts over scarce resources, and eroding 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 ASAL Counties. At least 3.4 million Kenyans were severely food insecure and an estimated 500,000 people did not have access to water.

Sea level rise is impacting coastal towns and communities. Coastal flooding from sea-level rise is projected to affect up to 86,000 people a year and lead to coastal erosion and wetland loss at an annual cost of about KES 6 billion by 2030. The National Museums of Kenya is constructing a KES 500 million sea wall to protect Fort Jesus in Mombasa from erosion contributed to by rising sea levels and storm surges.

Rising sea temperatures off the coast of Kenya have triggered mass coral bleaching and mortality on coral reef systems over the past two decades. This impacts the abundance and composition of fish species and negatively impacts coastal fisheries.

The **glaciers of Mount Kenya are declining** and are expected to disappear in the next 30 years, largely because of climate change. Mount Kenya is one of the country's water towers and a source of numerous rivers and streams.

Kenya's Contribution to Climate Change

Kenya has little historical or current responsibility for global climate change; the country's GHG emissions represent less than 1% of total global emissions. Adaptation is the priority for

Kenya, but climate action also needs to reduce greenhouse gas emissions that are projected to increase because of population and economic growth. Actions in the six mitigation sectors set out in the UNFCCC – agriculture, energy, forestry, industry, transport, and waste – are expected to lead to lower emissions than in the projected baseline and help to meet Kenya's mitigation NDC to abate GHG emissions by 30% by 2030 relative to the business as usual scenario. The forestry sector has large potential to reduce greenhouse gas emissions in Kenya because forests act as "sinks" through carbon sequestration.

Legal and Policy Framework

Climate change is a global problem that demands a global solution, and Kenya is an active player in international efforts. The international response to climate change is founded upon the **United Nations Framework Convention on Climate Change**. The Paris Agreement under the UNFCCC aims to strengthen the global response to the threat of climate change by keeping global temperature rise this century well below 2°C above pre-industrial levels. Kenya's NDC sets out the country's actions to contribute to achieving the global goal set out in the Paris Agreement, and includes mitigation and adaptation contributions. The Paris Agreement entered into force for Kenya on 27th January 2017, and as set out in Article 2(6) of the Constitution of Kenya (2010), the Paris Agreement now forms part of the law of Kenya.

At the domestic level, a robust regulatory framework comprising laws, policies, plans and institutions is being progressively established 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 10 sets out national values and principles of governance, such as sustainable development, devolution of government, and public participation, that are mandatory when making or implementing any law or public policy decisions, including climate change. 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.

The **Climate Change Act**, 2016 is the main legislation guiding Kenya's climate change response through mainstreaming climate change into sector functions, and it is the legal foundation of the NCCAP. In addition, Kenya has developed the National Climate Change Response Strategy (2010), first NCCAP (2013-2017), National Adaptation Plan (NAP 2015-2030), Kenya Climate Smart Agriculture Strategy (2017-2026), Climate Risk Management Framework (2017), National Climate Change Policy (2018) and National Climate Finance Policy (2018), among other sector plans and policies that address aspects of climate change. At the County level, Garissa, Makueni and Wajir Counties have enacted climate change fund regulations that allocate a portion of their development budgets to County-level funds that support local adaptation and mitigation actions.

Priority Climate Change Actions

NCCAP 2018-2022 takes cognisance of the impacts of climate change on Kenya's socio-economic sectors. It identifies strategic areas where climate action is linked to the Big Four agenda, recognising that climate change is likely to limit the achievement of these pillars. For example, food security is threatened through climate change-driven declines in agricultural productivity, health is impacted by an increase in vector-borne diseases, including malaria and

cholera; housing and manufacturing are impacted by damage to infrastructure (including homes, business, schools and hospitals) caused by flooding and storm events.

Kenya's National Climate Change Action Plan 2018-2022			
Aim: To further Kenya's sustainable development by providing mechanisms and measures to achieve low carbon climate resilient development in a manner that prioritises adaptation.			
Disaster (Drought and Floods) Risk Management	**Food and Nutrition Security**	**Water and the Blue Economy**	**Forestry, Wildlife and Tourism**
Reduce risks to communities and infrastructure resulting from climate-related disasters such as droughts and floods. ▪ Increase number of households and entities benefiting from devolved adaptive services ▪ Improve ability of people to cope with drought ▪ Improve ability of people to cope with floods and increase resilience of infrastructure ▪ Improve coordination and delivery of disaster risk management activities to effectively deal with drought, floods, landslides, disease outbreaks and other disasters	**Increase food and nutrition security through enhanced productivity and resilience of the agricultural sector in as low-carbon manner as possible.** ▪ Improve crop productivity through the implementation of climate-smart actions ▪ Improve crop productivity by increasing the acreage under irrigation ▪ Increase productivity in the livestock sector through implementation of priority climate-smart actions ▪ Enhance productivity in the fisheries sector through implementation of priority climate-smart actions ▪ Diversify livelihoods to adjust to a changing climate	**Enhance resilience of the Blue Economy and water sector by ensuring access to and efficient use of water for agriculture, manufacturing, domestic, wildlife and other uses** ▪ Increase annual per capita water availability through the development of water infrastructure ▪ Climate proof water harvesting and water storage infrastructure and improve flood control ▪ Promote water efficiency (monitor, reduce, re-use, and recycle) ▪ Develop green infrastructure ▪ Improve climate resilience of coastal communities	**Increase forest cover to 10% of total land area; rehabilitate degraded lands, including rangelands; increase resilience of the wildlife and tourism sector** ▪ Afforest and reforest degraded and deforested areas in Counties ▪ Implement initiatives to reduce deforestation and forest degradation ▪ Restore degraded landscapes (ASALs and rangelands) ▪ Promote sustainable timber production on privately-owned land ▪ Conserve land areas for wildlife

Health, Sanitation and Human Settlements	**Manufacturing**	**Energy and Transport**
Mainstream climate change adaptation into the health sector; and increase the resilience of human settlements, including improved solid waste management in urban areas ▪ Reduce incidence of malaria and other vector-borne disease ▪ Promote recycling to divert collected waste away from disposal sites. ▪ Climate proof landfill sites ▪ Control flooding in human settlements ▪ Promote green buildings	**Improve energy and resource efficiency in the manufacturing sector** ▪ Increase energy efficiency ▪ Improve water use and resource efficiency ▪ Optimise industrial and manufacturing processes ▪ Promote industrial symbiosis in industrial zones	**Climate-proof energy and transport infrastructure; encourage electricity supply based on renewable energy; encourage the transition to clean cooking; and develop sustainable transport systems** ▪ Promote the transition to clean cooking with alternative clean fuels such as LPG in urban areas, and clean biomass (charcoal and wood) cookstoves and alternatives in rural areas ▪ Increase renewable energy for electricity generation ▪ Climate proof energy and transport infrastructure ▪ Develop an affordable, safe and efficient public transport system, including a Bus Rapid Transit System in Nairobi ▪ Reduce fuel consumption and fuel overhead costs, including electrification of the Standard Gauge Railway ▪ Promote low-carbon action in the aviation and maritime sectors

The seven priority climate action areas, their strategic objectives and main actions are set out in the table above. The detailed descriptions in NCCAP 2018-2022 include information on the problem being addressed, the action needed to address the problem, expected results, national-level indicators, alignment with the Big Four Agenda, alignment with Sustainable Development Goals (SDGs), and relevant institutions to deliver the actions.

Adaptation actions are prioritised in NCCAP 2018-2022 because of the devastating impacts of droughts and floods, and the negative effects of climate change on vulnerable groups in society including women, older members of society, persons with disabilities, children, youth, and members of minority or marginalised communities. These actions are undertaken, where possible, in a way to limit greenhouse gas emissions to ensure that the country achieves its mitigation NDC. The 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 and in all sectors.

Enabling Actions to Support the Delivery of Priority Climate Actions

Thirty-eight crosscutting enabling actions are required to implement the priority adaptation and mitigation actions. These enabling actions equip government and stakeholders with the knowledge, skills, technologies and financing needed to deliver and report on climate actions. The crosscutting enabling actions are listed below.

Enabling Policy and Regulatory Framework	
P1	Develop regulations for the Climate Change Act, 2016
P2	Support County Governments to develop climate change legislation and regulations
Capacity Development and Knowledge Management	
C1	Operationalise the National Climate Change Resource Centre
C2	Establish Community Education, Business and Information Centres in two Counties
C3	Strengthen the capacity of the Climate Change Directorate and climate change units in State Departments
C4	Build the capacity of County Governments, in such areas as climate change response, climate finance, and monitoring and reporting
C5	Strengthen the capacity of the National Environment Management Authority to deliver on the functions set out in the Climate Change Act, 2016
C6	Build the capacity of stakeholders, including private sector, civil society and vulnerable groups, including women, youth, persons with disabilities, and marginalised and minority communities in such areas as climate change responses, climate finance, and reporting and monitoring
C7	Develop and implement national gender and inter-generational responsive awareness plan
C8	Develop and deliver a public awareness and engagement strategy
C9	Develop a national vulnerability assessment
C10	Integrate climate change in the education system
Technology and Innovation	
T1	Improve the capacity of the Kenya Industrial Research and Development Institute to deliver on its role as National Designated Entity for the UNFCCC Climate Technology Centre and Network

T2	Provide Climate Information Services for communities, farmers and early warning systems
T3	Establish a Sustainable Consumption and Production Networking facility
T4	Promote climate technologies and innovation in the private sector
T5	Identify policy and fiscal incentives to promote uptake of climate-friendly technologies
Climate Finance	
F1	Operationalise the Climate Change Fund
F2	Enhance the capacity of National Treasury and Planning as the National Designated Authority to the Green Climate Fund
F3	Establish a tracking system for climate finance
F4	Build capacity to develop bankable projects and assess climate risk
F5	Pilot the issuance of Green Bonds
F6	Participate in the development of market-based mechanisms domestically and internationally
F7	Complete second Climate Public Expenditure and Budget Review
Measurement, Reporting and Verification Plus (MRV+)	
M1	Establish the Monitoring and Evaluation system for adaptation action
M2	Establish the MRV system for mitigation, including development of the greenhouse gas inventory and tracking of NDC implementation
M3	Establish a system to track and report on land-based emissions
M4	Establish a Climate Business Platform to support the reporting requirements of non-state actors

Delivering the NCCAP

The Climate Change Act, 2016 sets out institutional structures and responsibilities that guide the oversight and management of NCCAP 2018-2022. The National Climate Change Council, chaired by His Excellency the President of the Republic of Kenya and co-chaired by the Deputy President, is responsible for overall coordination of climate change affairs, including guiding the implementation of NCCAP 2018-2022.

The Cabinet Secretary responsible for climate change affairs submits the action plan to the Council for approval, and reports to the Council and Parliament on the status of the implementation of this NCCAP. The Climate Change Directorate, established in the ministry responsible for climate change affairs, coordinates the implementation of NCCAP 2018-2022, including related monitoring and reporting.

State departments and national public entities are required to establish climate change units to integrate NCCAP 2018-2022 into strategies and implementation plans, and to report to the Council on an annual basis on performance and implementation.

County Governments are responsible for integrating and mainstreaming climate change actions into their 2018-2022 County Integrated Development Plans, designating a County Executive Committee member to coordinate climate change affairs, and reporting annually to the County Assemblies on the implementation of climate change. County governments are expected to establish climate change units that will oversee the implementation of climate actions.

Chapter 1: Introduction and Situational Analysis

1.1 Introduction

Climate change has increased the frequency and magnitude of extreme weather events in Kenya that have led to loss of lives, diminished livelihoods, reduced crop and livestock production, and damaged infrastructure, among other adverse impacts. 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 which focuses on ensuring food and nutrition security, affordable and decent 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 is the first climate change-dedicated legislation in Africa, and provides a regulatory framework for an enhanced response to climate change. It 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 vulnerable groups including women, youth, people with disabilities, and marginalised and minority communities.

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 National Climate Change Action Plan, 2013-2017, page 25.

Section 13 of the Climate Change Act, 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.

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 establishing climate change funds in five Counties, expanding geothermal power, establishing the National

Climate Change Resource Centre, and improving the legal and policy framework (see Section 1.4 for more details). NCCAP 2018-2022 is a framework for Kenya to deliver on its Nationally Determined Contribution (NDC) under the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC).

Climate change is a shared responsibility between the National Government and the County Governments. The National Government led and guided the process to develop NCCAP 2018-2022 working with County Governments. The implementation of the plan is coordinated by the two levels of government in line with the Constitution of Kenya (2010). 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.

NCCAP 2018-2022 guides the climate actions of the National Government, the County Governments, the private sector, civil society and other actors as Kenya transitions to a low carbon climate resilient development pathway.

1.2 Goal of NCCAP 2018-2022

Kenya's National Climate Change Action Plan is a five-year plan that helps Kenya adapt to climate change and reduce greenhouse gas emissions. **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, and vulnerable groups within society, including women, older members of society, persons with disabilities, children, youth, and members of minority or marginalised communities.
- Provide the framework to deliver Kenya's Nationally Determined Contribution (NDC) 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:

- Responsiveness – responds to actual adaptation and mitigation needs in Kenya by taking measures to reduce the adverse effects of climate change and prevent or minimise the causes of climate change.
- Equity and social inclusion – addresses the needs of vulnerable groups within society, including women, older members of society, persons with disabilities, children, youth, and members of minority or marginalised communities through an inclusive approach to climate change action.
- Consultation and cooperation – implements actions through consultation and cooperation between the National Government and County Governments, as well as consultation and cooperation with civil society and the private sector.

- Fairness – ensures that climate actions do not create competitive disadvantage for the Kenyan private sector relative to its trading partners.

The Ministry of Environment and Forests (MEF) led the development of NCCAP 2018-2022 through the NCCAP Task Force that was gazetted by the Cabinet Secretary. The Task Force was comprised of experts from National and County Governments, civil society and the private sector; and supported by the Adaptation and Mitigation Thematic Working Groups that developed the *Adaptation Technical Analysis Report (ATAR): Volume II* and *Mitigation Technical Analysis Report (MTAR): Volume III* that are part of NCCAP 2018-2022. The Climate Change Directorate (CCD) situated in MEF led the technical analysis and held extensive consultations to ensure that NCCAP 2018-2022 reflects the inputs and priorities of a range of stakeholders (see Box 2).

Box 2: Development of the NCCAP 2018-2022 – Stakeholder consultations

The climate change actions in this NCCAP were identified through extensive consultations with over 1,000 stakeholders from:

- Departmental Committee on Environment and Natural Resources – National Assembly
- Senate Standing Committee on Land, Environment and Natural Resources
- National Government sector ministries and state departments
- County Governments and Council of Governors
- Civil society
- Youth
- Women
- Vulnerable groups, including persons with disabilities, pastoralists, fisher communities and forest resource users
- Private sector
- Development partners

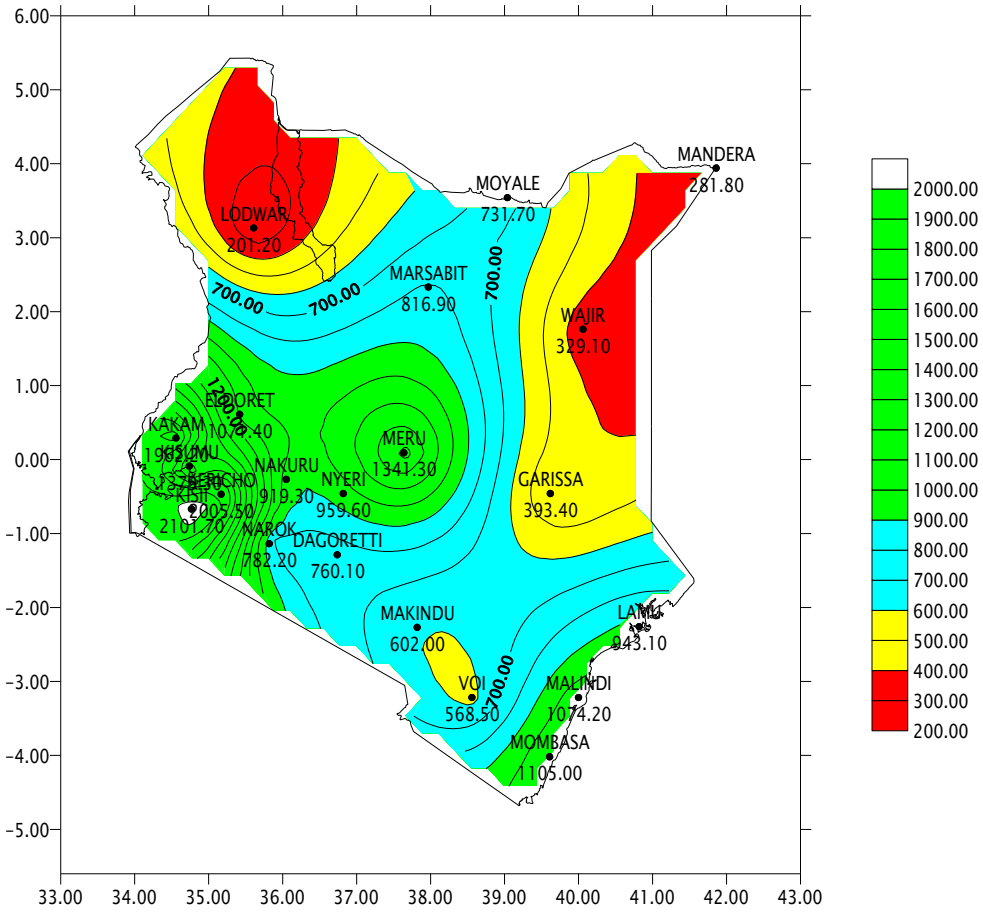
1.3 Situational Analysis

Kenya is a commercial, transportation and communications hub for eastern Africa. An estimated 50 million Kenyans (about 52% women and 48% men) 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.[1] In 2016 Kenya was the ninth-largest economy in Africa and a lower middle-income country with a gross national income (GNI) per capita of US$1,380.[2] About 45% of the population lives below the poverty line; with poverty being slightly higher in female-headed households.[3] Fifty-four percent 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.[4]

Kenya is an equatorial country 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-three of Kenya's 47 Counties are considered as arid or semi-arid lands (ASALs). The arid Counties are predominantly pastoral; and the semi-arid Counties are mainly agro-pastoral with integrated crop/livestock production systems.[5]

Figure 1: The distribution of annual rainfall in Kenya



Source: Kenya Meteorological Department (2017), Climate Change Risks.

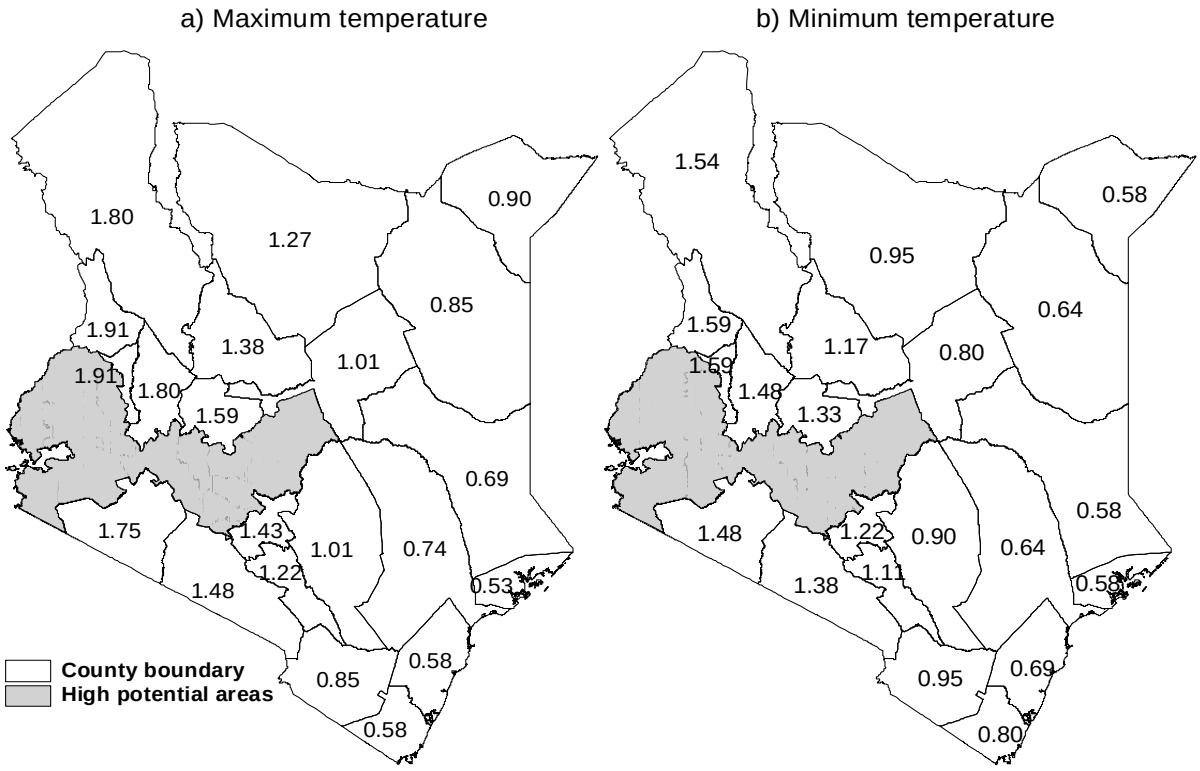
Kenya is frequently affected by weather-related disasters, particularly droughts, which have a profound impact on Kenya's economy and people's well-being. Floods are seasonal and more localised, mostly affecting areas around the Lake Victoria Basin and Tana River drainage basin, and coastal settlements. Flooding can occur across the country in years of above-normal rainfall and heavy rainfall storms, such as 2018 that saw some of the highest level of rainfall totals in the long rain season (March-April-May) recorded since 1950.[6]

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) presents 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.[7] The frequency

of cold days, cold nights and frost has decreased; while the frequency of hot days, hot nights and heat waves has increased. Temperature increase has been observed across all seasons (see Figure 2), but particularly from March to May. Variation between locations has occurred, with a lower rate of warming along the coast.[8] Surface temperature trends of Nairobi and its environs show warming of more than 2.5°C in the past 50 years.[9]

Figure 2: Temperatures changes in Kenya's 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 drier, and the short rainy season has become longer and wetter, while overall annual rainfall remains low. 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.[10] Droughts and heavy rainfall have become more frequent in eastern Africa in the last 30-60 years.[11]

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.[12]

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.[13]

1.3.2 Climate Change Impacts in Kenya

Climate change is causing an increase in average global temperatures an rising sea levels, 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, wildlife, and health, which increases vulnerability (see Table 1 for other sources of vulnerability). 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 extreme weather events.[14]

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

Social Impacts

Floods have led to the greatest **loss of human lives** in Kenya. The floods in early 2018 claimed over 183 lives, displaced more than 225,000 people including over 145,000 children, and closed over 700 schools.[15] 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.[16] 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.[17]

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.[18] 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.[19] Droughts have destroyed livelihoods, triggered local conflicts over scarce 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.[20] An estimated 482,882 children mainly from 23 ASAL Counties required treatment for acute malnutrition, and school attendance figures dropped in Counties impacted by drought.[21] Drought can cause changes in the migratory patterns of animals and increase conflicts between people and large mammals such as elephants.

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 women and men 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.[22] 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.[23]

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 favourable conditions, such as Laikipia, could enter into resource use conflicts as pastoralists from other counties move their animals to water and better pasture conditions.[24] Cross border conflicts could increase with other countries, such as Ethiopia and Tanzania, as pastoralists compete for food, water and grazing lands.

There is evidence of **migration linked to climate change** in Kenya, mainly because vulnerable groups are reliant on resource-based livelihoods. Reduced agricultural productivity is a main force behind rural-urban migration and settling in risk-prone areas and informal settlements. Resource scarcity, which often intermingles with historical land conflicts, can lead to displacement. Floods, droughts, and landslides also contribute to movement of people.[25]

Vulnerable 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.[26] Persons with disabilities, children and the elderly are vulnerable because of potential impacts on health and their more limited mobility. Many artisanal fisher communities suffer from severe poverty and are impacted by more severe storms and heavy rainfall causing rough seas, 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 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.

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.[27]

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.[28]

Rising sea levels are a concern for Kenya's coastline consisting of mangroves, coral reefs, sea grass and rocky, sandy and muddy shores. 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 millimetres 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.[29] The rate of sea level rise along Africa's Indian Ocean coast is projected to be greater than the global average. This will lead to greater levels of and more frequent coastal flooding, changing patterns of shoreline erosion, increased salinity of coastal aquifers, and modification of coastal ecosystems such as beaches, coral reefs and mangroves.[30]

Ocean acidification refers to a reduction in the pH of the ocean over an extended period of time caused mainly by the uptake of carbon dioxide from the atmosphere. The IPCC reports that the ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing seawater to become more acidic.[31] 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.[32] Research is underway to determine the economic and social impacts of ocean acidification on coastal communities and fisheries in Kenya.[33]

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. [34] 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.[35] The glaciers are melting because of 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 the 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 negatively affecting communities.[36] Climate change is also 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.[37] 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 carbon dioxide 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.[38]

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 21st century.[39] 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. Kenya Wildlife Services (KWS) reported that in some years, more animals die from drought than poaching in Kenya.[40] 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.[41]

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.[42] Kenya lost about 12,000 ha of forest annually from 1990 to 2005 through deforestation, and the 12% forest cover at Independence in 1963 had been reduced to about 6.9% in 2017 due to population pressure for settlements, infrastructure, demand for wood products and conversion to agriculture.[43] Deforestation is a major cause of climate change because clearing forests 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.[44]

Economic Impacts

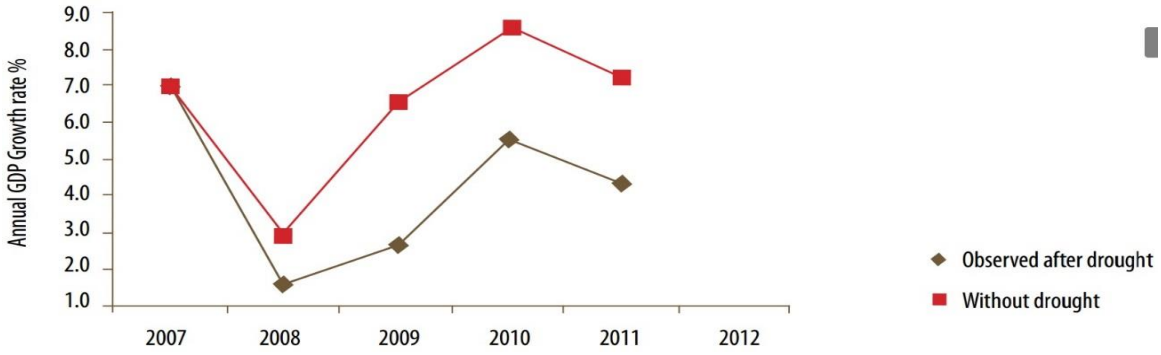
The economic cost of floods and droughts is estimated to create a long-term fiscal liability equivalent to 2%-2.8% of GDP each year.[45] Specifically, the estimated costs of floods are about 5.5% of GDP every seven years, while droughts account for 8% of GDP every five years.[46]

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 8,500 ha 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.[47] The El Niño induced floods in 1997/1998 caused losses and damages of between US$ 800 million and US$ 1.2 billion.[48]

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 (see Figure 3).[49] 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.[50] The drought depressed generation of hydroelectricity leading to an increase in generation of electricity from thermal sources that are more costly and produce greenhouse gas emissions. From 2007 to 2017, losses in livestock populations due to drought-related causes amounted to nearly US$ 1.08 billion.[51]

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. 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.[52]

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 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). 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 in Garissa, Wajir, Tana River, and Turkana.[53]

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 caused by rising sea levels and storm surges.[54] 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 US$ 7–58 million by 2030, rising to US$ 31–313 million by 2050.[55]

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

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

Sector	Likely impacts of climate change
Crops	▪ Greater food insecurity ▪ Decline in overall crop yields in most of the country due to insufficient availability of water, excessive moisture conditions, more pests, diseases and weeds ▪ 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 ▪ 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 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 ▪ Salt water intrusion along the coast due to sea level rise, with implications for domestic, industrial and agricultural uses as well as coastal ecosystems ▪ 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 due to sea level rise and storm surges ▪ Declines in fisheries and livelihoods dues to ocean acidification and warming oceans
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 fuel wood ▪ Reduction of hydroelectric power production capacity as water flows in rivers decline (particularly in the dry season) and reservoir siltation increases ▪ Increased demand for energy as high temperatures encourage the use of air conditioners and refrigeration ▪ Damage to infrastructure
Environment	▪ Increased likelihood of contestation and 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

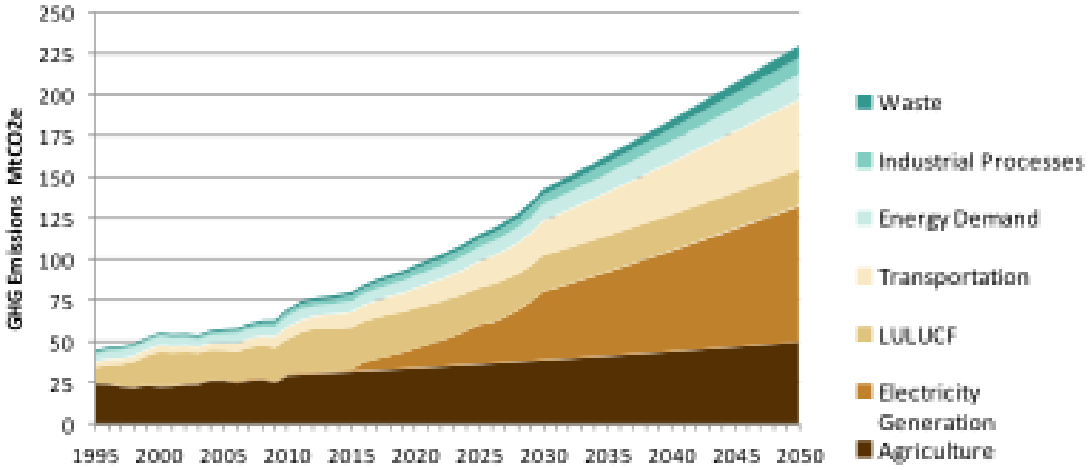
Sector	Likely impacts of climate change
Health	▪ Shift in the geographic range of malaria to higher altitudes ▪ Increase in the incidence of malaria, Rift Valley fever, malnutrition, scabies, chiggers, and lice infestations ▪ Increase in water-borne diseases such as cholera and typhoid
Housing and Buildings	▪ 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	▪ Reductions in hydro-electricity generation causing energy fluctuations or blackouts because of energy supply interruptions ▪ Greater resource scarcity (such as 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	▪ Increased likelihood of conflict within and between countries, counties and communities ▪ Political and financial instability through supply line disruptions and increased risks of doing business
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 and human-wildlife conflict ▪ Potential for species extinction
Transport	▪ 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 ▪ 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 Kenya's Contribution to Climate Change

The amount of greenhouse gases (GHG) that humans release has increased every year since the Industrial Revolution and is now at record levels. As carbon dioxide and other GHGs build up in the atmosphere, they trap heat causing climate change. Kenya has little historical or current responsibility for global climate change; the country's GHG emissions represent less than 1% of total global emissions. While adaptation is the priority for Kenya, action is needed to reduce GHG emissions that are projected to increase due to population and economic growth (see Figure 4). Kenya's mitigation actions help to keep GHG emissions lower than the projected trajectory and deliver co-benefits including sustainable development, green growth and resource efficiency. The low-carbon actions also contribute to achieving the Government's Big Four agenda.

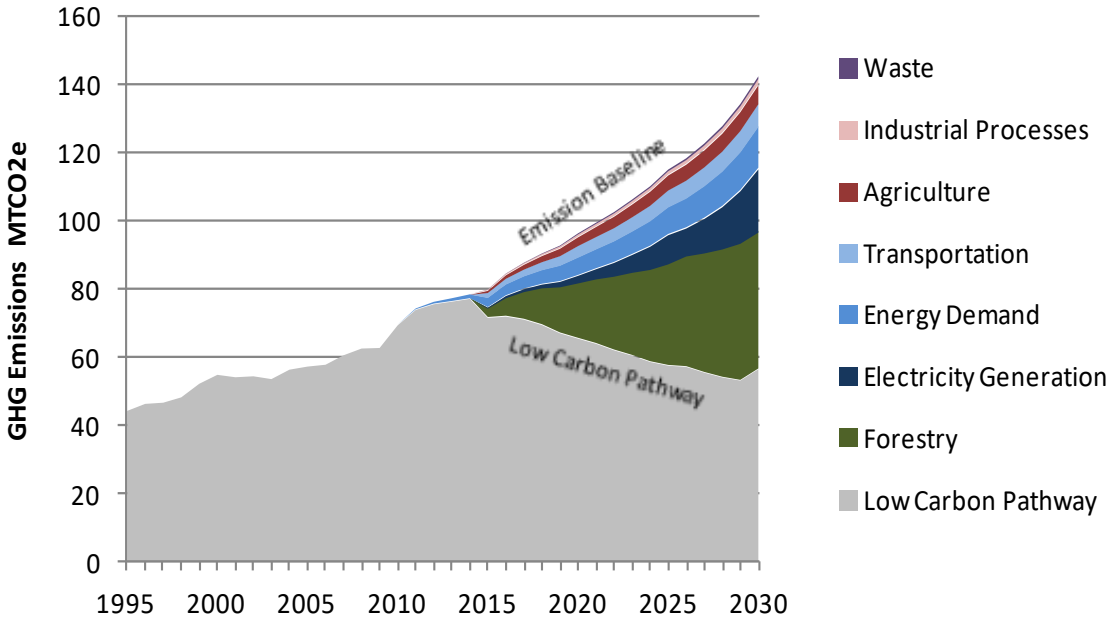
Figure 4: Greenhouse gas emissions baseline projection for Kenya ($MtCO_2e$)



Source: Government of Kenya (2017), Update of Kenya's Emissions Baseline Projections.

Actions in the six mitigation sectors set out in the UNFCCC – agriculture, energy, forestry, industry, transport, and waste – lead to lower emissions than in the projected baseline and help to meet Kenya's mitigation NDC. The forestry sector has large potential to reduce GHG emissions in Kenya because forests act as "sinks" through carbon sequestration (see the green wedge in Figure 5).

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

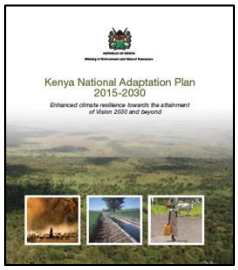


Source: Government of Kenya (2015), Second National Communication, page 13.

1.4 Summary of Implementation of 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.[56]

1.4.1 Progress on Adaptation



Priority adaptation actions were summarised in NCCAP 2013-2017 and further elaborated in the National Adaptation Plan (NAP 2015-2030). 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.[57] 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 were undertaken 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, Marsabit and other ASAL 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.

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 National Implementing Entity (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.[58] Garissa, Makueni and Wajir County Governments passed regulations to establish county climate change funds (see Box 3). Climate change fund legislation was developed in Isiolo and Kitui and was awaiting approval of County assemblies as of June 2018. Other County Governments, such as Kisumu, established institutional structures to mainstream climate change in plans and programmes.

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, Wajir and Garissa Counties in 2015, 2016 and 2018 respectively. Makueni's regulations mandate that the County Government set aside 1% of its annual development budget for climate change; and the legislation in Wajir and Garissa 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.

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. Various companies have worked to build the climate resilience of farmers in their supply chains.

1.4.2 Progress on Mitigation

NCCAP 2013-2017 identified six priority action areas for emission reductions 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 Nationally Appropriate Mitigation Action (NAMA) Facility for Nairobi's Bus Rapid Transit system that will be implemented under the second NCCAP 2018-2022.

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. MEF and Kenya Forestry Service (KFS) worked with County Governments and private land holders to plant trees and develop 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 (REDD+) actions.

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 the reported 250 MW of geothermal power generation in June 2013.[59] In 2016/2017, installed capacity was 2,333 MW, with geothermal accounting for 44% of the electricity generation mix, hydro 33%, thermal 21% and imports 2%.[60] 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) worked with the Ministry of Energy to support 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 16 CDM projects and 16 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 issue carbon credits for sequestering carbon in soil.

1.4.3 Progress on Enabling Actions

NCCAP 2018-2022 builds on the foundation established through enabling actions implemented under the first action plan (summarised in Box 4). A key accomplishment was the enactment of the Climate Change Act, 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.

Box 4: Highlights of progress on Enabling Actions under 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.
- KIRDI, Kenya Agricultural and Livestock Research Organisation (KALRO), Kenya Forestry Research Institute (KEFRI), Kenya Marine and Fisheries Research Institute (KMFRI) and other institutions supported the development and transfer of climate change technologies.
- Kenya Climate Innovation Centre, KAM Centre for Energy Efficiency and Conservation, and Kenya National Cleaner Production Centre provided technology- and innovation-related services to the private sector.

Knowledge Management and Capacity Development

- National Climate Change Resource Centre established in 2015.
- Kenya Climate Information Portal, with sections for children and youth, launched in 2018.
- Kenya Meteorological Department (KMD) improved its climate observation network, including the installation of automated weather stations, and established the National Climate Diagnostic Laboratory to improve climate knowledge and information management.
- MEF, in collaboration with the Kenya School of Government and the COG, developed a training programme on *Climate Change Policy, Planning and Budgeting at National and County Levels*.

Enabling Policy and Regulatory Framework

- Climate Change Directorate established.
- Climate Change Act (No. 11 of 2016) enacted in May 2016.
- National Climate Change Policy approved by Parliament in February 2018.
- Climate change fund regulations enacted in Garissa (2018), Makueni (2015), and Wajir (2016).

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.
- 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 actions developed in 2017.
- Kenya's Second National Communication, including an updated GHG inventory, submitted to the UNFCCC in 2015.
- 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.

1.4.3 Lessons Learned

Lessons learned while implementing the NCCAP 2013-2017 guided the development of NCCAP 2018-2022.[61] These lessons included:

- **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 addresses the issues of vulnerable groups,** including women, older members of society, persons with disabilities, children, youth, and members of minority and marginalised communities.
- **The robust legal framework established through the Climate Change Act, 2016 encourages mainstreaming,** which is essential for effective implementation of NCCAP 2018-2022. Kenya's Third Medium Term Plan (MTP III) includes climate change as a crosscutting issue, and climate change is mainstreamed in the relevant sectors.

- **Effective coordination of climate change action** is an important element of success. The Climate Change Act, 2016 defines a coordination role that is overseen by the National Climate Change Council and delivered by the CCD.
- **Ensure the process to develop the NCCAP includes adequate consultation.** Climate change is a cross-cutting issue with impacts across sectors. Consultations enable views and perspectives to be expressed by individuals and representatives of communities, Counties, business associations, civil society and vulnerable members of society.
- **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 have informed the development of NCCAP 2018-2022.
- **Reporting on climate actions** needs to account for devolution and the role of State Departments and Counties, as set out in the Climate Change Act.
- **An appropriate Measurement, Reporting and Verification Plus (MRV+) system that includes adaptation and mitigation can be introduced in a phased approach over 2018-2022**. The NCCAP 2018-2022 actions should lead to adaptation or mitigation benefits that can be measured, with baseline information and SMART (specific, measurable, attainable, relevant and within a specific time frame) indicators. National level indicators can be identified to provide a snapshot of progress on climate change (such as number of people receiving drought relief payments, percentage of renewable energy in the electricity mix). Enhanced data collection and management can improve reporting on climate results.

Chapter 2: Enabling Legal and Policy Framework

2.1 The Global Context

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 founded upon 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.*[62]

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 countries 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 carbon dioxide were avoided through the CDM, and US$ 9.5-13.5 billion in direct benefits went to host counties from the sale of credits as of 2012.[63] 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** 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, 178 Parties had 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 under section 9(1) of the Treaty Making and Ratification Act, and entered into force for Kenya on 27th January 2017. Kenya's NDC sets out the country's actions to contribute to achieving the global goal set out in the Paris Agreement (see Box 5). As set out in Article 2(6), and read with Article 94(5) of the Constitution of Kenya (2010), the Paris Agreement now forms part of the law of Kenya.

Box 5: 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 aims to strengthen the global response to the threat of climate change by keeping global temperature rise this century to well below 2°C 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** (GCF) 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 engages directly with the private sector through its Private Sector Facility. As of May 2018, 43 governments had made pledges to the GCF totalling US$ 10.3 billion.[64] The **Global Environment Facility** manages contributions from donors through trust funds to help developing countries meet the objectives of international environment conventions, including the UNFCCC. The trust funds include the Adaptation Fund, Special Climate Change Fund, and Capacity Building Initiative for Transparency (CBIT).

Kenya is signatory to the **United Nations Convention on Biological Diversity (1992)** (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.

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. The Protocol was agreed on 16th September 1987 and entered into force on 1st January 1989. Kenya ratified the Montreal Protocol on 9th November 1988. Kenya's ratification of the Kigali Amendment to phase down the production and usage of hydrofluorocarbons was in progress in June 2018. At the end of 2014 over 98% of controlled ozone-depleting substances had been eliminated. A very significant co-benefit is emission reductions of 135,000 $MtCO_2e$ from 1989 to 2013.[65]

The **Stockholm Convention on Persistent Organic Pollutants** is an international environment treaty that was signed in 2001 and entered into force in May 2004. The Convention aims to eliminate or restrict the production and use of persistent organic pollutants. Kenya ratified the Stockholm Convention on 24th September 2004. Climate change

has potential impacts on the releases, transport, distribution, and toxicity of persistent organic pollutants, which could lead to higher health risks for human populations and the environment.

The **Minamata Convention on Mercury** aims to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. The Convention was adopted and opened for signature in October 2013; 94 countries had ratified the agreement by June 2018. Kenya was in the process of preparing its instrument of ratification in June 2018. Both the UNFCCC and Minamata Convention place a significant onus on emissions from coal combustion and promote efficient use of coal.

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 around the dispute settlement mechanism established in UNCLOS eventually attracting claims relating to climate change.[66]

The **International Civil Aviation Organization** (ICAO) Assembly 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 $MtCO_2e$ 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. The Protocol to the International Convention for the Prevention of Pollution from Ships, 1997, known as MARPOL Annex VI, regulates air emissions from ships. Compliance with these IMO regulations has mitigated GHG emissions from international shipping. Jomo Kenyatta University of Agriculture and Technology hosts the regional Maritime Technology Cooperation Centre for the Africa region that aims to help mitigate the harmful effects of climate change. The Kenya Ports Authority has initiated a Green Port Strategy.

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 organizations committed to improving air quality and protecting the climate through actions to reduce 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.

The **Sendai Framework for Disaster Risk Reduction 2015-2030** is a voluntary agreement that recognises that the State has the primary role to reduce disaster risk, but that responsibility should be shared with other stakeholders including local governments, the private sector and other stakeholders. It aims for the following outcome: "The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries."[67] Kenya adopted the Sendai Framework in 2015.

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 United Nations (UN) Sustainable Development Summit. On 1st January 2016, the **17 Sustainable Development Goals** (SDGs) officially came into force (see Box 6).

Box 6: Sustainable Development Goals

Goal 1: End poverty in all its forms everywhere

Goal 2: End hunger, achieve food security and improved 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

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

Source: United Nations (2018). Sustainable Development Knowledge Platform. https://sustainabledevelopment.un.org/sdgs

While the SDGs are not legally binding, governments are expected to take ownership and establish national frameworks for the achievements of the goals. The 2030 Agenda includes dedicated goals for climate change (SDG 13) and protecting, restoring and promoting sustainable use of terrestrial ecosystems (SDG 15); and also mainstreams consideration of climate change impacts and climate actions across all the SDGs. The 2030 Agenda introduces the overriding objective of "leaving no one behind" that has strong implications for the

definition and selection of climate actions. This objective prioritises the poorest and most marginalised people so that they progress at a higher rate than those better off. To ensure that no one will be left behind, world leaders committed to end extreme poverty and curb inequalities by 2030, and underscored that no goal of the 2030 Agenda will be met until it is met for everyone.[68]

2.2 The Regional Legal and Policy Framework

At the regional level, the **African Union's Agenda 2063** commits to climate change action that prioritises adaptation and calls on member 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. The EAC is developing a climate change bill and forest policy and strategy; and exploring the establishment of an alliance on carbon markets and climate finance.

The **Lake Victoria Basin Commission** developed a Climate Change Adaptation Strategy and Action Plan (2018-2023) that presents a roadmap for addressing and adapting to climate change impacts.

The **African Forest Landscape Restoration Initiative** (AFR100) aims to bring 100 million hectares of land in Africa into restoration by 2030. The commitments announced under AFR100 also support the Bonn Challenge adopted in 2011, whose overall objective is to restore 150 million hectares by 2020; the New York Declaration on Forests that stretches the goal to 350 million hectares by 2030; and the African Resilient Landscapes Initiative to promote integrated landscape management to promote adaptation to and mitigation of climate change. In 2016, Kenya committed to restore 5.1 million hectares of land.

2.3 The National Legal and Policy Framework

A robust framework of policies, plans and institutions is being progressively established 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 10 sets out national values and principles of governance, such as sustainable development, devolution of government, and public participation, that are mandatory when making or implementing any law or public policy decisions, including climate change. 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.

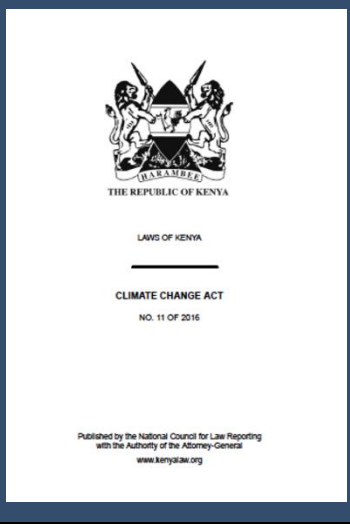
The Constitution of Kenya (2010) created the devolved system of government comprised of the National Government and 47 County Governments. The concept of devolution goes beyond mere decentralisation of government services, providing a form of self-governance at the local level and a process of equitable sharing of resources. The County Governments have a key delivery role in implementing the Climate Change Act, 2016, having jurisdiction, as set out in the Fourth Schedule (Part 2) of the Constitution, over sectors relevant for climate change such as agriculture, soil and water conservation, forestry, water and sanitation, and health. Article 203(2) of the Constitution requires that County governments be allocated a minimum of 15% of national revenue received annually, but the allocation often surpasses the minimum thus giving County governments considerable scope to influence climate change investments.

The Constitution of Kenya advances gender equality, stating in Chapter 4, the Bill of Rights that "women have the right to equal opportunities in political, economic and cultural spheres," and in order to achieve that equality, requires that government to put in place and implement affirmative actions that deliver equity for women. This commitment to gender equality and implementation of gender equity is taken up in section 7(6) of the Climate Change Act, 2016 that requires the President to ensure compliance with the two thirds gender principle when appointing members to the National Climate Change Council. Further, section 8(2)(c) of the Climate Change Act, 2016 obligates the Cabinet Secretary responsible for climate change affairs to formulate and implement a national gender and intergenerational responsive public education and awareness strategy.

The **Climate Change Act**, 2016 is the key legislation guiding Kenya's climate change response, setting the legal basis for mainstreaming climate change considerations and actions into sector functions, and providing the legal foundation of the NCCAP. This NCCAP 2018-2022 responds to provisions in the Climate Change Act, 2016 that require the updating of the NCCAP every five years (see Box 7).

Box 7: The Climate Change Act (No. 11 of 2016)

The Climate Change Act (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 Act establishes the National Climate Change Council, chaired by His Excellency the President. The Council 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 main policies, plans and frameworks that influence and guide climate change actions in Kenya are briefly described in Table 3, and elaborated in Chapter 2 of the Adaptation Technical Analysis Report (ATAR): NCCAP 2018-2022 Volume II

Table 3: Kenya's national climate change legal and policy framework

National 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 Medium Term Plan (2018-2022) recognised climate change as a crosscutting 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.
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.
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 the 21 planning sectors in MTP II.
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 legal 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).
Kenya Climate Smart Agriculture Strategy (2017-2026)	The objectives of the Kenya Climate Smart Agriculture Strategy (KCSAS) are to adapt to climate change and build resilience of agricultural systems while minimising greenhouse gas emissions. The actions will lead to enhanced food and nutritional security and improved livelihoods.
Climate Risk Management Framework (2017)	The *Climate Risk Management Framework for Kenya* integrates disaster risk reduction, climate change adaptation, and sustainable development so that they are pursued as mutually supportive rather than stand-alone goals. It

	promotes an integrated climate risk management approach as a central part of policy and planning at National and County levels.
National Climate Change Framework Policy (2018)	The *National Climate Change Framework Policy* 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* promotes the establishment of 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 (2018-2022)	The Government of Kenya Big 4 Agenda establishes priorities areas for 2018 to 2022 of ensuring food security, affordable housing, increased manufacturing and affordable healthcare. Sector plans and budgets are to be aligned to the Big Four priorities.

At the national level, several **ministries and departments** have established climate change units and climate change-related plans and policies to guide and mainstream climate actions in their sector, listed in Table 4.

Table 4: National sector climate change-relevant strategies, plans and regulations

Sector	Climate Change-relevant Plan	Ministry/Department
Agriculture	National Strategy on Genetic Resources within the Context of Climate Change (2016-2021)	Kenya Agricultural and Livestock Research Organisation
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 Disaster Risk Management Policy (2017)	National Treasury Ministry of Interior and Coordination
Drought Management	National Drought Management Authority Act (No. 4 of 2016) Ending Drought Emergencies Strategy Public Finance Management (National Drought Emergency Fund) Regulations, 2018	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, 1999 (Cap. 387) Green Economy Strategy and Implementation Plan (GESIP 2016-2030) Kenya Strategic Investment Framework on Sustainable Land Management (2017-2027)	Ministry of Environment and Forestry
Forestry	National Forest Programme (2017) - chapter on climate change REDD+ Readiness Plan and analysis (2013-2017)	Kenya Forest Service Ministry of Environment and Forestry
Health	Health Act (No. 21 of 2017) - section on environmental health and climate change (Part VII, sections 68 and 69)	Ministry of Health
Infrastructure	Kenya Building Research Centre: Strategic Plan, 2017/18-2021/22	Ministry of Transport, Infrastructure, Housing and Urban Development
Land Management	National Spatial Plan (2015-2045)	Ministry of Lands and Physical Planning
Transport	Action Plan to Reduce CO_2 Emissions from Aviation (2015) Executive Order: The Nairobi Metropolitan Area Transport Authority (2017) Kenya National Aviation Action Plan for International Civil Aviation Organisation (ICAO) and Mitigation plan for International Maritime Organisation (IMO) (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

County Governments have begun to develop regulatory frameworks for climate change (see Table 5). All County Governments are required by the Climate Change Act, 2016 to mainstream climate change in their County Integrated Development Plans (CIDPs).

Table 5: County Government climate-relevant plans and regulations

County Framework	Description
County Integrated Development Plans (2013)	County Governments are required to mainstream climate change in their 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 most County Governments.
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.
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.
Garissa Climate Change Fund Act (2018)	The Garissa Climate Change Fund Act requires the County Government to set aside 2% of its annual development budget for a special fund for climate change. The fund will undertake programmes to assist local people to adapt to climate change.

Chapter 3: Priority Climate Change Actions for 2018-2022

3.1 Identification of Priority Climate Change Actions

National Climate Change Action Plan (NCCAP 2018-2022) takes cognisance of the impacts of climate change on Kenya's socio-economic sectors. It identifies strategic areas where climate action over the next five years is linked to the Big Four agenda (see Box 8), recognising that climate change is likely to limit the achievement of these pillars. Food security is threatened through climate change-driven declines in agricultural productivity. The destruction of tens of thousands of hectares of crops and loss of livestock in the floods of March-May 2018 are recent examples of the impacts on farmers and pastoralists. Other negative climate impacts include an increase in vector-borne diseases, including malaria and cholera; damage to infrastructure, including homes, schools and hospitals; and high prices for electricity due to a reliance on thermal generators when dam levels are too low to sustain hydropower production.

Adaptation actions are prioritised in NCCAP 2018-2022 because of the devastating impacts of droughts and floods, and the negative effects of climate change on vulnerable groups, including women, older members of society, persons with disabilities, children, youth, and members of minority and marginalised communities. These actions will be undertaken, where possible, in a way to limit GHG emissions to ensure that the country achieves its 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 8: The Big Four

Food and Nutrition Security - Never again should we allow the vagaries of weather to hold us hostage. Over the next five 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 five 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 manufacturers 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 five years, we will target 100% Universal Healthcare Coverage for all households by ensuring that 13 million Kenyans and their dependents are beneficiaries of the National Hospital Insurance Fund (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 sets out the Big 4 Action Plan. See: http://www.president.go.ke

The priority climate change actions in this Action Plan contribute to achieving sustainable development benefits (see Box 9). These actions will benefit vulnerable groups through direct

and indirect benefits, such as increased agricultural productivity and improved water accessibility. NCCAP 2018-2022 actions provide benefits for women through access to clean cooking, and forest restoration and agroforestry actions that provide energy and water sources.

Box 9: Climate change-SDG impact assessment

MEF examined the impacts of climate change mitigation and adaptation actions on the SDGs and Big Four Agenda to foster alignment and synergies. Particular attention was given to the way 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 analysis indicated that the implementation of NCCAP 2018-2022 can provide an significant contribution to the attainment of the Big Four, including the achievement of food and nutrition security for all Kenyans. Climate actions are essential for reducing the vulnerability of the manufacturing, housing, health, and agriculture sectors. NCCAP 2018-2022 generates opportunities to boost the productivity of the agriculture and manufacturing sectors and supports improved health outcomes.

The MEF assessment found that adaptation and mitigation actions in NCCAP 2018-2022 directly address or provide likely benefits for all the 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 and Big Four Manufacturing)
- Sustainable waste management (SDG 11 and Big Four Health)
- Human health (SDG 3and Big Four Health)

Low-carbon energy sources; ecosystem-based solutions such as climate smart agriculture, rangeland restoration and agroforestry; and the development of sustainable public transport systems have sizeable win-win benefits for boosting employment and manufacturing capacity, protecting the environment, and narrowing inequalities.

Government of Kenya (2018). Report on the Impact Assessment of the Second National Climate Change Action Plan on the Big Four Agenda of the Government of Kenya and the National Implementation of the Sustainable Development Goals (SDGs). Nairobi: MEF.

The priority climate change actions in this Action Plan reflect input received from National and County Governments; vulnerable groups including women, youth, persons with disabilities, and members of marginalised and minority communities; private sector; civil society; and sector experts. These climate change actions are mainstreamed in the Third Medium Term Plan in all sectors and in Country Integrated Development Plans to ensure that strategic climate change actions are taken up across the country and in all relevant sectors.

3.2 Priority Climate Change Actions

NCCAP 2018-2022 outlines the programmes and strategies for adaptation and mitigation for 1st July 2018 to 30th June 2023. It is a comprehensive plan that:

- Enables all sectors to take action to achieve climate change adaptation and mitigation objectives;
- Supports achievement of the Big Four agenda and sustainable development goals;
- Enhances the adaptive capacity and resilience of communities, with an emphasis on vulnerable groups within society;
- Undertakes actions, where possible, in a way that limits GHG emissions to ensure that the country achieves its mitigation NDC under the Paris Agreement; and
- Enables actions to be undertaken in an integrated manner that address several priorities. For example, actions to plant trees also contribute to disaster risk management, water and food security objectives.

The priority climate change actions are summarised in Table 6 and described in this chapter. Further details on the priority actions and all other climate change actions identified by stakeholders are included in the Adaptation Technical Analysis Report (MTAR): NVCCAP Volume II and the Mitigation Technical Analysis Report (MTAR): NCCAP Volume III.

Table 6: Priority climate change actions

Priorities	Objectives
1. Disaster Risk (Floods and Drought) Management	Reduce risks to communities and infrastructure resulting from climate-related disasters such as droughts and floods.
2. Food and Nutrition Security	Increase food and nutrition security through enhanced productivity and resilience of the agricultural sector in as low-carbon a 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, 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 the manufacturing sector.
7. Energy and Transport	Climate-proof energy and transport infrastructure; promote renewable energy development; increase uptake of clean cooking solutions; and develop sustainable transport systems.

For each priority action, information is included on the problem being addressed, the action needed to address the problem, expected results, national-level indicators, alignment with the Big Four Agenda, alignment with SDGs, and relevant institutions to deliver the actions. NCCAP 2018-2022 recognises that certain enabling activities cut across the strategic priorities, such as improving the legal and policy framework, building capacity and enhancing knowledge management, promoting technology and innovation, increasing access to climate finance, and measuring and reporting on climate actions. These enabling actions are described in Chapter 4.

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.

Impacts of climate disasters on Kenyan society and economy

The impacts of climate-related 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.

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.[69] 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.[70]

Prolonged droughts lead to crop failure, shrinking of productive crop areas, and loss of livestock leading to reduced food security and increased malnutrition with impacts particularly for pregnant women, lactating mothers, children and the elderly. 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,[71] that can have negative impacts on rangeland management. A significant number of people from marginalised and minority groups 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 and is replaced by diesel generators.

Floods have more immediate, and often large-scale impacts, such as the flooding in early 2018 that claimed over 183 lives and displaced more than 225,000 people,[72] and the Solai dam disaster in May 2018 that claimed 47 victims, over half of them women and children. Persons with disabilities and the elderly are particularly at risk during floods and disasters because they may be left behind or abandoned during evacuation. Eleven flood-prone areas have been identified in Kenya (see Figure 6).

Figure 6: Flood-prone areas of Kenya

Source: Government of Kenya (2015). El Niño Response Plan, October 2015 to January 2016

A proactive approach to tackle climate-related disasters

The priority climate actions promote a proactive, rather than reactive, approach to climate-related disasters. The actions 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, and land use restrictions[73]), 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. In particular, women, as central players in disaster response, are provided with resources and support to carry out these roles effectively.

Some of the climate actions will be implemented under the National Disaster Risk Management Policy, approved by Cabinet in 2018, and the National Drought Emergency Fund (NDEF). This Fund 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.[74] The Contingencies Fund, established in the Constitution (2010), addresses urgent and unforeseen needs, and can be used to provide disaster relief. Other programmes that deliver climate actions include the National Drought Management Authority, Ending Drought Emergencies, National Safety Net Programme, and County Climate Change Funds.

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

- Adaptation – increased number of households benefiting from social protection systems and County Climate Change Funds, with an emphasis on reaching the poor and marginalised and minority groups; 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 – reduced exposure and vulnerability of the country, and especially of the poor and vulnerable groups, to climate disasters and shocks.

Strategic Objective 1: Reduce risks to communities and infrastructure resulting from climate-related disasters such as droughts and floods.		
Issue/problem: Floods and drought have national economic consequences and extensive socio-economic effects at the household and community levels, especially for vulnerable groups, such as women, older members of society, persons with disabilities, children, youth, and members of marginalised and minority communities. Current responses are reactive rather than proactive, and impeded by inadequate early warning systems, lack of disaster management coordination, and limited support to build disaster preparedness.		
Big 4 Pillars: Linked to Food Security, Health, Manufacturing, Housing		
SDGs: 1 – No poverty; 2 – Zero hunger; 3 – Healthy lives; 4 – Education; 5 – Gender equality; 6 – Sustainable water management; 8 – Sustained economic growth; 9 – Resilient Infrastructure; 10 – Reduced inequalities; 11 – Sustainable communities; 13 – Climate action		
National-level Indicators: ▪ 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 ▪ Number of households receiving food aid and cash transfers		
Actions	**Expected Results by 30th June 2023**	**Adaptation/ Mitigation**
1. Increase number of households and entities benefiting from devolved adaptive services	▪ Number of beneficiaries of social protection mechanisms and other safeguards (under the Hunger Safety Net Programme) increased from 100,000 to 150,000 for regular beneficiaries; and from 90,000 to 130,000 to scale up support to select beneficiaries in times of drought ▪ Number of households better able to cope with climate change because of receiving benefit from County Climate Change Funds increased from 300,000 households in 2018 to 800,000 households. Climate Change Funds	Adaptation Climate risk: extreme weather events, including droughts and floods

	address local adaptation priorities that are identified and monitored by community committees comprised of women and men. ▪ Number of beneficiaries under the National Safety Net Programme increased from 4,017,759 beneficiaries in 2017 to 4,280,000. *Note: number of beneficiaries increases because the expanded scope of programmes means that more Kenyans are eligible for support*	
2. Improve ability of people to cope with drought	▪ Drought early warning systems improved, including the promotion of people-centred systems at the national and county levels. ▪ Number of recipients of climate information services that use the 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 and the Blue Economy).* ▪ Operationalise the National Drought Emergency Fund.	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, and infrastructure to withstand, floods	▪ Flood early warning systems improved, taking advantage of widespread access to mobile technology that provides an avenue for disseminating information. ▪ Implement the existing 11 integrated flood management plans; for example, water storage, drainage networks, reforestation and rehabilitation of riparian areas, construction of dams, and land use restrictions. ▪ Dam Safety Control System established including a needs assessment, and development of safety manuals and codes of practice. ▪ Capacity development of at least 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, and water storage *(see expected results under Climate Action 3 – Water and the Blue Economy).*	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
4. Improve coordination and delivery of disaster risk management	Improve the coordination of disaster risk management (including floods, droughts, disease outbreaks, landslides and other disasters) by enacting and implementing the Disaster Risk Management Act that includes the establishment of: ▪ National Disaster Risk Management Authority to coordinate disaster response. ▪ Engendered County Disaster Risk Management Committees to coordinate disaster response at the County level. ▪ Disaster Risk Management Fund to provide funds for disaster preparedness, mitigation of disaster impacts, and disaster recovery measures, particularly for vulnerable groups.	Enabling

Enabling (legal)	▪ Implement the mandate of the National Water Harvesting and Storage Authority, under the 2016 Water Act, to undertake strategic water emergency interventions during drought on behalf of the National Government.	Enabling
Enabling (finance)	▪ Contingencies Fund allocations to address urgent and unforeseen needs	Enabling
Enabling (technology)	▪ Expertise developed to customize and manage satellite-generated vegetation condition index used for drought early warning and response	Enabling
Enabling (capacity development)	▪ Research on migration as an adaptation strategy	Enabling
Relevant Institutions: County Governments, CoG, NDMA, National Treasury and Planning, KMD, Water Resources Authority (WRA), WRUAs, community groups, civils society, private sector. All sectors identify actions to realise the strategic objective.		

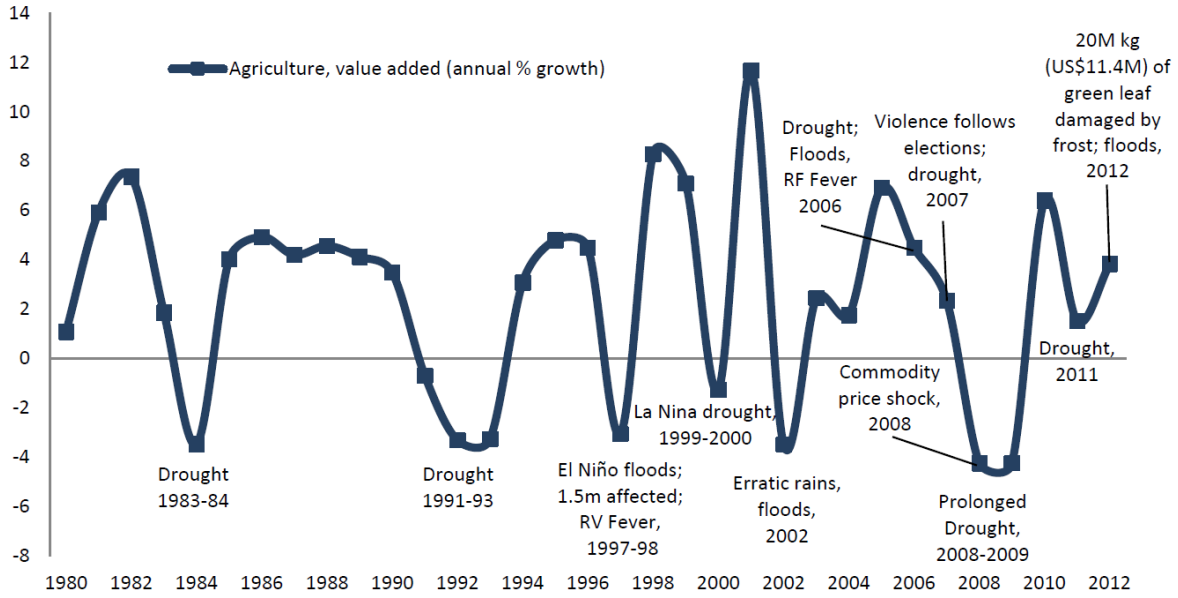
Climate Change Priority 2: Food and Nutrition Security

Climate change has the potential to prevent the achievement of the Big Four goal on food and nutrition security.

Increased food insecurity due to climate change

Climate shocks significantly impact the annual growth rate of the agriculture sector (see Figure 8); and this growth (or decline) has a large impact on the national economy. The agriculture sector is highly susceptible to the vagaries of weather, including temperature increase, precipitation changes, and extreme events.

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



Source: World Bank, 2016.

Climate change is expected to negatively impact crop yields in Kenya, with up to 45% yield reductions expected for maize, rice, and soybean crops 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.

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.[75] The impacts of the 2017 drought included:

- Maize production declined by 6.3% in 2017 from 2016.
- Tea production decreased by 7% in 2017 from 2016, despite increases in the area under production.[76]
- 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.[77]
- 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 due to high prices of inputs and the drying up of ponds due to drought.[78]
- 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.[79]

At the household level, drought caused high food prices; in 2017 the prices of maize, sugar, rice, and milk hit record highs.[80] The price of one kilogram of sugar increased from an average of KES 118 in 2016 to KES 138 in 2017.[81] These high prices particularly impacted 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.[82]

Pastoralists are impacted because extreme weather events lead to reduced pasture and forage availability, degradation of the environment, and an increase in poverty. Strong winds and dust storms erode top soil, making grass and rangeland regeneration difficult even when it rains. Recurring droughts have forced an estimated 30% of livestock owners out of pastoralism in the past 20 years.[83]

Fisher communities report that increasing temperatures impact fish breeding and fish distribution. In the coastal areas, fish are moving from in-shore to deeper waters and artisanal fisher communities 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.[84]

Win-win solutions for climate, agriculture and food security

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,[85] provided about 75% of total employment in Kenya and supported over 80% of the rural population.[86]

NCCAP 2018-2022 provides a range of actions to transform the agricultural sector. Increasing production in a changing climate is necessary to achieve the Big Four food and nutrition security goal over the next five years by enhancing large-scale production, driving smallholder productivity, and reducing the cost of food. Thus, adaptation actions are the priority and food security takes precedence over mitigation of GHG emissions. Many of the actions in the sector, however, also reduce GHG emissions – such as agroforestry, sustainable land management, and efficiency in livestock management. Reducing GHG emissions where possible is important because agricultural emissions accounted for approximately 40% of total national emissions in 2015.[87]

The main action will be the implementation of the Climate Smart Agriculture (CSA) Strategy, 2017-2026 that aims to enhance the adaptive capacity and resilience of farmers, pastoralists and fisher communities; 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 Volumes II and III of the NCCAP, the ATAR and MTAR.

To ensure success, these climate actions include focused interventions to address gender because women account for 75% of the labour in the agriculture sector.[88] 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. These services are 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 television stations.

Some climate actions to increase food and nutrition security will be supported through on-going programmes, including the Kenya CSA Strategy Implementation Framework and Strategy, CSA Project, National Agricultural Rural Inclusive Growth Project, Kenya Cereal Enhancement Programme – Climate Resilient Agricultural Livelihoods, insurance pilot programmes, and partnerships with the World Agroforestry Centre and International Livestock Research Institute.

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

- Adaptation – maintained or increased 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 2.61 $MtCO_2e$ by 2022 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 agricultural, livestock and fish productivity; increased food and water security; improved incomes and livelihoods of pastoralists and small-holder farmers; improved health with more healthy food available; and better management of ecosystems and their biodiversity.

Strategic Objective 2: Increase food and nutrition security by enhancing productivity and resilience of the agricultural sector in as low carbon manner as possible		
Issue/Problem: Climate change is negatively impacting agricultural productivity and resilience of value chain actors, including households. An increase in the severity and frequency of climate change-related disasters such as droughts 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: 2 – Zero hunger; 1 – No poverty; 5 – Gender equality; 10 – Inequality reduction; 12 – Sustainable consumption and production; 13 – Climate action; 15 – Life on land		
National-level Indicators: ▪ GDP growth of agricultural sector ▪ Livestock deaths from drought / number of livestock slaughtered attributable to drought ▪ Agricultural land under irrigation (acreage) ▪ GHG emissions in the agriculture, forestry and other land use sector		
Action	**Results by 30th June 2023**	**Adaptation / Mitigation**
1. Improve crop productivity through the Implementation of CSA interventions	▪ Number of institutions/value chain actors and households harvesting water for agricultural use/production increased to 500,000 ▪ Agricultural pre- and post-harvest losses reduced from 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
	▪ Number of households and acreage under sustainable land management (SLM) increased for agricultural production: - Support the reclamation of 60,000 ha of degraded land - 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	Adaptation Addresses climate risk: land degradation Mitigation GHG emission reductions of 0.55 $MtCO_2e$ by 2022 (conservation tillage) GHG emission reductions of 1.66 $MtCO_2e$ by 2022 (agroforestry)
2. Increase crop productivity through improved irrigation	▪ Acreage under irrigation increased from 202,000 ha to 486,000 ha ▪ Production efficiency from irrigated fields increased from 50% to 90%	Adaptation Addresses climate risk: changes in precipitation negatively impact rain-fed crop production
3. Improve productivity in the livestock sector through the	▪ 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 metres	Adaptation Addresses climate risk: land degradation

Implementation of CSA interventions	(MCM) to 20 MCM via small dams and water pans and 700 MCM through large multipurpose dams. - Improved animal disease control and surveillance ▪ Number of customers/ beneficiaries accessing climate-oriented livestock insurance increased from 18,000 to 105,750 farmers	
	▪ Efficiency in dairy management improved for 267,000 households ▪ Manure management improved through the adoption of biogas technology by 80,000 households and at least 200 abattoirs	Mitigation GHG emission reductions of 0.40 $MtCO_2e$ by 2022 (dairy)
4. Improve productivity in the fisheries through Implementation CSA interventions	▪ 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	Adaptation Addresses climate risk: Increased temperatures impact fish farming by drying of ponds
5. 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, pastoralists and fisher communities are supported to transition to specialised and market-oriented output in 13 priority value chains, including drought-tolerant values chains	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), WRA, Kenya Forest Service, KMD, Kenya Agriculture and Livestock Research Organisation (KALRO), Private sector, World Agroforestry Centre, International Livestock Research Institute (ILRI), Farmer organisations, Fisher organisations, Pastoralist organisations. All sectors identify actions to realise the strategic objective.		

Climate Change Priority 3: Water and the Blue Economy

NCCAP 2018-2022 addresses one of Kenya's largest challenges, water scarcity. The decline in access to quality water is exacerbated by climate change (such as drought and reduction of glaciers) and has the potential to undermine achievement of the Big Four agenda. Water is 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."[89]

Increased water scarcity: a vital challenge for Kenya

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, indicating chronic water scarcity. 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.[90] The water situation in Kenya is made worse by climate change and compounded by deforestation, 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 urban areas 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 households and small-scale agribusinesses, and the need to walk longer distances to obtain water. Women and girls are primary collectors of water for domestic use and can be exposed to potential conflict at times of water scarcities.

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.[91] 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.[92]

A comprehensive plan for ensuring access to quality water for all

NCCAP 2018-2022 aims to increase annual per capita water availability from 647 m^3 to 1000 m^3. To achieve this target, the plan proposes concrete actions to enhance resilience of the water sector by ensuring adequate access to and efficient use of water for agriculture, manufacturing, domestic, wildlife and other uses. The climate change actions involve women who help to reduce water wastage at the household level and to some extent also support water agencies in reducing wastage. The actions also promote the Blue Economy by encouraging low-carbon actions in the maritime sector, ensuring coastal infrastructure that can withstand expected sea level rise and storm surges, and assisting coastal fisher communities to cope in a changing climate.

Many of the actions will be implemented under existing initiatives such as African Initiative for Combatting Desertification; Kenya Integrated Water, Sanitation and Hygiene Project; and Water Sector Trust Fund.

The climate actions are expected 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.
- Sustainable Development – reduction in water scarcity through improved water harvesting and greater water use efficiency; improved human health and well-being; protection of coastal and marine ecosystems.

Strategic Objective 3: Enhance resilience of the blue economy and 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 (such as drought and reduction of glaciers). Coastal areas are impacted by sea level rise, storm surges, increasing ocean temperatures, and ocean acidification.		
Big 4 Pillars: Food Security, Health, Affordable and Decent Housing, and Manufacturing		
SDG 6: Clean water and sanitation; 14 – Life below water; 1 – No poverty; 2 – Food security and nutrition; 3 – Good health; 9 – Sustainable Infrastructure; 10 – Inequality reduction; 12 – Sustainable consumption and production		
National-level Indicators: ▪ Water storage per capita ▪ Water coverage ▪ Per capita water availability ▪ Coverage of protected areas in relation to marine area		
Action	**Expected Results by 30th June 2023**	**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 and stored) from 647 m^3 to 1000 m^3 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 to increase the supply of ground water - Five ground water surveys to establish abstraction levels against recharge - 56 sub-catchment management plans developed and 236 sub-catchment management plans implemented to assist local communities to protect wetlands, lakes, and other water catchment areas	Adaptation Addresses climate risk of high temperatures and changing precipitation patterns causing water shortages
2. Ponds livelihoods system 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 - Coastal sea walls - Development of flood early warning systems in	Adaptation Addresses climate risk of high temperatures and changing precipitation patterns causing water shortages

	areas susceptible to floods. *Linked to Climate Action 1: Disaster Risk Management*	
3. Increase gender-responsive affordable water harvesting-based livelihood resilience programmes	▪ Enhanced household water access and food security through water harvesting, including: - 300,000 farm ponds installed - Livelihood systems improved on 60,000 ha of degraded land through the development of water pans and ponds - Water utility creditworthiness index developed as well as tool kits on commercial lending to the water and sanitation sector to attract Public-Private-Partnerships	Adaptation Addresses climate risk of high temperatures and changing precipitation 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% through: - Large-scale installation of water meters - Regular inspection of water quality	Adaptation Increases resilience
6. Improve resilience of coastal communities	▪ Increase deep/offshore fishing fleet from 9 to 68 to improve coastal fisheries by addressing overcapacity of artisanal fishing vessels. ▪ Rehabilitate and restore mangrove forests ▪ Conserve at least 15% of coastal and marine areas, especially areas of importance for biodiversity and ecosystem services	Adaptation Addresses climate risk of on-shore fish moving into deeper waters.
7. Climate-proof coastal infrastructure	▪ Implement the greening of the Mombasa port plan that builds resilience and mitigates 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)	▪ Develop Blue Economy Master Plan to provide a blue print to guide the long-term holistic development of the Blue Economy ▪ Implement Water Act 2016 and enact relevant regulations and strategies to ensure universal access to clean drinking water ▪ Zero rate taxes for water harvesting and storage equipment ▪ Develop a water harvesting policy for institutions and households. Review by-laws that prohibit water harvesting in urban areas such as Nairobi ▪ Formulate a policy for recycled water pricing and beneficiary sectors such as construction, watering flower beds, and car washes	Enabling
Relevant Institutions: County Governments, CoG, Ministry of Water and Sanitation (MWS), MOTIHUD, National Treasury and Planning, Attorney General, Ministry of Tourism and Wildlife, Kenya Forest Service,		

KEFRI, Water Harvesting and Storage Authority, WRA, WRUA, KWTA, Kenya Maritime Authority, Kenya Ports Authority, Civil society, Private sector, Fisher organisations. All sectors identify actions to realise the strategic objective.

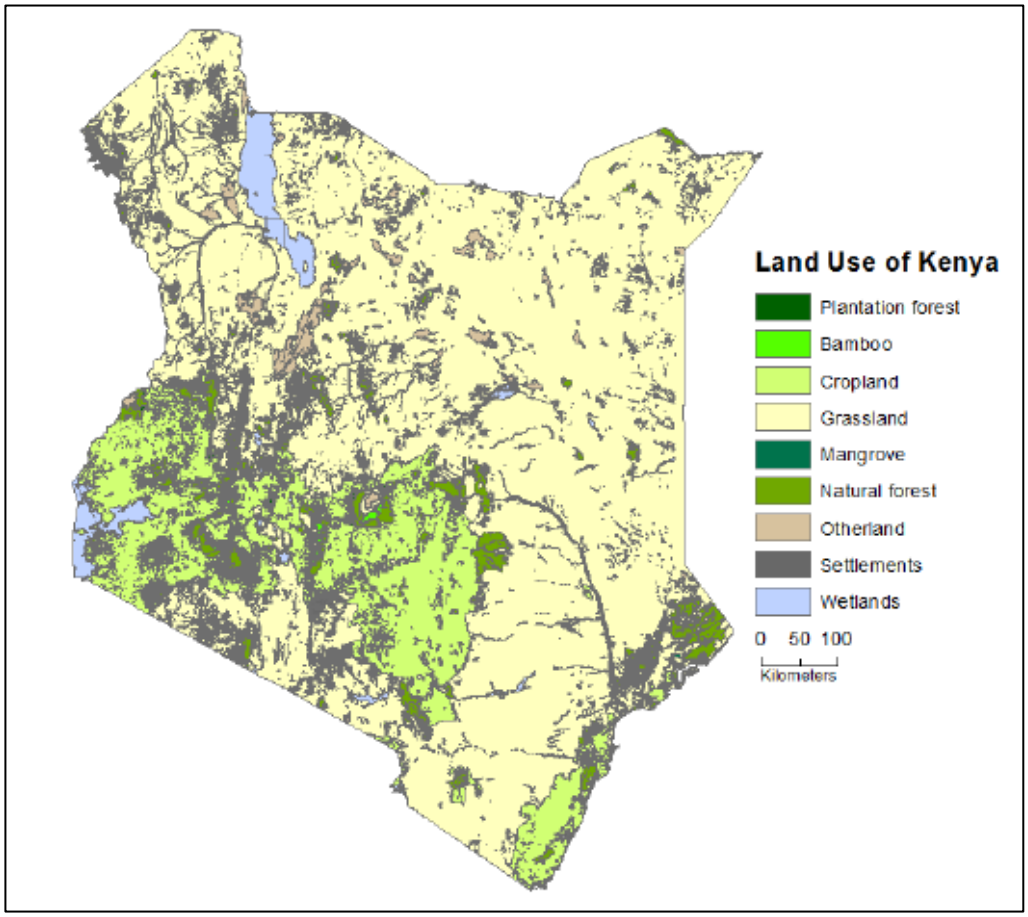
Climate Change Priority 4: Forests, Wildlife and Tourism

Sustainable and productive management of land and land resources are enshrined in Chapter 5 of the Constitution of Kenya, 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.[93] NCCAP 2018-2022 will contribute to restore, preserve, and sustainability manage forest and other ecosystems that play an essential role in Kenya's economy.

Highly valuable but fragile ecosystems

Kenya is composed of seven different agro-ecological zones (see Figure 8) consisting of 82% arid and semi-arid land (ASAL) and 18% humid to semi-humid land.[94] Several ecosystems providing various services exist across Kenya.

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).

Kenya's forest area covered 7.4% of land area in 2018[95], 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, with scattered natural forests that are small in area.[96] 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.[97] Forests offer water catchments, biodiversity and conservation functions, and are home to and provide a variety of goods that support the subsistence livelihoods of many communities, including forest resource users.[98]

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, and grazing in forests), and past governance and institutional failures in the forest sector.[99] The negative impacts that result from deforestation (such as soil erosion and increased flooding) are exacerbated by climate change.

Climate change is likely to affect the growth and development of tree species, 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.

Multiple benefits of sustainable management of forests

Actions to increase forest cover and prevent deforestation and forest degradation have important benefits for improving the livelihoods of a majority of Kenyans while enhancing the climate resilience of the country.

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. Women and forest resource users play a key role in managing forests and are crucial to integrating forest conservation activities in livelihood activities.

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 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.

Forests also provide significant carbon benefits by mitigating the harmful effects of GHG emissions by acting as "sinks" through carbon sequestration. The forestry sector is the second largest contributor to Kenya's GHG emissions after agriculture, accounting for 32% of emissions in 2015, largely due to deforestation.[100] The sector offers the greatest potential of all mitigation sectors to reduce emissions (illustrated in the green wedge in Figure 6 in Section 1.3.3). The calculation of the technical mitigation potential was based on the assumption that

Kenya's forest cover increases from 6% in 2013 to 10% by 2030, which would involve establishment and protection of forests on additional 2.4 million hectares of forest land.[101] The calculation therefore assumes that by 2030, Kenya's forests will cover 6.6 million ha against the current estimate of 4.2 million ha.

While reducing GHG emissions is critical, mitigation actions that have adaptation and sustainable development benefits are prioritised in NCCAP 2018-2022. Work is needed to measure the results and benefits of action in the forestry and land-use sector, requiring linking SLEEK with the Measurement, Reporting and Verification Plus (MRV+) system (see Enabling action M3 in Section 4). Actions in other sectors also contribute to an increase in forest cover and sustainable ecosystem management, including sustainable charcoal production (climate change priority 6) and the promotion of clean cooking (climate change priority 7).

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

- Adaptation – sustainability managed forests, increased forest cover, improved management of rangelands and grasslands, reduced coastal erosion (mangroves), and maintenance of ecosystems for wildlife and linking of protected areas.
- Mitigation – GHG emission reductions of 10.4 $MtCO_2e$ by 2023, through forest restoration, afforestation and reforestation, and reducing deforestation.
- Big Four – progress toward the achievement of food and nutrition security.
- Sustainable Development – restored and protected forests and rangelands, and their ecosystems and biodiversity; increased forest cover; improved food and water security; improved livelihoods of forest resource users; healthy wildlife populations and viable tourism operations; poverty and inequality reduction; and opportunities for timber industries and housing construction.

Strategic Objective 4: Increase forest/tree cover to 10% of total land area; rehabilitate degraded lands, including rangelands; increase resilience of wildlife.		
Issue/Problem: Unplanned development (such as agricultural expansion, settlement, and infrastructure development) and reliance on biomass for cooking leads to deforestation and forest degradation, with negative impacts on wildlife and increased GHG emissions.		
Big 4 Pillar: Food Security		
SDG 15 – Life on land; 5 – Gender Equality; 6 – Sustainable Water; 7 – Sustainable Energy; 13 – Climate Action		
National-level Indicators ▪ Forest cover as a % of total land area ▪ Area of land used for private forestry ▪ Proportion of land that is degraded over total land area ▪ Elephant deaths as a result of drought		
Actions	**Expected Results by 30th June 2023**	**Adaptation/ Mitigation**
1. Afforest and reforest degraded and deforested areas in Counties	▪ An additional 100,000 ha of land afforested or reforested (including agroforestry), aiming to plant one million trees per County per year through such initiatives as: - Annual National Tree Planting Day	Adaptation Reduces exposure by increasing surface cover

	- 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, including indigenous species) - Forest management and planning - Silviculture interventions - Promotion of agroforestry - *linked to climate change priority 1: Food and Nutrition Security* - 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* - Fast-tracking the signing and implementation of respective Transition Implementation Plans (TIPs)	Mitigation GHG emission reductions of 2.0 $MtCO_2e$ by 2023
2. Reduce deforestation and forest degradation	▪ Deforestation and forest degradation reduced through enhanced protection of additional 100,000 million ha of natural forests through such initiatives as: - Community/participatory forestry management - Limiting access to forests - Preventing disturbances through improved enforcement and monitoring - Developing alternative technologies to reduce demand for biomass (such as clean cooking and efficient charcoal production) - Carbon stock enhancement (enrichment planting) in existing forests - Financial innovations including payments through ecosystem services and carbon markets - Development of the REDD+ architecture through multi-stakeholder engagement including a national strategy and investment plan, safeguards information system, and National Forest Monitoring System and Forest Reference Level for improved forest monitoring and measurement	Adaptation Reduces exposure by increasing surface cover Mitigation GHG emission reductions of 2.0 $MtCO_2e$ by 2023
3. Restore degraded forest landscapes (ASALs and rangelands)	▪ Restoration of up to 200,000 ha of forest on degraded landscapes (ASALs, rangelands), through such initiatives as the GCF Dryland Resilience Project, including: - Enhanced natural generation of degraded lands through conservation and sustainable management - Ecosystem-based adaptation through rangeland and forest landscape restoration and sustainable management. (sites include rangelands, woodlands/forests, wetlands, and croplands). - Process to initiate restoration processes on 33% of land area in seven Counties. - Analysis of priority landscapes and existing restoration successes	Adaptation Reduces exposure by increasing surface cover Mitigation GHG emission reductions of 5.4 $MtCO_2e$ by 2023

	- Economic analysis of restoration options and identification of financing options to scale up landscape restoration	
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 areas 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. (*linked to Water and the Blue Economy)* ▪ 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, including social and environmental safeguards, for sustainable forestry management (voluntary moving to regulated) ▪ Develop guidelines and standards for establishment of green zones as required by the 2016 Forest Act. This requires linkage with county physical planning and development control functions ▪ Develop adaptation strategy for tourism sector ▪ Develop wildlife climate change strategy that includes the impacts of climate change on wildlife, human-wildlife conflict, locations suitable for harvesting flood waters and drilling of boreholes ▪ Land use planning and zoning to segregate and identify forest areas for conservation ▪ Mainstream climate change into environment audits, environmental impact assessments and strategic environmental assessments	Enabling
Enabling action (capacity development)	▪ Build the capacity of county level institutions for the efficient transfer and implementation of the devolved function with respect to community forests	Enabling
Relevant Institutions: County Governments, CoG, MEF, MAI, National Treasury and Planning, Ministry of Tourism and Wildlife, KFS, KWS, NEMA, NDMA, KEFRI, KWCA, Community Forestry Associations (CFAs), Community Institutions, Tea industry, Farmer organisations, Private sector, civil society, WRA. All sectors identify actions to realise the strategic objective.		

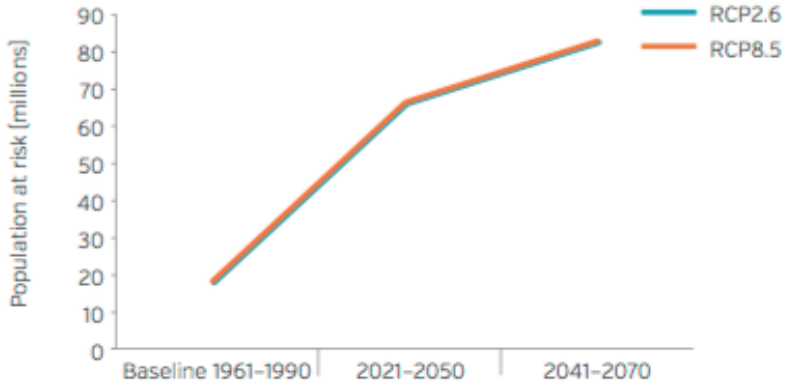
Climate Change Priority 5: Health, Sanitation and Human Settlements

Sustainable human settlements and sanitation services are essential for human health, a Big Four pillar. NCCAP 2018-2022 proposes an integrated approach to climate actions that address sustainable human settlements and health and sanitation services.

Climate-related threats to human health

The risk of malaria and other vector-borne diseases is projected to increase due to changing climate conditions (see Figure 9). 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 to 89% by 2050. In areas where malaria already occurs, transmission intensity is expected to increase along with the length of the transmission season. 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 five are the most vulnerable groups affected by malaria.[102]

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]

Climate change increases risks for human health by impacting human settlements. The cities of Nairobi, Kisumu, and Mombasa concentrate populations, economic activities and built environments, thus increasing the risk of flooding, heat waves, and other climate and other weather hazards. 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. Coastal areas are vulnerable with communities prone to flooding from sea level rise and storm surges. 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. 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.[103] 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 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 Government of Kenya's main guiding approach to waste management is the "zero waste principle" as set out in the National Solid Waste Management Strategy. Recycling, composting, waste minimisation, and industrial symbiosis are important elements of the strategy that aims to protect human health and the environment.

The waste sector contributes to climate change, accounting for about 3% of total national GHG emissions in 2015. [104] This is a very small contribution in comparison to other sectors such as agriculture, forestry, and energy.

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 and leishmaniasis, and malnutrition. More severe and frequent flooding displaces communities and increases the risks of water-borne diseases, such as cholera, dysentery, and typhoid that already affect large numbers of Kenyans.[105] Higher temperatures are projected to increase heat-related deaths in the elderly.[106] Short-lived climate pollutants, including black carbon (soot) and methane, are released through inefficient use and burning of biomass and fossil fuels. Household air pollution is a big health challenge, leading to about 21,560 deaths annually in Kenya. Women and children are particularly impacted. Exposure to household air pollution almost doubles the risk for childhood pneumonia, and women exposed to high levels of indoor smoke are more than two times as likely to suffer from chronic obstructive pulmonary disease than women who use cleaner fuels and technologies.[107]

The climate actions in the result in:

- Adaptation – reduced incidence of malaria, climate-proofed landfill sites, and flood control in urban settlements.
- Mitigation – GHG emission reductions of 0.72 $MtCO_2e$ by 2022 through mitigation actions to reduce and recycle solid waste, green buildings, and exploring options for methane capture and power generation.
- Big Four – improved health services and affordable housing.
- Sustainable Development – improved human health, reduced burden of disease for households, and greater individual productivity; improved engagement of women as community health workers; improved and sustainable waste management; more sustainable human settlements; reduced health impacts from inappropriate waste disposal and biomass cookstoves; and improved surveillance and monitoring of climate change-related diseases, including monitoring of deaths resulting from indoor air pollution.

Strategic Objective 5: Mainstream climate change adaptation into the health sector; and 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 and contribute to GHG emissions.
Big 4 Pillars: Linked to Health and Housing
SDG 3 – Good Health; 5 – Gender Equality; 6 – Clean water and sanitation; 9 – Sustainable Infrastructure; 11- Sustainable Cities; 12 – Sustainable consumption and production; 13 – Climate Action
National-level Indicators ▪ Malaria incidence per 1,000 population ▪ Percentage of urban solid waste regulatory collected and well managed ▪ Proportion of urban population living in slums, informal settlements or inadequate housing

Action	Expected Results by 30th June 2023	Adaptation/ Mitigation
1. Reduce the incidence of malaria and other vector-borne disease	▪ Scale-up community level interventions, with an emphasis on women as community health workers, on malaria control country-wide ▪ Uptake and utilisation of malaria treatment services increased in new malaria areas to reduce the incidence of malaria.	Adaptation Addresses climate risk of increases in diseases
2. Promote recycling to divert collected waste away from disposal sites.	▪ Implement a circular economy solid waste management approach in Nairobi that diverts at least 90% of collected waste away from disposal sites toward various recycling practices ▪ Explore options for methane capture and power generation at landfill sites (such as Eldoret); as well as waste incineration for energy generation	Mitigation GHG emission reductions of 0.72 $MtCO_2e$ by 2023 (recycling)
3. Climate proof landfill sites	▪ Existing dumpsites in two major urban areas screened for vulnerability to climate change and plans developed to adapt to extreme climate patterns	Adaptation Increases resilience
4. Control flooding in human settlements	▪ Flood ways (manmade channels to divert flood water) constructed in select urban centres	Adaptation Addresses climate risk of flooding caused by extreme rain events
Enabling Action (technology and capacity building)	▪ Improve the surveillance and monitoring of climate-related diseases. ▪ Track the health impacts of the transition to clean cooking (*linked to Climate Action 7*), aiming to reduce the number of household biomass related deaths from 21,560 annually (49% of total deaths) to 20%.	Enabling
Enabling action (capacity building)	▪ Strengthen the awareness of community health workers and volunteers by developing materials on climate-related health risks, including disaster risk management and the impacts on women, children and persons with disabilities	Enabling

Enabling Action (policy and regulation)	▪ Develop five County-based waste management plans and regulations that are consistent with the National Waste Management Strategy and other relevant policies ▪ Develop and implement a national resettlement policy framework that sets out safeguard mechanisms against involuntary resettlement and forced evictions from homes when land is acquired for development projects. Implement alternative approaches to land acquisition, other than compulsory acquisition, where possible. ▪ Develop policy for green building, and green building codes and regulations that account for climate information ▪ Develop national framework for waste water management ▪ 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), MOTIHUD, MEF, Ministry of Health, MOE, NEMA, National Construction Authority, Kenya Institute of Highways and Building Technology, Private Sector, Civil society, Youth organizations, Women's Groups. All sectors identify actions to realise the strategic objective.		

Climate Change Priority 6: Manufacturing

Climate change could prevent the Big Four goal of increasing manufacturing to 15% of GDP by 2022. NCCAP 2018-2022 supports the manufacturing sector by reducing the impacts of climate change on its activities, and creating new economic and market opportunities.

Climate change impact on manufacturing

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.[108]

Win-win solutions for climate-resilience, low-carbon impact, greater productivity and competitiveness

Climate actions to promote a green manufacturing sector focus on resource efficiency and sustainable production and managing waste as a resource to create new product lines from waste recovery and re-use. 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.[109]

The climate actions focus on improving energy and resource efficiency, including energy efficiency in the industrial sector and reducing emissions from industrial processes. A priority is charcoal production that 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 Climate Change Priority 4 – Forestry, wildlife and tourism. Actions to formalise the charcoal sector can draw on the innovation of youth and create roles for women in the value chain process.

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).[110] Some of the actions will be implemented under existing programmes, such as the Kenya Association of Manufacturers (KAM) Centre for Energy Efficiency and Conservation; and will complement programmes such as the Kenya National Cleaner Production Centre's SWITCH Africa Green-Industrial Symbiosis Project, and the Green Growth and Employment Programme.

These climate actions result in:

- Adaptation – improved water use efficiency and industrial symbiosis.
- Mitigation – GHG emission reductions of 0.45 $MtCO_2e$ by 2022 through sustainable charcoal production, industrial energy efficiency, and industrial symbiosis.
- Big Four – progress toward the achievement of the goals of the manufacturing pillar.
- Sustainable Development – promotion of sustainable production and green industries; renewable energy; greater energy and water efficiency; improved manufacturing productivity; reduced deforestation and forest degradation; development of green industries and jobs; promotion of innovation for youth and women.

Strategic Objective 6: Promote energy and resource efficiency in the manufacturing sector		
Issue/Problem: Resource (including water, electricity, and other inputs) scarcity because of climate change; and inefficient energy use in the manufacturing sector (such as charcoal production and cement production) increases GHG emissions		
Big 4 Pillar: Manufacturing		
SDG 9 – Industry, innovation and infrastructure; 1 – Zero poverty; 3 – Good health; 5 – Gender equality; 6 – Clean water and sanitation; 7 – Affordable and clean energy; 10 – Reduce inequalities; 12 - Responsible consumption and production; 13 – Climate action; 15 – Life on land		
National-level indicators ▪ GHG emission reduction through adoption of energy efficiency and energy conservation practices ▪ Number of industrial parks adopting waste diversion practices		
Action	**Expected Results by 30th June 2023**	**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 five more appliances, and existing testing facilities up-scaled to include these five appliances	Mitigation GHG emission reductions of 0.45 $MtCO_2e$ by 2022 (energy efficiency)

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 water scarcity caused by increased temperature and changing precipitation patterns
3. Optimise manufacturing and production processes	▪ Promote optimisation of manufacturing processes ▪ Promote a sustainable charcoal system by encouraging the uptake of efficient kiln technologies to increase yields to 30-42%, and establishing a charcoal certification and labelling scheme	Mitigation
4. Promote industrial symbiosis in industrial zones	▪ Scale-up of industrial symbiosis and environmentally sound technologies and practices in existing and upcoming Industrial Zones in Nairobi, Machakos, Mombasa, Kilifi, and Kwale Counties through waste diversion and energy and transport efficiency measures that will contribute to avoided GHG emissions and GHG emission reductions	Adaptation Addresses climate risk: Mitigation
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 (linked to Enabling Action T4) ▪ Awareness raising to promote resource efficiency with the private sector	Enabling
Enabling (policy and regulatory)	▪ Enhance application of special economic zones legislation; and planning laws that encourage clustering of industries into zones to enhance symbiosis and increase shared industrial efficiency measures ▪ Review and enhance regulatory framework governing treatment and management of industrial (trade) effluent to encourage waste water recycling, including through industrial symbiosis	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), NEMA, KIRDI, Private sector, Charcoal producers, Academia, Civil society, Youth organizations. All sectors identify actions to realise the strategic objective.		

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.

Major impact of climate change on the energy and transport sectors

Climate change, including temperature increase, sea level rise, and a greater number and severity of extreme weather events – such as heavy rains resulting in floods – damages 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.[111] 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 energy 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 maximise 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 achieve Kenya's mitigation NDC. Kenya's energy sector 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 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.[112]

Strong opportunities for transforming the energy and transport sectors

The implementation of NCCAP 2018-2022 can drive major transformations in the energy and transport systems of Kenya, which will support the achievement of the Big Four Agenda and provide strong benefits for poverty reduction and sustainable development.

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%.[113] An estimated 6.7 million households comprised the off-grid and decentralized electricity market in 2013.[114] 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 (SGR) 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 energy and GHG emissions savings, and health and cost-saving benefits compared to the business-as-usual incremental improvements. Clean cooking is an opportunity for investment in innovation and technology development in the biomass energy sub-sector. 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 liquefied petroleum gas (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. About 70% of Kenyans rely on biomass (fuel wood and charcoal) energy for cooking, which is a main driver of deforestation and forest degradation.[115] The use of biomass fuels for cooking is a pressing health, social, and environmental problem. About 21,560 Kenyans die every year from health conditions that can be traced back to indoor air pollution.[116] Use of LPG to replace charcoal can reduce 55 deaths per year per 25,000 households and save up to 30 trees per household each year.[117] 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.[118]

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 are 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 9.2 $MtCO_2e$ by 2022 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 7.1 $MtCO_2e$ by 2022, through uptake of alternative fuels and efficient cookstoves.
  - Transport - GHG emission reductions of 1.82 $MtCO_2e$ by 2022 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 – sustainable and renewable energy; new business opportunities for clean energy and transport sectors; reduced deforestation, forest degradation and stress on forests; protection of water catchment areas; and 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 promotes 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 industrialising nation. 70% 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; 8 – Sustainable growth; 9 – Resilient infrastructure; 11 – Sustainable cities; 13 – Climate action, 15 – Sustainable forests		
National-level Indicators: ▪ Renewable energy share in the total electricity generation mix - % ▪ Households using biomass for energy - % ▪ Proportion of households using LPG - % ▪ Freight moved by rail - %		
Outcome	**Actions and Expected Results by 30th June 2023**	**Adaptation/ Mitigation**
1. Increase renewable energy for electricity generation that is climate resilient and accounts for needs of rural areas	▪ 2,405 MW of new renewables developed, to include: - Geothermal – prioritised as baseload generation that is climate resilient - Biomass / Co-generation - Hydro - Solar - Wind	Mitigation GHG emission reductions of 9.2 $MtCO_2e$ 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, such as direct use of geothermal resources to power various industrial applications such as boilers and dryers	Mitigation
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
4. Climate proof energy infrastructure	▪ Concrete poles replace wooden poles ▪ Existing hydropower plants optimised, and water management and conservation improved	Adaptation

	▪ Conserve and rehabilitate 1000 ha of water catchment areas by protecting water catchment areas feeding the hydro-power dams. *Linked to climate change priority 3 – Forestry, wildlife and tourism*	Increases resilience of the energy system
5. Promote the transition to clean cooking with alternative fuels, such as LPG, ethanol and other clean fuels in urban areas	▪ 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 *Actions 5 and 6 linked to Climate change priority 3 – Forestry, wildlife and tourism; Climate change priority 5 – Health, sanitation and human settlements; and Climate change priority 6 – Manufacturing*	Mitigation GHG emission reductions of 0.8 $MtCO_2e$ 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, through tax-relief incentives for manufacturers, and training and loans for local service providers - 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 6.3 $MtCO_2e$ 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	Enabling

	▪ Train *jua kali* artisans to produce improved cookstoves, working with civil society organisations ▪ 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 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 and Planning, MoH, CCD, KFS, Attorney General, CoG, Country Governments, Energy Regulatory Commission (ERC), Kenya Power, Kenya Electricity Generating Company (KenGen), Geothermal Development Corporation (GDC), Kenya Power, Rural Electrification Authority (REA), Kenya Electricity Transmission Company (KETRACO), KIRDI, Correctional Services, Kenya Climate Innovation Centre (KCIC), Micro-finance institutions, Private sector, Civil society, Women's Groups, Youth Groups. All sectors identify actions to realise the strategic objective.		

Strategic Objective 7b: Establish efficient, sustainable world-class transport 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, 1 – Zero poverty; 3 – Health, 7 – Sustainable cities and communities, 10 – Reduced inequality; 12 – Sustainable consumption and production; 13 – Climate action		
National-level Indicator: ▪ Freight moved by rail (from road) - %		
Action	**Expected Results by 30th June 2023**	**Adaptation / Mitigation**
1. Develop an affordable, safe and efficient public transport	▪ 13 km 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 ▪ 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	Mitigation GHG emission reductions of 0.44 $MtCO_2e$ by 2022 (BRT)
2. Reduce fuel consumption and fuel overhead costs	▪ SGR (Nairobi to Mombasa) electrified ▪ 30% of freight from Mombasa to Nairobi shifted from road to rail. ▪ Roadmap for the improvement of heavy-duty truck efficiency developed, including increased use of low-rolling	Mitigation GHG emission reductions of 0.24 $MtCO_2e$ by 2022 (SGR)

	resistance tyres, super structure fittings etc., vehicle standards. ▪ Light-duty vehicle fuel economy improved through labelling, promotion of fuel efficient driving, improved traffic management	GHG emission reductions of 0.82 $MtCO_2e$ by 2022(freight) GHG emission reductions of 0.32 $MtCO_2e$ by 2030 (trucks)
3. Encourage low-carbon technologies in the aviation and maritime sectors	▪ Install shore power infrastructure for four berths to provide power to ships while at berth instead of using their engines ▪ Purchase 2 new aircraft (B787) which have fuel efficient engines ▪ Implement Service Charter on Sustainable Aviation Fuels (certification and use of biodiesel production for captive use at the airports) by 2020 ▪ Install and commission 0.5 MW solar power plant at Moi International Airport by 2018	Mitigation
4. 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 undertaken ▪ Climate proof 4,500 km of roads	Adaptation Addresses climate risk of damage to infrastructure from extreme weather events
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 (capacity development)	▪ Build awareness on fuel economy and electric mobility options, including exploring infrastructure needs for electric mobility	Enabling
Enabling (policy and regulation)	▪ Review and implement the Integrated National Transport Policy (2021) ▪ Domesticate and implement international standards on aviation (ICAO Annex 16 Vol 4) by 2021 and maritime (MARPOL Annex VI) by 2020 ▪ Develop and implement standards for electric cars and two-wheelers by 2019 ▪ Develop standards for climate proofing transport infrastructure ▪ 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: MOTIHUD, Ministry of Energy, 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), ERC, 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. All sectors identify actions to realise the strategic objective.		

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 10). County Governments are the main implementing agents of many climate actions set out in Section 3.2, and implement the actions in a locally-appropriate manner that accounts for the unique needs of their populations. The County Governments play a critical role in such areas as:

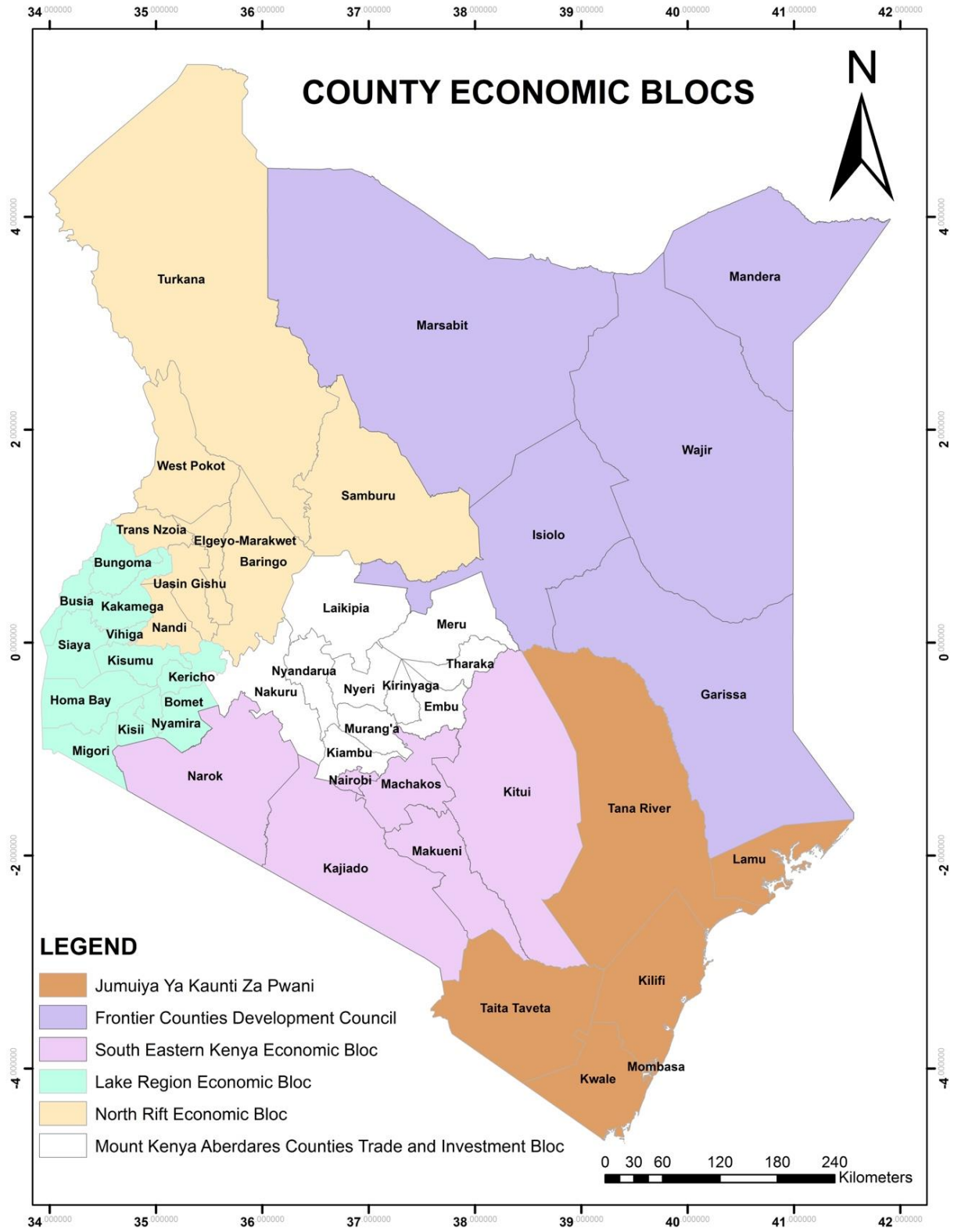
1. Disaster Risk Management – Response measures to address drought, floods, and other climate-driven disasters.
2. Food and Nutrition Security – Agriculture, including crop and animal husbandry; livestock sale yards; county abattoirs; plant and animal disease control; and fisheries.
3. Water and the Blue Economy – Water management, and implementation of national government policies on water conservation.
4. Forestry, Wildlife and Tourism – Implementation of the natural resource and environmental conservation policies, and management of community and private forests.
5. Health, Sanitation and Human Settlements – County health facilities and promotion of primary health care; refuse removal, refuse dumps and solid waste disposal; housing; and storm water management systems.
6. Manufacturing – Planning and development.
7. Energy and Transport – Electricity and gas reticulation, energy regulation, and county transport.

The Climate Change Act, 2106 requires that County Governments mainstream climate change actions and interventions in the CIDPs, taking into account National and County priorities. In 2013, all 47 CIDPs mentioned the impacts of climate change and many identified 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 negatively impacted economic activities, leading to reduced food and livestock production, scarcity of potable water, increased spread of diseases, and increased conflict (human/human and human/wildlife).[119]

The impacts of and responses to climate change vary across the Counties as noted during consultations with the six County Economic Blocs. The Counties in each of the Economic Blocs consulted during the development of NCCAP 2018-2022 are listed below:

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

Figure 10: Kenya – County Economic Blocs



Source: Muhanji, S. (2018), derived from Geographic Information Service (GIS).

- 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: droughts and floods. Other impacts of climate change identified by the Counties are listed in Box 10 below.

Box 10: 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
- 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 and biogas and LPG alternatives). 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 included 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 vulnerable groups in society, including women, youth, and marginalised and minority communities. 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 fisher communities that are the backbone of coastal communities.

A summary of priority climate change actions identified in the county consultations is provided in Table 7. A full description of the climate actions submitted by the County Economic Blocs can be found in the reports of the County consultations available at: http:// http://www.kcckp.go.ke.

Table 7: Adaptation, mitigation and enabling issues identified by County Economic Blocs

<table>
<tr><th>Adaptation</th><th>Adaptation/Mitigation</th></tr>
<tr><td>Drought
Establishment of early warning systems
Livelihoods diversification
Flood water harvesting
Food and nutritional supplements (such as school feeding programmes)</td><td rowspan="2">Forestry
Afforestation, reforestation, tree planting
Agroforestry
Reducing deforestation and forest degradation
Establishment of tree nurseries
School tree planting programs/ National and County tree planting days
Planned grazing and management of rangelands
Commercial wood lots
Promote non-timber forest products
Introduction of new tree species
Introduction of fast-growing trees for charcoal production
Farmer-managed natural regeneration</td></tr>
<tr><td>Flooding
Establishment of early warning systems
Protection of riparian areas along rivers Strategic placement of dams / dykes
Drainage systems for storm waters / storm water harvesting
Insurance systems</td></tr>
<tr><td rowspan="4">Food security
Crops
Farm forestry / agroforestry
Drought tolerant crops
Climate smart agriculture
Establishment of irrigation systems, such as construction of dams for irrigation and up-scaling drip irrigation
Improved agricultural extension services
Soil and water conservation / conservation agriculture
Water efficient technologies
Crop diversification
Climate information services for farmers
Urban agriculture
Promotion of non-rain agricultural practices (greenhouse farming)
Livestock
Proper management of pasture lands / controlled grazing
Fodder banks
Drought-resistant breeds
Adoption of new animal husbandry techniques
Livestock insurance
Fisheries
Fish harvesting</td><td>Mitigation</td></tr>
<tr><td>Manufacturing
Regulations and laws for charcoal production
Promotion of the briquette industry</td></tr>
<tr><td>Energy
Renewable/green energy (wind, solar, biogas)
Promotion of efficient cookstoves
Transport
Legal and policy instruments to promote high efficiency vehicles</td></tr>
<tr><td>Waste management
Waste to energy
Proper waste management – including recycling</td></tr>
<tr><td></td><td>Enabling</td></tr>
<tr><td></td><td>Education
Enhance community awareness
Increase accessibility to learning materials and tools
Improve network reception
Synchronize school calendar with weather-related events</td></tr>
</table>

▪ Fish farming ▪ Controlled mangrove harvesting ▪ Research of coral bleaching ▪ Protect fish breeding sites	**Disaster management** ▪ Establish disaster response unit ▪ Establish disaster management fund / recovery "kitty" for post-drought and post-flood
Water ▪ Water harvesting ▪ Dams, boreholes and water pans ▪ Spring / water catchment protection ▪ Water storage ▪ Water treatment ▪ Capture of water run-off on roads ▪ Management of ground waters	**Human settlements** Proper planning of towns / county spatial planning / land use planning **Human-wildlife conflict** ▪ Community sensitization, provision of water in national parks
Ecosystem degradation ▪ Restore water catchment areas ▪ Soil conservation and erosion control (terracing, gabions) ▪ Promote conservation of natural resources ▪ Protection of wetlands ▪ Rehabilitate degraded rivers **Infrastructure** ▪ Climate proof infrastructure – concrete poles, bridges and dykes, roads ▪ Construct raised ports and jetties	**Conflict Resolution** ▪ Strengthening of conflict resolution mechanisms **Climate monitoring and information** ▪ Weather monitoring infrastructure **Climate change regulatory framework** ▪ Establish institutional and legal frameworks for climate change ▪ Establish climate change fund / ward development funds to address local problems
Health ▪ Vaccination / immunization campaigns ▪ Disease surveillance and reporting ▪ Mosquito nets ▪ Promote family planning	

Chapter 4: Delivering the Action Plan

4.1 Enablers

A range of crosscutting enabling actions are required to implement the adaptation and mitigation actions set out in the seven priority climate change areas described in Chapter 3. These enabling actions equip government and stakeholders with the finance, knowledge, skills and technologies needed to deliver and report on adaptation and mitigation actions.

The crosscutting enabling actions described in this section include:

- Enabling policy and regulatory framework;
- Capacity development and knowledge management;
- Technology and innovation;
- Climate finance and resource mobilisation; and
- Measuring climate results.

This section provides brief descriptions of the priority enabling actions to be completed from 1st July 2018 to 30th June 2023. The descriptions note if the actions are continued from NCCAP 2013-2017, identify the relevant institutions, and set out process indicators to measure progress and achievements.

4.1.1 Enabling Policy and Regulatory Framework

The process of developing a comprehensive policy and regulatory framework for climate change is well underway in Kenya, as demonstrated by the Climate Change Act, 2016, and National Climate Change Policy, 2018. A key element of the Climate Change Act is the requirement for various regulations to provide further interpretation of certain provisions, and to support operationalisation of the administrative aspects of the Act such as reporting requirements. At the County level, support is needed to develop appropriate legislation, including climate fund regulations, that are informed by the local context, aligned to county systems, and conform to national public finance policies and laws. This legal and policy framework will guide development and utilisation of County Climate Change Funds and enable climate finance to address County-specific local issues. The two enabling actions are described below in Table 8.

Table 8: Priority enabling actions – Enabling Policy and Regulatory Framework

	Enabling Actions	Coordinating Institution and Relevant Partners	Expected Results (Process Indicator)
P1	Prioritise, develop and implement the needed regulations to effectively implement the Climate Change Act, 2016 through a multi-stakeholder process that includes women, youth and marginalised and minority groups.	CCD National Treasury and Planning	**By 30th December 2020** – Assessment of needed regulations complete. **By 30th June 2023** – Two

	(Action continues from NCCAP 2013-2017: Enabling Policy and Legal Framework 5)	Office of Attorney General	regulations developed and operationalised.
P2	Support alignment of County legislation to the Climate Change Act, 2016. Assist County Governments to develop County climate change fund regulations that are linked to the National Climate Change Fund, building on the examples of Makueni, Wajir, Garissa, Isiolo and Kitui.	CCD National Treasury and Planning CoG Country Governments	**By 30th December 2020** – Five County Governments have developed climate change fund regulations. **By 30th June 2023** – An additional ten County Governments have developed climate change fund regulations.

4.1.2 Capacity Development and Knowledge Management

Knowledge management refers to the organisation and sharing of climate change knowledge. Capacity development is defined by the UNFCCC as enhancing the capacity and ability of countries to take effective climate change action.[120] The priority capacity development actions (see Table 9) emphasise establishing the engendered coordination structures for the CCD to effectively implement the Climate Change Act, 2016 and National Climate Change Policy and deliver on Kenya's NDC. The actions will also build the capacity of climate change units in state departments, and assist NEMA to incorporate climate change in environmental assessments and develop its enforcement role.

Building the capacity of County Governments will be a priority. This action will include building the capacity of County Executive Committee (CEC) members responsible for climate change and officials assigned to the climate change units in County. This will include support to report on climate change, to enhance the implementation of public finance management in relation to climate finance, and to develop policies and frameworks linked to the Climate Change Act, Climate Change Policy, and Climate Finance Policy.

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 KMD headquarters, is a national facility complete with a library, amphitheatre and training facilities; and is open for public use.

The integration of climate change in education curriculum, the development of a gender and inter-generational awareness plan, and the development of a public awareness and engagement strategy are priority actions required under the Climate Change Act, 2016.

Table 9: Priority enabling actions - Capacity Development and Knowledge Management

	Enabling Actions	Coordinating Institution and Relevant Partners	Expected Results (Process Indicator)
C1	Operate a publicly 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 platforms for children, youth, women, and marginalised and minority communities. Use *Knowledge Harvesting* techniques to capture and share climate change information, including information on local Traditional Knowledge, especially from women and the elderly. *(Action continues from NCCAP 2013-2017: Knowledge Management and Capacity Development 1, 2, and 5)*	CCD	**By 30th December 2020** – Business plan for NCCRC developed. **By 30th June 2023** – NCCRC refitted to enable access for people with disabilities.
C2	Establish Community Education, Business and Information Centres in select Counties, building on the model established in Samburu County, to improve access to information and reduce climate vulnerability. The Centres will be managed by engendered local management committees. The Centres will provide focused services for women, youth and minority and marginalised groups.	CCD CoG Country Governments	**By 30th December 2020** – Samburu Community, Education, Business and Information Centre established. **By 30th June 2023** – Two additional Community, Education, Business and Information Centres established.
C3	Strengthen the capacity of National Government institutions to implement the Climate Change Act, including: - Training of staff of climate change units on reporting, climate finance. - Support to National Climate Change Council - Training on the climate change-gender nexus - Support to CCD for its coordination role. *(Action continues from NCCAP 2013-2017: Knowledge Management and Capacity Development 3 and 4, and Enabling Policy and Legal Framework 5.)*	CCD National Treasury and Planning and Planning State Departments	**By 30th December 2020** – Climate change is mainstreamed in MTP sector plans. **By 30th June 2023** – All state departments providing annual reports with gender-disaggregated information.
C4	Build the capacity of County Governments, including: - Strengthening of engendered Climate Change Coordination Units. - Setting up functional Climate Change Units, gazettement of engendered County Environment Committees and other supportive structures. - Coordination of climate change programmes across Counties.	CCD National Treasury and Planning CoG County Governments	**By 30th December 2020** – Five County Governments reporting on a pilot basis. **By 30th June 2023** – All County Governments providing annual reports on climate change with gender-disaggregated information.

	- Mobilisation and tracking of climate finance using gender-disaggregated data, including allocations through County Climate Change Funds. - Monitoring and reporting on the impact of climate change programmes.		
C5	Strengthen the capacity to NEMA to implement the Climate Change Act, including integrating climate change in impact assessments and GHG emissions control, regulation, and enforcement.	NEMA CCD	**By 30th December 2020** – Climate change integrated in impact assessment guidelines. **By 30th June 2023** – Role of NEMA in compliance and enforcement defined and capacity built.
C6	Build the capacity of stakeholders, including - Vulnerable groups, including women, youth, persons with disabilities and marginalised and minority communities, to participate in, attract funding for, and report on climate change actions. - Private sector and civil society to implement and report on climate actions.	CCD County Governments	**By 30th December 2020** – Ten awareness sessions held. **By 30th June 2023** – Twenty awareness sessions held.
C7	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. Engage women and youth in the development of the plan.	CCD National Gender and Equality Commission	**By 30th December 2020** – National gender and inter-generational plan delivered to the Council. **By 2022** – Gender integration guidelines and training toolkits developed. Twenty institutions sensitised on integration of gender into NDC planning and implementation.
C8	Develop and operationalise a public awareness and engagement strategy that highlights outreach to politicians and media; and engagement of vulnerable groups, including women, older members of society, children, youth, persons with disabilities, and members of minority and marginalised communities.	CCD	**By 30th December 2020** – Public awareness and engagement strategy delivered to the Council. **By 30th June 2023** – Strategy operationalised at National and County level.
C9	Develop a national vulnerability assessment to identify and prioritise adaptation actions. To include identification and compilation of existing vulnerability assessment at the National and County levels.	CCD	**By 30th December 2020** – National vulnerability assessment developed. **By 30th June 2023** – National vulnerability assessment informs updating of NCCAP.
C10	Integrate climate change in the education system, emphasising integration in existing curriculum for lower secondary grades 7, 8 and 9. *(Action continues from NCCAP 2013-2017 – Knowledge Management and Capacity Development 6.)*	Ministry of Education Kenya Institute of Curriculum Development CCD	**By 30th December 2020** – Draft climate change curriculum developed and piloted for lower secondary grades. **By 30th June 2023** – Climate change curriculum introduced for lower secondary grades.

4.1.3 Technology and Innovation

The technology and innovation actions are important enablers of success for the adaptation and mitigation actions described in Chapter 3. An overall objective is to support the sectors to promote appropriate technologies to deliver adaptation and mitigation actions, such as water harvesting, climate information services, and clean cooking technologies. Technology development and transfer is defined by the IPCC as a broad set of processes 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, civil society, and academia.[121]

Technology and innovation enabling actions (see Table 10) include building the capacity of KIRDI to deliver on its role as the National Designated Entity (NDE) for the Climate Technology Centre and Network (CTCN) under the UNFCCC. Other research institutions will be supported to promote climate innovation role, including the Kenya Agriculture and Livestock Research Organization (KALRO), Kenya Forestry Research Institute (KEFRI), and Kenya Marine and Fisheries Research Institute (KMFRI).

The enabling actions promote the role of the private sector in developing and disseminating adaptation and mitigation technologies to deliver the priority climate actions. The development and deployment of locally-relevant climate change technologies will be supported through the provision of incubation and capacity building services and financing to Kenyan entrepreneurs. The promotion of sustainable production and consumption will help the private sector achieve resource efficiency and move toward industrial symbiosis. 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 100% duty remission for inputs and raw materials for assembly of clean energy cooking stoves imported by local manufacturers introduced in the 2018/19 budget statement.[122]

Another priority is to assist KMD to improve provision of Climate Information Services (CIS), which includes immediate and short-term weather forecasts and advisories. Climate information is important for farmers to manage risk, for planning standards and regulations, and for assessing climate change risks in environmental assessments. Climate information is a critical element of early warning systems that help communities, especially vulnerable groups, cope with extreme weather events like droughts and floods.

Table 10: Priority enabling actions - Technology and Innovation

	Enabling Actions	Coordinating Institutions and Relevant Partners	Expected Results (Process Indicators)
T1	Improve the capacity of KIRDI to coordinate the activities and services that it delivers as the NDE for the CTCN, the operational arm of the UNFCCC Technology Mechanism. This includes the promotion, upscaling and dissemination of endogenous technologies that meet the needs of women and marginalised groups. Endogenous technologies are based on locally available knowledge and cultures, and ensure that external resources fit the local conditions.	KIRDI KALRO KEFRI CCD Academia Research institutions Private sector	**By 30th December 2020** – Request to CTCN for technical assistance on gender-responsive climate technologies is approved for KES 25 million. **By 30th June 2023** – Information on five endogenous climate technologies disseminated to stakeholders.
T2	Provide Climate Information Services (CIS) – including information to help farmers manage risk and to inform early warning systems, to inform decision making for organisations, businesses and households.	KMD CCD CoG County Governments Private sector	**By 30th December 2020** – 24 County Climate Information Service Plans developed. **By 30th June 2023** – at least 100 clients (organisations, businesses and households) access CIS provided by KMD.
T3	Establish a Sustainable Consumption and Production Networking facility for Micro, Small and Medium Enterprises (MSME), with an emphasis on women and youth.	CCD Private sector Youth organizations Women's groups	**By 30th December 2020** – 50 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 10%.
T4	Promote gender-responsive climate technologies and innovation in the private sector through the provision of financing, capacity building and start-up/scale-up services. Encourage youth innovation through outreach programmes with schools, universities and youth organisations.	CCD Netfund Private sector	**By 30th December 2020** – 10 clients, half being women and youth, are supported to commercialise their clean technology businesses. **By 30th June 2023** – Clean technology businesses reach 1,000 customers.
T5	Identify policy and fiscal incentives to promote the uptake of climate-friendly technology (such as tax incentives, reduced-energy tariffs, low-interest loans, public-private partnerships). *Action continues from NCCAP 2013-2017: Finance 7.*	National Treasury and Planning CCD CoG Other State Departments and Agencies Private sector	**By 30th December 2020** – Options identified and analysed, including development of baseline information and expected climate results. **By 30th June 2023** – Two policies and fiscal incentives launched.

4.1.4 Climate Finance and Resource Mobilisation

The priority climate finance and resource mobilisation actions set out in Table 11 implement the National Climate Finance Policy, 2018. The actions emphasise designing and launching 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 operationalisation 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 Garissa, Makueni and Wajir Counties, and were in the planning and design stages in many other Counties.

Building the capacity of The National Treasury and Planning as the National Designated Authority (NDA) to the Green Climate Fund (GCF) is a priority action. Capacity is needed to track and report on sources, applications, and impacts of climate finance. Climate finance includes all finance that targets low-carbon or climate-resilient development; and includes domestic budget allocations, public grants and loans from bilateral and multilateral agencies, and private sector investment. Important sources of international climate finance for Kenya include the GCF and the Global Environment Facility (GEF), which are the entities entrusted with the operation of the Financial Mechanism of the UNFCCC. Other mechanisms under the UNFCCC include the Special Climate Change Fund, Adaptation Fund, and REDD+ mechanism.

Tracking of and reporting on climate finance will include an alignment of climate finance (tracked by National Treasury and Planning) and adaptation and mitigation results (tracked by CCD). This will improve analysis, including identifying actions that provide value for money, determining how much climate finance reaches those most in need (such as women, youth and marginalised and minority communities), and the climate impact of that finance.

The National Treasury and Planning 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.

The capacity of the private sector to access climate finance will be built, recognising the critical role of private sector investment in implementing the priority climate actions in Chapter 3. This includes developing bankable projects and accessing funding through Green Bonds. The National Treasury and Planning 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 and to benefit from results-based payment mechanisms. This action will support engaging in the development of new market mechanisms under the UNFCCC, developing clarity on the treatment of emission reductions in Kenya created through climate finance and investment, 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 11: Priority enabling actions - Climate Finance and Resource Mobilisation

	Enabling Actions	Coordinating Institution and Relevant Partners	Expected Results (Process Indicator)
F1	Operationalise 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 capitalising the fund through GCF, development partner, and other contributions. *(continued from NCCAP 2013-2017 – Finance 1.)*	National Treasury and Planning Office of the Attorney General	**By 30th December 2020** – Fund is operationalised, including establishment of secretariat and management board as set out in the Climate Fund regulations. **By 30th June 2023** – 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 mobilise and manage climate finance, including the management of, access to, and tracking of international climate finance; and development of funding proposals. Build the capacity of national institutions to gain accreditation for international finance mechanisms and to develop bankable proposals. Develop a climate finance resource mobilisation strategy (including domestic allocations, international climate finance, access to carbon credits and markets, allocations from the private sector, and Public-Private Partnerships for climate-friendly investments). *(continued from NCCAP 2013-2017 – Finance 1.)*	National Treasury and Planning and Planning NEMA State Departments County Governments	**By 30th December 2020** – Climate resource mobilisation strategy developed. **By 30th June 2023** – Climate resource mobilisation strategy cascaded to the Counties (five Counties have developed strategies).
F3	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 development partners. *(continued from NCCAP 2013-2017 – Finance 2 and 3.)*	National Treasury and Planning CCD State Departments County Governments	**By 30th December 2020** – Climate finance tracking system established at the national level. **By 30th June 2023** – Climate finance tracking system reporting on domestic and international climate finance flows.
F4	Build the capacity of private sector and civil society to develop bankable projects and build the in-house capacity of financial institutions to assess climate risk and develop climate-related schemes.	National Treasury and Planning CCD Private sector	**By 2022** – Three financial institutions have developed climate-related lending schemes.
F5	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 and Planning	**By 30th December 2020** – Pilot the issuance of two green bonds. **By 30th June 2023** – Assessment of the green bonds' impact on climate

			change.
F6	Participate in the design and implementation of market-based mechanisms; promote investor confidence and participation in market-based and results-based mechanisms; 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 and Planning CCD NEMA CoG KenGen GDC KFS Private sector	**By 30th December 2020** – Submission to UNFCCC on market-based mechanisms. **By 30th June 2023** – Unit established to promote projects responsible for generating carbon credits.
F7	Update the Climate Public Expenditure and Budget Review (CPEBR).	National Treasury and Planning CCD State Departments County Governments	**By 30th December 2020** – Updated CPEBR complete. **By 30th June 2023** – Implementation of recommendations of CPEBR.

4.1.5 Transparency: Measurement, Reporting and Verification Plus (MRV+)

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

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

Kenya's transparency framework is based on the measurement, reporting and verification plus (MRV+) system defined in NCCAP 2013-2017 as "an integrated framework for measuring, monitoring, evaluating, verifying and reporting results of mitigation actions, adaptation actions and the synergies between them."[123]

The MRV+ system includes MRV of emissions and removals of greenhouse gases for mitigation actions (see Table 12). Kenya reports to the UNFCCC through National Communications and Biennial Update Reports, which include GHG inventories in the agriculture; energy (including transport); land use, land-use change and forestry (LULUCF); industrial processes; and waste sectors.

Adaptation actions are tracked through a Monitoring and Evaluation (M&E) system. Currently, there are no agreed adaptation indicators at the international level. Kenya made progress under NCCAP 2013-2017 and the NAP to identify relevant and appropriate indicators to track progress on adaptation and building resilience.

The MRV+ system generates information for national and international reporting requirements. 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 will be developed in a phased approach over 2018-2022. Initial action will improve the measurement of adaptation outcomes including the identification of indicators to measure climate-related impacts and the collection of baseline data. The mitigation actions include the establishment of an appropriate process to collect, collate and analyse GHG emissions; and improvements to and embedding of the SLEEK process. 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 GEF, and support for the third GHG inventory from the UN Environment Programme and the Low Emission Climate Resilient Development (LECRD) project managed by UNDP and funded by the United States Agency for International Development.

Table 12: Priority enabling actions: MRV+

	Enabling Actions	Coordinating Institution and Relevant Partners	Expected Results (Process Indicators)
M1	Establish the monitoring and evaluation (M&E) component of the MRV+ system to report on adaptation actions and benefits, including identification and measurement of adaptation indicators (including collection of baseline information and development of gender-disaggregated data and gender indicators). *(continued from NCCAP 2012-2017: NPBM 1,2,3,4, 6, 7, 8)*	CCD KNBS County Governments State Departments National Gender and Equality Commission	**By 30th December 2020** – Climate registry for adaptation actions established, with information publically available. **By 30th June 2023** – Adaptation M&E system fully functional, setting out institutional structures and role of stakeholders in reporting.
M2	Establish a functional system to develop Kenya's GHG inventory and an MRV system for tracking mitigation for NDC reporting. Strengthen capacity for carbon management and verification. *(continued from NCCAP 2013-2017: NPBM 5)*	CCD NEMA SLEEK KNBS State Departments	**By 30th December 2020** – Third National Communication submitted, including third National GHG Inventory. **By 30th June 2023** – CCD has established systems to collate, track, analyse, and report on GHG data, including climate registry for mitigation actions.
M3	Establish a system to track and report on land-based emissions using through the	CCD	**By 30th December 2020** – Six working groups under SLEEK

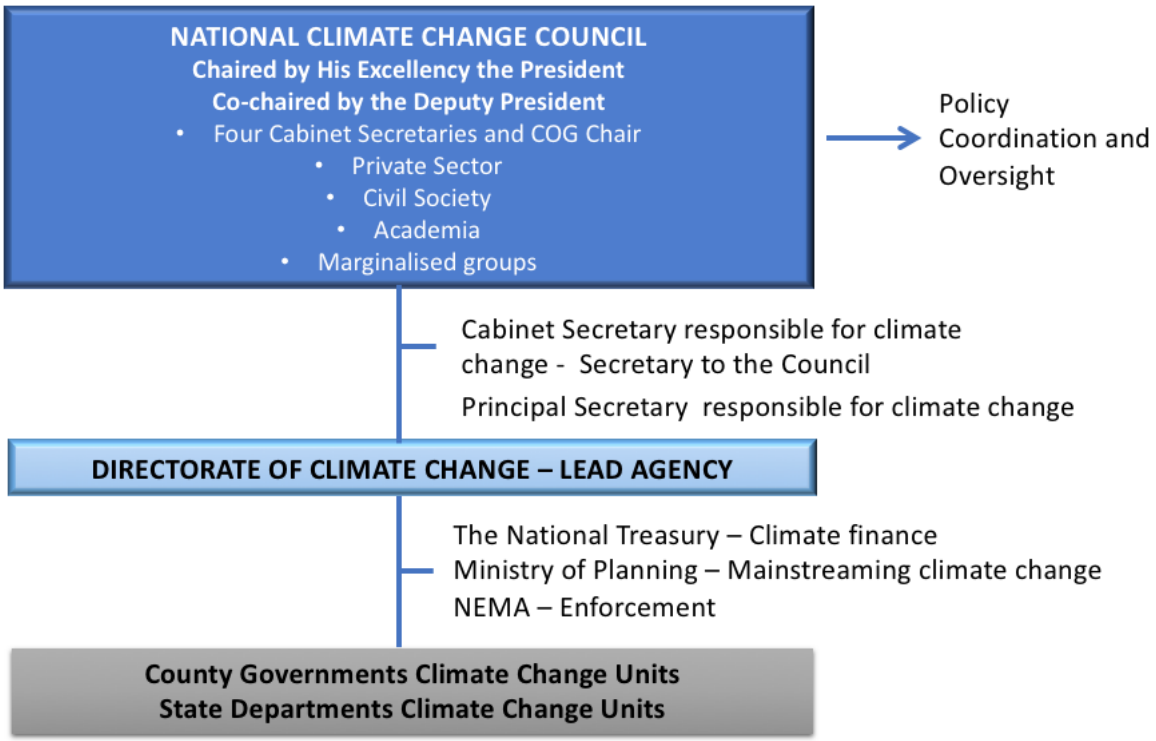
	development of a monitoring and reporting system for transparent accounting of emissions and removals in the forestry and land-use sectors. *(continued from NCCAP I – Mitigation 8)*	KFS SLEEK	established to provide data and information to the national GHG inventory and MRV systems. **By 30th June 2023** – Reporting on land-based emissions fully integrated in GHG inventory.
M4	Establish a Climate Business Platform to support centralised reporting requirements of private entities.	CCD Private sector	**By 30th December 2020** – Framework for large emitter reporting established. **By 30th June 2023** – Private sector large emitters are reporting to CCD on a voluntary basis.

4.2 Delivery and Coordination Mechanisms

4.2.1 Institutional Roles and Responsibilities

The Climate Change Act, 2016 sets out institutional structures and responsibilities that guide the oversight and management of NCCAP 2018-2022. The responsibilities of the main institutions engaged in the oversight, implementation, and monitoring of the NCCAP 2018-2022 are described below and illustrated in Figure 11.

Figure 11: Climate change institutional structures in the Climate Change Act



The **National Climate Change Council, chaired by His Excellency the President of the Republic of Kenya and co-chaired by the Deputy President,** is responsible for overall coordination and advisory functions, including guiding the implementation of 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, 2016 and are listed below:

- Cabinet Secretary responsible for environment and climate change affairs;
- Cabinet Secretary responsible for the National Treasury and Planning;
- 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.

To ensure gender equity on the Council, groups recommending nominations for the representatives for the private sector, civil society, marginalised communities and academia are requested to take into account gender equity in context of the broader membership of the Council.

The **Cabinet Secretary responsible for climate change affairs is the Secretary to the Council**. The Cabinet Secretary formulates and periodically reviews climate change policy, strategy, and the NCCAP, and submits to the Council for approval. The Cabinet Secretary provides through the CCD technical assistance on climate change actions and responses to County governments, based on mutual agreement and needs identified by County governments. The Cabinet Secretary 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 climate change affairs** is responsible for coordination of the implementation of NCCAP 2018-2022, including coordination of climate change actions and related measurement, monitoring, and reporting. The 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 NCCAP 2018-2022. The responsibilities of the CCD are described in greater detail below in Section 4.2.2.

In regard to implementation of climate change actions and implementation of \ 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].

- **State departments** and national public entities are to establish Climate Change Units responsible for integrating the NCCAP into strategies and implementation plans; and report to the Council on an annual basis on performance and implementation. All state departments and public entities will be required to report on the priority actions in NCCAP 2018-2022, even if they did not implement climate change actions [Section 15(5)].
- **National Treasury and Planning** 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** 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:

- The **National Drought Management Authority** coordinates drought management and disaster risk reduction actions in the 23 ASAL counties. NDMA plays 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** is the focal point for disaster management and response in Kenya, including drought, floods and landslides. The Centre plays 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)].
- The **National Disaster Risk Management Authority** proposed in the National Disaster Risk Management Bill, 2018, is expected to lead the coordination of disaster risk management activities.

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

- **Public**: The public 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 (Section 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, policy research and analysis, and advocacy on key socio-economic issues including climate change.
- **Vulnerable groups within society,** including women, older members of society, persons with disabilities, children, youth, and members of minority or marginalised communities are engaged through an inclusive approach to climate change action. Due to inequities and disparities, these groups face disproportionate climate impacts. Climate change actions will be delivered in a way that accounts for the unique needs of these groups.
    - **Women:** Gender equality is a critical component of NCCAP 2081-2022 and women will be engaged through planning, implementation, and monitoring of climate change interventions. Women will be involved in reviews of implementation of actions, and the development and implementation of the gender and intergenerational plan.
    - **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 climate change actions, and the development and implementation of the gender and intergenerational plan.
    - **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 engage these communities in implementation and monitoring.

- **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 and adapting to climate change.
- **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 CCD is responsible for the overall coordination of the implementation of this 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 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, biennial update reports and Kenya's GHG inventory; and representing Kenya in international negotiations.
- **Coordinate implementation of the gender and intergenerational plan** – at the National and County Government levels.
- **Coordinate actions related to climate finance**.

Additionally, the 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 **mobilise climate finance.**

The CCD is delivering on these roles, including the establishment of a pilot registry, launching the National Climate Change Resource Centre, and providing analytical support; but much work remains and will be supported by the enabling actions set out in Section 4.1.

The CCD will establish an inter-governmental platform to improve its climate change coordination function. This engendered platform will include key players in the climate change response, including sector ministries, County Governments, private sector, civil society, academia, and representatives of vulnerable groups (which could include women, youth, and minority and marginalised communities). The members of this platform will assist the CCD to access required information, mainstream climate change in plans and policies, guide the actions of the Climate Change Units in state departments and County Governments, monitor progress on implementing the Climate Change Act, 2016, and report to the National Climate Change Council This platform will play a role in the M&E of NCCAP 2018-2022, described below in Section 4.2.3.

Three coordination committees – adaptation, mitigation and means of support – will report to the inter-governmental platform for climate change coordination. These technical committees will provide advisory support for effective coordination of the respective issues, support monitoring of actions, advise on gaps in implementation of the NCCAP, identify climate finance opportunities, and propose solutions to enhance the delivery of NCCAP 2018-2022. The committees will submit regular progress reports to the inter-governmental platform and the CCD.

Role of the County Governments

The County Governments will support the 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 CCD to ensure that County Climate Change Units are established, strengthened, and functional, leading to effective implementation of 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, 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 CCD is responsible for M&E of NCCAP 2018-2022. The implementation of the NCCAP will be reviewed every two years as required by Section 13(7) of the Climate Change Act, 2016. 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

private sector, academia, women, youth, and minority and marginalised groups including pastoralists, hunter gatherers, and fisher communities.

M&E of NCCAP 208-2022 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 NCCAP 2018-2022, and climate finance raised to deliver on the action plan. This will provide the evidence base for planning and implementing future actions, seeking support, and domestic and international reporting.

The M&E system to report on implementation of NCCAP 2018-2022 will be linked to the MRV+ system and SDG reporting. The establishment of the M&E system 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 will:

- **Ensure that all state departments** report on their progress and achievement of NCCAP actions.
- **Ensure efficient reporting processes for the County Governments**, and draw on established reporting procedures where possible, such as the National Integrated Monitoring and Evaluation system and County Integrated Evaluation System.
- **Report on climate finance that supports the delivery of NCCAP 2018-2022.**
- **Identify a limited number of national indicators that have baseline data** and are tracked by The National Treasury and Planning to measure climate-related impacts at the national level. This will help to align the tracking and measurement of climate change co-benefits with the Government's Big 4 agenda and SDGs.
- **Use gender-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 an action or County basis is costly and resource-intensive, and unlikely to generate robust information that is aligned with the national GHG inventory approach.

4.2.4 Financial Requirements

CCD will require approximately KES 350 million annually to carry out its duties and functions to ensure effective coordination and delivery of NCCAP 2018-2022. This funding will enable CCD officials to participate in international discussions and negotiations on climate change; build capacity of National Government ministries and departments, County Governments, and other stakeholders; develop regulations and guidelines; mobilise and track climate finance to deliver NCCAP 2018-2022; and monitor and report on climate actions.

Endnotes

[1] Worldometers (2018). Elaboration of data by United Nations, *World Population Prospects: 2017 Revision*. Retrieved from: http://www.worldometers.info/world-population/kenya-population

[2] World Bank Group (2018). *Data for Lower middle income, Kenya.* Retrieved from: https://data.worldbank.org/?locations=XN-KE

[3] Kenya National Bureau of Statistics [KNBS] (2015). *Spatial Dimension of Well-Being in Kenya: Where are the Poor?* Nairobi: KNBS.

[4] Kaudia, A. (2015). *Gender mainstreaming*. Retrieved from: https://www.slideshare.net/agroforestry/4-kenya-gendermainstreaming

[5] Njoka, J., Yanda, P., Maganga, F., Liwenga, E., Kateka, A., Henku, A., Mabhuye, E., Malik, N. & Bavo, C. (2016). *Kenya: County situation assessment – Working Paper*. Nairobi: Pathways to Resilience in Semi-arid Economies.

[6] 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.

[7] Niang, I., O.C. Ruppel, M.A. Abdrabo, A. Essel, C. Lennard, J. Padgham & P. Urquhart (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* [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge and New York: Cambridge University Press. page 7.

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

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

[10] Masih, I., Maskey, S., Mussa, F.E.F., & Trambaurer, P. (2014). A review of droughts on the African continent: a geospatial and long-term perspective, *Hydrology and Earth System Sciences*, *18*: pp. 3635-3649.

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

[12] Christensen, J.H., Krishna Kumar, K., Aldrian, E., An, S.-I., Cavalcanti, I.F.A., de Castro, M. & Zhou, T. (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*. Stocker, T.F., Qin, D., Plattner, G.-K., Tignor, M., Allen, S.K., Boschung, J., Nauels, A., Xia, Y., Bex V., and Midgley P.M. (eds.). Cambridge: Cambridge University Press.

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

[14] Eckstein D., Kunzel, V. & Schafer, L. (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.

[15] KMD (2018).

[16] Reliefweb (2018). *Kenya: Drought – 2014-2018.*

[17] Emergency Events Database (2015). *The International Disaster Database*. Brussels: Centre for Research on the Epidemiology of Disasters, University of Louvain.

[18] Standard Digital (2014). *Mombasa and other coastal islands threatened by sea level rise, cautions CS Wakhungu*. Retrieved from: https://www.standardmedia.co.ke/lifestyle/article/2000123960/mombasa-and-other-coastal-islands-threatened-by-sea-level-rise-cautions-cs-wakhungu

[19] Emergency Events Database (2015).

[20] Reliefweb (2018).

[21] Reliefweb (2018).

[22] Njoka, et al. (2016).

[23] County Government of Isiolo (2014). *Isiolo County Integrated Development Plan 2013-2017*. Nairobi: Republic of Kenya.

[24] Said, M., et al. (2018). *Livestock trends in Kenya's Arid and Semi-arid counties between 1977 and 2016*. Nairobi: PRISE.

[25] International Organization for Migration (2016). *Assessing the Evidence: Migration, Environment and Climate Change in Kenya*. Geneva: International Organization for Migration.

[26] Njoka, et al. (2016).

[27] Government of Kenya (2017). *The 2017 Long Rains Season Assessment Report*. Nairobi: Kenya Food Security Steering Group.

[28] 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*. Cambridge: Cambridge University Press. page 1688.

[29] Christensen, et al. (2013).

[30] Hoegh-Guldberg, et al. (2014). page 1666-1670.

[31] Pörtner, H.-O., D.M. Karl, P.W. Boyd, W.W.L. Cheung, S.E. Lluch-Cota, Y. Nojiri, D.N. Schmidt & P.O. Zavialov (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* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge and New York: Cambridge University Press.

[32] 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*.

[33] Coastal Oceans Research and Development – Indian Ocean (2018). *Ocean acidification and small-scale fisheries*. Mombasa: Coastal Oceans Research and Development – Indian Ocean East Africa. Retrieved from: http://cordioea.net/small-scale-fisheries/ocean-acidification/

[34] Prinz,R., Nicholson, L.I., Molg, T., Gurgiser, W. & Kaser, G. (2016). Climate controls and climate proxy potential of Lewis Glacier, Mt. Kenya. *The Cryosphere* 1: 133-148.

[35] Hastenrath, S. & Polzin, D. (2004). Dynamics of surface wind field over the equatorial Indian Ocean. *Quarterly Journal of the Royal Meteorological Society* 130: 503–517.

[36] Mwenda, S.M, Mugambe, A. & Nyaga, J. (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.

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

[38] MyGov (2016). *Kenya initiates programmes to counter desertification*.

[39] 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.

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

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

[42] Bakkegaard, R.K., Moller, L.R. & Bakhtuiarai, F. (2016). *Joint Adaptation and Mitigation in Agriculture and Forestry*. UNEP DTU working paper series, Climate Resilient Development Programme, Working Paper 2. Copenhagen: UNEP DTU.

[43] Kenya Forest Service (2013). *Forest Preservation Programme*. Retrieved from: http://www.kenyaforestservice.org

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

[45] KIPPRA (2018). Opening Remarks by the Cabinet Secretary, National Treasury and Planning Hon. Henry Rotich, in *Daily Conference Summary Report of Proceedings: Day 2: Wednesday 6th June 2018*. KIPPRA Annual Regional Conference: Building Resilience to Mitigate the Impacts of Drought and Floods, 5-7th June, Nairobi. https://kippraconference.org/wp-content/uploads/2018/06/DAY-2-Conference-Proceedings-A-Summary-Reviewed.pdf

[46] Government of Kenya (2018). *National Disaster Risk Management Policy*. Nairobi: The National Treasury and Planning.

[47] Omondi, D. (2018). State at a loss as floods wash away costly infrastructure. *Standard Digital* (5th May).

[48] Stockholm Environment Institute (2009). *Economics of Climate Change in Kenya: Final Report submitted in advance of COP15*. Stockholm (Sweden): Stockholm Environment Institute.

[49] Government of Kenya (2018). *National Disaster Risk Reduction Policy*..

[50] KNBS (2018). *Economic Survey 2018*. Nairobi: KNBS.

[51] 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.

[52] Government of Kenya (2012). *Kenya Post-Disaster Needs Assessment: 2008-2011 Drought*. With technical support from the European Union, United Nations and the World Bank.

[53] Said, M. et al. (2018).

[54] Otieno, B. (2018). Sh 498m Fort Jesus wall to stop erosion of World Heritage Site. *The Star* (17th January).

[55] Stockholm Environment Institute (2009).

[56] Murphy, D. & Chirchir, D. (2017). *Review of Implementation of the Kenya National Climate Change Plan 2013-2017*. Nairobi: StARCK+ Technical Assistance to the Government of Kenya.

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

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

[59] 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.

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

[61] 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.

[62] United Nations (1992). *United Nations Framework Convention on Climate Change*. page 9.

[63] UNFCCC (2018). *Achievements of the Climate Development Mechanism*. Retrieved from: http://unfccc.int/timeline/

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

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

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

[67] United Nations Office for Disaster Risk Reduction (2018). *Sendai Framework for Disaster Risk Reduction*. Retrieved from: https://www.unisdr.org/we/coordinate/sendai-framework

[68] United Nations General Assembly (2015). Preamble.

[69] United Nations Children's Fund (UNICEF) (2018). *Kenya: Humanitarian Action for Children,* Nairobi: UNICEF.

[70] Njoka, et al. (2016).

[71] Njoka, et al. (2016). page 24.

[72] KMD (2018).

[73] Republic of Kenya (2012). *Isiolo River Basin Integrated Flood Management Plan.*

[74] KIPPRA (2018).

[75] KNBS (2018), *Economic Survey 2018 (*Nairobi: KNBS), page 113.

[76] KNBS (2018), pages 118 and 121.

[77] KNBS (2018), page 126.

[78] KBNS (2018), page 139.

[79] KNBS (2018). page 130.

[80] Business Daily (2017). *Kenya not yet out of the woods over high food prices* (21st December). Retrieved from: https://www.businessdailyafrica.com/markets/marketnews/Kenya-not-yet-out-of-the-woods-over-high-food-prices/3815534-4238112-8jdn0ez/index.html

[81] KNBS (2018). page 55.

[82] KNBS (2018). page 295.

[83] Ministry of Agriculture, Livestock and Fisheries (2017). *Kenya Climate Smart Agriculture Strategy*: 2017-2026. Nairobi: MALF. page 49.

[84] Consultations with Marginalised Communities, Nakuru, May 2018.

[85] KNBS (2018). page 19.

[86] Ministry of Agriculture, Livestock and Fisheries (2017). page 17.

[87] Government of Kenya (2015). *Second National Communication to the UNFCCC*. Nairobi: National Environment Management Authority.

[88] Ministry of Environment and Forestry (2018). *Adaptation Technical Analysis Report (ATAR)*. Nairobi: MEF.

[89] Government of Kenya (2018). *Sector Plan for the Blue Economy*. Kenya Vision 2030. page 3.

[90] World Bank (2012). World Bank study cited in: Government of Kenya (2017). *National Policy for the Sustainable Development of Arid and Semi-Arid Lands*. Nairobi: Ministry of Devolution and ASAL Areas. page 19.

[91] Government of Kenya (2018). page 19.

[92] IMO (2014).

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

[94] Government of Kenya (2016). *Kenya Forest Service: Improving Capacity in Forest Resources Assessment in Kenya: Proposal for National Forest Resources Assessment in Kenya*. Nairobi: KFS.

[95] KBNS (2018), *Economic Survey 2018*, page 140.

[96] Government of Kenya (2016). *Kenya Forest Service: Improving Capacity in Forest Resources Assessment in Kenya: Proposal for National Forest Resources Assessment in Kenya*.

[97] Government of Kenya (2018). *Kenya Forest Service*. Retrieved from: http://www.kenyaforestservice.org/index.php/about-kfs/history-of-forestry-in-kenya.

[98] Ministry of Environment, Water and Natural Resources (2014). *Forest Policy, 2014*. Nairobi: Ministry of Environment, Water and Natural Resources. page 1.

[99] GoK (2010). *Kenya Forest Service Study Report 2010*. Nairobi: Kenya Forest Service;

[100] Government of Kenya (2015). *Second National Communication to the UNFCCC*.

[101] Ministry of Environment and Natural Resources (2013). Forestry, Chapter 4 in Mitigation Analysis, *National Climate Change Action Plan, 2013-2017*. Nairobi: MENR.

[102] Dekens, J., Parry, J., Zamudio, A. & Echeverría, D. (2011). *Climate Risk Management for Malaria Control in Kenya: the case of the western highlands*. New York: UNDP.

[103] Soezer, A. & Owino, T. (2015). *A Circular Economy Solid Waste Management Approach for Urban Areas in Kenya*. Nairobi: UNDP.

[104] Government of Kenya (2015). *Second National Communication to the UNFCCC*.

[105] World Health Organization [WHO] (2017). *Cholera – Kenya: Disease Outbreak News, 21 July 2017*. Retrieved from http://www.who.int/csr/don/21-july-2017-cholera-kenya/en/

[106] World Health Organization and United Nations Framework Convention on Climate Change (2015). *Climate and Health County Profile – 2015: Kenya*. Retrieved from: http://apps.who.int/iris/bitstream/10665/246133/1/WHO-FWC-PHE-EPE-15.23-eng.pdf

[107] World Health Organization (2018). *Household air pollution and health: Key facts*. Accessed at: http://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health

[108] Government of Kenya (2015). *Second National Communication to the UNFCCC*.

[109] Consultation with Youth (2018). Nairobi, 2018.

[110] Government of Kenya (2016). *Green Economy Strategy and Implementation Plan*. Nairobi: Ministry of Environment and Natural Resources. pages 21-27.

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

[112] Government of Kenya (2015). *Second National Communication to the UNFCCC*.

[113] The Kenya Power and Lighting Company Limited [KPLC] (2017). *Annual Report and Financial Statements*. Nairobi: KPLC. pages 41-42.

[114] 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/

[115] Ministry of Energy (2018). Consultations with the energy sector.

[116] UNEP (2016). *Actions on Air Quality*. Nairobi: UNEP.

[117] Dalberg (2018). *Scaling up clean cooking in urban Kenya with LPG and Bio-ethanol: Executive Brief (*pending publication).

[118]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).

[119] Murphy, D. & Chirchi, D (2017). *Kenya County Integrated Development Plans 2013-2017: Review of Climate Change Mainstreaming*.

[120] UNFCCC (2017). *Focus: Capacity Building*. Retrieved from: http://unfccc.int/cooperation_and_support/capacity_building/items/1033.php

[121] 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.

[122] Government of Kenya (2018) *Budget Statement FY 2018/19: Creating Jobs, Transforming Lives and Sharing Prosperity*. Nairobi: The National Treasury and Planning. Page 16.

[123] Government of Kenya (2013). *National Climate Change Action Plan, 2013-2017*. page 129.