REPUBLIC OF KENYA

MINISTRY OF ENVIRONMENT
AND FORESTRY

NATIONAL CLIMATE CHANGE ACTION PLAN (NCCAP) 2018-2022

EXECUTIVE SUMMARY

Towards Low Carbon Climate Resilient Development

2018

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

Foreword

Climate change is a major threat to Kenya's socio-economic wellbeing. Climate change, indeed, has the potential to roll back the development gains made over the years, and threatens the attainment of our *Vision 2030* and my Government's Big Four Agenda.

In line with our responsibility to mitigate the effects of climate change, and in keeping with the objective of the *Paris Agreement,* my Government promulgated the *Climate Change Act, Number 11 of 2016.* This *Act* provides the legal framework for enhanced response to climate change at both the National and County Government levels. Consequently, climate change is now recognised as a crosscutting thematic area in our planning process. Further, the *Act* recognises the *National Climate Change Action Plan (NCCAP)* as a five-year iterative tool for the integration of low carbon climate resilient initiatives across our different socio-economic sectors.

This *National Climate Change Action Plan (NCCAP) 2018-2022* builds on the strong foundation laid during the implementation of the *National Climate Change Action Plan (NCCAP) 2013-2017,* and the *Climate Change Act. NCCAP 2018-2022* sets out bold measures to ensure that our development remains sustainable in the event of any adverse climate change impacts, including droughts, floods, and other extreme climate events that have in the recent past occasioned far-reaching negative implications on our economy.

A key action during the 2018-2022 medium-term planning period is increasing our forest cover to at least 10%. This action will contribute to the protection of our water towers and associated ecosystem services, which will then translate to tangible benefits for our citizens across the different sectors. It will also contribute to the achievement of our Nationally Determined Contribution under the *Paris Agreement.*

The collective contributions of the National and County Governments, the private sector, the civil society, faith-based organisations, other non-state actors, and individual citizens to this *National Climate Change Action Plan* will help deliver the expected transformational outcomes. The *Plan* will also require the support of our development partners and other well-wishers to ensure its effective implementation for the benefit of the present and future generations.

I personally commit to be at the forefront of these efforts, as Chair of the National Climate Change Council, so as to ensure that our aspiration of a low carbon climate resilient and, prosperous Kenya is realised.

Kazi iendelee!

May God bless the Republic of Kenya!

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

Acknowledgements

The development of *NCCAP 2018-2022* was guided by a Taskforce that was appointed and gazetted. It also involved the participation of State Departments and Agencies of the National Government, County Governments, civil society, the private sector, and the academia. A wide range of individuals and institutions participated in the development *NCCAP 2018-2022.* I take this early opportunity to recognise their efforts.

Technical inputs to *NCCAP 2018-2022* were enriched through the Adaptation and Mitigation Thematic Working Groups, whose membership was inclusive and drawn from the National and County Governments, civil society, the academia, and the private sector. Contributions from members of the Taskforce and the Thematic Working Groups, both at individual and corporate levels, are greatly appreciated. The Ministry of Environment and Forestry (MEF) is also grateful to the national and international climate change experts that provided valuable technical inputs to the process.

I wish to commend the Principal Secretary for Environment and Forestry for ably chairing the Taskforce, and coordinating the entire process of developing *NCCAP 2018-2022,* including managing contributions from contracted experts. I recognise the experts for their professionalism and diligence throughout the process of developing *NCCAP 2018-2022.*

NCCAP 2018-2022 was prepared through an extensive consultation process. Over 1,000 stakeholders, including representatives from the National and County Governments, civil society, the academia, women's groups, youth groups, marginalised and minority groups, and the private sector, were consulted. These are gratefully acknowledged for their candid views that form the basis of this *Plan.* It is appreciated that effective implementation of *NCCAP 2018-2022* will require continued input from these stakeholders, and increased partnerships and enhanced support from development partners.

The development of *NCCAP 2018-2022* would not have been possible without the support of development partners. These include the Government of Germany through the GIZ NDC Assist Project, and the Government of the United States of America through the Low-

Emission, Climate-Resilient Development Project, which is managed by the United Nations Development Programme. Other support was also received from the Government of the United Kingdom through the Deepening Democracy Programme, NDC Partnership, Transparency International, Pan-Africa Climate Justice Alliance, Friedrich-Ebert Stiftung, and Sustainable Environmental Development Watch (SusWatch) Network. The Kenya Red Cross through the Partner for Resilience project funded by the Dutch Government. I thank all these institutions for their invaluable support.

NCCAP 2018-2022 will be distributed widely to National and County Government institutions, and amongst non-state actors so that it guides their envisaged roles in the implementation. Development partners will particularly find the information provided in the *Plan* very helpful in their alignment of funding preferences with Kenya's aspirations to attain a low carbon climate resilient economy. We remain grateful to their commitment to walk alongside Kenya in this journey.

The Ministry of Environment and Forestry is committed to the implementation of this *Plan,* and will lead efforts to increase our forest cover to at least 10% of Kenya's land. We will work with the National Climate Change Council to ensure a coordinated and effective approach that will involve the National and County Governments, and other stakeholders across the Kenyan society in this initiative, and on other planned actions.

National Climate Change Action Plan Taskforce

Charles Sunkuli - Principal Secretary, Ministry of Environment and Forestry (Chair)
Pacifica Achieng Ogola, PhD - Ministry of Environment and Forestry (Joint Secretary)
Stephen M. King'uyu - Ministry of Environment and Forestry (Joint Secretary)
Clara Busolo - National Gender and Equality Commission
Martin Eshiwani - Ministry of Transport, Infrastructure, Housing and Urban Development
Lulu Hayanga - Office of the Attorney General and Department of Justice
Frank Msafiri - Kenya Climate Change Working Group
Lucy Ng'ang'a, PhD - Ministry of Agriculture, Livestock, Fisheries, and Irrigation
Faith Ngige - Kenya Private Sector Alliance
Joyce Njogu - Kenya Association of Manufacturers
David Nyantika - Ministry of Water and Sanitation
Philip Odhiambo - World Wide Fund for Nature Kenya (WWF-Kenya)
Stephen Osingo - Council of Governors
Erastus Wahome - The National Treasury and Planning
Elizabeth Wamalwa - The National Treasury and Planning
Esther Wang'ombe - Ministry of Energy

Secretariat/Climate Change Directorate

Charles Mutai, PhD
Moses Omedi Jura
Thomas Lerenten Lelekoitien
Augustine Kenduiwo
Peter Omeny
Michael Okumu
Samuel Muchiri
David B. Adegu
Veronica Kioko
Steve Muhanji
Innocent Muriithi
Fiona Oweke

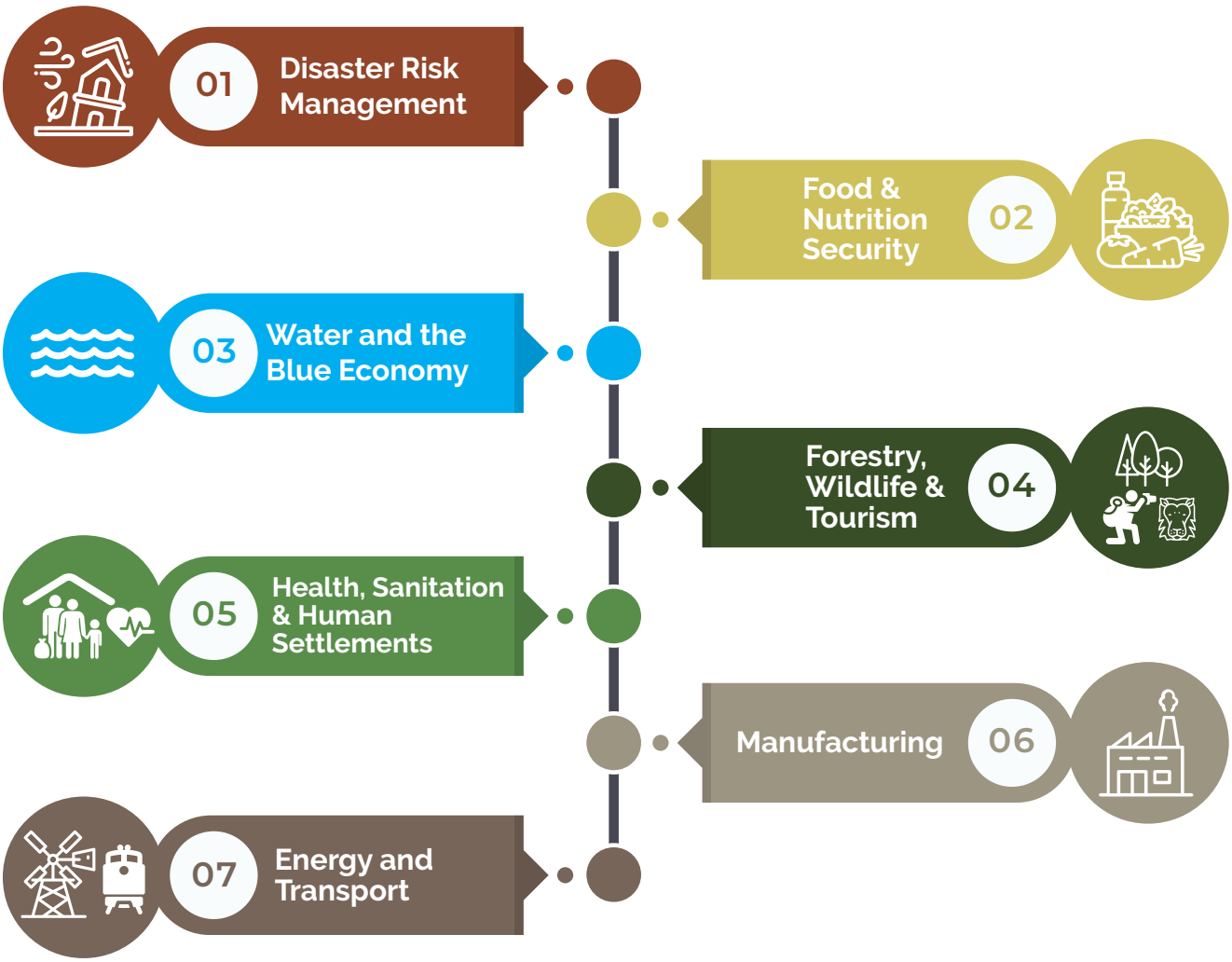
Environmental conservation and protection is the foundation to low carbon and climate resilience development.

CONTEN

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.

Strategic Objectives



SO1

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

SO2

Increase food and nutrition security by enhancing productivity and resilience of the agricultural systems in as low-carbon a 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

SO3

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

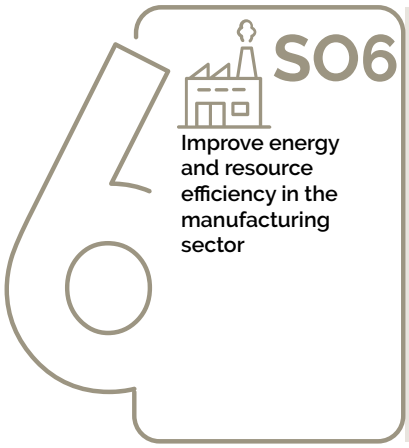
- Increase annual per capita water availability through the development of water infrastructure
- Climate proof water harvesting and water storage infrastructure and improve flood control
- Increase affordable water harvesting-based livelihood programmes
- Promote water efficiency (monitor, reduce, re-use, and recycle)
- Improve access to good quality water
- Improve climate resilience of coastal communities
- Climate proof coastal infrastructure

SO4

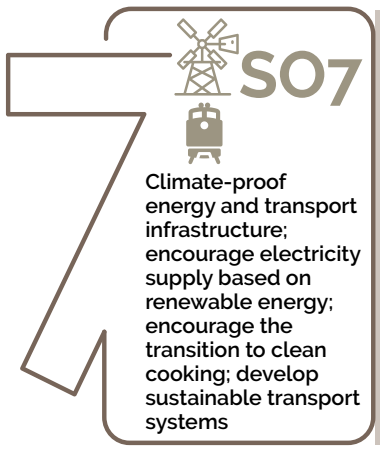
Increase forest cover to 10% of total land area; rehabilitate degraded lands, including rangelands; increase resilience of the wildlife and tourism sector

- Afforest and reforest degraded and deforested areas in counties
- Implement initiatives to reduce deforestation and forest degradation
- Restore degraded landscapes (arid and semi-arid lands (ASALs) and rangelands)
- Promote sustainable timber production on privately-owned land
- Conserve land areas for wildlife

- 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



- Increase energy efficiency
- Improve water use and resource efficiency
- Optimise industrial and manufacturing processes
- Promote industrial symbiosis in industrial zones



- 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 Journey in climate change action in Kenya

1992 — *UNFCCC* Adopted

1994 — Kenya ratified the *UNFCCC*

1997 — *Kyoto Protocol adopted*

2005 — Kenya ratified Kyoto and implemented CDM projects

2010 — *National Climate Change Strategy*

2013 — *NCCAP 2013-2017*

2014 — Ratified Doha Ammendments to *Kyoto Protocol*

2015 — Kenya's NDC submitted

2015 — *Paris Agreement* Adopted

2015 — National Adapation Plan *NAP 2015-2030*

2016 — Kenya ratified *Paris Agreement*

2016 — *Climate Change Act*

2017-2018 — *National Climate Change Fund*

2018 — *NCCAP 2018-2022*

2018 — *Climate Finance Policy*

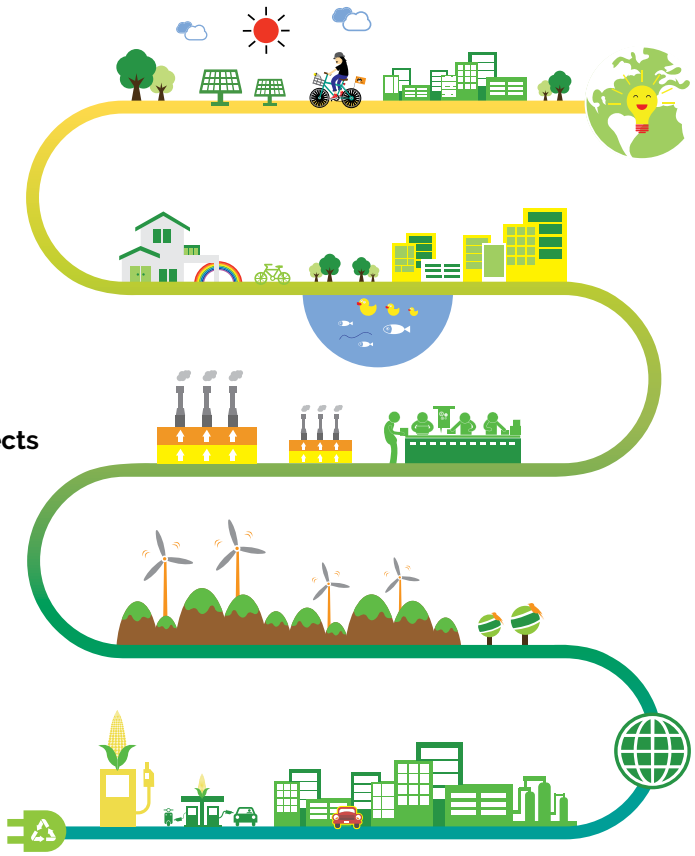
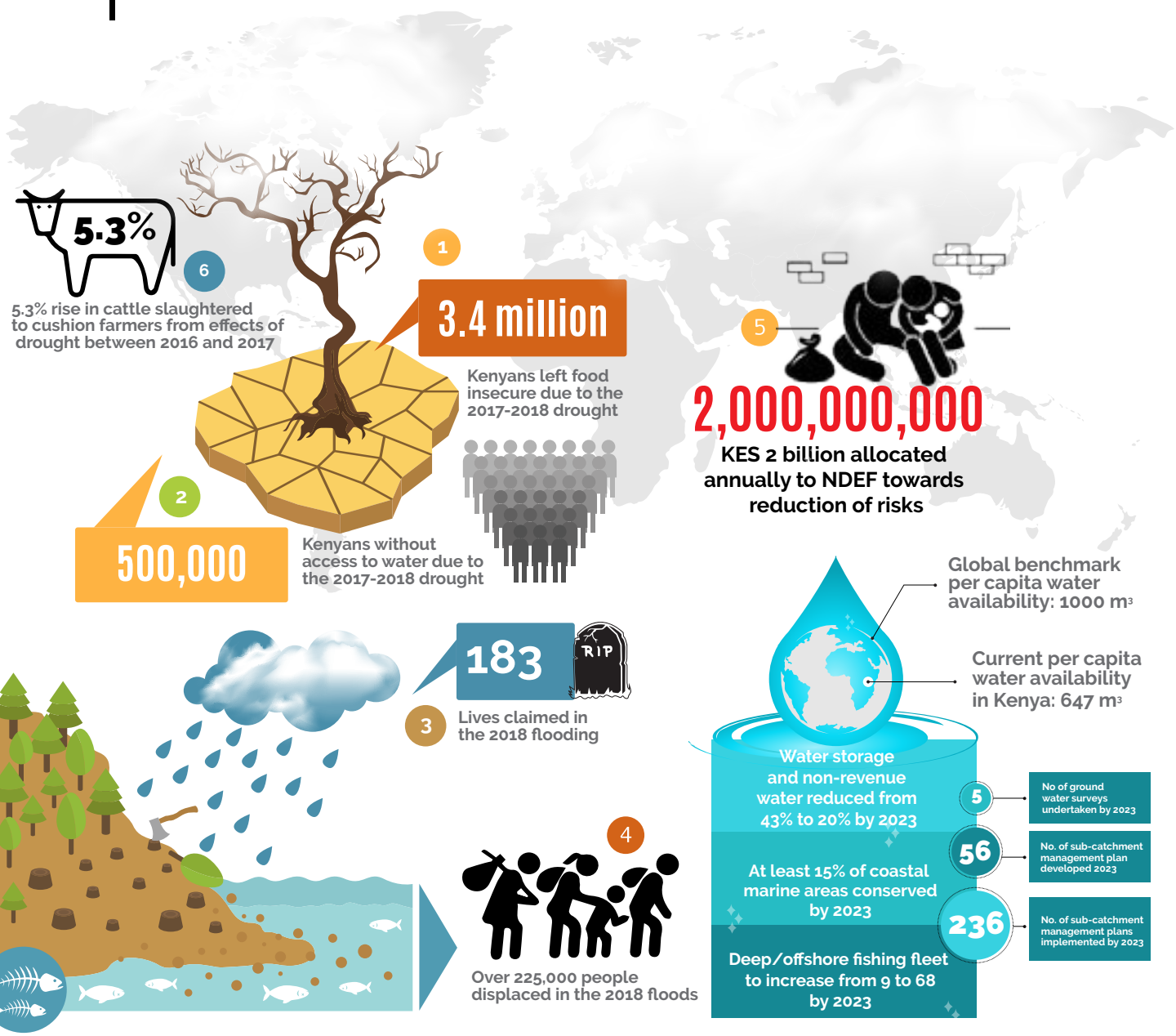


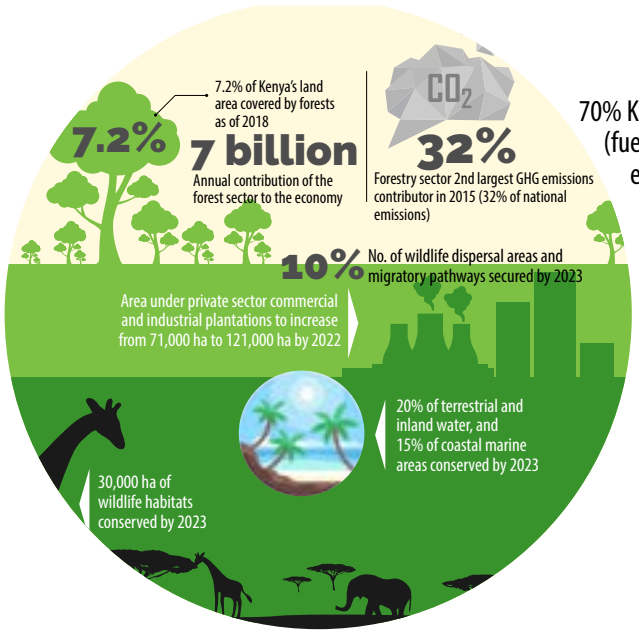

Photo: Benard

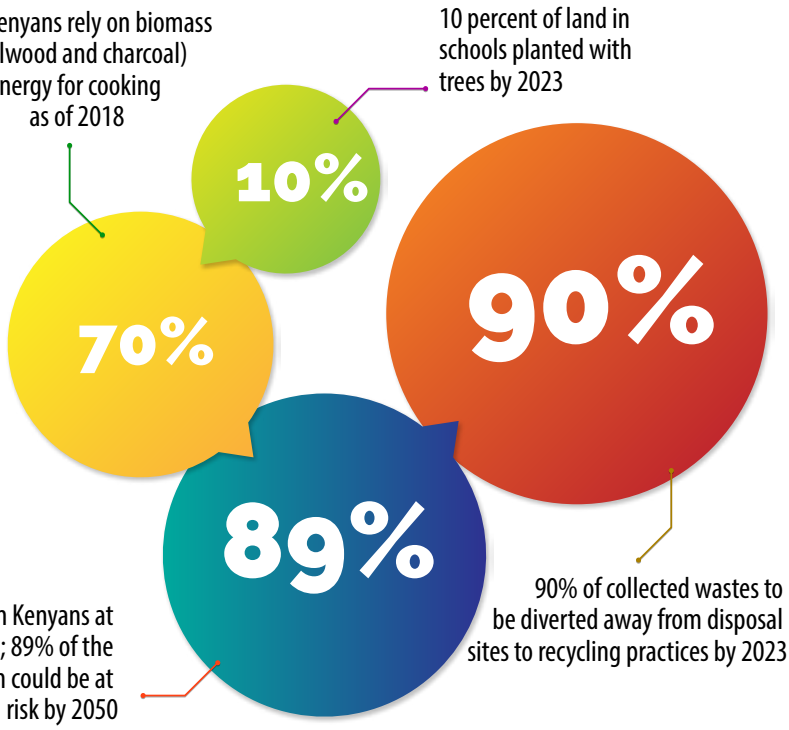
CHAPTER ONE

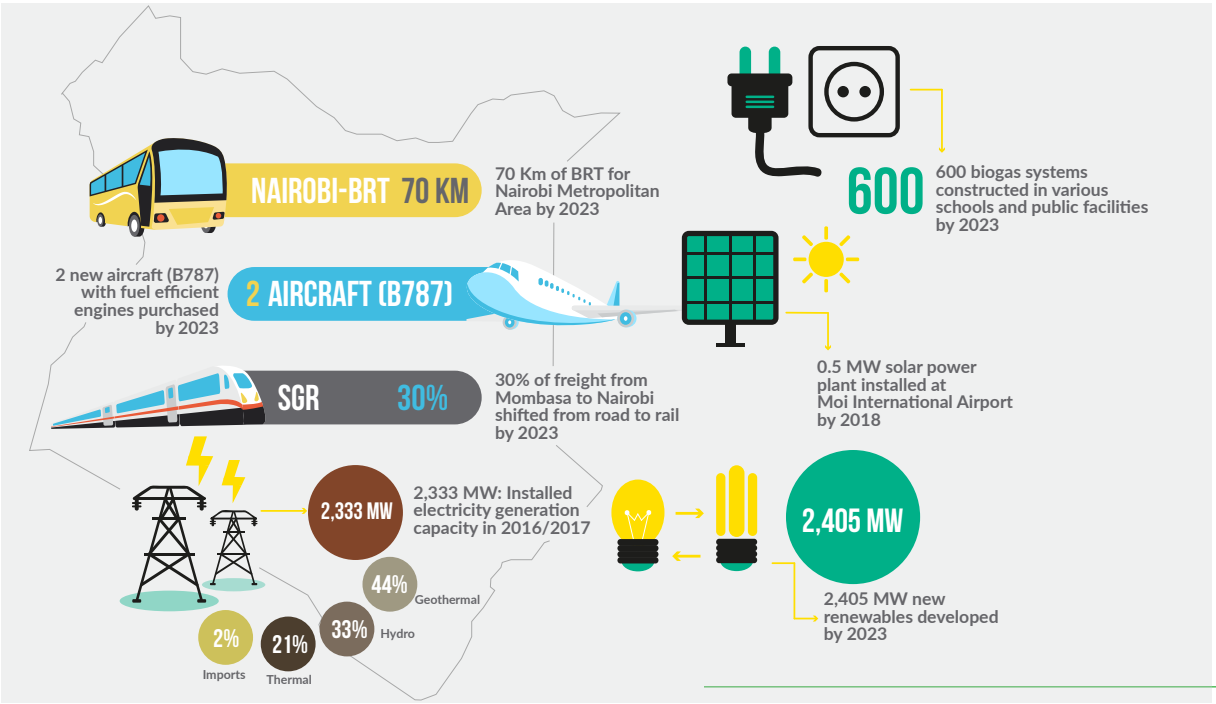
What is Kenya's Climate Change Action Plan?

Facts & Figures




7.2%
7.2% of Kenya's land area covered by forests as of 2018
7 billion
Annual contribution of the forest sector to the economy
CO_2
32%
Forestry sector 2nd largest GHG emissions contributor in 2015 (32% of national emissions)
10%
No. of wildlife dispersal areas and migratory pathways secured by 2023
Area under private sector commercial and industrial plantations to increase from 71,000 ha to 121,000 ha by 2022
20% of terrestrial and inland water, and 15% of coastal marine areas conserved by 2023
30,000 ha of wildlife habitats conserved by 2023


70% Kenyans rely on biomass (fuelwood and charcoal) energy for cooking as of 2018
10 percent of land in schools planted with trees by 2023
10%
70%
90%
89%
90% of collected wastes to be diverted away from disposal sites to recycling practices by 2023
13 to 20 million Kenyans at risk from malaria; 89% of the population could be at risk by 2050


NAIROBI-BRT 70 KM
70 Km of BRT for Nairobi Metropolitan Area by 2023
600
600 biogas systems constructed in various schools and public facilities by 2023
2 new aircraft (B787) with fuel efficient engines purchased by 2023
2 AIRCRAFT (B787)
0.5 MW solar power plant installed at Moi International Airport by 2018
SGR 30%
30% of freight from Mombasa to Nairobi shifted from road to rail by 2023
2,333 MW
2,333 MW: Installed electricity generation capacity in 2016/2017
2,405 MW
2,405 MW new renewables developed by 2023
44% Geothermal
33% Hydro
21% Thermal
2% Imports

Kenya's National Climate Change Action Plan (NCCAP) 2018-2022, is a five-year plan that helps Kenya adapt to climate change and reduce greenhouse gas emissions. *The Climate Change Act (Number 11 of 2016)* requires the Government to develop action plans to guide the mainstreaming of climate change into sector functions (See Box 1). *The Act* is the first climate change-dedicated legislation in Africa and is the legal foundation of this action plan.

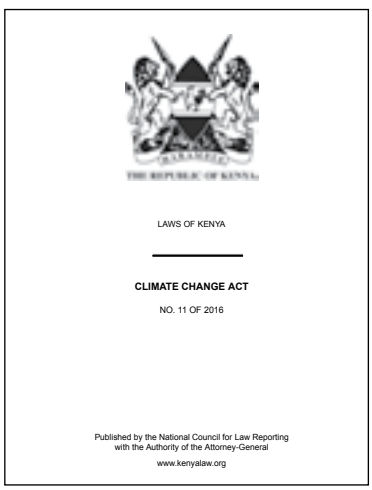
NCCAP 2018-2022 aims to further Kenya's development goals by providing mechanisms and measures that achieve low carbon climate resilient development. A low carbon climate resilient development pathway emphasises sustainable development and prioritises adaptation, recognising the importance of increasing the climate resilience of vulnerable groups, including women, youth, persons with disabilities, and marginalised and minority communities.

NCCAP 2018-2022 builds on the first *action plan (2013-2017),* sets out actions to implement the *Climate Change Act (2016),* and provides a framework for Kenya to deliver on its Nationally Determined Contribution (NDC) to the Paris Agreement (see Box 1). The actions in *NCCAP 2018-2022* were developed through extensive consultations with over 1,000 stakeholders from Parliament, national and county governments, civil society, private sector, youth groups, women's groups, and representatives from marginalised and minority groups including persons with disabilities, pastoralists, forest resource users, and fisher communities. The Ministry of Environment and Forests led the development of *NCCAP 2018-2022* through the NCCAP Task Force that was gazetted by the Cabinet Secretary.

NCCAP 2018-2022 sets out seven priority climate action areas with adaptation and mitigation actions. Enabling actions are identified in the areas of the policy and regulatory environment, capacity building and knowledge management, technology and innovation, climate finance, and measurement, reporting and verification plus (MRV+). *NCCAP 2018-2022* guides the climate actions of the national and county governments, the private sector, civil society and other actors. Climate change is a shared responsibility between the national and county governments, in line with the Constitution of Kenya (2010). The implementation of this action plan is, therefore, coordinated between the two levels of government.

This Executive Summary is informed by the full NCCAP 2018-2022 that consists of Volume I: *NCCAP 2018-2022*; Volume II: Adaptation Technical Analysis Report; and Volume III: Mitigation Technical Analysis Report. These reports can be accessed at: *http://www.kcckp.go.ke/nccap-ii-2018-2022/*

Box 1: *The Climate Change Act (No. 11 of 2016)*


LAWS OF KENYA

CLIMATE CHANGE ACT

NO. 11 OF 2016

Published by the National Council for Law Reporting
with the Authority of the Attorney-General

www.kenyalaw.org

The Climate Change Act (2016) is a 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, 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.

CHAPTER TWO

Why is Action on Climate Change a Priority for Kenya?

Climate change is a scientific fact. The amount of greenhouse gases that humans release has increased every year since the Industrial Revolution and is now at record levels. As carbon dioxide and other greenhouse gases build up in the atmosphere, they trap heat. As a result, average global temperatures and sea levels are rising, causing significant environmental and economic disruption.

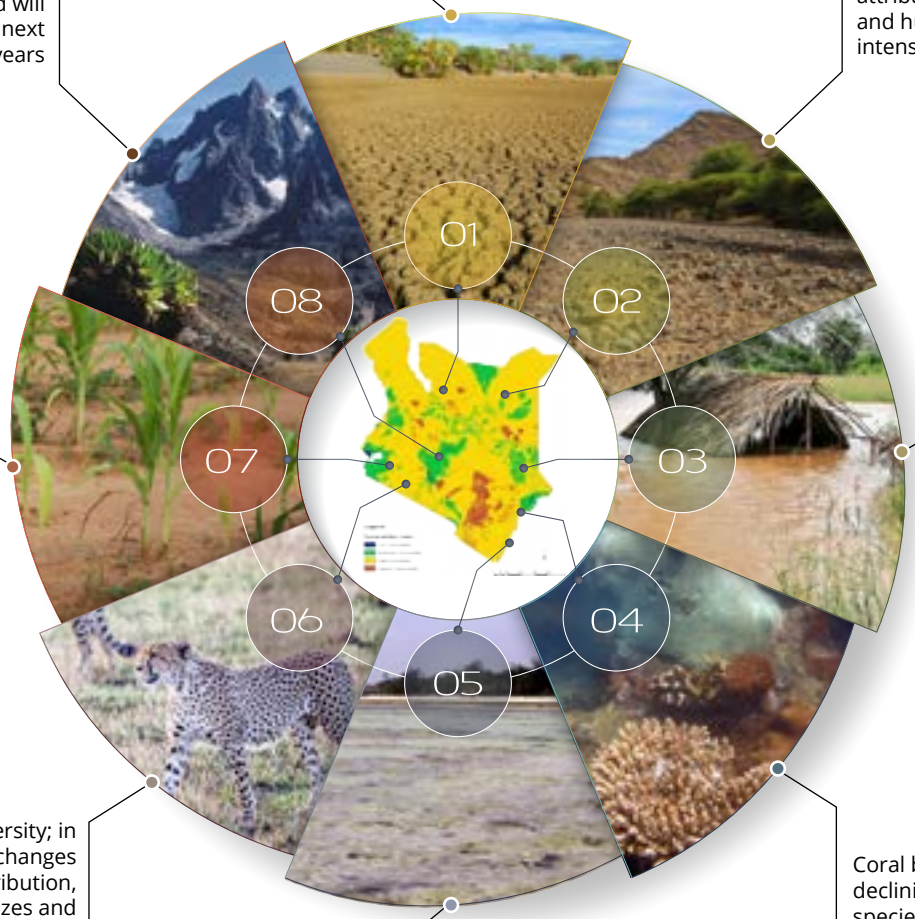
Kenya's climate is changing. The country has experienced a general warming trend since 1960, and the trend of rising temperatures is expected to continue. Rainfall patterns have changed, with the long rainy season becoming shorter and dryer and the short rainy season longer and wetter. Overall annual rainfall remains low, the long rains have been continuously declining in recent decades, and the proportion of rainfall that occurs from heavy events is expected to increase. 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. Droughts have intensified in terms of frequency, severity, and coverage over the past few decades. Sea level rise along Kenya's Indian Ocean coast, caused by increased melting of land-based ice such as glaciers and ice sheets and thermal expansion, caused by warming of the ocean, is projected to be greater than the global average of 26 to 82 cm by the 2080s.

Kenyans are feeling the impacts of climate change (see Figure 1). Higher temperatures, unpredictable rainfall patterns, increased incidence of droughts and floods, and rising sea levels are impacting people across the country. Extreme weather events 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.

It is probable that climate change will 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.

***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



Drought - In February 2017, 3.4 million Kenyans were food insecure and 0.5 million did not have access to water because of drought

Desertification in the ASALs, attributed to climate change and human activities, is intensifying and spreading

Flooding in 2018 claimed over 183 lives, displaced more than 225,000 people including over 145,000 children, and closed over 700 schools Flooding in 2018 claimed over 183 lives, displaced more than 225,000 people, including over 145,000 children, and closed over 700 schools.

Coral bleaching and die-off, declining abundance and species of fish

Coastal erosion, wetland loss, damage to coastal infrastructure and communities

Loss of biodiversity; in regard to wildlife, changes in species distribution, reduced population sizes and extinction of some species

Crop yield reductions of up to 45% expected for maize, rice and soybean crops by 2100

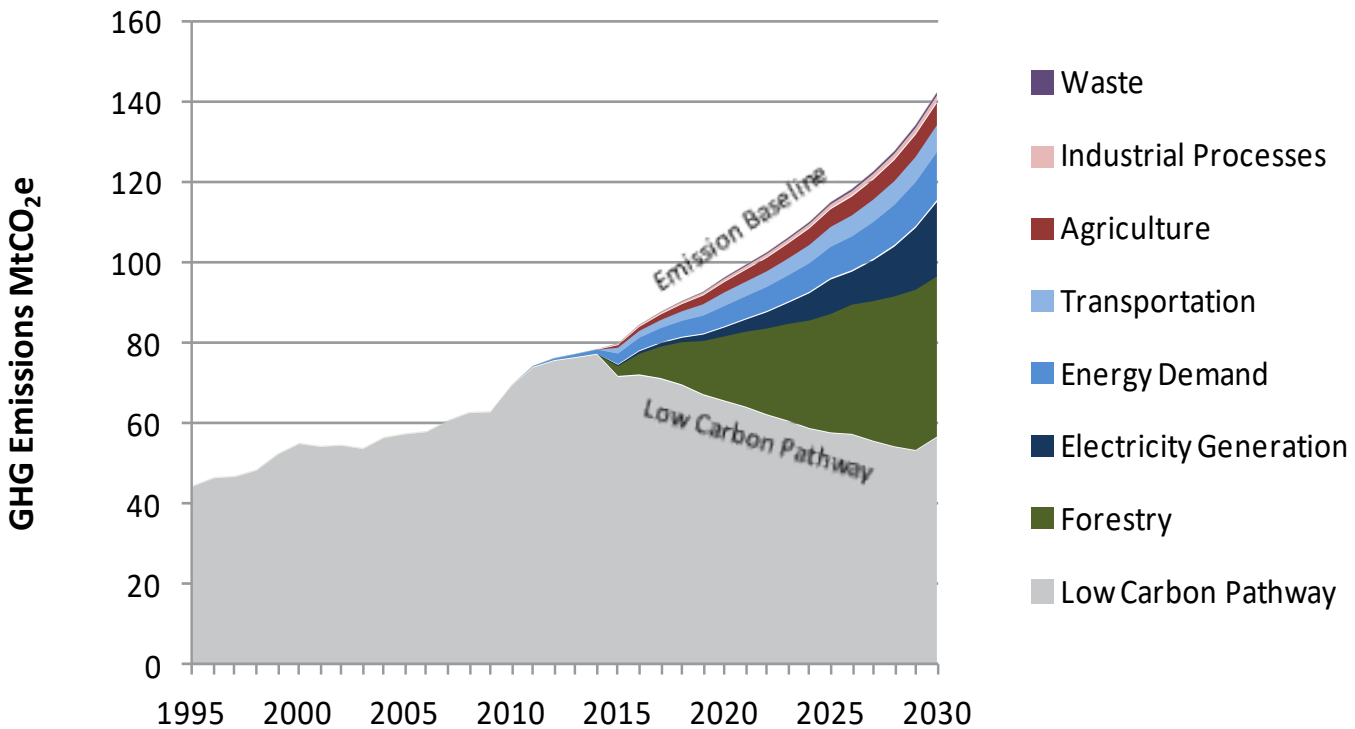
Mount Kenya glaciers are declining and will disappear in the next 30 years

Figure 1: *The impacts of climate change in Kenya*

A high level of water scarcity and a high reliance on climate-sensitive economic activities – such as crop production, livestock production and tourism – contributes to Kenya's vulnerability to climate change (see Table 1). From a geographical perspective, the Arid and Semi-Arid Lands (ASALs), which comprise 82% of Kenya's land area, are particularly vulnerable to climate change. Vulnerable groups in society, including women, children, youth, the elderly, persons with disabilities, and marginalised and minority groups, are particularly impacted by climate change.

Climate change has significant adverse effects on the Kenyan economy. 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. As an example, the 2018 floods wiped out resources worth billions of shillings. Roads and infrastructure were damaged, seasonal crops across an estimated 8,500 hectares were destroyed, and over 20,000 livestock drowned. The National Government allocated over KES 75 billion in 2018 to combat floods and fix roads destroyed by rains.

While adaptation is the priority for Kenya, *NCCAP 2018-2022* also identifies actions to reduce greenhouse gas emissions that are projected to increase due to population and economic growth (see emission baseline in Figure 2). Kenya's mitigation actions help to keep greenhouse gas emissions lower than the projected trajectory, moving Kenya toward the low carbon pathway illustrated in Figure 2. The mitigation actions deliver co-benefits including sustainable development and green growth and contribute to achieving the Government's *Big Four Agenda.*



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

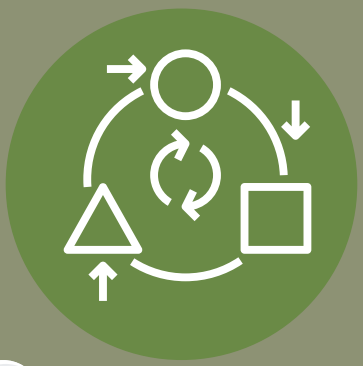
Figure 2: *Composite abatement potential for all sectors for Kenya (technical potential) in million tonnes of carbon dioxide equivalent (MtCO2e)*

CHAPTER THREE

What Has Kenya Done to Address Climate Change?

Climate change is a global problem that demands a global solution, and Kenya is an active participant in international efforts. The international response to climate change is now recorded under the *Paris Agreement*, which 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 Nationally Determined Contribution 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 (see Box 2). The *Paris Agreement* entered into force for Kenya on 27th January 2017, and as set out in *Article 2(6) of the Constitution (2010)*, the *Paris Agreement* now forms part of the law of Kenya.

Box 2: Kenya's Nationally Determined Contribution under the *Paris Agreement*



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.

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 (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 local level, Garissa, Makueni and Wajir Counties have enacted climate change fund regulations that allocate a portion of their development budgets to funds that support local climate change actions.

Action under NCCAP 2013-2017

NCCAP 2018-2022 is Kenya's second action plan on climate change. The first *NCCAP* identified 38 priority actions, which included nine mitigation actions and 29 enabling actions in the areas of climate finance, knowledge management, capacity development, policy and regulatory framework, and performance measurement. Seven actions were completed and 23 actions were in progress as of May 2018, and many are carried into *NCCAP 2018-2022*.

Considerable progress was made under the first action plan, including an increase of geothermal and other renewable energy electricity generation, completion of the Standard Gauge Railway from Mombasa to Nairobi that encourages a shift of freight transport from road to rail, and reforestation and afforestation. Adaptation actions reduced vulnerability and built adaptive capacity through disaster risk reduction, drought management, and adaptation in the agricultural sector including irrigation, improving the climate resilience of pastoralists, and sustainable land management.

Enabling actions included improvements to the policy and regulatory environment with the enactment of the *Climate Change Act(2016)* and approval of the *National Climate Change Policy* and *Climate Finance Policy.* Climate change funds were established in five Counties, the National Climate Change Resource Centre was established, the Climate Change Directorate was established, and a greenhouse gas inventory unit was established, including the System for Land-based Emissions Estimation in Kenya (SLEEK).

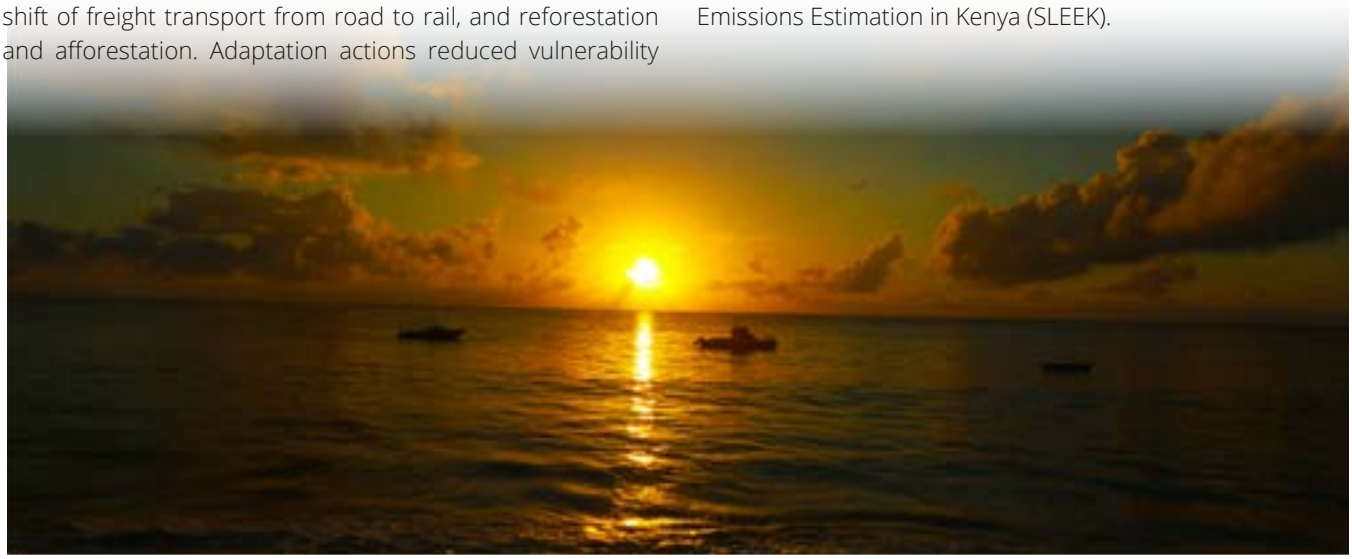


Photo: *CCD*

CHAPTER FOUR

What Are the Priority Climate Change Actions for 2018-2022?

NCCAP 2018-2022 takes cognisance of the impacts of climate change on Kenya's socio-economic sectors. It identifies seven 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.

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 act to achieve climate change adaptation and mitigation objectives;
- Supports achievement of the *Big Four Agenda* and Sustainable Development Goals;
- Prioritises adaptation actions 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.
- Undertakes actions, where possible, in a way that limits greenhouse gas 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 seven priority climate action areas, their strategic objectives, and main actions are discussed below. 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, and relevant institutions to deliver the actions.

01 Disaster Risk Management

Reduce risks to communities and infrastructure resulting from climate-related disasters such as droughts and floods

Actions

- 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

Impact of climate disasters on Kenyan society and economy. Climate-related disasters, such as drought and floods, could prevent the achievement of the *Big Four Agenda*. 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 disaster at the expense of other programmes.

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. Droughts increase water scarcity with negative impacts for communities, especially for women and girls who must travel long distances for water and have less water for hygiene. Pastoralists in the arid and semi-arid lands (ASALs) face livestock deaths due to lack of forage, water, and increases in insecurity and conflicts within Kenya and across national borders. 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.

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 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 women, 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 Agenda* –** progress towards 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.

02 Food & Nutrition Security

Increase food and nutrition security by enhancing productivity and resilience of the agricultural sector in as much of a low-carbon manner as possible

Actions

- Improve crop productivity through the implementation of climate-smart actions
- Improve crop productivity by increasing the acreage under efficient irrigation
- Increase productivity in the livestock sector through implementation of climate-smart actions
- Enhance productivity in the fisheries sector through implementation of climate-smart actions
- Diversify livelihoods to adjust to a changing climate.

Increased food insecurity because of climate change. The agriculture sector is highly susceptible to the vagaries of weather, including temperature increase, precipitation changes, and extreme events. Dry weather conditions in 2017 led to a decline in the production of most agricultural commodities, and an increase in the number of livestock slaughtered as farmers and pastoralists tried to cushion their losses. Recurring droughts have forced an estimated 30% of livestock owners out of pastoralism in the past 20 years. Fisher communities report that fish are moving from in-shore to deeper waters and artisanal fisher communities lack the technologies to safely fish in deeper waters.

Win-win solutions for climate, agriculture, and food security. Increasing production in a changing climate is necessary to achieve the *Big Four Agenda* food and nutrition security goal over the next five years. Thus, adaptation actions are the priority and food security takes precedence over mitigation of greenhouse gas emissions. Many of the actions, however, also reduce greenhouse gas emissions, which is important because agricultural emissions accounted for approximately 40% of total national emissions in 2015.

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 –** greenhouse gas emissions of 2.61 $MtCO_2e$ by 2022 through agroforestry, minimum tillage systems, manure management, and efficiency in livestock management.
- ***Big Four Agenda* –** 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, small-holder farmers, and fisher communities; improved health with more healthy food available; and better management of ecosystems and their biodiversity.

03 Water and the Blue Economy

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

Actions

- Increase annual per capita water availability through the development of water infrastructure
- Climate proof water harvesting and water storage infrastructure, and improve flood control
- Increase affordable water harvesting-based livelihood programmes
- Promote water efficiency (monitor, reduce, re-use, and recycle)
- Improve access to good quality water
- Improve climate resilience of coastal communities
- Climate proof coastal infrastructure

Increased water scarcity: a vital challenge. Kenya is a water scarce country with per capita water availability of 647 m^3, which is well below the global benchmark of 1000 m^3 per capita, indicating chronic water scarcity. 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. 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.

A comprehensive plan for ensuring access to quality water for all. *NCCAP 2018-2022* aims to increase annual per capita water availability to 1000 m^3. To achieve this target, actions will enhance the resilience of the water sector by ensuring adequate access to and efficient use of water for agriculture, manufacturing, domestic, wildlife, and other uses. 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.

The climate change actions result in:

- **Adaptation –** increased water availability through water harvest and storage, improved water efficiency, and improved water availability.
- ***Big Four Agenda* –** 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, and protection of coastal and marine ecosystems.

04 Forestry, Wildlife & Tourism

Increase forest cover to 10% of total land area; rehabilitate degraded lands, including rangelands; increase resilience of the wildlife and tourism sector

Actions

- Afforest and reforest degraded and deforested areas in Counties
- Reduce deforestation and forest degradation
- Restore degraded landscapes (ASALs and rangelands)
- Promote sustainable timber production on privately-owned land
- Conserve land areas for wildlife

Highly valuable but fragile ecosystems. 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. *NCCAP 2018-2022* contributes to the restoration, conservation, and sustainable management of forests and other ecosystems that play an essential role in Kenya's economy. 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, 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. The negative impacts that result from deforestation (such as soil erosion and increased flooding) are exacerbated by climate change.

Multiple benefits of sustainable management of forests and ecosystems. Forests provide ecosystem services that contribute to reducing the vulnerability of people and wildlife, and provide hydrological ecosystem services such as regulation of storm waters. Forests also provide significant carbon benefits by mitigating the harmful effects of greenhouse gas emissions by acting as "sinks" through carbon sequestration. The forestry sector is the second largest contributor to Kenya's greenhouse gas emissions after agriculture, accounting for 32% of emissions in 2015, largely due to deforestation.

The sector offers the greatest potential of all mitigation sectors to reduce emissions. While reducing GHG emissions is critical, mitigation actions that have adaptation and sustainable development benefits are prioritised in *NCCAP 2018-2022*.

The climate change actions 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 2022 through forest restoration, afforestation and reforestation, and reducing deforestation and forest degradation
- ***Big Four Agenda* –** 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; and opportunities for timber industries and housing construction.

05 Health, Sanitation & Human Settlements

Mainstream climate change adaptation into the health sector; increase the resilience of human settlements, including improved solid waste management in urban areas

Actions

- Reduce the incidence of malaria and other vector-borne diseases that increase with changes in climate
- Promote recycling to divert collected waste away from disposal sites
- Climate proof landfill sites
- Control flooding in human settlements
- Promote green buildings

Climate-related threats to human health. The risk of malaria and other vector-borne diseases is projected to increase due to changing climate conditions. 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, and increases the transmission intensity in areas where malaria already occurs. Climate change also increases risks to human health by impacting human settlements. Urban areas concentrate populations, economic activities and built environments, thus increasing the risk of flooding, heat waves, and other climate hazards. This is especially true in informal settlements and other low-income areas with high population densities and lack of infrastructure. Improperly managed solid waste can accumulate in areas 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.

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

The climate change actions result in:

- **Adaptation –** reduced incidence of malaria and other diseases expected to increase because of climate change, 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, promote green buildings, and explore options for methane capture and power generation.
- ***Big Four Agenda*** **–** 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; 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.

06 Manufacturing

Improve energy and resource efficiency in the manufacturing sector

Actions

- Increase energy efficiency
- Improve water use and resource efficiency
- Optimise manufacturing and production processes
- Promote industrial symbiosis in industrial zones

Climate change negatively impacts manufacturing. Climate change could prevent the *Big Four Agenda* goal of increasing manufacturing to 15% of GDP by 2022. Manufacturing is capital intensive, with many long-life fixed assets, long supply chains, and significant water requirements, which are negatively impacted by floods, droughts, and extreme weather events. Climate change will increase resource scarcity (such as water and raw materials) that are inputs to the manufacturing process. An example is the 2017 drought that affected tea production and resulted in diminished turnover in processed tea.

Win-win solutions for climate-resilience, low-carbon impact, greater productivity and competitiveness. *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 actions to promote a green manufacturing sector focus on resource efficiency, sustainable production, and managing waste as a resource to create new product lines from waste recovery and re-use. Mitigation actions are also important because the sector emitted about 7% of Kenya's total emissions in 2015. These actions emphasise how improving the efficiency of charcoal production also helps to reduce deforestation and forest degradation.

The climate change 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 Agenda* –** 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 jobs; and promotion of innovation for youth and women.

07 Energy and Transport

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

Establish efficient, sustainable world-class transport systems and logistic services that can withstand the expected impacts of climate change

Energy Actions

- Promote the transition to clean cooking with alternative clean fuels, such as: LPG, ethanol and other clean fuels in urban areas; and, clean biomass (charcoal and wood) cookstoves or other alternatives in rural areas
- Increase renewable energy for electricity generation that is climate resilient and accounts for needs of rural areas
- Increase captive renewable energy generation capacity
- Improve energy efficiency and energy conservation
- Climate proof energy infrastructure

Transport Actions

- Develop an affordable, safe and efficient public transport system, including a Bus Rapid Transit System in Nairobi and non-motorised transport facilities
- Reduce fuel consumption and fuel overhead costs, including electrification of the Standard Gauge Railway
- Encourage low-carbon technologies in the aviation and maritime sectors
- Climate proof energy and transport infrastructure

Climate change negatively impacts the energy and transport sectors. Temperature increase, sea level rise, and a greater number and severity of extreme weather events – such as heavy rains resulting in floods – damage energy and transport infrastructure. These climatic changes increase the risk of delays, disruptions, damage, and failure across land-based, air, and marine transportation systems. For example, the floods in early 2018 caused extensive damage to the road network. 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 a rise in the price of electricity.

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. 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 National Adaptation Plan, 2015-2030*, as a means of addressing infrastructure-related climate change impacts.

Reducing greenhouse gas emissions in the energy and transport sectors is required to achieve Kenya's mitigation Nationally Determined Contribution. 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 greenhouse gas emissions, directly accounting for about 13% of Kenya's total greenhouse gas emissions in 2015, a number which is projected to rise to 17% of total national emissions by 2030.

Climate actions promote a renewable and affordable electricity supply with low greenhouse gas emissions to meet the demands of a growing population and industrialising nation. Seventy percent (70%) of Kenyans depend on biomass for primary energy, most of which is non-renewable. This leads to indoor air pollution, deforestation, and greenhouse gas emissions. The transition to clean cooking presents an opportunity for technological leapfrogging with energy and greenhouse gas emissions savings, health benefits particularly for women and children, and protection of forests. Climate actions in the transport sector reduce greenhouse gas emissions while promoting sustainable world-class transport systems, including a mass rapid transit system in Nairobi that includes non-motorised transport facilities, an improved rail system for movement of people and freight, and reduced fuel consumption in the rail, road, maritime, and air transport systems.

The climate change 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, and energy efficiency.
  - *Energy demand* - GHG emission reductions of an estimated 7.1 $MtCO_2e$ by 2022, by encouraging the transition to clean cooking through the uptake of liquefied petroleum gas (LPG) and other clean fuels in urban areas and efficient biomass cookstoves in rural areas.
  - *Transport* - GHG emission reductions of 1.82 $MtCO_2e$ by 2022 through electrification of the standard gauge railway, 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 Agenda –** 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 and forest degradation; protection of water catchment areas; improved local air quality; sustainable transportation systems that improve people's mobility and safety; and reduction of deaths from indoor air pollution from 49% of the total annual deaths (21,560 in 2017) to 20%.

CHAPTER FIVE

What is Needed to Move Forward on the Climate Actions?

Enabling actions are required to implement the priority adaptation and mitigation actions set out in the seven priority climate change action areas. Thirty-eight crosscutting enabling actions, listed in Table 1 and described in *NCCAP 2018-2022*, aim to equip government and stakeholders with the knowledge, skills, technologies and financing needed to deliver and report on climate actions.

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 design and implementation of market-based mechanisms domestically and internationally
F7	Complete the 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 the implementation of Kenya's Nationally Determined Contribution
M3	Establish a system to track and report on land-based greenhouse gas emissions
M4	Establish a Climate Business Platform to support the reporting requirements of non-state actors


Photo: CCD

CHAPTER SIX

How will NCCAP 2018-2022 be Delivered?

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 is responsible for overall coordination of climate change affairs, including guiding implementation of *NCCAP 2018-2022*.

The Cabinet Secretary responsible for climate change affairs reports to the Council and Parliament on the status of the implementation of *NCCAP 2018-2022*. The Climate Change Directorate, within the ministry responsible for climate change affairs, coordinates the implementation of *NCCAP 2018-2022*, including monitoring and reporting.

State departments and national public entities are required to establish climate change units to mainstream *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.

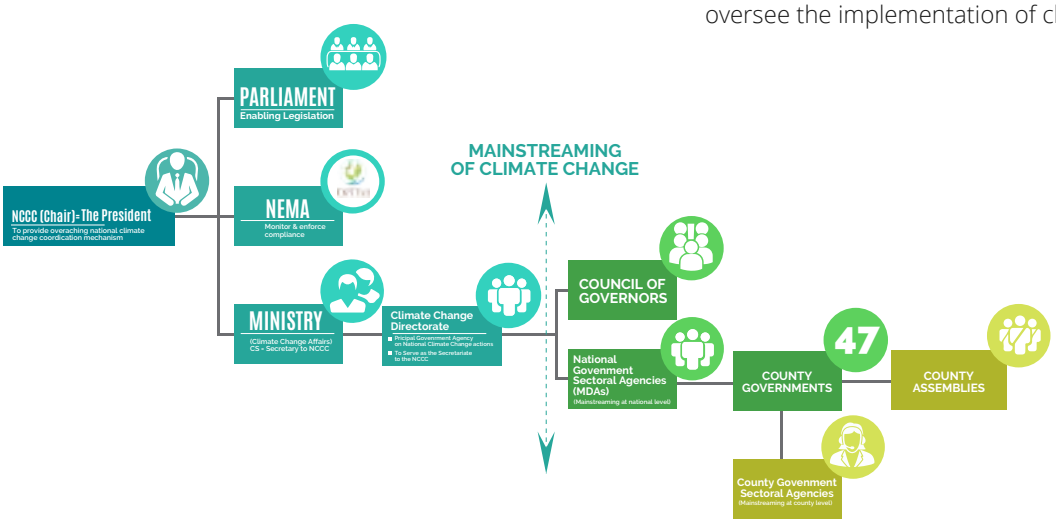


Figure 3: *Institutions established in the Climate Change Act, 2016.*

CHAPTER SEVEN

How Will Progress on NCCAP 2018-2022 be Monitored?

The Climate Change Directorate is responsible for monitoring the implementation of *NCCAP 2018-2022* every two years as required by 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 the private sector, civil society, academia, women, youth, and minority and marginalised groups including pastoralists, forest resource users, and fisher communities.

The monitoring system will track implementation and results of *NCCAP 2018-2022*, and the 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.

National-level indicators have been identified for the seven priority climate action areas, listed in the table below. *NCCAP 2018-2022* identifies expected results for all mitigation and adaptation actions, which are included in the full NCCAP. Process indicators have been developed for all enabling actions against which to track progress.

Priority Climate Action	National-level Indicators
01 Disaster Risk Management	***Adaptation*** ■ Number of deaths, missing persons, and directly affected persons attributed to disasters per 100,000 population. ■ Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national strategies. ■ Number of households receiving food aid and cash transfers
02 Food & Nutrition Security	***Adaptation*** ■ GDP growth of agricultural sector ■ Livestock deaths from drought / number of livestock slaughtered attributable to drought ■ Agricultural land under irrigation (acreage) ***Mitigation*** ■ Greenhouse gas emissions in the agriculture, forestry, and other land use sector ■ Area under agroforestry (acreage)
03 Water and the Blue Economy	***Adaptation*** ■ Water storage per capita ■ Water coverage ■ Per capita water availability ■ Coverage of protected areas in relation to marine area
04 Forestry, Wildlife & Tourism	***Adaptation /Mitigation*** ■ Forest cover as a percent of total land area ***Adaptation*** ■ Proportion of land that is degraded over total land area ■ Elephant deaths as a result of drought ***Mitigation*** ■ Greenhouse gas emissions in the land use, land-use change and forestry sector

Priority Climate Action	National-level Indicators
05 Health, Sanitation & Human Settlements	***Adaptation*** ■ 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 ***Mitigation*** ■ Greenhouse gas emissions in the waste sector
06 Manufacturing	***Mitigation*** ■ Number of industrial parks adopting waste diversion practices ■ Greenhouse gas emissions in the industrial sector
07 Energy and Transport	■ ***Mitigation*** ■ Renewable energy share in the total electricity generation mix - percentage ■ Households using biomass for energy - percentage ■ Proportion of households using LPG - percentage ■ Greenhouse gas emissions in the energy sector ■ Freight moved by rail as proportion of total freight moved over land -percentage ■ Greenhouse gas emission in the transport sector


Sustainable
Energy
renewable
generations
efficiency
power
sources
future
source
needs
environment
compromising
includes
technology
interpretation
provision
human
long
ability
disaster
use
without
green
meet
time
generation
fission
meets
due
alternative
organization
replenishable
Conventional
Partnership
continue
uranium
Effectively
equitable
technologies
biofuels
atmosphere
Low-carbon
conservation
preferably
radioactive
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