REPUBLIC OF KENYA

MINISTRY OF ENVIRONMENT & FORESTRY

NATIONAL CLIMATE CHANGE ACTION PLAN (NCCAP)

VOLUME II

2018

ADAPTATION TECHNICAL ANALYSIS REPORT (ATAR) 2018-2022

Correct Citation:

Government of Kenya (2018). National Climate Change Action Plan (Kenya) Volume 2: Adaptation Technical Analysis Report 2018-2022. Ministry of Environment and Forestry. Nairobi.

Cover Design and Layout: Boniface Gor (www.digimatt.co.ke)

For further information, please contact:

Principal Secretary

Ministry of Environment and Forestry

Email: psoffice@environment.go.ke

Website: www.environment.go.ke

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National Climate Change Action Plan (2018-2022) Task Force

Charles Sunkuli (Chair)	- Principal Secretary, Ministry of Environment and Forestry
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 - Coordinator
Augustine Kenduiwo
Peter Omeny
Michael Okumu
Samuel Muchiri
David B. Adegu
Veronica Kioko
Stephen Muhanji
Innocent Muriithi
Fiona Oweke

Adaptation Thematic Working Group Members

Pacifica Achieng Ogola, PhD	Ministry of Environment and Forestry
Thomas Lerenten Lelekoitien	Climate Change Directorate
Alfred Gichu	Kenya Forest Service
Lolem Lokolile Bosco	Ministry of Health
Esther Gacanja	Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works
Arthur Tuda, PhD	Ministry of Tourism and Wildlife
Anne Kariuki	Kenya Association of Manufacturers
Kelvin Khisa, PhD	Kenya Industrial Research and Development Institute
David Kiboi	State Department of Planning
Andrew Kinyua	Ministry of Water and Sanitation
Suada Ibrahim	Kenya Red Cross
Josep Muhwanga	Kenya Private Sector Alliance
Brian Muthoka	Council of Governors
Veronica Ndetu	Ministry of Agriculture and Irrigation (Agriculture)
Francis Nyambariga	Ministry of Agriculture, Livestock, Fisheries and Irrigation (Irrigation)
Peter Odhengo	The National Treasury
Victor Orindi	National Drought Management Authority
Sunya Orre	National Drought Management Authority
Maurice Otieno	National Environment Management Authority
Sayianga Parsanka	Indigenous Groups
Ayub Shaka	Kenya Meteorological Department
Michael Okoti, PhD	Kenya Agriculture and Livestock Research Organisation
Susy Wandera	Sustainable Environmental Development Watch
Stephen King'uyu	Climate Change Directorate
Michael Okumu	Climate Change Directorate
Joab Osumba	ATAR Consultant
Deborah Murphy	NCCAP Consultant
Stephen Manengene	Ministry of Tourism and Wildlife

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Abbreviations and Acronyms

AECF	Africa Enterprise Challenge Fund
AfDB	African Development Bank
AR5	Fifth Assessment Report
ASALs	Arid and Semi-Arid Lands
ASDSP	Agriculture Sector Development Support Program
ASSAR	Adaptation at Scale in Semi-Arid Regions (Project)
ASTGS	Agricultural Sector Transformation and Growth Strategy
ATAR	Adaptation Technical Analysis Report
ATWG	Adaptation Technical/Thematic Working Group
AUC	African Union Commission
AWF	African Wildlife Foundation
CARE	Cooperative for American Relief Everywhere
CARIAA	Collaborative Adaptation Research Initiative in Africa and Asia
Cat-DDO	Catastrophe Deferred Drawdown Option
CBD	Convention on Biological Diversity
CCA	Climate Change Adaptation
CCCF	County Climate Change Fund
CCD	Climate Change Directorate
CCF	Climate Change Fund
CCISP	County Climate Information Service Plans
CCTWG	Climate Change Thematic Work Group
CCU	Climate Change Unit (in Government MCDAs)
CDA	Coast Development Authority
CDKN	Climate and Development Knowledge Network
CIC	Climate Innovation Centre
CIDPs	County Integrated Development Plans.
CIMES	County Integrated Monitoring and Evaluation System
CIS	Climate Information Services
CMA	Community Managed Area
CoG	Council of Governors
CORDEX	Coordinated Regional Downscaling Experiment
CRM	Climate Risk Management
CSO	Civil Society Organization
CTCN	Climate Technology Centre and Network
DFID	Department for International Development (of United Kingdom)
DRM	Drought Risk Management
DRR	Disaster Risk Reduction
EAC	East African Community
EBRD	European Bank for Reconstruction and Development
EDE	Ending Drought Emergencies
EIA	Environmental Impact Assessment

ENSO	El Niño Southern Oscillation
EPA	Environmental Protection Agency (USA)
EWS	Early Warning System
FAO	Food and Agriculture Organization (of the United Nations)
FEWS Net	Famine Early Warning Systems Network
GCF	Green Climate Fund
GDC	Geothermal Development Company
GDP	Gross Domestic Product
GEF	Global Environment Facility
GESIP	Green Economy Strategy and Implementation Plan
GGEP	Green Growth and Employment Programme
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GNI	Gross National Income
GoK	Government of Kenya
GYVG	Gender, Youth and Other Vulnerable Groups
HMIS	Health Management Information Systems
HSNP	Hunger Safety Net Project
HSNP-CT	Hunger Safety Net Programme Cash Transfers
ICAO	International Civil Aviation Organization
ICHA	International Center for Humanitarian Affairs
ICPALD	IGAD Centre for Pastoral Areas Development and Livestock Development
ICZM	Integrated Coastal Zone Management
IEA	Institute of Economic Affairs (of Kenya)
IFAD	International Fund for Agricultural Development
IGAD	Intergovernmental Authority on Development
ILRI	International Livestock Research Institute
IMO	International Maritime Organisation
IOD	Indian Ocean Dipole
IPCC	Intergovernmental Panel on Climate Change
ITCZ	Inter-Tropical Convergence Zone
ITS	Intelligent Transportation System
IWRM	Integrated Water Resources Management
JJA	June- July-August
KALRO	Kenya Agriculture and Livestock Research Organization
KAM	Kenya Association of Manufacturers
KCSAIF	Kenya Climate Smart Agriculture Implementation Framework
KCSAS	Kenya Climate Smart Agriculture Strategy
KEFRI	Kenya Forestry Research Institute

KEMRI	Kenya Medical Research Institute
KenGen	Kenya Electricity Generating Company
KENHA	Kenya National Highways Authority
KEPSA	Kenya Private Sector Alliance
KERRA	Kenya Rural Roads Authority
KFS	Kenya Forest Service
KICD	Kenya Institute of Curriculum Development
KIRDI	Kenya Industrial Research and Development Institute
KMD	Kenya Meteorological Department
KMFRI	Kenya Marine and Fisheries Research Institute
KNBS	Kenya National Bureau of Statistics
KPLC	Kenya Power and Lighting Company
KURA	Kenya Urban Roads Authority
KWS	Kenya Wildlife Service
LDN	Land Degradation Neutrality
LECRD	Low Emissions & Climate Resilient Development
MAM	March-April-May
MCA	Multi-Criteria Analysis
MCDAs	Ministries, Counties, Departments and Agencies
MCM	Million Cubic Metres
MED	Monitoring and Evaluation Department
MoAL&F	Ministry of Agriculture Livestock and Fisheries
MoALF&I	Ministry of Agriculture Livestock, Fisheries and Irrigation
MoD&P	Ministry of Devolution and Planning
MoE	Ministry of Energy
MoE&F	Ministry of Environment and Forestry
MoE&NR	Ministry of Environment and Natural Resources
MoEW&NR	Ministry of Environment, Water and Natural Resources
MoH	Ministry of Health
MoSSP	Ministry of State for Special Programmes
MoTIHUD	Ministry of Transport, Infrastructure, Housing and Urban Development
MoT&W	Ministry of Tourism and Wildlife
MoW&S	Ministry of Water and Sanitation
MRV+	Measurement, Reporting and Verification Plus – an Integrated National Performance and Benefit Measurement Framework (NPBMF)
MSP	Multi-Stakeholder Process
MTEF	Medium Term Expenditure Framework
MTP	Medium Term Plan
NACOSTI	National Commission for Science, Technology and Innovation
NAMA	Nationally Appropriate Mitigation Action
NAO	North Atlantic Oscillation
NAP	National Adaptation Plan
NASEP	National Agricultural Sector Extension Policy

NCCAP	National Climate Change Action Plan
NCCC	National Climate Change Council
NCCFP	National Climate Change Framework Policy
NCCRS	National Climate Change Response Strategy
NCFP	National Climate Finance Policy
NDA	National Designated Authority
NDC	Nationally Determined Contribution
NDE	National Designated Entity
NDMA	National Drought Management Authority
NDOC	National Disaster Operations Centre
NEMA	National Environment Management Authority
NGO	Non-Governmental Organization
NIE	National Implementing Entity
NIMES	National Integrated Monitoring and Evaluation System
NLP	National Land Policy
NPBMF	National Performance and Benefit Measurement Framework (also referred to as MRV+)
NSNP	National Social Safety Net Programme
NSP	National Spatial Plan
NWSA	National Water Storage Authority
OCHA	Organization for the Coordination of Humanitarian Affairs
OND	November-December
OP-CT	Older Persons- Cash Transfers
OVC-CT	Orphans and Vulnerable Children- Cash Transfers
PDNA	Post-Disaster Needs Assessment (Kenya)
PES	Payment for Environmental/ Ecosystem Services
PPP	Public-Private Partnerships
PRISE	Pathways to Resilience in Semi-arid Economies
PWSD-CT	Persons with Severe Disability- Cash Transfers

PSP	Participatory Scenario Planning
QBO	Quasi Biennial Oscillation
RCA	Rossby Center Regional Atmospheric Model
RCP	Representative Concentration Pathways
REACT	Renewable Energy and Adaptation to Climate Change Technologies
SDGs	Sustainable Development Goals
SDHUD	State Department of Housing and Urban Development
SEI	Stockholm Environment Institute
SEZ	Special Economic Zone
SLM	Sustainable Land Management
SLMP	Sustainable Land Management Policy
SPARS	Strategic Plan for Agricultural and Rural Statistics
StARCK+	Strengthening Adaptation and Resilience to Climate Change in Kenya (Phase II of DFID Climate Change Programme in Kenya)
STI	Science, Technology and Innovation
SWIOC	Southwest Indian Ocean Cyclone
TARDA	Tana and Athi River Development Authority
TIMPs	Technologies, Innovations and Management Practices
TNA	Technology Needs assessment
UK-Met	United Kingdom Meteorology (Department)
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
URTI	Upper Respiratory Tract Infection
USAID	United States Agency for International Development
WHO	World Health Organization (of United Nations)
WRA	Water Resources Authority
WRUA	Water Resource Users Association

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EXECUTIVE SUMMARY

A variety of technical and policy instruments are being applied in adaptation planning and implementation. One of these instruments is the Adaptation Technical Analysis Report (ATAR). *ATAR 2018 – 2022* was developed by the Adaptation Thematic Working Group in consultation with the *National Climate Change Action Plan (NCCAP) 2018-2022* Task force, climate change experts, and other relevant stakeholders. The process benefited from a number of consultative sessions, including interactions with sectors, County Economic Blocs, youth, marginalized groups and indigenous communities (minorities, including pastoralists), and the Joint Parliamentary Committee on Environment and Climate Change. *ATAR 2018-2022* is one of the technical documents underpinning *NCCAP 2018-2022*, which is to be delivered jointly by the National and County Governments toward building Kenya's resilience and adaptation to climate change. The *Climate Change Act 2016* requires that deliberate considerations be made to ensure climate change considerations are mainstreamed in all government plans, policies and programmes, resulting in in-built public climate financing of all sectors of the economy.

Adaptation actions proposed in *ATAR 2018-2022* address key issues identified during the situational analysis stage, and considered by sector. Sector contributions were received from Disaster (Drought and Floods) Risk Management, Food and Nutrition Security (Agriculture: Crops, Livestock and Fisheries), Forestry, Water and Sanitation, Population, Settlement, Urban Development, Affordable Housing and Waste Management, Manufacturing (Industrialization), Energy, Transport/ Infrastructure, Marine and Coastal Resources, Health, Tourism and Wildlife. The major issues were natural disasters, mainly drought and floods, pests, and disease epidemics. Other issues considered included food insecurity, water insecurity, vulnerability of infrastructure, exposure of land to the harsh climatic conditions, and exposure of marine and coastal zone to such impacts of climate change as sea level rise.

In planning the adaptation actions in *ATAR 2018-2022*, Kenya is responding to threats brought about by climate change, including temperature rise and variability, rainfall unreliability, drought, floods, landslides, ocean acidification, sea level rise, and melting of glaciers. Adaptation actions for Kenya respond to actual risks posed by these hazards. The climate change adaptation actions implemented in Kenya under *NCCAP 2013–2017* generated valuable lessons on the types of adaptation actions that promise huge success in different contexts in Kenya, and how they enhance resilience and/or promote adaptation. The actions fall under the adaptation sectors that *ATAR 2018-2022* has prioritised.

Actions proposed in *ATAR 2018-2022* align with the Governments Big Four Agenda, which focuses on achieving Food and Nutrition Security, Affordable Housing, Universal Health Coverage, and Enhanced Manufacturing. They are also aligned with the SDGs and it will track 72 out of 169 Sustainable Development Goal (SDG) targets across all the 17 SDGs.

Kenya has selected 128 SDG indicators for monitoring and reporting at national level, out of which 70 have been identified under ATAR 2018-2022 adaptation actions. The remaining SDG targets specifically require actions relating to international cooperation.

Delivering adaptation actions in *ATAR 2018-2022* requires activation of enabling and cross-cutting actions, including financial resource mobilisation, technology development, and capacity building. The cross-cutting actions will focus on building the capacity of stakeholders and providing a framework to encourage innovation and investments in climate-friendly technologies, ensuring that Kenya is well-positioned to access climate finance, and on measuring the climate results and benefits of adaptation actions. The coordination and delivery structure created by the *Climate Change Act 2016* offers an opportunity for both the National and

Table i: *Alignment of the proposed actions to the SDGs* [1]

#	Sector	Nº of main adaptation actions	Nº of SDG Targets
1	Drought and Epidemic Risk Management / Ending Drought Emergencies	5	30
2	Flood, Landslide and Epidemic Risk Management	4	15
3	Agriculture, Food and Nutrition Security	8	20
4	Energy	4	13
5	Forestry	7	9
6	Health	5	13
7	Human Settlement, Urban Development and Housing and waste infrastructure	2	13
8	Manufacturing	4	7
9	Transport and other Infrastructure	1	15
10	Water and Sanitation	5	19
11	Tourism	3	10
12	Wildlife	5	7
13	Marine and Coastal Resources	9	19
14	Gender, Youth and Other Vulnerable Groups	3	18

Table ii: *Breakdown of the distribution of the 72 ATAR targets (out of 169) SDG targets across all 17 SDGs.*

SDG Goals - Agenda 2030		Nº of SDG Targets in ATAR II
1	No Poverty	5
2	Zero Hunger	5
3	Good Health & Well- Being	6
4	Quality Education	4
5	Gender Equality	4
6	Clean Water & Sanitation	8
7	Affordable & Clean Energy	4
8	Decent Work & Economic Growth	1
9	Industry, Innovation & Infrastructure	4
10	Reduced Inequalities	1
11	Sustainable Cities & Communities	4
12	Responsible Consumption, Production	5
13	Climate Action	3
14	Life Below Water	5
15	Life on Land	7
16	Peace, Justice & Strong Institutions	2
17	Partnerships for the Goals	4
Overall Nº of SDG Targets		**72**

Source: *Author computation*

[1] *All SDG Goal Targets and Indicators quoted in this ATAR II Report are based on Global indicator framework adopted by the General Assembly (A/RES/71/313) and annual refinements contained in E/CN.3/2018/2 (Annex II) for 2018*

County levels of government to play a key role in delivering and coordinating adaptation actions at the National, County, and Community levels.

ATAR 2018–2022 is structured as follows: Chapter 1 comprises the situation analysis, Chapter 2 - the legal and institutional framework, Chapter 3 – the adaptation actions, and Chapter 4 – ATAR 2018-2022 delivery mechanisms. The *Report* also has a detailed implementation matrix, with projected costs for implementing the proposed actions. About KES 1.3 Trillion will be required over the next five years (KES 255 Billion per annum) to implement the proposed adaptation actions, based on the estimates in the *National Adaptation Plan (NAP) 2015 - 2030*. The Medium Term Plan (MTP III) sector reports were also used to get cost estimates for climate actions. Financing for the actions planned in *ATAR 2018-2022* will be drawn from public and private sources, both domestic and international.

Table iii: *A 5-year budget estimates, iterated from the NAP for the 2018 – 2022 plan period*

Budget Estimates: 5 Year Budget Estimates iterated from the NAP	
Sector, Focus Area or Enabling Institution	**Budget (in KES)**
1. Drought Risk Management – Ending Drought Emergencies	**70,609,265,067**
2. Flood Risk Management	**56,394,324,267**
3. Agriculture, Food and Nutrition Security	**28,057,935,199**
4. Energy	**116,962,948,700**
5. Forestry	**4,240,998,033**
6. Health	**1,336,719,400**
7. Human Settlement, Urban Development and Housing (including waste management infrastructure)	**155,440,606,967**
8. Manufacturing	**3,898,766**
9. Transport and infrastructure	**342,745,863,599**
10. Water and Sanitation	**56,394,324,267**
11. Tourism	**76,889,214,633**
12. Wildlife	**4,240,998,033**
13. Marine and Coastal Resources	**334,896,617,201**
14. CCD	**4,261,710,681**
15. KMD	**4,948,990,121**
16. NEMA	**4,240,998,033**
17. KIRDI (for Science, Technology and Innovation)	**742,621,900**
18. CoG	**3,620,281,733**
19. Gender, Youth and Other Vulnerable Groups	**9,154,885,100**
TOTAL	**1,275,183,201,700**

Note: *This financing will be drawn from public and private sources, both domestic and international.*

CHAPTER ONE

BACKGROUND AND CONTEXT

Image/Photo courtesy of the Adaptation Consortium

1.1 Introduction

This *Adaptation Technical Analysis Report (ATAR) 2018-2022* explores the options available for Kenya's adaptation action on climate change for the 2018-2022 medium term. It outlines the priority actions that informed the *National Climate Change Action Plan (NCCAP) 2018-2022*.

The report was developed with the understanding that climate change has become an impediment to sustainable development globally, and Kenya is heavily impacted by various adverse effects of climate change, including temperature rise and increased frequency and intensity of extreme climate events. While Kenya actively supports global efforts to reduce the pace of temperature rise and minimize climate change impacts, it has to adapt to the impacts of climate change. Kenya depends on such climate-sensitive sectors as agriculture, water, health, tourism, wildlife, forestry, and prioritizes adaptation and resilient building actions in climate change action.

This chapter provides adaptation-related technical information, including the definition of adaptation and its national and global adaptation goals (see Box 1), the importance of ATAR 2018-2022 on Kenya's development aspirations, the national and international climate change situation, Kenya's response to climate change, and actions undertaken since the *National Climate Change Action Plan (NCCAP) 2013-2017*.

Box 1: Definition of Adaptation, and the National and Global Adaptation Goals

Definition of Adaptation

Adaptation refers to what is undertaken to cope with an uncertain future. Adaptation in respect of climate change entails taking action to address the consequences of climate change, and/or taking advantage of positive effects of climate change. When faced with increasing drought, for example, we may change the crops we plant and/or improve rainfall capture and storage.

The Global Goal for Adaptation

As stated in the Paris Agreement, the global goal for adaptation is:

"Enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal".

NAP 2015-2030 Adaptation Goal

Enhance climate change resilience towards the attainment of vision 2030

ATAR 2018-2022 will help further Kenya's development aspirations by: -

- Aligning adaptation actions with the Government's development agenda, including the Big Four Agenda;
- Providing a framework for the mainstreaming of climate change action into sector- and County-level functions;
- Encouraging participation in climate change action by the private sector and non-state actors; and
- Serving as the Implementation Plan for the National Adaptation Plan (NAP) 2015-2030 and Kenya's Nationally Determined Contribution (NDC) to climate change action for the period 2018- 2022.

Image/Photo courtesy of the Adaptation Consortium

1.2 Situation Analysis

Kenya's adaptation response is driven by such factors as the current and expected climate trends and their impacts on the economy, society and the environment. The country's adaptation actions are derived from such adaptation issues as have been identified by climate change action stakeholders (see Box 2), and are delivered within the context of domestic and international legal and policy frameworks. These are presented in detail in Chapter 2.

Box 2: Key Adaptation Issues in Kenya

1. Natural disasters, including drought, floods, landslides, pests, and diseases;
2. Food insecurity, including reduction of productivity in crop and livestock farming, fisheries, and aquaculture;
3. Water insecurity, including in rural and urban areas;
4. Electricity supply, cost, and infrastructure challenges. When water levels reduce in the reservoirs used for hydro-generation due to drought, rationing of power impacts households and industries. Use of thermal sources of electricity in such times results in increased electricity costs, which increase the cost of doing business. The thermal sources also emit greenhouse gases (GHGs). Damage to energy infrastructure also affects supply and cost. Key issues include a climate resilient energy mix, and robustness of energy source options, including solar, wind, hydro, and thermal;
5. Degradation of terrestrial land, including forests, wetlands, rangelands, and agricultural land; and
6. Degradation of marine and coastal ecosystems, including mangrove forests, coral reefs, seagrass beds, beaches, deltas, and coastal agriculture.

1.2.1 The Climate of Kenya

Kenya has a tropical climate that is modified in some instances by varying topographies and altitudes (GoK, 1997; GoK, 2010a). These variations contribute to climate regimes that range from warm and humid in the country's coastal regions, to arid and very arid in the north eastern areas. They also influence the mean annual rainfall in Kenya, which has wide spatial variations, ranging from about 200 mm in the driest areas of north-western and eastern parts of Kenya to between 1200 mm and 2000 mm in the wetter areas bordering Lake Victoria and the Central Highlands to the east of the Rift Valley. Over two thirds of the country receive less than 500 mm of rainfall per year, and only 11 per cent of the country receives more than 1000 mm of rainfall per year (GoK, 2016a).

1.2.2 Climate Trends in Kenya

(a) Temperature Trends

Data collected since 1960 indicates that Kenya has experienced a general warming trend of about 1 °C, which is 0.21 °C per decade (GoK, 2010a; McSweeney, New, and Lizcano, 2009). The temperature increase has been observed across all seasons, particularly from March to May. Variations between locations are however evident, with a lower rate of 0.4 °C to 1.2 °C reported of the coastal area for the period from 1963 to 2012 (Daron, 2014). Ogutu, Piepho, Hans, Said, Ojwang, Njino, Kifugo, and Wargute (2016) have reported striking temperature rises in Kenya's Arid and Semi-Arid Lands (ASALs), with annual average maximum temperatures of 0.58°C to 1.91°C observed from 1960 to 2013. Mean annual minimum temperature rose from 0.58°C to 1.69°C between these years, which displays a more country-wide warming. This has been affirmed by Said, Muhwanga, Bedelian, Moiko, Atieno, and Abuya (2018), as shown in Figure 1.2.

(b) Rainfall Trends

Kenya's annual rainfall patterns show unpredictable trends, with interrupted spatial distributions. Increased rainfall has been observed during the October to December short rains period, particularly in northern Kenya and Rift Valley, Western and Eastern regions (Njoka, 2015). In the northern and western parts of Kenya, the short rains have been extending into the historically hot and dry months of January and February (GoK, 2010a). The number of days with heavy rains and increased intensity of adverse climate events are increasing in the country, especially in the October-December short-rains season. The number of consecutive dry days is also on the rise.

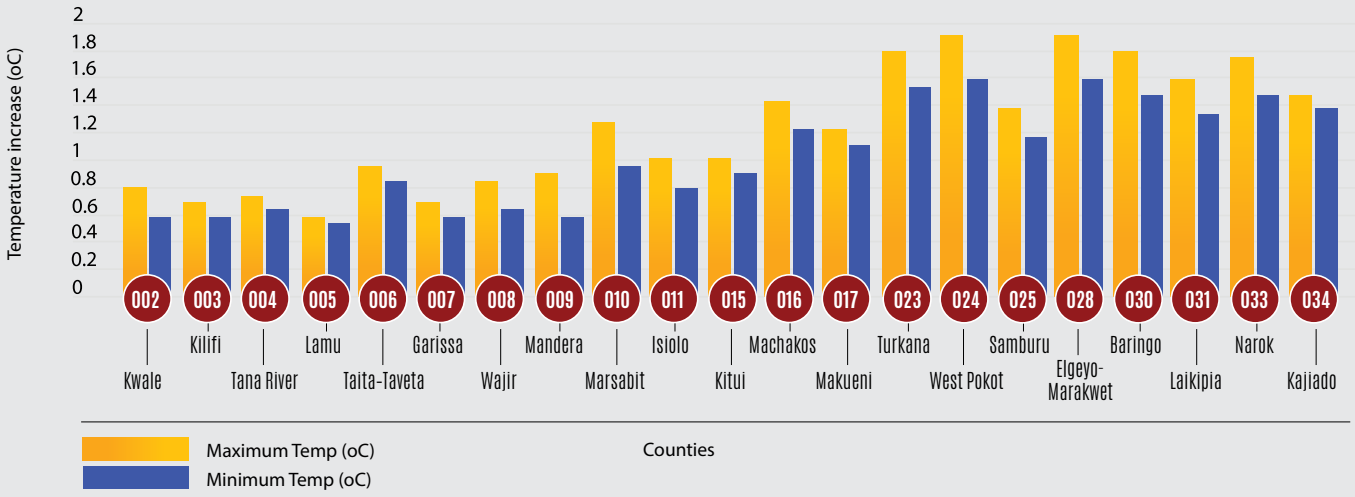


Figure 1.1: Temperature Changes in Kenya's 21 Arid and Semi-Arid Counties from – 1960 to 2013 (Said et al., (2018).

c) Trends in Drought and Floods

Drought and floods are the most significant of the climate-related disasters in Kenya. Before 1970s, on average, Kenya experienced drought every 10 years. The pattern has however changed, with the ratio of drought years to normal years exponentially rising between 1970 and 2011. The frequency and impacts of both drought and floods, and the number of people they affect, have been on the increase in the recent past. Figure 1.3 illustrates the number of people affected by drought and floods in Kenya from 1971 to 2009.

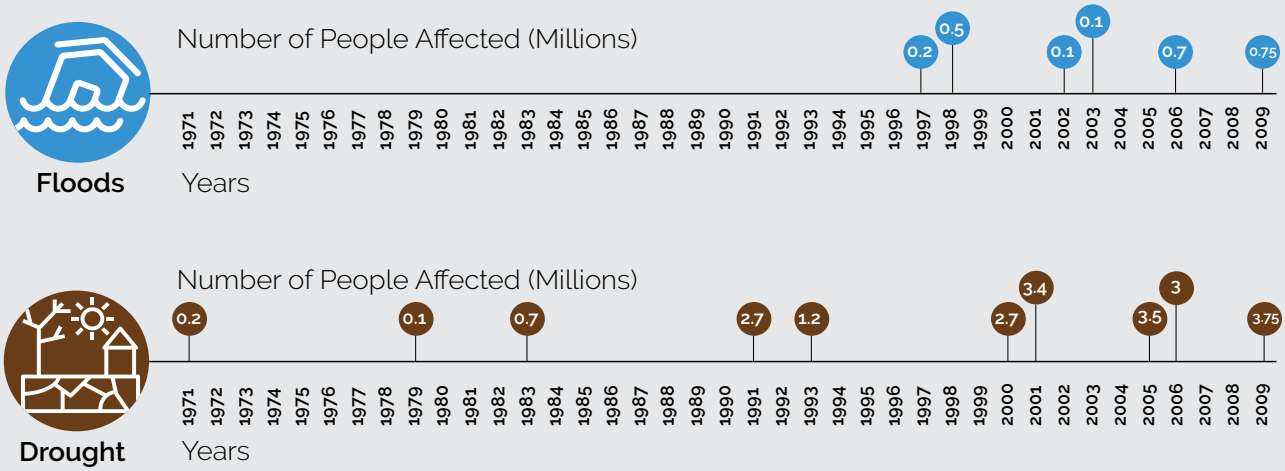


Figure 1.2: Number of People Affected by Drought and Floods in Kenya from 1971 to 2009 (Adapted from MoSSP (2009).

1.2.3 Projections for Climate Change in Kenya

Rising mean annual temperatures is a trend that has been projected to continue in Kenya in all seasons (Daron, 2014). The degree of the increase will however vary with regions. Funk, Eilerts, Davenport, and Michealsen (2010) predicted that lowlands would experience a higher rate of temperature increase than the plateaus and highlands. It has been estimated that by 2025, temperature rise will be between 0.9 °C and 1.1 °C in the Western and Northern regions of Kenya, and slightly lower (0.5 °C), in the southern part of the Coastal region. Daron (2014) has predicted that variability in precipitation patterns in Kenya would be a dominant influence on the country's climate over the coming decades. Some climate models indicate heavy declines in rainfall during the June- July-August (JJA) period, except for some few areas in Western Kenya and around Lake Victoria, where there may be slight increases in rainfall. In general, rainfall is expected to increase in the October-November-December (OND) period, and decline during the March-April-May (MAM) period, for most of Kenya.

Rising sea levels are a concern for Kenya's coastal areas. Globally, sea levels are projected to rise by between 26 cm and 55 cm by 2080s, under a low emissions scenario and, between 45 cm to 82 cm under the high emission scenario (IPCC, 2013). In Africa, it has been projected that the rate of sea level rise along the continent's coast, particularly the Indian Ocean will be greater than the global average (Schaeffer, Baarsch, Balo, de Bruin, Calland, Fallasch, Melkie, Verwey, Freitas, De Marez, van Rooij, Hare, 2015).

1.2.4 Vulnerability of Systems, Sectors and Populations

A high level of water insecurity, and reliance on such climate-sensitive economic activities as rain-fed crop production, livestock production, and tourism, contribute to the country's vulnerability to climate change. Kenya is a water insecure country, with water resources covering only 2 per cent of the total surface area. Fresh water resources have been stressed for years, and have a low replenishment rate. Climate change, coupled with high levels of poverty, particularly among the Kenyan communities in ASAL areas; an ever growing population; and increased manufacturing, have been cited to be contributors to increased water scarcity and competition over resources in Kenya (Njoka, 2015). For ASALs where livestock production, mainly through semi-nomadic pastoralism, is the main income source, water scarcity is very devastating. Women are very vulnerable because they have less economic power than men, which makes it more difficult for them to recover from climate-induced disasters. Women's role as primary caregivers and providers of food and fuel also increases their vulnerability. Table 1.1 presents a summary of climate risks and key sources of vulnerabilities in Kenya.

Table 1.1: *Climate risks and key sources of vulnerabilities in Kenya.*

Climate hazards/sources of climate risks	Key sources of vulnerability				
Rising temperatures	High levels of multi-dimensional poverty, particularly in ASALs	Environmental degradation	Destruction or degradation of ecosystems	High reliance of the national economy and local livelihoods on rain-fed agriculture	Water scarcity and mismanagement of water resources, particularly in ASALs
Uncertain changes in rainfall patterns					
Rising sea levels and stronger storm surges	Insecure land tenure and land fragmentation	Rapid population growth and migration to urban areas	Heavy disease burden and limited access to quality healthcare	Gender inequality	Increased insecurity
Extreme weather events (droughts, floods, and landslides)					

1.2.5 Impacts of Climate Change in Kenya

Climate change has caused increase in average temperatures, climate extremes, unpredictable rainfall patterns, and increased incidences of drought and floods, which are affecting people across the country. Extreme climate events have caused significant loss of life in Kenya and adversely affected the national economy. Kenya experienced an average of 57.95 deaths per year, and GDP losses of 0.362 per cent per year, between 1997 and 2016, due to extreme climate events (Eckstein, Kunzel, and Schafer, 2017). Climate change also creates stresses on food and water supply, and enhances environmental degradation.

Droughts are large-scale disasters in Kenya. The 2014-2018 drought, which affected 23 of the country's 47 Counties, was declared a national emergency in February 2017. Affected Counties were in ASALs, which are located to the north, east, and south of the country. Temperatures that are hotter than normal, and accelerated forage and water depletion, are a common phenomenon across most ASALs in Kenya (FEWS Net, 2017; ICHA, 2017). Rise in temperatures has serious implications for future extreme heat and drought events and such livelihoods activities as crop production (GoK, 2013a). Droughts cause the greatest economic impact; on average, a 0.6 percentage point decline in GDP growth is observed in Kenya in years of poor rains (World Bank, 2015a). Extended periods of drought erode livelihoods opportunities and resilience among communities in vulnerable areas, which leads to undesirable coping strategies that damage the environment and impair household nutritional status. This undermines long-term food security. The World Bank (2018a) reported that over the past decade, losses in livestock populations in Kenya due to drought-related causes amounted to US$ 1.08 billion. The economic cost of climate change is demonstrated by the 2008-2011 drought, which led to losses and damages that 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 (GoK, 2012a). It is estimated that between 2008 and 2011, drought caused losses in the livestock and agriculture sectors worth KES 699.3 billion for livestock (72.2% of total losses) and KES 121.1 billion for crops (12.5% of total losses) (see Figure 1.4). Along with a series of other internal and external shocks, the severe drought witnessed between 2008 and 2011 contributed to the reduction of the growth rate of Kenya's GDP from an average of 6.5 per cent between 2006 and 2007, to an average of 3.8 per cent between 2008 and 2012 (GoK, 2012a).

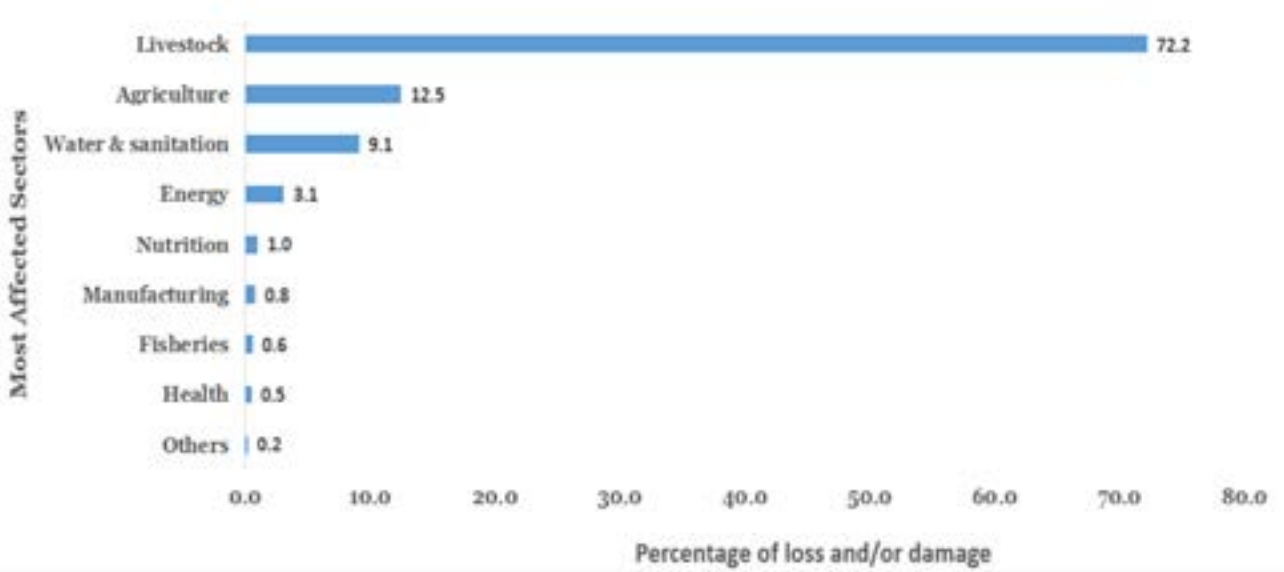


Figure 1.3: *Sectoral losses and/or damages attributed to the 2008 – 2011 drought in Kenya (Source: GoK 2012a).*

Floods in Kenya are particularly prevalent in the lowlands where large rivers approach the water bodies into which they empty. While usually more localized, floods have led to the greatest loss of human lives in Kenya (OCHA, 2012). Coastal flooding leads to sea-level rise and storm surges, coastal erosion, and intrusion of salty water. This could be expected to increase with climate change, and result in erosion of shorelines and increased salinity of coastal aquifers.

Ocean acidification impacts many ocean species, and leads to declines in fish stocks, with negative impacts on communities that rely on these resources for food and livelihoods. Ocean acidification refers to the reduction in the potential Hydrogen (pH) levels of an ocean over an extended period of time, caused mainly by the uptake of carbon dioxide (CO_2) from the atmosphere. As atmospheric levels of CO_2 increase, so do its levels in oceans increase, which causes the ocean water to become more and more acidic. Kenya was ranked 42nd on the vulnerability ranking on the combined effect of climate change and ocean acidification. Research is underway to determine the economic and social impacts of ocean acidification on coastal communities and fisheries in Kenya.

Decline of Mount Kenya glaciers: It is estimated that all the glaciers on Mount Kenya will disappear in the next 30 years, largely due to climate change (Prinz, Nicholson, Molg, Gurgiser, and Kaser, (2016). The Lewis Glacier shrunk by 23 per cent in six years, from 2004 to 2010, while the Gregory Glacier disappeared. Glaciers on Mount Kenya are melting because East Africa is getting drier, and precipitation (snowfall on the mountain peaks), which helps to sustain the glaciers, is diminishing. Mount Kenya is one the country's water towers and a source of many rivers and streams.

Desertification in Kenyan ASALs could be attributed to climate change, and human activities. Desertification is intensifying and spreading in Kenya, and reducing the productivity of land, which negatively affects communities. Land mass in Kenyan ASALs has for a long time been estimated to be 80 per cent in the past. The figure has however been increasing with time: 83 per cent (GoK, 2010b); 85 per cent, and >89 per cent (GoK, 2012a; MoD&P 2017a), which demonstrates that ASALs are on the increase in Kenya. ASALs are an important climate change action area because they support almost 30 per cent of the total national population, and 70 per cent of Kenya's livestock production (GoK, 2012a). While good data is scanty on the nexus between land degradation and economic disruption, land degradation, including through desertification, affects livelihoods and food security in severely degraded areas (MoALFI, 2017).

Loss of biodiversity is another effect of climate change in Kenya. The Inter-Governmental Science-Policy Platform on Biodiversity and Ecosystem Services has reported that climate change could result in significant losses of many African plant species, some animal species, and a decline in the productivity of fisheries in inland waters of Africa during the twenty-first century. Assessing the impacts of climate change on biodiversity is difficult because changes occur slowly, and effects of climate change interact with other stress factors. Climate change has also led to variations in the migration and dispersal potentials of wildlife. The study also noted that climate change led to reductions in genetic diversity and viability of populations of species and influenced shifts in ecosystem processes.

Climate change and extreme climate events are major factors contributing to **land degradation,** which encompasses changes in the chemical, physical and biological properties of the soil. These changes in soil properties alter and reduce the soil's ability to sustain peculiar quality and quantity of plant growth. However, human activities pose the greatest threat through such unsustainable land management practices as destruction of natural vegetation, over-cultivation, overgrazing and, excessive forest conversion (Gok, 2016b)

Other climate-related hazards in Kenya include forest fires and landslides, the latter of which mostly affects the highland regions. Landslides are largely associated with heavy rainfall in such regions with steep slopes as Murang'a, Some counties in Western and Northern Rift Valley. While deforestation and forest degradation in Kenya largely result from human activities, their impacts, including soil erosion, challenges on water cycles, and increased flooding, are exacerbated by climate change. Deforestation is

a major cause of climate change because clearing forests for farming, charcoal production, and other uses releases huge amounts of greenhouse gases (GHGs) into the atmosphere as well as compromising its resillience to climate change.

1.2.6 Impacts Climate Change on Sectors in Kenya

(a) Agriculture – (Food and Nutrition Security)

The country's agriculture is 98 per cent rain-fed and therefore highly vulnerable to extreme weather events, climatic shocks, climatic changes and variability. Key sources of vulnerability in agriculture are mainly due to; changes in temperature regimes and precipitation patterns, extreme weather events which include droughts and floods; unsustainable natural resource management resulting to environmental degradation, loss of forest cover and untenable fishing land tenure and fragmentation. Figure 5 illustrates how extreme weather events, including droughts, floods and extreme weather events, impacts annual growth rates in the agriculture sector. The drought and flood impacts lead to, among others, unsustainable land and agricultural water management.

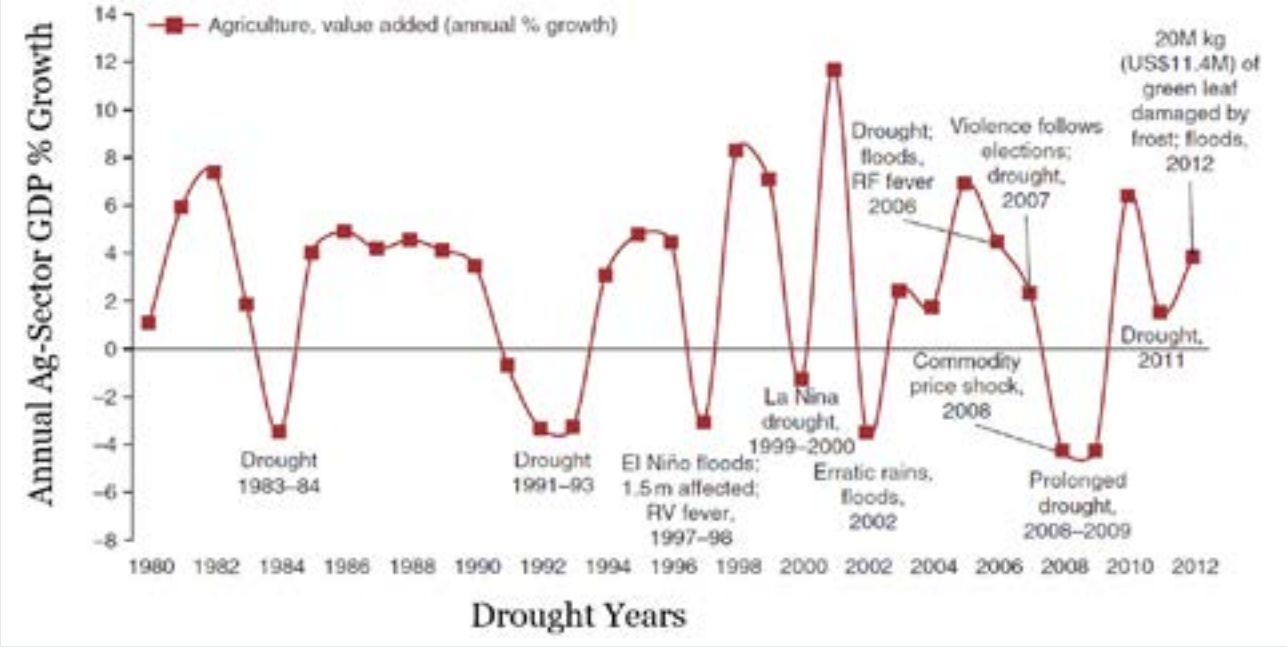


Figure 1.4: *Historical timeline of shocks in major agricultural production in Kenya, 1980-2012 (World Bank, 2015b).*

The extreme climate events affect food production; and the availability, accessibility, utilisation, and stability of food supply, which increase food insecurity. They have direct economic implications on the overall national economy, as the agriculture sector is a key source of employment, food security, livelihoods, and economic development in Kenya (GoK, 2013a). Kenya's GDP growth is highly correlated with growth in the agriculture sector. Figure 1.6 demonstrates the correlation between overall growth in the national Gross Domestic Product (GDP) and GDP growth in agriculture in Kenya, which shows the importance of the agriculture sector for stimulation of overall economic growth.

Impacts of climate change in the agriculture sector result in threats to agro-based livelihoods, encroachment into fragile ecosystems (in search of more productive land), land degradation, and decrease in agricultural productivity. These, in turn, lead to loss of income in the agriculture sector, food shortage, malnutrition, and reduced quality of earnings and produce from the agriculture sector.

Livestock management systems in Kenya, especially in ASALs, rely extensively on such natural systems as rain-fed pasture. The systems are very climate-sensitive, and vulnerable to impacts of changing and irregular rainfall patterns, and droughts. Greater drought frequency in

ASALs increases livestock morbidity and mortality because of reduced availability of forage, increased incidences of disease, and a breakdown of marketing infrastructure (MoEW&NR, 2014).

In the fisheries sector, temperature changes in aquatic environments affect the breeding and feeding behaviour of fish, and have a significant effect on the composition of species. There is evidence of thinning of species and the abundance of biomass due to effects of temperature increase on the nesting and feeding grounds for fish. In some cases, catches of non-resident species have been reported, with a compounded risk of alien invasive species. Species of fish that could be farmed in certain areas, including cold-water aquaculture that has been in practise over the past decade, are increasingly becoming unsustainable.

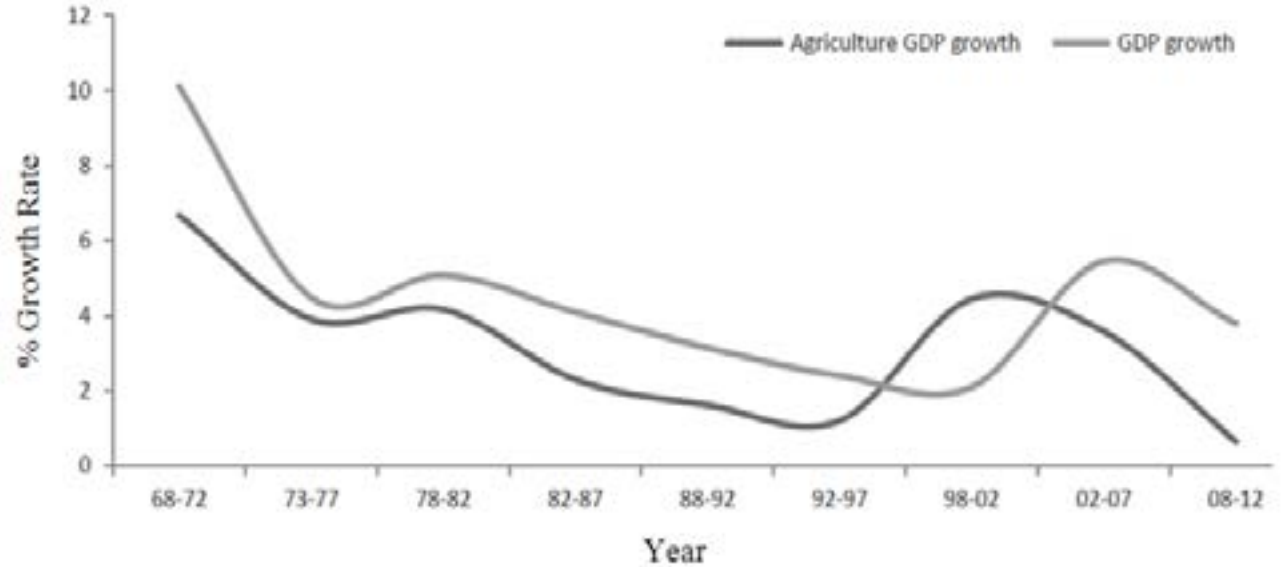


Figure 1.5: *The correlation between growth in agricultural GDP and national GDP, 1968–2012 (World Bank 2015b).*

(b) Coastal Zones

Coastal zones in Kenya have increasingly experienced induced rainfall, flooding, and droughts (GoK, 2010a, 2010b). Coastal flooding from sea-level rise is reported to be affecting 10,000–86,000 people per year, and projected lead to coastal erosion and wetland loss at an annual cost of $7–58 million by 2030, which could rise to $31–313 million by 2050 (SEI, 2009). Coastal erosion and salt water intrusion require substantial management interventions. Climate change is also impacting coastal zones in Kenya by increasing the submergence of mangrove forests in low-lying coastal areas.

(c) Energy

Concerns about the impact of climate change on Kenya's energy sector largely relate to the vulnerability of the country's hydroelectric power sector (World Energy Council, 2015; GoK, 2016c, 2016d). It has been projected that climate change will reduce the production capacity of hydroelectric power in the country due to decline in the flows river water, particularly during dry seasons (GoK, 2013b, 2013c). Low water levels in the country's hydroelectric reservoirs that resulted from the drought in early 2017 led to increased use of diesel-powered generators, with consequences being increased prices of electricity (Otuki, 2017). Traditional sources of energy, such as wood, charcoal, dung, and agricultural residues continue to be the primary energy source for over 80 per cent of Kenyans (MoEW&NR, 2013a; Muthike and Githiomi (2017). Declined productivity in the forestry and agriculture sectors could have a knock-on impact on the availability of energy, particularly in rural areas, and among the poor. These ramifications are particularly impactful to women and children because of their often role of collecting fuel-wood.

(d) Environment

Environmental degradation manifests in several forms including air pollution and land quality which may affect human, animal and plant health (MoE&NR 2016). Decline in environmental quality brings social and economic hardship to the communities who depend on these ecosystems, and increases contestation and the likelihood of conflict over diminishing natural resources. It also creates a window for invasive species, new pests and diseases. The ASALs are particularly vulnerable to climate change impacts and are currently under threat from land degradation and desertification caused by climatic variations and human activities such as overgrazing of livestock, smallholder farming on poor soils and the urbanisation. Impacts on the environment include loss of biodiversity, threats to animal and plant species, change in vegetation composition and structure, decrease in forest coverage, rapid deterioration of land cover, and depletion of water quality and quantity through the destruction of catchments and underground aquifers (MoEW&NR, 2014).

(e) Forestry

Climate change could affect the growth, composition, and regenerative capacity of forests, with results being reduced biodiversity and capacity to deliver important forest goods (both timber and non-timber) and services. In the *National Climate Change Response Strategy (NCCRS)*, the Government has pointed out that such changes are evident in Machakos, Kitui, Taita Taveta, and ASALs (GoK, 2010b). Some regions in the country will undergo changes in types of vegetation and composition of species and, more invasive species will emerge (GoK 2010b). The emergence and spread of such species as *Prosopis juliflora* in places like Tana River, Baringo, and Garissa has partly been linked to climate change (GoK, 2010b). Other potential impacts of climate change include long periods of drought, which lead to more frequent and intense forest fires that further degrade forests. There has also been notable increase in pests and pathogens in forests due to changes in climate, with consequences on tree growth, survival, and yield, and the quality of wood and non-wood products.

(f) Health

The risk of such vector-borne diseases as malaria are projected to increase due to changing climate conditions, which shift vector belts. Dekens, Parry, Zamudio, and Echeverría, (2013) have reported that the number of Kenyans at risk from malaria could increase from 36 to 89 per cent by 2050. This means that 2.9 to 6.9 million more people in Kenya could be at risk from contracting malaria. A study by Githeko (2009) on malaria and climate change in Nyeri District (now Nyeri County) established that malaria transmission was prevalent in that region, and attributed the shift to the changes in mean annual temperatures. More severe and frequent flooding have been projected, which may displace communities and increase the risks of such water-borne diseases as cholera, which are already affecting large numbers of Kenyans (WHO, 2017). Heat-related deaths among the elderly is projected to increase as a result from climate change-induced temperature rises (WHO, 2015).

(g) Housing and other Infrastructure

Shifting climatic patterns and extreme weather events increase the risk of collapse of buildings, and infrastructure, and reduce the value as a result of more frequent and heavier rain events, water encroachment, and storm surges in coastal areas (Posey, 2012). Climate change increases safety risks in existing buildings that do not meet standards and codes, e.g., in higher temperatures, poor design of housing and office buildings could exacerbate heat collection, thus affecting inhabitants' health. Adaptation will mean changes in the planning, design, operation and use of the built environment, including housing with increased cost for climate proofing the building infrastructure.

(h) Manufacturing

The manufacturing sector is capital intensive, with long-life fixed assets and supply chains, and significant water requirements, which are negatively impacted by floods, droughts, and other extreme weather events. Rising sea levels and temperatures increase coastal winds and storms, which affect ship navigation and other port operations. Motor vehicle assembly, machinery, and electronics and other industries, which depend on export and import services, are also likely to be negatively affected. Adverse climate events could also impact local and regional trade.

Climate change will increase the scarcity of such manufacturing resources as water and raw materials, its associated reduction in crop production will directly impact the agro-manufacturing sector. An example is the 2011 frost that affected tea production across the country and resulted in diminished turnover in processed tea. Some industries, such as those in agro-processing are major consumers and polluters of water resources that are generally scarce and likely to become more so with climate change. The manufacturing sector is usually one of the biggest casualties of reduced capacity for generation of electric power from hydroelectric reservoirs because of droughts and reduced rainfall.

(i) Tourism and Wildlife

Climate change affects such wide range of environmental resources that are critical attractions for tourists as wildlife, biodiversity, and water levels and quality. It also has a major influence on such environmental conditions and incidents that could deter tourists as very high temperatures, infectious diseases, wildfires, increased wildlife mortality, and insects and waterborne pests. Damage to infrastructure, such as roads and buildings, could limit access to tourism attractions and increase operating costs. Evidence of the negative impacts of climate change on tourism in Kenya include the closure of the main highway to the Maasai Mara National Reserve, which is one of the most popular tourism destinations in Kenya, due to flooding and damage caused by earth movement. Flooding in Mombasa, which is a major tourism destination city in Kenya. The drought in 2016 resulted in the dispersal of wildlife from their traditional habitats in search of pasture and water, which increased human-wildlife conflict. Furthermore, dozens of animals died in 2017 as a result of lack of water and pasture in national parks and reserves, which was a direct impact of drought during that time (Mkanyika, 2017). According to KWS in some years, more animals die from drought than poaching in Kenya. (Kahumbu 2017).

Image/Photo courtesy of the CORDIO EA

(j) Transport

Sea level rise, storms, rain, flooding and higher temperatures pose several immediate and long-term risks and impacts for the transportation sector's day-to-day operations. Specific risks include risk of damage to port facilities from increasingly severe storm events and sea level rise, and destruction of infrastructure including roads and bridges during storms. Flooding, emanating from torrential rainfall, poses a risk to maritime, road, rail and air networks. For example, the 1997-98 El Niño floods are estimated to have caused damage equivalent to at least 11 per cent of GDP, including KSh 62 billion in damage to transport infrastructure (GoK, 2012b). Higher temperatures can cause pavement to soften and expand, creating rutting and potholes, as well as warping of rail tracks, requiring track repairs or speed restrictions to avoid derailments.

(k) Waste Management Infrastructure

The environmental and health risks from disasters related to waste management are high in Kenya. Landfills and dumpsites, which are the dominant practice in many cases in the country, are usually located at low levels, and excavated with no consideration of climate risks. They are often vulnerable to flooding, blockage, and collapse due to extreme rainfall events. Sanitation infrastructure is equally at risk from flooding, which could spill off into, and contaminate water sources.

(l) Water and Sanitation

Climate change often impacts the water sector through increased incidences of drought and erratic rainfall. Climate change-associated global warming has heavily impacted the water cycle, leading to increased spatio-temporal variability in precipitation patterns worldwide. The effect on the water cycle is increased risk from drought, including dry spells and increased intensity of such extreme precipitation events as flooding and, expanding the range of agricultural pests and diseases. Climate change has contributed to the drying up of rivers, receding of lake levels, siltation in dams and water pans, and deterioration of water quality. This further reduces the availability of, and access to water for use in agriculture, manufacturing, and sanitation, and household use, among others. Table 1.2 presents a summary of the likely impacts of climate change by sector.

Table 1.2: Sector-based impacts of climate change.

Agriculture	• Increased food insecurity • Decline in overall crop yields in most of the country due to insufficient availability of water, excessive moisture conditions, and more pests, diseases and weeds • Reduced production in ASALs due to temperature increases and low precipitation that would lead 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 such export cash crops as tea, coffee, and horticulture
Livestock	• Decline in livestock production due to lack of pasture, reduced access to water, and heat stress • Increased changes in disease patterns, and potential for re-emergence of some diseases and pests
Fisheries	• Reduced production due to thinning of biodiversity as a result of effects of temperature increase on the nesting and feeding grounds for fish. • Increased risk from alien invasive species
Coastal Zones	• Costal erosion • Salt intrusion • Coral Bleaching • Reduced production due to thinning of biodiversity as a result of effects of temperature increase on the nesting and feeding grounds for fish. • Increased risk from alien invasive species
Drought Management	• Increased frequency and intensity of droughts, especially in ASALs, which reduces people's ability to cope. • Increased number of food-insecure and malnourished people. • Increased number of people without access to water. • Declining school attendance and rising dropout rates.
Energy	• Decline in forest productivity restricts availability of fuelwood • Reduction of hydroelectric power production capacity as river water flows decline and reservoir siltation potentially increases • Increased demand for energy as high temperatures encourage the use of air conditioners and refrigeration • Damage to infrastructure
Ecosystems	• Faster degradation of dry land, mountain and wetland ecosystems • Increased contestation and likelihood of conflict over diminishing natural resources. • Increases in invasive species, new pests and diseases. • Increase in stagnant air days leading to worse air pollution
Forestry	• Increased exposure to fire, pathogens and invasive species • Reduced provision of environmental resources and economic activity

Health	• Shift in the geographic range of malaria to higher altitudes • Increased incidences of malaria, Rift Valley Fever, malnutrition, scabies, jiggers and lice infestations • Increase in such water-borne diseases as cholera and typhoid
Housing and Buildings	• Increased risk from collapse, declining structural intergrity of buildings, and loss of value as a result of more frequent and heavier rain events and water encroachment, and, storm surges in coastal areas. • Safety risk in buildings that do not meet established standards and codes.
Manufacturing	• Reduced productivity due to energy fluctuations or blackouts resulting from supply interruptions occasioned by reductions in water levels in reservoirs used for hydro-electricity generation. • 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.
Tourism and Wildlife	• Unattractive tourist facilities due to reduced availability of water and lack of access due to damaged roads and other infrastructure • Adverse impacts on ecologically sensitive tourist destinations, with implications for demand for, and earnings from Kenyan tourism • Potential for migration of wildlife populations, with implications for park boundaries • Potential for extinction species that are signature to Kenyan tourism
Transport	• Damage to port facilities from increasingly severe storm events and sea level rise • Damage to infrastructure including roads and bridges during storms. • Interruptions to maritime, road, rail and air networks because of flooding and heavy rainfall events. • Softened and expanded pavement, creating rutting and potholes, and warping of rail tracks because of increased temperatures.
Water	• Reduced availability of surface water for irrigation, livestock production, household use, wildlife and industry • Salt water intrusion along the coast due to sea level rise, with implications for domestic, industrial and agricultural uses as well as coastal ecosystems • Continued retreat of glaciers on Mount Kenya that feed the Tana and Ewaso Ng'iro Rivers, leading to lower water levels, particularly in the dry season

1.3 Adaptation Actions under *NCCAP 2013-2017*

The first Adaptation Technical Analysis Report was developed as part of *NCCAP 2013-2017* to provide the underpinning evidence base for the adaptation actions that were planned. *NAP 2015-2030* was developed under the framework of the *NCCAP 2013-2017*. It identified actions to build climate resilience in Kenya. *NAP 2015-2030* identifies macro-level actions and their related sub-actions in twenty Medium Term Plan planning sectors, to guide adaptation actions in the short-, medium-, and long-term. It provides a framework for integrating climate change adaptation into the National- and County-level development planning and budgeting processes. The priority actions in *NAP* informed Kenya's adaptation action in its Nationally Determined Contribution (NDC).

1.3.1 Implementation of Adaptation Actions

Kenya and its partners have taken action to reduce climate change vulnerability, and build adaptive capacity. Interventions during the 2013-2017 Medium Term Plan were directed towards disaster risk reduction, humanitarian action, preparedness and response actions, and other priorities identified in *NAP 2015 - 2030*. Adaptation actions supported by development partners focused on adaptation within the agricultural sector, which included the climate resilience of pastoralism. Examples of adaptation actions undertaken during the time-frame of *NCCAP 2013-2017*, which have been identified as successes in the climate change action, are listed in Table 3.

Image/Photo courtesy of the Adaptation Consortium

Table 1.3: Successes of adaptation actions undertaken during the period of NCCAP 2013-2017 (GoK, 2016f).

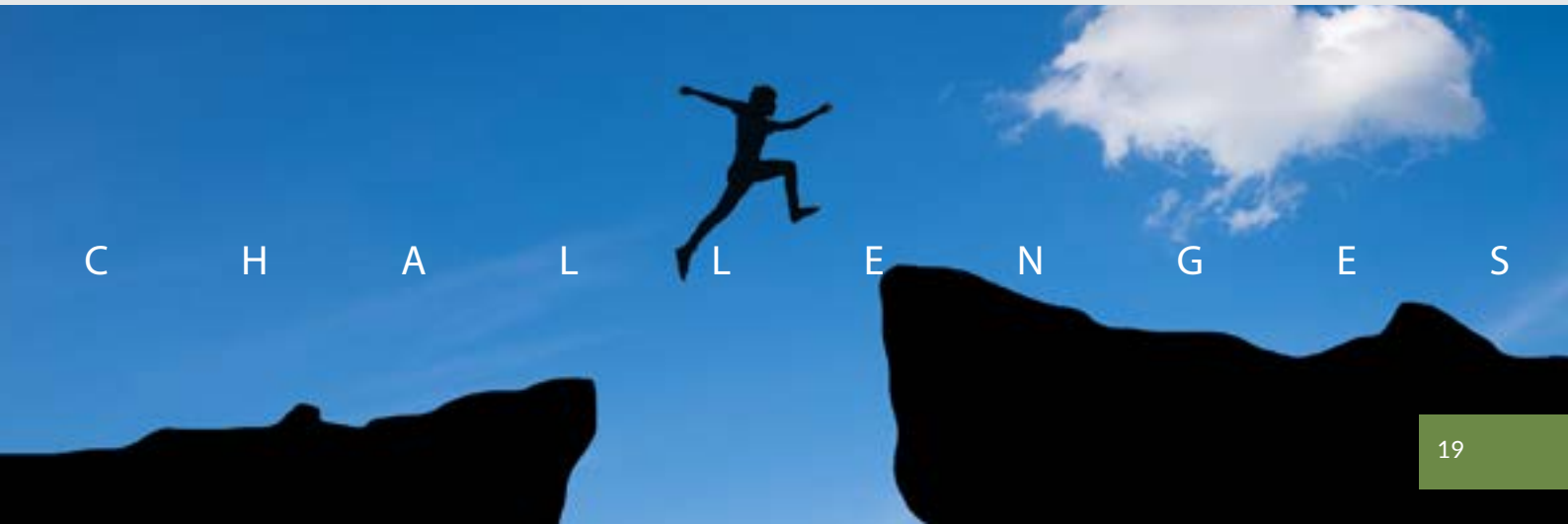
Project name	Description	Partners
Kenya Water Security and Climate Resilience Project	Increased the availability and productivity of Irrigation and Water sectors, and built the capacity of water sector institutions, including in integrated and particularity basin planning.	Ministry of Environment and Forestry (MEF),World Bank
Coastal Region Water Security and Climate Resilience Project	Increased water supply to Mombasa County through construction of dams; and access to water and sanitation in Kwale County through investments in water, sanitation and irrigation.	MoE&F, World Bank
Adaptation to Climate Change and Insurance Project	Facilitated small-scale farmers and small-scale agricultural enterprises to increase their capacity to adapt to climate change by making use of climate risk management measures	State Department of Agriculture and GIZ
Kenya Livestock Insurance Programme	Provided index-based insurance products to pastoralists' communities that received pay out once satellite images indicated vegetation cover was below a certain threshold. This allowed pastoralists to utilise the payouts to purchase animal feed, pasture, and water, to support their livestock during the drought periods.	Government of Kenya, International Livestock Research Institute (ILRI), Swiss Re
Water Towers Protection and Climate Change Mitigation and Adaptation	Identified and developed integrated management plans for ecological and economical sustainable land use systems in the watershed systems that feed into lakes Victoria, Turkana and Baringo.	MEF, County Governments, European Union
Integrating Agriculture in National Adaptation Plans	Integrated climate change risks and opportunities as they affect the agriculture sector-based livelihoods into National and sectoral planning and budgeting processes.	Ministry of Agriculture Livestock and Fisheries (MALFI), MEF, Food and Agriculture Organization (FAO), UNDP and Government of Germany
Kenya National Agricultural Insurance Programme	Based on Area Yield Index Insurance, the crop insurance framework benefited rural smallholder farmers in three pilot Counties (Embu, Bungoma and Nakuru), and will be rolled out to other Counties.	MALFI, MEF, USAID-UNDP through the LECRD project, World Bank
Integrated Programme to Build Resilience to Climate Change and Adaptive Capacity of Vulnerable Communities in Kenya	Built resilience to climate change, and increased the adaptive capacity of vulnerable communities in Kenya. This USD 10 million programme was implemented by three executing entities; the Kenya Forest Research Institute (KEFRI), Tana and Athi River Development Authority (TARDA), and Coast Development Authority (CDA), and eight sub-executing entities. It covered five thematic areas: Food Security, Water Management, Coastal Management, Disaster Risk Management and Knowledge Management. The project was implemented in Marsabit, Kajiado, Kwale,Mombasa, Homa Bay, Laikipia, Machakos, Kisumu, Wajir, Makueni, Kiambu, Meru, Kitui, Kilifi, Taita Taveta, Lamu, Tana River and Garissa Counties.	National Environment Management Authority (NEMA) as the National Implementing Entity (NIE), UNFCCC Adaptation Fund

Project name	Description	Partners
Kenya: Adaptation to Climate Change in Arid and Semi-Arid Lands Phase 2	strengthened climate risk management and natural resource base-related knowledge; built institutional and technical capacity for improved planning and coordination, to manage climate risks; and invested in communities' priorities in sustainable land and water management and alternative livelihoods that help them to adapt to climate risk.	MoD&P, World Bank, with incremental support from UNFCCC Special Climate Change Fund administered by UNDP
Ending Drought Emergencies	The Common Programme Framework operationalised a commitment to end drought emergencies by June 2023 through a collaborative approach across sectors, Counties, and development partners. NDMA leads the efforts and establishes mechanisms such as the National Drought Contingency Fund which is guided by contingency planning and early warning systems,	NDMA, MoD&P, Development Partners
Kenya Integrated Climate Risk Management Project	builds national and sectoral capacity for climate analysis that informs effective use of disaster risk reduction and adaptation resources	NDMA, Government of Sweden
Adaptation Consortium	Supported County Governments to mainstream climate change in planning, and access climate finance through establishment of County Climate Change Funds (CCCFs) and related planning structures and, development of County Climate Information Services (CIS) plans.	NDMA, KMD, UK-Met, International Institute for Environment and Development, CARE, Government of the UK through the StARCK+ programme
National Agriculture and Rural Inclusive Growth (NARIG)	Aimed at increasing agricultural productivity and the profitability of targeted communities. The project supports the adoption of climate smart agriculture practices and processes, and will be complementary to the Kenya Climate Smart Agriculture Project.	MoALFI and 21 County Governments, World Bank
Kenya Cereal Enhancement Programme-Climate Resilient Agricultural Livelihoods Window	Grant funding to complement an International Fund for Agricultural Development (IFAD) loan, which seeks to build the capacity of farmers to adopt climate smart practices by promoting efficient water management, conservation agriculture, and crop insurance.	MALFI, IFAD, European Union
Implementing a Resilience Framework to Support Climate Change Adaptation in the Mt. Elgon Region of the Lake Victoria Basin Project	Improves scientific knowledge of climate change information, and demonstrates increased social and ecological resilience toward addressing climate vulnerability in the Mt. Elgon water tower.	Lake Victoria Basin Commission; International Union for Conservation of Nature, African Collaborative Centre for Earth Systems Science, USAID

Project name	Description	Partners
Kenya Climate Smart Agriculture Project	Increases agricultural productivity and builds resilience to climate change risks in the targeted smallholder farming and pastoral communities in Kenya, and in the event of an Eligible Crisis or Emergency, to provide immediate and effective response.	MALFI and World Bank
National Agriculture and Rural Inclusive Growth Project	Increases agricultural productivity and profitability for targeted rural communities in selected Counties, and in the event of an Eligible Crisis or Emergency, to provide immediate and effective response.	MALFI and World Bank
Agriculture Sector Development Support Programme I and II	Develops sustainable value chains for improved income, and food and nutrition security, by increasing agricultural productivity, promoting investment, and encouraging private sector participation in agricultural enterprises and agribusiness.	MALFI and Sida

1.4.2 Challenges and Obstacles that Affect Adaptation Effort

- Skill and technical expertise to support climate change adaptation activities limited;
- Iinsufficient financial resources allocated for climate change activities both at National- and County-levels;
- Inadequate functional data, and lack of a climate information management system and clear documentation, which make monitoring, evaluation, learning and planning adaptation activities difficult;
- Inadequate climate adaptation technologies to address felt National needs;
- Low productive base for natural and man-made capital assets, which limits capacities to adapt;
- Inadequate knowledge and poor understanding of adaptation concepts, with options to reduce climate risks or means to implement their associated adaptation actions lacking;
- Socio-cultural and institutional rigidity, with cultural norms that discourage change and innovation, but only affirm existing traditional means of reacting to climate stress and shock;
- A tendency for partners to work with Counties providing enabling environments in-terms of legislation that supports climate change activities, which makes some attract several adaptation funding and projects and not others. This trend might lead to having some Counties 'left behind' in terms of implementation of NAP.



Lesson Learned

- Emphasis on priority sectors and identification of measurable actions could provide more focus and direction.
- Timeliness, effectiveness and reliability of climate information needed for decision-making,
- Legal and high-level direction could guarantee climate change action by designating mandate, roles, and reporting lines. The *Climate Change Act (section 3(b))* mandates National and County Governments to "build resilience and enhance adaptive capacity to climate change."
- To enhance synergy in climate change action among the different actors, concepts and proposals and vulnerability assessments should be based on the actions in relevant NCCAPs that are designed to provide information or funding for a desired outcome.
- An appropriate MRV/M&E system should be developed and introduced in a phased approach, and include the collection of baseline data, and the identification of a number of key indicators to measure climate-related impacts.
- Closer collaboration between the National and County Governments is essential for successful delivery of such cross-cutting issues as capacity building, policy development and implementation.
- Supporting counties to implement adaptation activities helps them to address and appreciate the challenges of climate change.
- Continued efforts to enhance linkages and build stronger collaborations with all the stakeholders, at both National and County Governments in order to achieve ressilience.
- Development and implementation of a comprehensive M&E framework in order to track and report progress of implementation.
- Adoption of an evidence-based policy planning helps to inform on impacts of policies.
- Documentation and up scaling of best practices that address climate change challenges is useful for future climate change action.

1.4.3 Adaptation in Kenya

Adaptation is the priority of Kenya to enable her people to cope with and take advantage of the opportunities presented by climate change. Climate change is likely to impact the country's future development and negatively impact achievement of the goals of Kenya's Vision 203, which is the country's long-term development blueprint, and the Government's Big Four Agenda that has established Food and Nutrition Security, Affordable Housing, Enhanced manufacturing, and Universal Health Coverage, as priority action pillars for the 2018-2022 medium plan.

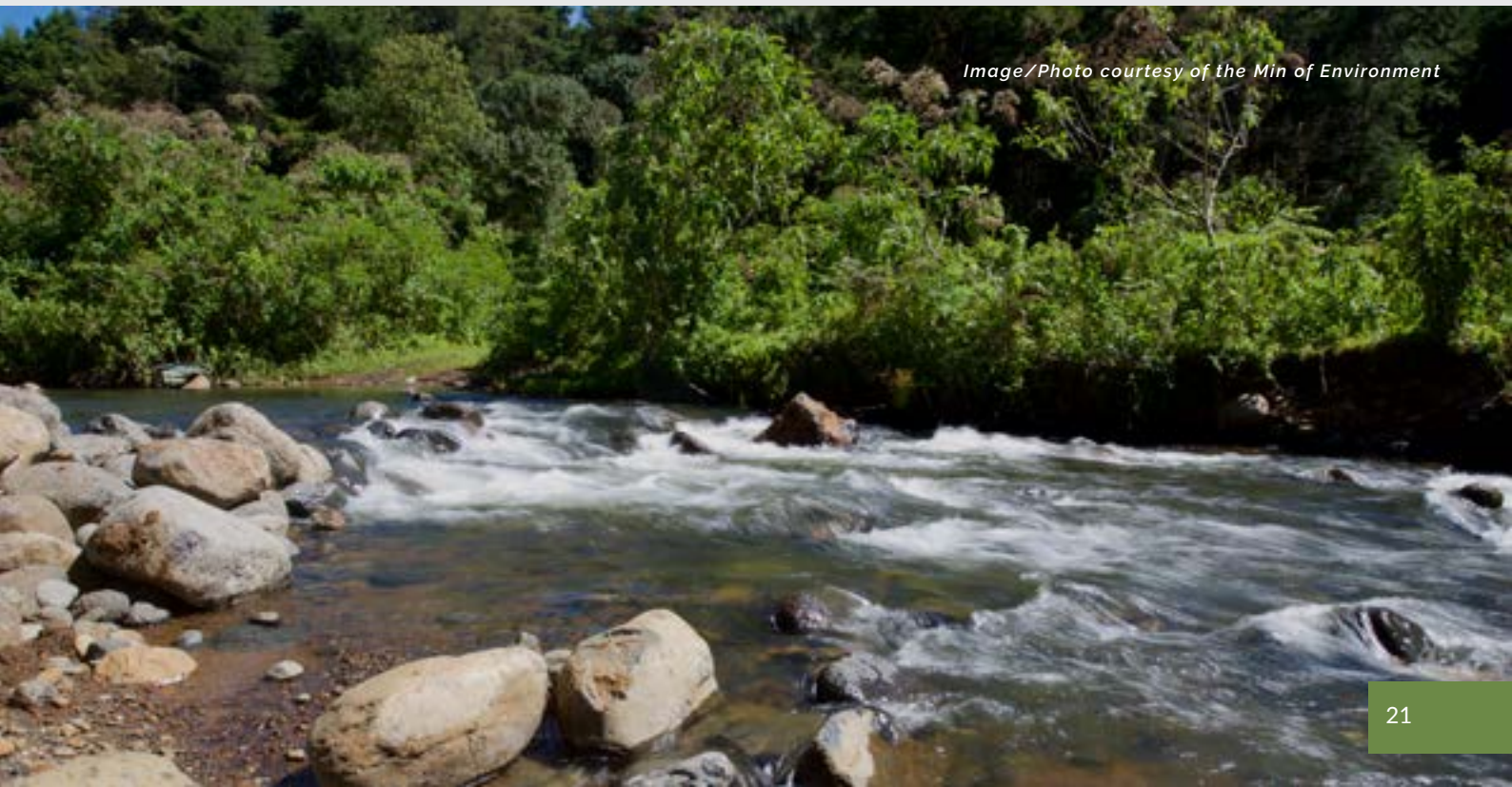
Kenya's economy is very dependent on such climate-sensitive sectors as agriculture, water, energy, tourism, wildlife, and health (KNBS, 2017a, 2017b). The economic cost of climate change is estimated to be equivalent to 2 per cent-2.4 per cent of GDP each year. Specifically, estimated costs of floods are 5.5 per cent of GDP every 7 years, while droughts account for 8 per cent of GDP every 5 years.(GoK 2018d)

The increasing intensity and magnitude of climate-related disasters in Kenya aggravates conflicts, mostly over natural resources, and contributes to security threats. An example is the prolonged and chronic drought that began in 2014 and continued to 2017-2018, which left 3.4 million people severely food insecure and an estimated 500,000 without access to water.

The 2018 flooding in Kenya impacted communities that were already struggling to recover from the 2014-2018 drought. The floods in April and May 2018 claimed up to 172 lives, displaced 300,000 people (Omondi, 2018), and led to active cholera outbreaks in five Counties. The economic costs were severe, with the rains and flooding wiping out resources worth billions of shillings. Roads and other infrastructure were destroyed, seasonal crops across an estimated 21,000 acres of land destroyed, and over 20,000 livestock drowned. Kenya allocated KES 60 billion to combat floods in addition to the KES

17.5 billion infrastructure funding received to fix roads that had been destroyed by the rains (Omondi, 2008). An estimated 482,882 children, mainly from 23 Counties in Arid and Semi-Arid Lands (ASALs) required treatment for acute malnutrition. Flooding also increases people's risk from such vector-borne diseases as malaria and dengue fever (Reliefweb, 2018). In the twenty-year period from 1997 to 2016, extreme climate events in Kenya are estimated to have caused an average of 57.4 deaths per year, and 0.3620 per cent losses per unit of GDP on an annual basis (Omondi, 2008; Reliefweb, 2018). Kenya therefore prioritises adaptation to enable people in the country cope with, and take advantage of, the opportunities presented by climate change. However, different Counties and regions of the country are still at different stages of preparing and developing sub-national adaptation strategies.

Image/Photo courtesy of the Min of Environment



Image/Photo courtesy of the Min of Environment

CHAPTER TWO

ENABLING POLICY AND LEGAL FRAMEWORK

Image/Photo courtesy of the ADA consortium

2.1 The Global and Regional Context

Climate change is a global problem which demands a global solution. Kenya has engaged in international efforts to address climate change through the *United Nations Framework Convention on Climate Change (UNFCCC). The Paris Agreement* (see Box 2.1), which further enhances the operationalisation of the *UNFCCC* entered into force on 4th November ,2016. Kenya signed the *Paris Agreement on 22nd April, 2016* and ratified it on 28th December ,2016.

Box 2.1: Goals of the Paris Agreement

The Paris Agreement seeks to:

- Strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels;
- Pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius; and
- 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, thus supporting action by developing countries and the most vulnerable countries, in line with their own national objectives.

The Agreement also provides for enhanced transparency of action and support through a more robust transparency framework

Kenya submitted its Nationally Determined Contribution (NDC) to *UNFCCC*, which sets out the country's ambitious mitigation and adaptation actions, and indicates that Kenya prioritises adaptation. Box 2.2 highlights key statements in the NDC that underpin this *ATAR 2018-2022*.

Box 2.2: Key statements in Kenya's Nationally Determined Contribution

Adaptation Contribution:

- Ensure enhanced resilience to climate change towards the attainment of Vision 2030b by mainstreaming climate change into the Medium Term Plans (MTPs) and implementing adaptation actions

Mitigation Contribution:

- Seek to abate GHG emissions by 30 per cent by 2030, relative to the business as usual scenario of 143 $MtCO_2eq$.

2.1.1 Global Agreements Relating to Climate Change Adaptation

Kenya is signatory to the *Convention on Biological Diversity (CBD) (1993)*, and the *United Nations Convention to Combat Desertification (UNCCD) (1994)*. Kenya ratified the CBD on 24th October, 1994 and the *UNCCD* on 25th June, 1997. *Article 6 (a)* and *(b) of the CBD* calls for countries to "develop national strategies, plans, or programmes for the conservation and sustainable use of biological diversity, or adapt existing strategies, plans, or programmes to reflect the measures espoused by the Convention; and to "integrate, the conservation and sustainable use of biological diversity into sectoral or cross-sectoral plans, programmes, and policies." *Article 2.2 of UNCCD* states that "Achieving this objective will involve long-term integrated strategies that focus on improved productivity of land, and the rehabilitation, conservation, and sustainable management of land and water resources, leading to improved living conditions, in particular at the community level." *UNCCD's* Land Degradation Neutrality (LDN) further requires that "the amount and quality of land resources necessary to support ecosystem functions and services, and enhance food security, remains stable or increases within specified temporal and spatial scales and ecosystems."

Kenya is committed to the *United Nations' 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs)*, which became operational on 1st January, 2016. Countries committed to mobilising efforts to end all forms of poverty, fight inequalities, and tackle climate change, while ensuring that no one is left behind. Kenya adopted the *United Nations' Sendai Framework for Disaster Risk Reduction (2015-2030)*, which outlines seven targets and four priorities to prevent new, and reduce existing, disaster risks, to minimise disaster-related deaths and economic losses.

2.1.2 Regional Agreements Related to Climate Change

The *African Union's Agenda 2063* seeks to accelerate the implementation of existing continental initiatives for growth and sustainable development (AUC 2015). It commits countries to build climate resilient economies and communities, prioritise adaptation, and implement the Programme on Climate Action in Africa.

The East African Community Climate Change Policy Framework of 2010 guides member states and stakeholders on the preparation and implementation of adaptation actions, to reduce the vulnerability of the region, enhance adaptive capacity, and build socioeconomic resilience of vulnerable populations and ecosystems (EAC 2010). Other important regional policy documents include the *East African Community Climate Change Master-Plan 2011 – 2031 (EAC 2011)*. The Master Plan provides a long-term vision and basis for operationalising a comprehensive framework for adapting to climate change in line with the EAC Protocol on Environment and Natural Resources Management, and with international climate change agreements.

2.2 National-level Climate Change-related Policies, Strate gies, and Plans

In 2008 Kenya launched *Vision 2030* to guide the country's long-term development (GoK, 2007). The goal of *Vision 2030* is to transform Kenya into a newly-industrialising, middle income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. Climate change is identified in *Vision 2030* as one of potential environment-related risks that could slow the country's expected rate of economic growth, with the risks associated with the country's dependence on climate-sensitive economic sectors, and its weak capacity to cope with climate hazards specifically mentioned.

Vision 2030 also flags out the need to integrate climate change adaptation into national disaster management planning and, more generally, to shift from disaster response to disaster risk reduction. *Vision 2030* is implemented through a series of five-year plans. The Second Medium Term Plan (MTP 2) of 2013-2017 acknowledged the need to achieve its objectives while building resilience to climate change. MTP 2 included commitments to implement the first *National Climate Change Action Plan (NCCAP)*, which was *NCCAP 2013-2017*, to approve the Climate Change Policy and Bill to guide Kenya's mitigation and adaptation efforts, and establish a Climate Change Fund.

The *National Climate Change Response Strategy (NCCRS)*, launched in 2010, is the first national policy document to advance the integration of climate change adaptation and mitigation into all of Kenya's planning, budgeting, and development objectives (GoK, 2010a). It prioritised climate change actions in the most vulnerable sectors, such as water, agriculture, energy, rangelands, forestry, and health, physical and social infrastructure. A variety of such adaptation measures as strengthening the provision of downscaled weather forecasts to farmers, promoting water efficiency measures, encouraging coastal management, promoting sustainable pastoralism, climate-proofing infrastructure, and strengthening disaster preparedness, were proposed for implementation under the strategy. To operationalise *NCCRS*, Kenya prepared *NCCAP 2013-2017* (GoK, 2013a). *NCCAP 2013-2017* focused on fostering integrated planning to support a vision for a low carbon climate resilient development pathway. Although *NCCAP 2013-2017* had climate actions for both adaptation and mitigation needs, adaptation was prioritised. GoK (2013a) prioritised six "big wins" that anticipated delivery of significant development: Geothermal power generation, distributed clean energy solutions, improved management of water resources, restoration of forests on degraded lands, climate smart agriculture and forestry, and infrastructure that was climate-proofed, reliable, expanded and effective. Priority adaptation actions were identified in eight sectors: agriculture, livestock, water, environment, infrastructure, sustainable livelihoods, energy infrastructure and tourism.

In 2010, Kenya promulgated a New *Constitution* to create a new socio-political dispensation. In the Preamble of the *Constitution of Kenya, 2010*, emphasis has been put on being "respectful of the environment, which is our heritage", and the determination to "sustain it for the benefit of future generations." *Article 42* of the *Constitution* 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, particularly those contemplated in *Article 69* (obligations in respect of the environment); and to have obligations relating to the environment fulfilled under *Article 70* (enforcement of environmental rights). The *Bill of Rights* in *the Constitution* requires the State to take legislative, policy, and other measures, including the setting of standards, to achieve the progressive realisation of the rights guaranteed under *Article 43*. These include the constitutional recognition of sustainable development, public participation in decision making on the environment, socio-economic rights, the intensification of forest rehabilitation and reforestation through mandatory forest cover, and the requirement for agro-forestry on all farms.

In 2015 Kenya developed *NAP 2015-2030*, drawing on the adaptation technical analysis undertaken for *NCCAP 2013-2017*. *NAP 2015-2030* was submitted to the *UNFCCC* in early 2017. It provides a climate hazard and vulnerability assessment, and sets out key adaptation actions in 20 planning sectors. Most key actions in *NAP 2015–2030* are included in Kenya's adaptation contribution in its NDC. Achievement of the adaptation goals, both in *NAP 2015-2030* and NDC is conditional: Subject to the country receiving adequate finance, investment, technology development and transfer, and capacity building.

In 2016, Kenya established a legal and policy architecture to guide climate change planning and implementation at the National and County levels. The *Climate Change Act*, *2016* provides the legal basis for mainstreaming climate change in National and County planning, and establishes the institutional structures for coordination of climate change issues in the country.

The *Climate Change Act* is the first comprehensive legislative framework on climate change governance for Kenya. The *Act* provides "*a regulatory framework for enhanced response to climate change, and sets out mechanisms and measures to improve climate resilience and promote low carbon development*." It makes the mainstreaming of climate change across sectors mandatory at both the National and County government levels.

The *Climate Change Fund (CCF)* established under the Act is administered by the National Climate Change Council, and managed by the Principal Secretary of the Ministry responsible for climate change affairs. The National Treasury and Planning is the lead in developing regulations and modalities for CCF in consultation with the Ministry responsible for climate change affairs. The *Act* requires that *NCCAP* be updated every five years, and the mainstreaming of climate change action into County Integrated Development Plans (CIDPs). The Act also requires State Departments to establish Climate Change Units (CCUs)

The following Chapters and Articles of the Constitution are implied in the spirit and intent of the Climate Change Act 2016:

- *Article 2 (Sections 5 and 6):* International law and any convention ratified by Kenya shall form part of the law of Kenya;
- *Article 19:* Recognise and protect human rights and fundamental freedoms and preserve the dignity of individuals;
- *Article 21:* Address the needs of vulnerable groups within society;
- *Article 42:* Economic and social rights, including health, housing, adequate food, clean and safe water, social security and education;
- *Article 43 (d):* Right to clean and safe water in adequate;
- *Article 48 (Section 23):* Right to access to justice;
- *Article 50:* Rights to a fair hearing;
- *Article 118:* Role of parliament in facilitating public participation;
- *Chapter 4:* Advances gender equality;
- *Chapter 5:* Land and Environment.

The *National Spatial Plan (NSP) 2015-2045* provides a National Spatial Design Framework for the integration of social, economic, and political policies (GoK, 2016c). *NSP 2015-2045* presents Kenya's intention to enhance disaster preparedness in all disaster-prone areas, and improve its capacity for adaptation to global climatic change. Most people in Kenya depend directly or indirectly on environmental goods and services. In addition, environmental resources contribute directly and indirectly to the local and national economy, through revenue generation, and wealth creation in the productive sectors of the economy.

The Green Economy Strategy and Implementation Plan (GESIP) 2016-2030 is Kenya's blueprint toward a low-carbon, resource efficient, equitable, and inclusive socio-economic transformation (GoK, 2016e). *GESIP 2016-2030* is meant to guide National and County governments, the private sector, civil society, and communities, in adopting different development pathways that encourage higher green growth, cleaner environments, and higher productivity. *GESIP 2016-2030* will help in Kenya's transition to sustainable infrastructure, building of resilience, sustainable management of natural resources, resource efficiency, social inclusion, and sustainable livelihoods. *The Green Growth and Employment Programme (GGEP)* is designed to implement *GESIP 2016-2030* and, seeks to improve public policy for the engagement of the private sector in green growth, mainstream green growth in CIDPs, and improve access to, and use of, climate data to inform economic planning and disaster risk management.

The National Climate Change Framework Policy (NCCFP) approved by Parliament in 2018 seeks for the integration of climate change considerations into planning, budgeting, implementation, and decision-making at the National- and County-levels, and across all sectors (GoK, 2018a). *NCCFP* complements the *Climate Change Act 2016.*

The *National Climate Finance Policy (NCFP)*, approved by Parliament in 2018, establishes the institutional and reporting frameworks to access and manage climate finance (GoK, 2018b).

Kenya's 2018 – 2022 planning period focusses on the Big Four Agenda comprised of Food and Nutrition Security, Enhanced Manufacturing, Universal Health Coverage, and Affordable Housing, which areas are seriously impacted by climate change, and would benefit from dedicated climate action. The Big Four Agenda is summarised in Box 2.3.

Box 2.3: The Big Four Agenda

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

National-level Sectoral Actions

Relevant Departments and Agencies within sectors are establishing climate change desks as required by the *Climate Change Act 2016*. Most sectors already have policies, strategies, and plans, to support adaptation actions. Some of the sector-based policy instruments are listed in Table 2.4.

Table 2.4: *National sector-based adaptation-related policies, strategies and plans.*

Sector	Climate Change Adaptation-related Plan	Ministry/ Department
Agriculture	Kenya Climate Smart Agriculture Strategy (2017-2026)	Ministry of Agriculture, Livestock, and Fisheries (MALFI)
Disaster Risk Management	Draft Kenya's Disaster Risk Financing Strategy for Catastrophe Deferred Drawdown Option or Cat-DDO (2018-June 2023)	National Treasury and Planning
Drought Management	Climate Risk Management Framework (2017)	National Drought Management Authority
Energy	Energy Bill (2017) – Part 3, section 43; Part 4, section 74 (i), and Part 9 address climate change-related issues	Ministry of Energy
Environment Biodiversity and Climate Change Strategy (2016)	Environmental Management and Coordination Act (No. 8 of 1999 and Amendment 2015)	Ministry of Environment and Forestry (MEF)
Finance	National Climate Finance Policy (2018)	National Treasury and Planning
Forestry	National Forest Programme (2017) - chapter on climate change. REDD+ Readiness Plan and analysis (2013-2018)	MEF, Kenya Forest Service,
Health	Health Act (No. 21 of 2017) - section on environmental health and climate change (part VII, sections 68 & 69)	Ministry of Health (MoH)
	Draft Disaster Risk Management Policy (2018); Draft Disaster Risk Management Bill (2018)	Department of Interior National Disaster Operations Centre National Treasury and Planning
Transport	Kenya National Aviation Action Plan for International Civil Aviation Organisation (ICAO) International Maritime Organisation (IMO) (2017)	Ministry of Transport, Infrastructure, Housing, and Urban Development
Water	Draft Water Harvesting and Storage Policy (2018)	Ministry of Water and Irrigation

2.3 County Government Adaptation Plans and Processes

County Governments have been progressively mainstreaming climate change adaptation actions into CIDPs. For example, Siaya County's CIDP 2013-2017 considered the changing rainfall patterns, reduced water quality and quantity, and greater risk from fires and floods, and enacted a climate change legislation to support implementation of the *NCCAP*. Murang'a County's Fiscal Strategy Paper noted the links between climate change and, food insecurity and loss of biodiversity, and sought to address the challenges brought about by lack of an early warning system, weak environment and disaster management committees, lack of expertise at the County level, unreliable data, and inappropriate farming practices. Garissa, Isiolo, Makueni and Wajir Counties have established County Climate Change Funds (CCCFs) that identify, prioritize and finance investments to reduce climate risk and achieve adaptation priorities aligned with priorities set out in *NAP 2015-2030*. These instruments enable the concerned County Governments to strengthen and reinforce implementation of national climate change policies, through delivering on local adaptation priorities.

County Governments have also established Climate Change Desks that are led by respective County Executive Committee Members (CECs) in charge of coordinating the implementation of climate change actions.

CHAPTER THREE

ADAPTATION ACTIONS THE 2018-2022 PERIOD

3.1 Introduction

This chapter highlights the actions prioritised by various sectors in Kenya to adapt to the risks from, and vulnerabilities and impacts of, climate change. The actions are intended to enhance the resilience of vulnerable sectors, systems, livelihoods, and communities, to climate change. They either help to manage climate risks (avoid, prevent, reduce, transfer or absorb) or to exploit the beneficial opportunities created by climate change.

3.2 Proposed Adaptation Actions

The process of developing adaptation actions for *NCCAP 2018-2022* was led by the *National Adaptation Coordination Committee (NACC)*. It involved reviewing and updating the adaptation section in *NCCAP 2018-2022*. NACC served as the Adaptation Technical/Thematic Working Group (ATWG), whose role was to facilitate the development of *ATAR 2018-2022*.

Various sectors provided input that guided the development of *ATAR 2018-2022*. In prioritising adaptation actions, ATWG used *NAP 2015-2030*, the *Third Medium Plan (MTP 3), the Medium Term Expenditure Framework (MTEF), NDC, CIDPs* for the period 2013–2017, and other climate change-related National and County policies and plans. Prioritised adaptation actions were adopted using a 'sector-institution' matrix, which is a tool used to generate consensus on the best adaptation actions from among list of proposed ones. The 'institution' in the matrix referred to the entity that originated the proposed action, while the 'sector' referred to the area where the action falls.

The actions were developed in consultation with various stakeholders, including the youth, minority and marginalised communities, the private sector, civil society, Counties through their Regional Economic Blocs, Members of Parliament (MPs), and Senators. They were also subjected to gender analysis.

The adaptation actions identified by the sectors for the 2018–2022 planning period focused on six broad issues:

- **Climate Induced Natural disasters** – drought, floods, consequent infrastructure damage, landslides, pests, and diseases;
- **Food insecurity** – crops, livestock, fisheries;
- **Water insecurity** – both in urban and rural areas;
- **Energy infrastructure** – vulnerability, resilient energy mix, robustness (biomass, solar, wind, hydrodynamic, geothermal, etc.);
- **Land degradation** – terrestrial (forests, wetlands, rangelands, agricultural land); and
- **Marine and Coastal ecosystem degradation** – e.g. mangrove forests, coral reefs, sea grass beds, beaches, deltas, sea water intrusion, and coastal erosion.

Photo courtesy of SUSWATCH

3.2.1 Key Adaptation Sectors

1. The sectors and their respective action areas considered in this section are:
    a. Disaster Risk Management
    b. Drought
    c. Floods
2. Agriculture, Food and Nutrition Security
    a. Crops
    b. Livestock
    c. Fisheries
3. Forestry
4. Water and Sanitation
5. Human Settlement, Urban Development, and Housing
    a. Affordable housing
    b. Waste Management Infrastructure
6. Manufacturing
7. Energy, Transport, and other Infrastructure
8. Marine and Coastal Resources
    a. Maritime zone
    b. Coastal zone
9. Health Sector
10. Tourism and Wildlife
    a. Tourism sub sector
    b. Wildlife sub sector
11. Gender, Youth, and Other Vulnerable Groups

3.2.2 Sector Priority Adaptation Actions

The priority climate change actions planned in the various sectors are described in Tables 3.1 to 3.10. The Tables describe the issue or problem being addressed, alignment with the Big Four Agenda, alignment with *SDGs*, priority climate change actions, and the relevant institutions to deliver the actions.

Table 3.1: *Strategies and options for adaptation actions (Fay and Ebinger, 2010).*

Adaptation Strategy/Option	Description
Bear the loss/ damage	"Do nothing," where there is no capacity to respond, or the cost of adaptation is too high in relation to the risk or expected damage.
Share the loss/ damage	Private insurance, public relief, reconstruction, and rehabilitation.
Modify the risk of loss/ damage	Flood control measures; migrate away from high risk areas; substitute/ change the location of new initiatives; improve forecasting systems to give advance warning of hazards and impacts; contingency and disaster plans.
Reduce the magnitude of impacts	More investment in such structural and technological changes as increased irrigation water; increased reservoir capacity; water transfers; water efficiency like adopting water-saving irrigation technologies; upgrade of storm water systems/leveraging on storm water; building resilient housing; modifying transport infrastructure; Legislative, regulatory, and institutional changes, including changing traditional land use planning practices; revising guidance for planners; including climate change risks in criteria for site designation for biodiversity protection; and amending design standards.

Adaptation Strategy/Option	Description
Change use	Where continuation of economic activity is impossible or extremely risky, including substitute for more drought tolerant technologies, practices, and processes, return crop land to pasture or forest.
Change location	Relocate major activities away from areas of increased threat.
Research	New technologies and methods of adaptation; improve short-term climate forecasting and hazard description; more information on the frequency and magnitude of extreme climate events; better regional indicators for climate change; more risk-based integrated climate change impact assessments.
Educate, inform and encourage behaviour change	Increased public awareness to encourage people to take individual action, and to accept/initiate change of public policies.

The adaptation actions presented in this chapter were generated from a number of combinations of the strategies/options presented in Table 3.1 toward effective adaptive response to climate change impacts in the country. The overall strategy was to minimize irreversible investments and maximize reliance on win-win approaches, i.e., approaches that yield benefits even when the projected risks do not materialise as projected.

The actions were analysed and found to contribute significantly to the Government's Big Four Agenda for the 2018-2022 period, and the Global Sustainable Development Goals (GoK, 2018a).

3.2.3 Disaster-Risk Management

In the face of increasing climate variability and change, and their associated disasters, especially those related to hydro-meteorological hazards in the country, there was need to develop interventions that effectively connect disaster risk reduction (DRR) and climate change adaptation (CCA). This was because DRR forms an important element of CCA, including early warning, preparedness, strengthening of coping mechanisms, and reducing vulnerability. All forms of climate change adaptation constitute DRR. Kenya's disaster risk profile is dominated by drought and floods, and a significant occurrence of landslides/mudslides, storm surges, outbreaks of pests and/or diseases, and extreme temperatures, among others (GoK, 2009; GoK, 2014a, GoK, 2015a; CDKN, 2017; Oxfam, 2017; UNICEF, 2018). All the four major hazards occur in different regions of the country, but at different levels of frequency and severity. Table 3.2 shows the spatial spread of each of the hazards in the former administrative provinces of the country.

Table 3.2: *Major climate change-related hazards/ risks in former administrative provinces in Kenya ((Owuor, 2015; Huho, Mashara, and Musyimi (2016).; and Styles and Cochran, 2016)).*

Region	Drought	Floods	Landslides/ Mudslides	Pest/Disease Epidemics
Nyanza	*	**	**	**
Western	*	**	**	**
Rift Valley	**	**	**	**
Central	*	**	**	**
Eastern	**	**	**	**
North Eastern	**	**	*	**
Coast	**	**	**	**
Nairobi	*	**	o	*

Note: *** More severe incidences; *Less severe incidences; o No major incidences*

(a) Drought Risk Management

Since drought is one of the hazards with high socio-economic impacts in the country, Kenya developed the Ending *Drought Emergencies (EDE) strategy in 2015*. Through increased frequency and intensity of droughts, climate change jeopardises the attainment of this strategy. Figure 3.3 shows the key pillars of the EDE strategy[1] . The planned adaptation actions for Ending Drought Emergencies are presented in Strategic Action Area 1a.

Figure 3.1: *Common Programme Framework for Ending Drought Emergencies (GoK, 2015a).*

[1] *The NDMA, through Adaptation Consortium supported by DFID's StARCK+ Programme, assisted five county governments – Garissa, Isiolo, Kitui, Makueni and Wajir – in the operation of County Climate Change Funds (CCCFs) that identify, prioritize and finance investments to reduce*

Strategic Action Area 1: **Disaster Risk Management**

Risks: Drought, floods, landslides/mudslides, storm surges, outbreaks of pests/diseases, and extreme temperatures.

Strategic Action Area 1a:

Drought risk management / Ending drought emergencies by 2022.

Strategic Objective 1a

To reduce the vulnerability of communities to drought-related disasters, through improved institutional resilience (preparedness and response) at all levels (National, County, Community)

Issue/ problem:

Incidences, frequency, and magnitude of drought disasters have increased, which exacerbates the vulnerability of many populations around the country, and erodes realised economic growth.

Big 4 Pillars: Food and Nutrition Security; Universal Health Coverage

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by 2022	SDG Targets
Strengthen the ability of people in Kenya to better cope with drought. Linked to *EDE Pillar 5.*	■ Integrate climate risk management and climate change adaptation into all relevant development policies, plans, budgets, and activities, at National, County, and Community levels, for at least 23 counties. ■ Integrate climate change scenarios and climate early warning into spatial planning. ■ Update drought hazard maps in at least 23 drought-prone Counties. ■ Provide reliable drought-related early warning information to stakeholders: Strengthen and expand downscaled drought early warning, preparedness, and rapid response mechanisms countrywide (all 47 counties) through: ● Strengthening the provision of monthly drought and food security early warning information, and bi-annual drought and food security information for at least 23 counties; and ● Increasing the number of climate information recipients factoring climate early warning information in their risk management decisions from 1,000,000 to 2,000,000 ■ Operationalise, in at least 23 counties, the National Drought Contingency Fund provided for under the NDMA Act of 2016,	1.1 1.2 1.4 1.5 2.1 2.2 2.4 5.1 6.1 6.4 13.1 13.3 17.1

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by 2022	SDG Targets
	to support the scaling up of adaptive social safety nets,[2] and to strengthen broader resilience country-wide. ■ Increase the number of households that are able to better cope with climate change impacts because of support from the devolved financial mechanism (County Climate Change Funds), from 300,000 households in 2018 to 800,000 households by 2022. ■ Increase the number of eligible[3] beneficiaries of social protection mechanisms and other safeguards: ● From 100,000 to 150,000 for regular beneficiaries, and from 90,000 to 130,000 for scalability beneficiaries; and ● From 4,017,759 beneficiaries in 2017 to 4,280,000 beneficiaries under the Hunger Safety Net Programme.	
Promote at least 3 climate-resilient livelihoods and strengthen at least 2 value chains for emerging climate-resilient livelihoods in at least 23 counties. *Linked to EDE Pillar 4.*	■ Promote and strengthen at least 3 climate-resilient value chains for alternative livelihoods in at least 23 counties.	1.5 13.1
Strengthen the provision of social services for mobile pastoralists (safe water supply, renewable energy, mobile health and veterinary services, long distance schools and communications). *Linked to EDE Pillar 3.*	■ Support a balanced, spatio-temporally well-distributed availability of water and forage in at least 23 drought-prone Counties to reduce inter-communal competition over natural resources within the pastoral system, between pastoralists and farmers, between people and wildlife, and across Kenya's borders. ■ Promote renewable energy technologies, mobile health, and veterinary and communications services, among vulnerable communities in at least 23 drought-prone Counties.	1.a, 2.3, 3.8, 4.1, 4.2, 4.4, 6.1, 6.3, 6.5, 6.b, 7.1, 7.2, 15.1

[3] *As the supported people graduate out of the safety net support, more eligible people are recruited. The National Social Safety Net Programme (NSNP) comprises four cash transfer programmes namely: Hunger Safety Net Programme Cash Transfers (HSNP-CT); Orphans and Vulnerable Children- Cash Transfers (OVC-CT), Older Persons- Cash Transfers (OP-CT) and Persons with Severe Disability- Cash Transfers (PWSD-CT). One of the social protection initiatives NDMA implements is the Hunger Safety Net Project (HSNP) of the National Social Safety Net Programme (NSNP).*

Image/Photo courtesy of the Kenya Red Cross

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by 2022	SDG Targets
Strengthen local institutions, mechanisms and processes that build resilience to drought risks. *Linked to EDE Pillar 6.*	■ Support implementation of the approved DRM Policy, and completion and enactment the DRM Bill by aligning it to the DRM provisions of Climate Change Act of 2016, and the Sendai Framework for Disaster Risk Reduction of 2015. ■ Governance: Promote and support at least 100 (at least 2 per County) robust community-based institutions and organizations to strengthen community-led management of water points (drought risk preparedness and response initiatives). ■ Operationalise drought risk preparedness and response for both the National and County Governments. ■ Develop a framework for measuring climate risk resilience, and an open platform for sharing climate risk-relevant information and knowledge, in line with the global adaptation goal. ■ Develop a GIS-based tool for real-time mapping and monitoring of drought hazards.	1.4 5.5 5.b 6.4 6.5 10.2 13.1 13.3
Enabler: Reduce incidences of drought-induced conflict (human/ human and human/ wildlife), and insecurity in drought-prone Counties. *Linked to EDE Pillar 1*[4]	■ Support the strengthening of community-based peace committees, strategies, and initiatives, for conflict management and peace building, in at least 23 drought-prone Counties. ■ Support County Governments to strengthen the institutions for inter-communal conflict management at County levels, ■ Support the implementation of projects that target at-risk youth or that reward peace efforts at the county level ■ Convene a policy dialogue on a sustainable balance of land use in rangelands (for pastoralists, agro pastoralists, ranchers and conservationists), to determine the most sustainable range land-use model and to co-develop and implement robust grazing management plans, including contingency plans against catastrophic loss	4.7 16.1

[4]*The pillar is chaired by the Peacebuilding and Conflict Management Directorate in the Ministry of Interior and Coordination of National Government, and co-chaired by UNDP, working closely with county governments and other state and non-State partners. County governments meet on a cluster basis to address shared risks and plan joint interventions such as social amenities along migration corridors, intercounty rapid response mechanisms, and action to resolve boundary disputes*

Relevant Institutions: National Drought Management Authority, Climate Change Directorate, Development Partners, CSOs/ NGOs/Multilateral Agencies, Council of Governors, County Governments, Kenya Meteorological Department, Ministry of Devolution and The ASALs, Ministry of Health, Ministry of National Treasury and Planning, National Disaster Operations Centre, Ministry of Agriculture, Livestock, Fisheries and Irrigation, Ministry of Water and Sanitation, Ministry of Education, Ministry of Interior and Coordination of National Government, Private Sector, Indigenous and Marginalised Peoples.

(b) Flood and Landslide Risk Management

Kenya experiences serious incidents of floods in different parts of the country, which cause major disturbances, destroy property, and result in loss of life (MoW&I, 2009; Opere 2013). The key adaptation strategy in flood risk management would be to strengthen the capacity of the Water Resource Authority (WRA) and Water Resource Users Associations (WRUAs), to monitor flood risk patterns, provide early warning, and prepare vulnerable communities and systems for response. A map of flood-prone areas in Kenya is presented in Figure 3.2.

WRA developed Flood Management Plans for major river basins in the country. The Plans provide for an integrated approach to flood management, which ensures downstream, midstream, and upstream co-operation. This approach places emphasis on structural and non-structural measures, in consultation with stakeholders, in planning and implementation. The Plans highlight pro-active consideration of all the flood management phases, i.e., preparedness, response, recovery, and reconstruction. Table 3.3 presents a compilation of the issues identified in the river catchment plans. The planned adaptation actions for Flood Risk Management are presented in Strategic Action Area 1b.

Figure 3.2: *River Basins and Floodplains of Kenya – River Flooding Regions in Kenya (GoK, 2015b).*

Table 3.3: *Major flood issues by river catchment segments.*

Catchment	Major Issues
Upper	■ Deforestation due to inadequately proper forest management. ■ Sediment-related disasters likely to increase due to increased rainfall with higher short-time intensity. ■ Increase in sediment run-off that is projected to cause sediment deposition in flood control reservoirs as it reaches lower levels.
Middle	■ Flooding and inundation projected to be more frequent due to dike breaches caused by heavier precipitation, higher short-time rainfall intensity, flooding from the upper reaches, and greater sediment runoff. ■ Land use in the flood plains, originally designed to serve as retarding basins and also to help floodwaters flow back into the main streams, has been changed from agricultural to residential use. ■ Frequent, large-scale floods, and increased sediment runoff may destabilise riverbeds, causing destruction of such structures as bridges, and dike beaches, which may lead to more flooding.
Lower	■ Flood water from the middle reaches likely to cause more frequent inundation and flooding events due to the overflow/breaching of dikes. ■ Lower catchment over populated with accumulation of property. ■ Drought due to climate change posing a serious danger for domestic, industrial, and agricultural water use.

Image/Photo courtesy of Benard Omwaka

Strategic action area 1b:

Flood and Landslide Risk Management

Strategic Objective 1b

To reduce the vulnerability of communities to flood-related disasters, through improved institutional resilience (preparedness and response) at all levels (National, County, and Community)

Issue/ problem:

The incidence, frequency, and magnitude of flood-related disasters have increased, which exacerbates the vulnerability of many people in the country

Big 4 Pillars: Food and Nutrition Security; Universal Health Coverage

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Support the climate-proofing of all National and County flood and landslide control infrastructure (especially for water, energy, transport, and ICT), to enhance their resilience	■ Mainstream climate change adaptation into, and implement, all existing Flood Management Plans. ■ Develop and implement climate-proofed design, siting, construction, and maintenance codes and standards for all flood- and landslide-control infrastructure. ■ Rehabilitate, strengthen, and protect degraded flood management structures (e.g., check dams, dykes, water pans, river training/dredging, culverts/drainage systems, raised roads, etc.), to harvest, store, and use flood waters upstream. ■ Establish a standing arrangement for routine maintenance of flood- and landslide-control structures countrywide. ■ Strengthen the capacity of Counties to plan, contract, and supervise the implementation of climate-proofed infrastructure. ■ Develop a GIS-based tool for real-time mapping and monitoring of flood hazards.	1.1, 1.2 1.4,1.5 2.1 2.2 3.2 3.3 9.1 13.1 13.3
Increase the number of households better able to cope with flood-induced risks	■ Strengthen the institutional mechanisms for proactive community-based flood early warning systems in flood-prone areas in at least half of the flood-prone Counties by June 2023. ■ Expand best-practice social protection mechanisms (adaptive social safety nets), and measures to poor and vulnerable people countrywide by June 2023. ■ Promote insurance services for those able to take insurance cover, alongside social protection services.	1.1, 1.2 1.4, 1.5 2.1, 2.2 3.2, 3.3 9.1, 13.1 13.3

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Strengthen the participation of local community flood management institutions, mechanisms, and processes that build resilience to flood- and landslide-related risks	■ Establish an operational Flood (and Drought) modelling, forecasting, preparedness, and response centre. ■ Develop and implement a regulatory Enforcement Plan for flood situations. ■ Support an integrated ecosystem-based approach to watershed, drainage basin, flood, and landslide management through enhancement of such structural/ mechanical designs as structural catchment protection in the upper catchments. ■ Support Water Resources User Associations and other stakeholders to assist affected communities through Community-Based Flood Management Committee approaches. ■ Promote and support at least 100 (at least 2 per county) robust community-based institutions and organizations to strengthen community-led management of flood prone areas (flood risk preparedness and response initiatives).	1.1, 1.2,1.4 1.5, 2.1 2.2, 3.2 3.3, 6.3 6.6, 9.1 13.1,13.3 16.6 17.19
Policy	■ Extend Drought Contingency Fund to cover Floods by initiating policy dialogue to harmonise the various disaster and Contingency Funds into an all-inclusive Fund for all climate-related contingencies.	13.3

Relevant Institutions: Ministry of Water and Sanitation, Water Resources Authority, Water Resource Users Associations, Council of Governors, Flood Affected Communities, Country Governments, Development Partners, CSOs/NGOs/Multilateral Agencies, Ministry of Health, Ministry of The National Treasury and Planning, National Water Storage Authority, Kenya Rural Roads Authority, State Department for Infrastructure.

3.2.4 Agriculture, Food, and Nutrition Security

The adaptation actions in the agriculture sector seek to increase food and nutrition security and incomes for value chain actors by, ensuring that agricultural production and productivity are maintained or increased, agriculture infrastructure is climate-proofed, and the value of agricultural products and produce is enhanced, despite the changing climate.

In order to achieve this, and in line with the Food and Nutritional Security pillar of the Big Four Agenda, the strategic actions over the next five years will include such measures as addressing decline in the production and productivity of crops, livestock, and fisheries; post-harvest losses in livestock, fish and crop products; livelihood losses by farmers, pastoralists, fisher communities, and value chain actors; reduced market access, value addition, and distribution options; and inadequate nutrition (see Strategic Action Area 2).

Image/Photo courtesy of the Adaptation Consortium

Strategic Action Area 2:

Agriculture, food and nutrition security

Strategic Objective 2

Increase food, nutrition, and income security through enhanced productivity and resilience of agricultural systems and value chains

Issue/ problem:

Climate change is negatively impacting the agricultural productivity and resilience of value chain actors, including households, farmers, pastoralists, and fisher communities through:

1. Declining land and water productivity, which result in decline in the production and productivity of crops, livestock, and fisheries;
2. Post-harvest losses of crop, livestock, and fish products;
3. Livelihood losses by farmers, pastoralists, fisher communities, and value chain actors in the agriculture sector;
4. Market access and distribution options; and
5. Increased food nutrition insecurity.

Big 4 Pillars: Food and Nutrition Security

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Increase access to climate-related resilience and safety net programmes	■ Support the capacity building of County officials and local communities to improve technical services for climate risk management in agro-food systems in all Counties. ■ Strengthen and cascade the downscaling of agro-climate information services to sub-Counties in all Counties, while tapping on existing/essential local traditional knowledge, and co-production of climate information with communities. ■ Promote the uptake of climate information in agricultural (crop, livestock, and fisheries) decision-making at all levels. ■ Increase the number of beneficiaries accessing climate-oriented: ● agricultural inputs subsidies from 239,000 to 311,300 farmers; ● crop insurance from 280,000 farmers to 3,500,000 farmers; and ● livestock insurance from 18,000 to 105,750 farmers. ■ Strengthen government-supported advocacy for insurance products in the agriculture sector through sustainable public-private partnerships (PPP), and the development of insurance packages for the fisheries sub-sector.	1.1 1.2 1.4 1.5 2.1 13.1 13.3

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Increase adoption of Sustainable Land Management (SLM)	*Crops subsector:* ■ Promote sustainable land management through the National Land Policy and the Sustainable Land Management Policy, to conserve, stabilise, and strengthen the resilience of water catchments, including in rangelands. ■ Increase the number of households practicing, and acreage under, sustainable land management for agriculture. ■ Increase the area under integrated soil nutrient management practices by 250,000 acres by June 2023. ■ Reclaim 130,000 acres of degraded land for climate-smart agricultural production, using agro-ecology approaches. ■ Increase the farm area under conservation agriculture to 250,000 acres, incorporating minimum/no tillage and agro-ecology principles. ■ Increase the total area under agroforestry at farm level by 200,000 acres. ■ Conduct adaptive research to strengthen understanding of adaptability of crop varieties. *Livestock subsector:* ■ Invest in rangeland health for sustainable pastoralism, to supply "organic" livestock prod¬ucts (meat, milk, fat, hides and fibre) to local and international markets. ■ Strengthen the sustainability of pastoralism through local institutions and social structures that govern the mobility of pastoral livestock by facilitating implementation of the Inter-Governmental Authority on Development (IGAD) Centre for Pastoral Areas and Livestock Development (ICPALD) Transhumance Protocol on mobility of pastoralists and their animals in the Horn of Africa; and supporting the growth of Acacia for Gum Arabic in Drylands. ■ Support integrated rangeland rehabilitation, including range reseeding, for 25,000 acres in 23 ASAL counties by strengthening such rangeland use management systems as maintenance of fodder banks and strategic reserves; and restoration of degraded grazing lands. ■ Develop pastoral product value chains and market linkages that provide economic opportunities to pastoralists, through information, diversification, certification, niche markets, payments for ecosystem services, sustainable tourism, and local and sub-regional marketing infrastructure. ■ Conduct adaptive research, to strengthen understanding of the adaptability of livestock breeds. *Fisheries subsector:* ■ Develop national guidelines on climate-smart standards for cage fish farming. ■ Increase the number of climate-smart cages for fish farming from 3,450 to 8,000. ■ Increase the number of fish ponds by 16,000 by June 2023. ■ Conduct adaptive research, to strengthen understanding of the adaptability of fish breeds.	1.1 1.2 1.4 1.5 2.1 13.1 13.3

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Increase on-farm water harvesting and storage, waste water recycling, and area under irrigation. ***Linked to Action Area 7: Water.***	■ Increase the number of institutions/value chain actors and households harvesting water for agricultural use/ production to 500,000. ■ Increase annual water harvesting and storage in ASALs by 25 per cent from 16 million cubic meters (m3) to 20 m3, through small dams, pans, and river drenching; and 700 m3 through large multipurpose dams. ■ Undertake studies on water budgeting for agricultural enterprises in all Counties; ■ Promote water harvesting, water storage, soil moisture conservation, climate-smart irrigation infrastructure, and efficient water use, through sustainable land management, ecosystem-based adaptation, landscape approaches, and watershed conservation, with particular emphasis on: ● Promoting community-managed small scale irrigation systems in all Counties; ● Increasing acreage under irrigation from 480,000 acres to 1.2 million acres; ● Increasing efficiency from irrigated fields from 50 per cent to 90 per cent, through precision/drip irrigation; ● Promoting water recycling in all Counties; ● Desalinising water in the coastal zone for agricultural use; and ● Utilising controlled flooding technology to improve production through floodplain farming. ■ Support the implementation of the Water Act, 2016 for food production in the agricultural sector.	1.1 1.2 1.4 1.5 2.1 13.1 13.3
Promote the adoption of diversified adaptive enterprises/ value chains, including drought tolerant value chains, for sustained livelihoods and nutrition security.	■ Support at least 521,500 households to adopt diversified adaptive enterprises/value chains. ■ Support small-scale farmers, pastoralists, and communities to transition to specialised, market-oriented outputs in 13 priority commodity value chains under the Agricultural Sector Transformation and Growth Strategy (ASTGS) through: ● Developing and implementing a pilot project on climate resilient fish species, and related value chains; ● Promoting the up-scaling of climate resilient strategies/ technologies in fisheries and, climate resilient fish species; and ● Lobbying for tax zero rating on the development of traditional, climate resilient crop value chains. ■ Increase the number of farmers and pastoralists practicing livelihood diversification and market access for products from camels, indigenous poultry, beekeeping, rabbits, and such emerging livestock as quails, guinea fowls, and ostriches. ■ Establish price stabilisation schemes and strategic livestock-based food reserves in pastoral Counties. ■ Support the strengthening of market systems, infrastructure, and information, to incentivise the pastoral economy, and enhance off-take, including sale of animals when in distress, for specialised and niche markets.	1.1 1.2 2.1 2.2 2.4 6.5 13.1 13.3

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Reduce agricultural losses along the production and supply chains (pre-and-post-harvest)	■ Reduce climate-induced agricultural (pre-&-post) harvest losses from 40 per cent to 15 per cent through: ● Promoting PPP in post-harvest handling, marketing, and market distribution infrastructure, to reduce losses; ● Developing and promoting the adoption of such effective, climate-smart post-harvest technologies as milk coolers, green energy powered cold storages, solar crop driers, etc. by at least 2 million farmers by: » Developing post-harvest level SMEs; and » Facilitating effective market linkages. ● Strengthening commodity funding for adaptive crops by developing an inclusive warehouse receipt system; ● Rehabilitating and equipping cold storage facilities, including through the provision of milk coolers to dairy farming communities to reduce milk loss by 6 per cent; ● Adding value to livestock products by preservation, including through canning of livestock products, and expanding the establishment of abattoirs and cold storage facilities; ● Including drought tolerant pulses/legumes in the gazette-listed Strategic Food Reserves, and contract farmers and commercial off-takers for the targeted food commodities; and ● Developing fish ponds.	1.1 1.2 2.1 2.2 2.4 12.3
Develop a platform for sharing of up-to-date data and information on agriculture and nutrition, based on the Global Open Data for Agriculture and Nutrition (GODAN)	■ Support research to reduce market inefficiencies along the priority actions. ■ Strengthen networks and structures for data collection and information dissemination to enhance evidence-based decision-making, including decisions on cross-border mobility. ■ Develop and implement a policy on climate-smart agricultural data and statistics.	1.1 1.2 2.1 2.2 2.4 13.3

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Support the establishment of a decentralised, streamlined, and ring-fenced County-based climate risk funding mechanism for the agricultural sector, as provided for in the *Kenya Climate-Smart Agriculture Strategy (KCSAS) 2017-2026*	■ Support the development of agriculture advisory services, and innovation and multi-stakeholder dissemination platforms. ■ Strengthen financial mobilisation and support for the priority actions. ■ Enhance access to credit and finance for small-holder farmers, along the priority actions. ■ Support the harmonisation of local legislation to favour of cottage industries. ■ Support the development of climate smart agriculture curricular in all agriculture faculties of learning in the education and training sector.	1.1 1.2 1.4 13.3 17.3 17.7
Streamline coordination and partnerships, and support the harmonisation and further decentralization of climate-smart policies, strategies, legal guidelines, and implementation frameworks	■ Downscale and cascade KCSAS 2017–2026, the Kenya Climate Smart Agriculture Implementation Framework (KCSAIF) 2018 – 2027, the Agricultural Sector Transformation and Growth Strategy (ASTGS), 2018, and the Climate Change Act, 2016, through NCCAP 2018 –2022, and the County Integrated Development Plans (CIDPs) for the period 2018 –2022. ■ Mainstream climate change adaptation in agricultural extension. ■ Develop and implement climate change adaptation-compliant design and construction codes, and standards for all infrastructure in agriculture.	13.3

Relevant Institutions: Ministry of Agriculture, Livestock, Fisheries and Irrigation, Agriculture and Food Authority, Kenya Agricultural and Livestock Research Organization, Council of Governors, County Governments, Universities, Private sector, Kenya Forest Service, CSOs/NGOs/Multilateral Agencies, Development partners, Kenya Forestry Research Institute, National Drought Management Authority, Ministry of Water and Sanitation, Communities/water resource users association, Ministry of Health, Farmer organisations.

3.2.5 Energy

Achievement of Vision 2030 and the Government's Big Four Agenda is dependent on sustainable and affordable energy. Kenya's energy supply chain is however vulnerable to climate variability and change, and its associated extreme climate events that affect the energy resources and supplies, and make energy demand seasonal. In 2018, hydropower represented 36 per cent of installed capacity. Hydropower is reliant on the unpredictable climatic conditions, which leads to frequent power outages. Over the last decade, Kenya's electricity mix has been characterised by a decrease in the climate-vulnerable hydro-power sources, and a

steady increase in climate-resilient geothermal sources (IEA, 2015; Moraczewski, 2015; MoE&P 2015; GoK, 2016d; Owino et al., 2016; Longaand Zwaan, 2017; Kenya Power, 2017).

Kenya has great potential in geothermal, wind, and solar power (GoK, 2017a; KPLC, 2017), which provides opportunity for more robust, resilient, and well thought out response options for addressing drought-induced energy crises. Decisions on these energy sources should include climate proofing of associated infrastructure (World Energy Council, 2015). This could be achieved through diversified renewable energy systems, which would strengthen the country's energy security by broadening the national energy generation portfolios.

The climate change strategic actions to promote adaptation in the energy sector over the next five years include measures to enhance climate-proofing of energy infrastructure along the energy supply chain; promote environmentally sustainable practices in the energy sector; and diversify energy provision across sources and technologies (see Strategic Action Area 3).

3.2.6 Forestry

Forest ecosystems in Kenya are impacted by climate change, mostly through drought and wildfires (Chidumayo, Okali, Kowero, and Larwanou, 2011; Halofsky, Peterson, Metlen, Myer, and Sample, 2016). Adaptation actions to address these impacts include forestry practices and planting of tree species that are less vulnerable to drought and fires. Actions to address adaptation priorities in the forest sector, and achieve the Big Four Agenda and the SDG targets includes increasing the forest cover in each County by June 2023; enhancing forest landscape restoration initiatives that have forest cover benefits; promoting afforestation/reforestation in the Counties; encouraging sustainable timber production on privately-owned land; and promoting non-wood forest products (see Strategic Action Area 4).

Image/Photo courtesy of the Ministry of Environment and Forestry

Strategic Action Area 3:

A climate-resilient electricity supply mix

Strategic Objective 3

Enhance an electricity supply mix that is based on renewable energy, is resilient to climate change, and promotes energy efficiency

Issue/ problem:

The current mix of energy sources is expensive and climate sensitive. Affordable electricity supply needs to increase to meet the demands of a growing population and industrialising nation

Big 4 Pillars:

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Enhance climate-proofing of energy infrastructure along the energy supply chain	Incorporate the emerging and projected climate scenarios and impacts in the design, construction, operation, and maintenance of energy infrastructure through: ■ Establishing and implementing climate change risk-based construction standards for energy infrastructure; ■ Using concrete poles to replace wooden poles; ■ Optimising existing hydropower plants; and ■ Improving water management and conservation.	7.1 7.2 7.b
Promote environmentally sustainable practices in energy sector. ***Linked to Strategic Action Area on Forestry, Wildlife, and Tourism***	Continue the rehabilitation of water catchment areas, to provide sustainable ecosystem services for energy production through: ■ Protecting water catchment areas that feed the hydro-power reservoirs; and ■ Conserving and rehabilitating 1000 hectares of water catchment areas between 2018 and June 2023.	7.2 7.b 6.4 9.1 12.2

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Diversify energy provision across sources and technologies	■ Prioritise geothermal energy as the country's climate resilient and green energy, and develop 1,102.3 megawatts (MW) of geothermal power by June 2023. ■ Substitute thermal power plants with geothermal power plants. ■ Increase the network of other climate change resilient renewable energy technologies to provide power to off-grid areas.	7.2, 9.4 11.b, 13.1 7.3 7.b
Capacity development	■ Training and public awareness programmes on climate change adaptation mechanisms.	4.7 13.3
Policy and regulations	■ Update the integrated energy policy, to factor climate risks in energy planning for better development. ■ Develop a climate-resilient policy to guide the management of vegetation, and acquisition of wayleaves and corridors for energy infrastructure.	7.1 7.2 7.3 7.b

Relevant Institutions: Ministry of Energy, Ministry of The National Treasury and Planning, Council of Governors, Climate Change Directorate, Country Governments, Kenya Electricity Generating Company, Kenya Climate Innovation Centre, Kenya Industrial Research and Development Institute, Private Sector, Geothermal Development Corporation, Kenya Electricity Transmission Company, Kenya Power and Lighting Company, Kenya Forest Service, Rural Electrification Authority, and other stakeholders

Image/Photo courtesy of the Ministry of Environment and Forestry

Strategic Action Area 4:

Forest Cover

Strategic Objective 4

Increase forest cover to 10 per cent of total land area

Issue/ problem:

Forest services are crucial to sustainable development and human well-being, but forests degradation and land use change is being exacerbated by climate change

Big 4 Pillars:

Food and Nutrition Security

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Increase forest cover in every County by June 2022	Reduce deforestation and forest degradation, and enhance the protection of an additional 100,000 hectares of forests through such efforts as: ■ Community/participatory in forestry management; and ■ Financial innovations, including payments through Payment for Environmental/Ecosystem Services (PES) / carbon markets.	1.1, 1.2, 1.4 15.1, 15.2 15.3
Enhance Forest Landscape Restoration Initiatives, with forest cover benefits	Restore up to 200,000 hectares of forest on degraded landscapes, especially in ASALs and rangelands through: ■ Green Climate Fund (GCF) Dryland Resilience Project that focuses on: ● 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 initiative restoration processes on 33 per cent of land area in 7 Counties; ● Analysis of priority landscapes, and existing restoration successes; and ● Identification of financing options to scale up landscape restoration.	1.1 1.2 15.1 15.2

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Promote afforestation/ reforestation in Counties. ***Linked to Action Area 2: Food Security: Agroforestry***	Maintain watershed health (water quality and site productivity) for a healthy forestry: Afforestation/reforestation/agroforestry of additional 100,000 hectares of land through: ■ Increasing tree nurseries and, production and availability of seedlings for tree planting; ■ Promotion of trees on farms; ■ Promotion of forest management and planning; and ■ Promotion of silviculture interventions.	6.6 15.1 15.2
Encourage sustainable timber production on privately-owned land	Increase area under private sector-based industrial plantation from 71,000 hectares to at least 121,000 hectares by: ■ Developing standards and regulations for sustainable forestry management (voluntary moving to regulated); ■ Carrying out land use planning and zoning to segregate and identify forest areas for conservation; and ■ Undertaking in-depth evaluation of forest cover (at least bi annually).	15.1 15.2
Promote non-wood forest products	■ Establish at least 2,000 hectares of nature-based enterprises (non-wood forest products) to increase forest cover, and to provide safety nets to local communities when climate variability causes crop failures. ■ Increase the number of communities engaging in such pro-forest related services as bee keeping, eco-tourism, and agroforestry.	15.1 15.2
Enabling Action - capacity development and technology	■ M&E technologies, including remote sensing, global positioning systems, and computer tagging and tracking systems.	17.19
Policy	Review and mainstream climate change adaptation into, and implement forestry strategies and plans.	13.2

Relevant Institutions: Ministry of Environment and Forestry, Council of Governors, County Governments, CSOs/NGOs/Multilateral Agencies, Kenya Forestry Research Institute, Community Forestry Associations, Private Sector, Ministry of Agriculture, Livestock, Fisheries and Irrigation, National Drought Management Authority, Ministry of The National Treasury and Planning, Frontier Counties Development Council, County Governments in ASALs, Ministry of Lands and Physical Planning

3.2.7 Health

Climate change affects health through three pathways: Directly through such climate variables as heat and storms; indirectly through such natural systems as disease vectors; and through such pathways that are heavily mediated by human systems as under-nutrition (UNDP, 2013; WHO, 2015; WHO, 2017).

In Kenya, climate change affects human health by changing the severity or frequency of health threats that are already impacted by climate or weather factors; and by creating unanticipated health threats in places where they have not previously occurred. Figure 3.3 illustrates the various pathways through which climate change impacts health.

The risk from malaria and other vector-borne diseases is projected to increase in the future due to changing climatic conditions (Dekens, Parry, Zamudio, and Echeverría, 2013). Other health risks include upper respiratory tract infections (URTI's), and indirectly, relating to such non-communicable diseases as cancer and diabetes, among others.

Climate change strategic actions in the health sector include, climate-sensitive disease control and research to understand shifts in the transmission of diseases, promoting climate-resilient and sustainable health infrastructure and technologies, including adopting designs of green health buildings and other infrastructure.

Other actions include scaling up financial investments in reducing the number of deaths related to household and institutional air pollution that is linked to biomass stoves and, introducing appropriate measures for surveillance and monitoring of climate change-related diseases. There is also need to have a sector-specific adaptation plan, which is key in creating an enabling environment for the sector to mainstream climate change action.

Opportunities for adaptation in health include, promoting preventive healthcare, treating diseases at the community level, and such opportunities for human safety as early warning systems, public awareness programmes, and avoidance and preparedness campaigns.

Planned adaptation actions for the health sector are presented in Strategic Action Area 5.

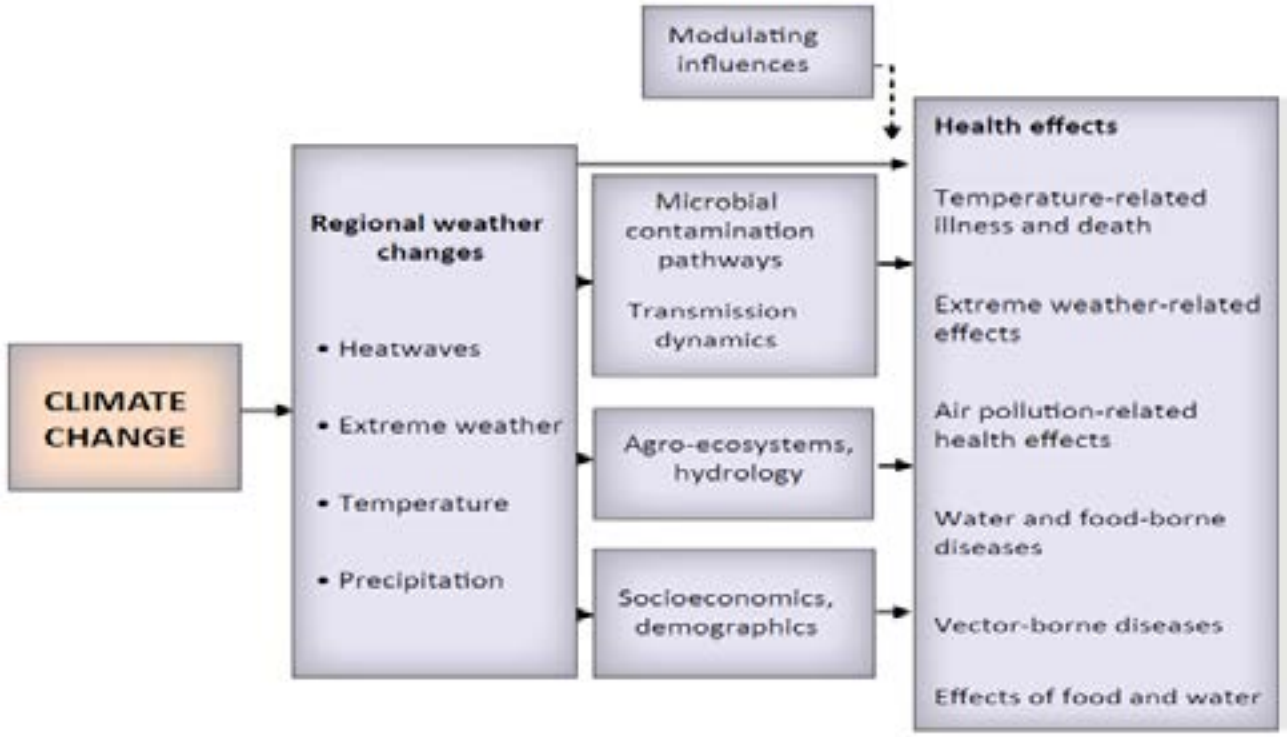


Figure 3.3: *Pathways by which climate change affects human health (GoK, 2010a).*

Strategic Action Area 5:

Climate change adaptation in the health system.

Strategic Objective 5

Mainstream climate change adaptation in the health system

Issue/ problem:

It is projected that increased climate variability and change will increase death rates from climate related diseases, heat stress, air pollution, unsafe drinking water, insufficient food, and insecure shelter.

Big 4 Pillars:

Universal Health Coverage

Food and Nutrition Security

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Reduce incidences of climate-sensitive diseases, as malaria and other vector- and water-borne diseases. The current malaria incidence per 1,000 populations is 225.	■ Scale-up community-level interventions on climate-sensitive diseases countrywide (100 per cent healthcare); and adaptation and mitigation through awareness and efficacious projects ■ Increase uptake of treatment services in areas prone to climate-sensitive diseases. ■ Support Counties to play their roles in addressing climate-sensitive health issues, e.g., diseases.	3.2 3.3 3.8 6.3
Strengthen the capacity of health workers, including community health workers and volunteers on skills in, and awareness of, climate-related health risks	■ Incorporate materials on climate-related health risks, including disaster risk management considerations, in 20 training programmes for health workers comprised of community health extension workers, and community health volunteers, among others.	3.d 7.3 13.3

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Improve the surveillance, response, and monitoring of climate change-related diseases	■ Roll out the use of best available technologies for climate-related health products and commodities, including in health care and chemical waste treatment and disposal. ■ Enhance training on integrated diseases early warning modelling, and promotion of best available technologies and innovations in clean cooking and household air quality management.	3.7, 3.9 3.d,4.7 13.3 17.1
Enhance the coordination mechanism within health and its collaborative sectors	■ Provide support for the development of training manuals, and integrate climate and health into curricula of health-related colleges and universities. ■ Have in place a communication strategy for disseminating information on the importance of taking actions to address impacts of climate change in health.	3.d 4.7 13.3
	■ Strengthen the health of vulnerable people in drought-prone areas (Counties) to provide a strong foundation for increased resilience to drought	1.5, 3.d, 4.7,13.1
Development and tracking of indicators: Design appropriate measures for surveillance and monitoring of climate change-related diseases, to enhance early warning. including enhancing existing databases on health sector indicators	■ Develop/adopt indicators and tracking. ■ Incorporate the developed/adopted indicators and tracking into Health Management Information Systems (HMIS) or relevant system.	3.d

Relevant Institutions: Ministry of Health, Council of Governors, County Governments, The National Treasury and Planning, Medical and Health Research Institutions, CSOs/NGOs/ Multilateral Agencies, Development Partners

3.2.8 Human Settlement, Urban Development, and Housing

Climate change affects human settlements directly or indirectly in Kenya through such extreme climate conditions as floods, landslides, droughts, and rise in sea level. To alleviate the shortfall of urban housing and curb the mushrooming of informal settlements/ slums, various interventions and strategies have to be adopted (GoK, 2017b; MoD&P, 2017b). Through the Big Four Agenda, Kenya plans to provide affordable housing to its citizens. Increased incidences of climate-related hazards however threaten the country's housing and the built environment.

A requirement to climate-proof housing structures could greatly benefit from urban spatial planning, toward climate-proofing whole urban centres in an integrated manner. Design or building codes, including green building codes, provide useful tools for doing this. Integration (e.g. networks of open spaces) would need to consider adapting public realms and spaces between buildings and other developments, for an overall resilient mix of urban infrastructure.

Opportunities for adaptation to climate change in human settlements include proper land use planning, sustainable management of such natural resources as water, and use of renewable and efficient energy. The climate change strategic actions to improve resilience and adaptive capacities of urban settlements include climate proofing and construction of green buildings, control of flooding in urban areas, and climate-proofing of landfill sites. Actions to climate-proof urban infrastructure are presented in Strategic Action Area 6.

Image/Photo courtesy of Min. of Environment

Strategic Action Area 6:

Resilience and Adaptive Capacities of Urban Infrastructure.

Strategic Objective 6

Improve the resilience and adaptive capacities of urban areas by enforcing climate-proof standards for housing and other urban infrastructure

Issue/ problem:

Climate change-induced hazards are negatively impacting urban environments, including housing and other infrastructure (roads, buildings, storm drainage facilities, dumpsites, landfills, etc.)

Big 4 Pillars:


Affordable Housing


Universal Health Coverage


Enhanced Manufacturing

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Strengthen the management of urban flooding in major urban centres, towns and cities	■ Adapt and enforce climate-smart, green building designs, and construction codes and standards for all urban infrastructure, to align with projected future climate conditions and extreme weather events. ■ Construct flood-ways to divert flood waters in major flooding urban centres, towns, and cities in the country. ■ Construct levees in urban rivers that flood frequently. ■ Rehabilitate all degraded storm water drains in at least seven (7) urban centres, i.e., Nairobi, Mombasa, Kisumu, Eldoret, Nakuru, Garissa, and Narok by June 2023, in cross-collaboration with WRA, in order to control risk from urban flooding. ■ Rehabilitate Nairobi dam and stabilize Nairobi River catchment, to harness and store catchment run-off, and reduce the flood incidences in Nairobi City by June 2023. ■ Rehabilitate the entire 'natural infrastructure' within urban centres, towns, and cities, including establishing green spaces to reduce flooding.	1.1,1.2, 1.5 3.9 6.2 6.4 9.1 11.5 11.6 11.b 13.1 13.3

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Construct climate-proofed sanitary landfills in all major urban centres, towns, and cities	■ Mainstream Climate Change Adaptation into the National Waste Management Strategy and align County-based waste management plans and other relevant policies to it. ■ Mainstream Climate Change Adaptation into County waste recovery and disposal laws and regulations by June 2023. ■ Construct at least one climate-proofed sanitary landfill in each of Nairobi, Mombasa and Kisumu by June 2023. ■ Transform all waste dumpsites into climate-proofed landfills in at least 5 County headquarters, based on the levels of generated waste.	1.1, 1.5, 3.9 6.2 11.6 11.b 12.5 13.1

Relevant Institutions: State Department of Housing and Urban Development; Ministry of Water and Sanitation, National Construction Authority, Council of Governors, County Governments, CSOs/NGOS/CBOs/Multilateral Agencies, Private sector (building industry) and the local people, National Environment Management Authority, Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works, Physical Planning Department

3.2.9 Manufacturing

Kenya's manufacturing sector accounts for 9 per cent of Kenya's GDP and 12 per cent of employment in the formal sector (GoK, 2017c; KEPSA, 2014a, 2014b). It is however very vulnerable to climate change because it relies on such infrastructure and services as water, energy, and transport that are vulnerable to disruptions caused by drought and/or heavy rains. Impacts of climate change on the manufacturing sector in turn affect the trade and commerce sector. This is because the trade and commerce sector depends on products and services developed by other sectors of the economy, including the manufacturing sector, hence, any adverse climate change impacts on such sectors will affect trade and commerce, and vice versa.

The trade and commerce sector is exposed to the impacts of climate change due to effects on goods that are traded, and also directly through transport of the goods. Climate-proofing of industrial facilities and their value chain linkages is therefore very crucial. A changing climate threatens the industrial supply chains of manufacturing, including disruptions to operations due to extreme climate events, damage to essential infrastructure and transport routes, and variations in water quality and availability due to extreme climate events. Adaptation actions adopted in the manufacturing sector will depend on the location and nature of the manufacturing facilities.

The business case for adaptation action on climate change includes enhanced efficiency in the use of such resources as water, energy, and materials, and making sure that industry adjusts appropriately to any consequences of climate change, by managing risk and exploiting opportunities (EBRD, 2015; Klingel and Davies, 2015; Norton, Ryan, and Wang, 2015). Adaptation Actions for the manufacturing sector are presented in the Strategic Action Area 7.

Strategic Action Area 7:

Resilience of the manufacturing infrastructure and systems.

Strategic Objective 7

Promote the growth and resilience of the manufacturing industry to drive jobs in the manufacturing sector

Issue/ problem: Inefficient use of resources and disruption of commodity supply chains due to climate change impacts

Big 4 Pillars:  Enhanced Manufacturing

SDGs: 

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Improve water harvesting and water use efficiency	■ Increase the number of companies participating in efficient water-use initiatives to 200 (to include 200 water audits) by June 2023. ■ Subsidize water harvesting components to incentivise water harvesting by participating companies.	6.4 9.4
Enhance climate0proofing of all manufacturing infrastructure, to create enabling environments for the resilience of private sector investment.	■ Develop and implement climate change adaptation-compliant design and construction codes. and standards for all manufacturing infrastructure ■ Build the capacity of the private sector (formal and informal) so as to enhance the resilience of their investments, e.g., through identification of new and more resilient products and services. ■ Demonstrate an operational business case for private sector investment in adaptation. ■ Develop fiscal incentive measures to encourage businesses to undertake investment in adaptation and resilience building measures. ■ Ecolabel industrial products to promote green procurement, especially by public procurement agencies.	9.4

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Promote industrial symbiosis	■ Climate-proof waste management infrastructure for waste exchange clearance centres in Special Economic Zone (SEZ) by June 2023. ■ Climate-proof waste management infrastructure for waste management facilities for SEZ (effluent treatment plants) by June 2023. ■ Climate-proof waste management infrastructure for waste recovery, reuse, and recycling, to create 20,000 decent green jobs by June 2023 (5 per cent of jobs created under four sectors: leather, textiles and apparel, agro-processing and fish processing) for merging with bullet 1	9.1 11.b 13.1
Support research and innovation for productivity and competitiveness	■ Strengthen the academia-industry-government-civil society (quadruple helix) collaboration to boost research and innovation for productivity and competitiveness, and attracting of funding opportunities.	9.4,9.5, 13.3

Relevant Institutions: Kenya Private Sector Alliance; Kenya Association of Manufacturers; Private Sector; Ministry of Industry, Trade and Co-operatives; Ministry of Water and Sanitation; Kenya Industrial Research and Development Institute; County Governments; and the Academia, CSOs/NGOs/Multilateral Agencies

3.2.10 Transport and Infrastructure

Climate change has adverse effects on transport infrastructure, including ports (air, sea), roads, and railways. The bulk of adaptation measures related to transport infrastructure involve management of storm water (Posey, 2012). Examples include increased use of permeable paving surfaces, open space preservation, landscaping, measures to modify alleys, and green roofs, to reduce runoff.

Methods for adapting to more intense storms include, armouring/reinforcing of ditches to prevent erosion, and designing drainage systems (e.g. culverts and other hydraulic structures) with anticipation of heavy flow volumes. Other actions include, continually monitoring the condition of such assets as roads, bridges, and culverts, using geographic information systems (GIS) and other tools. Methods for adapting to hotter and drier climates include, intensifying monitoring of pavement conditions during extreme heat periods. Adaptation actions under transport and other infrastructure sector are presented in Strategic Action Area 8.

Image/Photo courtesy of the Min. of Transport

Strategic Action Area 8:

Climate-Proofing Transport Infrastructure.

Strategic Objective 8

Establish efficient, safe, world-class transport systems and logistic services that are better able to withstand projected impacts of climate change

Issue/ problem: | Disruption of transport systems by extreme climate events

Big 4 Pillars:  Enhanced Manufacturing

SDGs: 

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Enhance climate-proofing of all infrastructure, especially for water, energy, transport, and ICT, to facilitate resilience building. *Linked to EDE Pillar 2.*	■ Mainstream climate change adaptation into, and implement, the Integrated National Transport Policy, in order to integrate climate risk information in infrastructure planning and implementation in the infrastructure sector. ■ Mainstream climate change adaptation, into and implement, the Blue Economy Strategy, to harness the potential of ocean and maritime assets. ■ Mainstream climate change adaptation into, and implement, the Maritime service. ■ Develop and apply standards and guidelines for the design and climate-proofing of transport infrastructure and other infrastructure (both existing and new). ■ Climate-proof at least 4000 km of existing roads and, where feasible, upscale the construction of roads to systematically harvest water and reduce floods by June 2023. ■ Explore the feasibility of designing and constructing new roads to systematically harvest water during floods. ■ Support the climate-proofing of National and County infrastructure projects (especially for water, energy, transport, and ICT), to facilitate resilience building (see EDE Pillar 2). ■ Strengthen the capacity of at least 23 Counties, to enable them plan, contract, and supervise the implementation of climate-proofed infrastructure.	1.1 1.2 1.5 2.1 2.2 6.1 6.4 7.2 7.3 9.1 11.2 11.b 13.1 13.3 15.3

Relevant Institutions: Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works; Kenya National Highways Authority; Kenya Rural Roads Authority; Kenya Urban Roads Authority; Council of Governors; County Governments; Kenya Bureau of Standards; Ministry of Water and Sanitation; Kenya Institute of Highways and Building Technology; State Department of Transport; and State Department of Physical Planning.

3.2.11 Water and Sanitation

In Kenya, access to safe, adequate, and reliable water supply is one of the central indicators of socio-economic development (GoK, 2017c). The climate change strategic actions to increase forest cover also help the water sector, through restoration and protection of watersheds and water-related ecosystems, including water towers; and increased water availability through water harvesting and storage, improved water efficiency, and improved water availability for domestic, agricultural, and industrial use, and for wildlife.

The activities in the water sector that are related to climate change adaptation include, sector reforms related to groundwater abstraction, rainwater harvesting and building of water storage capacity, and the management of lakes, aquifers, and rivers (GoK, 2007; GoK, 2010c). Opportunities for adaptation technologies in the water resources sector include, groundwater abstraction, rainwater harvesting, and development and implementation of policies and regulations to encourage water resources management and water conservation practices (GoK, 2010c). The other opportunity is development of water desalination technology in order to make use of the country's seawater endowment and adapt to climate change-induced sea water intrusion of groundwater along the coastal region. Adaptation Actions under the water and sanitation sector are presented in Strategic Action Area 9.

Image/Photo courtesy of the Adaptation Consortium

Strategic Action Area 9:

Resilience of the Water Resources.

Strategic Objective 9

Enhance the resilience of the water resources 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-induced drought and reduction of glaciers.

Big 4 Pillars: Food and Nutrition Security; Universal Health Coverage; Affordable Housing; Enhanced Manufacturing

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Increase annual per capita water availability through the development of climate-proofed water infrastructure, including mega dams, small dams, water pans, and untapped aquifers	■ Mainstream climate change adaptation into, and implement, the *National Water Master Plan* ■ Develop and implement climate change adaptation-compliant design and construction codes and standards for all water resources infrastructure. ■ Increase to 2000 the number of annual climate-proofed water harvesting/storage infrastructure from 700. ■ Increase annual per capita water availability (harvested, abstracted,[5] and stored) from 647 m^3 to 1000 m^3 by June 2023. ■ Increase the number of people and entities accessing good quality water for domestic, agricultural, and industrial use from 58% to 65% by June 2023.[6] ■ Climate-proof the construction and maintenance of at least 12 and at most 36 multipurpose dams, small dams, water pans, and in situ water harvesting and storage structures countrywide[7] by June 2023. ■ Mainstream disaster risk reduction measures in planning and service delivery in the water sector, particularly in vulnerable and high risk regions. ■ Undertake national hydrogeological surveys, to identify strategic aquifers.	1.4 1.5 6.1 6.2 6.3 6.4 6.5 6.6 9.1 11.b 13.1 13.3 12.5 13.1 13.3

[5] *Ensure that underground water abstraction is accompanied by aquifer recharge points*
[6] *Less than 1700 m^3 = regular water stress; less than 1000 m^3 = chronic scarcity; less than 500 m^3 = absolute scarcity*
[7] *12 multipurpose dams (Thwake, Thiba, Radat, Gogo, Thuci, Kaiti, Lowaat, Rupingazi, Thambana, Maara, Kithino, Kamumu) under construction and 36 in the pipeline.*

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
	■ Undertake a national ground water survey to establish abstraction levels against recharge, and map locations and buffer zones suitable for direct artificial groundwater recharge and other priority interventions. ■ Develop at least 56 ecosystem-based adaptation and integrated sub-catchment management plans, and implement at least 236 other sub-catchment management plans, by June 2023.	
Increase number of pro-poor water harvesting-based livelihood resilience programmes, to enhance household water access, food and nutrition security, and boost groundwater recharge of the aquifers	■ Establish at least 300,000 on-farm ponds in at least 15 Counties, for on-farm (in-situ) agricultural water harvesting. ■ Support improved water-harvesting-based livelihood systems on at least 60,000 hectares, through various methods of land reclamation. ■ Support and strengthen local communities to protect at least 5 water catchment areas. ■ Develop a water utility creditworthiness index, and a financial instrument for adaptation.	1.1, 1.4 1.5 2.1 2.2 6.2 6.4 6.6
Promote efficient use of water	■ Reduce water wastage and non-revenue water (unbilled and unaccounted for) from the current 43 per cent to 20 per cent, by June 2023 through: ● Conducting awareness programmes for water efficiency; and ● Introducing innovation in water tracking, and leakages identification and reporting.	6.4 13.3
Improve water access for wildlife in major game parks and reserves	■ Develop and implement an integrated water management strategy for rangeland economy (wildlife and pastoral livestock), to include: ● Restoration of degraded rangeland units through planting of indigenous trees, and constructing artificial water dams for wildlife use; ● Identifying and mapping out locations suitable for harvesting of flood water in rangelands; and ● Promoting the recycling of waste water, including through the use of treated sewage water in building and road construction	6.4 9.1 15.1 15.2 15.3

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Policy dialogue	■ Zero rate taxes on water harvesting and storage equipment, to stimulate household and institutional water harvesting, both at rural and urban areas ■ Review by-laws that prohibit water harvesting in urban areas like Nairobi. ■ Develop a policy to make water harvesting mandatory for institutions and households that consume over 20 m3 per month, or to have a 60 – 40 per cent balance between tap and harvested water, respectively. ■ Enforce laws on urban planning and storm water management in urban areas, including desilting of drainages and riparian protection. ■ Formulate a policy for recycled water pricing and beneficiary sectors, such as, construction, watering flower beds, and car washes. ■ Conduct national awareness and education to increase uptake of recycled water for secondary uses. ■ Develop a national framework for waste water management.	6.5 13.1 13.3

Relevant Institutions: Ministry of Water and Sanitation; Water Resources Authority; National Water Storage Authority; Council of Governors; County Governments; National Drought Management Authority; Water Sector Trust Fund; Centre for Training and Integrated Research in ASAL Development; Local Communities; Ministry of Tourism and Wildlife; Kenya Wildlife Service; Ministry of Education; Private Sector; CSOs/NGOs/ Multilateral Agencies; The National Treasury and Planning; State Law Office and Department of Justice; Water Users Associations; Forest Action Associations; Resident Associations; State Department of Infrastructure; Ministry of Health; Water Service Providers; Water Service Boards; Water Service Providers Associations; Public-Private Partnerships Unit; Regional Development Authorities; Development Partners; National Irrigation Board; Kenya Association of Manufacturers; Water Consumers; Ministry of Environment and Forestry; Kenya Water Towers Agency; Kenya Forest Service; Community Forest Associations; the National Land Commission; National Environment Management Authority; Kenya Water Institute; Department of mines and Geology

*Payments for environmental/ecosystem services (PES) are a potentially more predictable and a less drought prone source of income.

3.2.12 Tourism and Wildlife

Increasingly warmer temperatures are reducing plant and vegetation productivity in semi-arid environments, which affects wildlife diversity and distribution. This results in wildlife competing with domestic livestock and human beings for both food and water.

The tourism sector is one of the highly climate-sensitive economic sectors in Kenya. Both the stakeholders in the tourism supply side (tourism operators, destination communities) and those on the tourism demand-side (tourists) could be directly affected by climate change through its indirect influence on a wide range of environmental resources (KEPSA, 2014c). Wildlife-based tourism represents about 70 per cent of tourism revenues in Kenya (KEPSA, 2014c). Climate change is threatening this by impacting wildlife species and natural ecosystems, and the livelihoods and communities that depend on them (AWF, 2015; Fynn, Augustine, Peel, and MGarine-Wichatitsky, 2016). Adaptation Actions under the tourism and wildlife sector are presented in Strategic Action Area 10.

Strategic Action Area 10: **Resilience of the Tourism Value Chain.**

Strategic Action Area 10a:

Tourism sub-sector.

Strategic Objective 10a

Enhance the resilience of tourist attractions[8] and tourism infrastructure[9]

Issue/ problem: Climate change affects critical tourist attractions and tourism infrastructure

Big 4 Pillars: Food and Nutrition Security

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Develop and implement a climate change adaptation strategy for the tourism sector	■ Review and update (within the context of climate change adaptation) tourism sector policies, laws, regulations, and other quasi-regulatory guidelines and governance. ■ Develop and implement climate-resilience action plans for the tourism sector, and coordinate the response to climate change at all levels of tourism management. ■ Enhance the diversification of climate-resilient tourism products. ■ Safeguard tourist attraction sites by sensitising value chain actors on climate change.	8.9 12.b 13.3 15.9
Support climate-proofing of infrastructure in and/or leading to tourist attraction sites	■ Identify and support climate-proofing of tourism infrastructure, with emphasis on: ● Support for the improvement of drainage along roads in tourist attraction sites; ● Support for the construction of bridges that are better able to withstand flooding events; and ● oPutting in place early warning systems and communication structures that target value chain actors.	8.9 12.b 13.3 15.9

[8] *Tourism is a highly diverse economic sector, comprising local, national and international stakeholders, those directly involved in the tourism sector or whose livelihoods are affected by tourism (government ministries, local government, tourism industry representatives, tourism labour representatives, local businesses and communities), and those in other sectors that might be affected by tourism adaptations (e.g., transportation, energy or agriculture), whose adaptations might affect tourism (e.g., insurance industry, health sector), or that have other relevant expertise (e.g. universities, non-governmental organizations).*

[9] *Components of the tourism value chain (sometimes described as sub-sectors of the industry) includes tourists, tourism service suppliers, destination communities, and tour operators among others.*

Relevant Institutions: Ministry of Tourism and Wildlife, Kenya Wildlife Service, Kenya Tourism Board, CSOs/NGOs/Multilateral Agencies, Council of Governors, County Governments, Private Sector

Strategic Action Area 10b: Wildlife sub-sector.

Strategic Objective 10b

Enhance the resilience of wildlife, habitats and ecosystems that sustain wildlife

Issue/ problem: Decreasing wildlife species diversity, habitat connectivity and increased ecosystem degradation due to climate change impacts.

Big 4 Pillars: Food and Nutrition Security

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Finalise and implement the Kenya Wildlife Climate Change Adaptation (Conservation and Management) Strategy	■ By June 2023, at least 20 per cent of terrestrial and inland water, and 15 per cent of coastal and marine areas, especially areas of particular biodiversity and ecosystem service importance, conserved through effective and equitable management, ecological representativeness, and well connected systems of protected areas, in order to: ● Restore ecosystem functioning; ● Reduce other anthropogenic stresses; ● Protect and manage large and biodiverse landscapes; ● Increase, where feasible, the size of protected areas; ● Increase connectivity among protected areas and conservancies; ● Manage translocation (assisted migration); ● Supplement watering sources; and ● Manipulate habitats to enhance adaptation.	13.3 14.2 14.5 15.9

Image/Photo courtesy of the NDC Partnership

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Mainstream climate change adaptation into, and implement, existing species- and habitat-specific management plans	■ Maintain and increase the population of critically endangered and endangered species of wildlife (see sixth schedule of the Wildlife Act 2013) by 5 percent by June 2023 through: ● Prioritising recovery funding to maximize strategic outcomes for listed species; ● Strengthening partnerships for species recovery by expanding collaboration among stakeholders and neighbouring countries (Tanzania & Uganda); ● Promoting more monitoring and adaptive management for species recovery; ● Conducting targeted, efficient monitoring, to assess species status and improve management strategies; ● Refining recovery methods to have more objective and measurable recovery criteria that is based on best practice in science; and ● Using such well-established climate-smart conservation strategies, as increasing habitat connectivity and reducing non-climate stressors.	15.5 15.9
Integrate ecosystem-based adaptation and community-based adaptation approaches to reduce natural resource-based conflicts in rangelands	■ Identify and effectively conserve 30,000 hectares of wildlife habitats, to support a broad range of wildlife and plants under changing conditions, with emphasis on: ● Implementing an adaptive wildlife management strategy in 10 Protected Areas by June 2023; and ● Improving the resilience of coral reef ecosystems, by increasing areas under effective coral reef management by 10 per cent by June 2023, from the current base line; ■ Reduce area under invasive plant species in Protected Areas (listed in the 7th schedule of the Wildlife Act, 2013) by 50 per cent of current coverage by June 2023 through: ● Implementation of finalised climate-resilient ecosystem, fire, and flood management plans. ■ Design and develop a strategy for wildlife and livestock to co-exist harmoniously in rangelands through niche differentiation and functional resource heterogeneity,[10] with emphasis on: ● Developing adaptive grazing management plans; and ● Reducing the risk of human-wildlife conflict by 50 per cent of current baseline by June 2023.	8.9 15.5 15.9 15.5 15.8 15.9

[10] *While pastoralism is potentially compatible with wildlife conservation, there is a spatial and dietary overlap and displacement between the two, with a large proportion of wildlife found outside protected areas, in rangelands where there are large numbers of pastoralists (Butt and Turner, 2012). While long term animal nutrition can be limited by water, mineral availability, heat stress, parasites and infectious diseases, short-term livestock-wildlife competition is seen as occurring through lowering the availability of fodder. Factors such as drought and habitat/forage loss are likely to influence the viability of wildlife and livestock populations. There is therefore need to strengthen the understanding of wildlife-livestock competition to better manage the mixed cropping-grazing landscapes in Kenya.*

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Incorporate wildlife considerations in the preparation of County spatial plans	■ Implement the National Wildlife Corridors and Dispersal Areas Report, with emphasis on: ● Integrating wildlife issues in all 47 County Spatial Plans; ● Securing the 20 per cent of dispersal corridors and migratory pathways that have been identified in the Report; » Enhancing private sector involvement in the wildlife sector, to encourage buy-in and funding; » Developing and operationalising at least 5 new conservancies; » Enhancing wildlife entrepreneurship among communities; » Recovering encroached areas to facilitate their conversion back to wildlife corridors; and » Increasing number of wildlife protection zones outside the existing protected areas (parks).	15.5
Establish frameworks for transboundary collaboration between Kenya and Tanzania	■ Harmonise and mainstream climate change adaptation in, and implement, at least four transboundary wildlife policies and strategies between Kenya and Tanzania, and between Kenya and Uganda.	15.5 15.9

Image/Photo courtesy of the NDC Partnership

Relevant Institutions: Ministry of Tourism and Wildlife, State Department of Livestock Production; Kenya Wildlife Service, Kenya Wildlife Conservancies Association; Conservation Partners, Private Sector, Council of Governors, County Governments, CSOs/NGOs/ Multilateral Agencies, Community Conservation Groups, Directorate of Resource Surveys and Remote Sensing, International Livestock Research Institute, African Conservation Centre, Save the Elephants, African Wildlife Foundation, International Fund for Animal Welfare, Nature Kenya, Kenya Meteorological Department

3.2.13 Marine and Coastal Resources

Kenya is endowed with about 534 km coastline that has diverse habitats, including mangrove forests, coral reefs, sea grass beds, rocky and sandy beaches, and muddy areas and deltas. It also has the port of Mombasa, which a key gateway to the country, and to other areas, such as countries in East and Central Africa, and Southern Sudan, among other countries. Increase in ocean and air temperature, acidification of oceans, rising sea levels, and shifts in ocean circulation, which result from climate variability and change, have been cited as some of the key physical changes that could stress marine and coastal environments (GoK, 2017d). Among the significant ecological impacts associated with these are coral bleaching due to increased temperature and ocean acidification, species invasion, changes in species distribution and biodiversity, and reduced biological productivity.

Kenya seeks to mainstream climate action into the Marine, Coastal Zone, and Blue Economy through promoting climate-resilient fishing technologies, green port initiatives, and related energy efficiency programmes. The main activities in the coastal and marine resources sector are associated with wildlife, tourism, energy, the environment, and agriculture. Existing opportunities for adaptation technologies in the coastal and marine resources sector include, disaster preparedness, building coastal dykes, and seawater desalination. Adaptation Actions under the marine and coastal resources sector are presented in Strategic Action Area 11.

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Strategic Action Area 11:

Marine and Coastal Resources Sector.

Strategic Objective 11

Mainstream climate change adaptation into the Blue Economy

Issue/ problem: Climate change negatively affects maritime activities, coastal ecosystems, and port infrastructure

Big 4 Pillars: Food and Nutrition Security; Universal Health Coverage; Affordable Housing; Enhanced Manufacturing

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Mainstream climate change adaptation in, and implement, the *Integrated Shoreline Management Strategy for Marine and Coastal Zone*	■ Include climate change considerations in the Environmental Impact Assessment (EIA) for Marine and Coastal Zone development projects, and implement the recommendations of the climate-inclusive EIA Reports. ■ Develop a systematic climate-resilient conservation plan for the transboundary marine and fresh water conservation areas between Kenya and Tanzania. ■ Strengthen early warning, disaster preparedness, and response systems.	14.1 14.2 14.3 14.4
Promote integrated river-delta planning and management	■ Support the implementation of management plans to rationalise diversion and damming of rivers, and flood control, to ensure environmental flows are maintained, with emphasis on: ● Tana Delta Management plan; and ● Sabaki Estuary management plan.	6.5 14.2
Promote Integrated Water Resource Management (IWRM) strategies to safeguard water quality	■ Develop and implement IWRM for Tana and Athi basins, ■ Design and implement a plan for the sustainable extraction of groundwater, to control the problem of intrusion of salty water into freshwater aquifers. ■ Promote suitable management strategies to protect water catchments and water supply aquifers.	6.4 6.5

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Climate-proof all infrastructure in the marine and coastal zone	■ Develop and implement a strategy for the protection of the shoreline against impacts of climate change and other natural disasters. ■ Develop and implement climate change adaptation-compliant design, siting, and construction codes and standards for all marine and coastal infrastructure. ■ Climate-proof the Port of Mombasa. ■ Climate-proof and maintain roads, buildings, and drainage structures in road networks. ■ Enforce standards on setback lines to protect and conserve shoreline riparian areas.	9.1 11.b 13.1 13.2 14.2 14.3 14.5
Strengthen the implementation of *Marine Risk and Disaster Management Plans*	■ Strengthen early warning systems for Tsunami, drought, floods, and other disasters through: ● Developing and implementing Disaster Preparedness and Response Plans. ■ Raise public awareness on the importance of shoreline protection. ■ Install wave monitoring systems in the coastal areas. ■ Develop and implement climate change adaptation-compliant design and construction codes and standards for all marine and coastal infrastructure. ■ Develop and implement a strategy for protection of the shoreline against impacts of climate change and other natural disasters.	4.7 13.3 14.1 14.2 15.9
Mainstream climate change adaptation in, and implement, the *National Mangrove Ecosystem Management Plan*	■ Restore and co-manage degraded mangrove forests and coastal terrestrial ecosystems, using a multi-sectoral approach to guide and regulate the multiple activities carried out in these habitats. ■ Mainstream the management of mangroves and coastal forests and ecosystems into coastal land use planning.	6.4, 6.5 13.1 13.2 14.2
Diversify tourist packages	■ Strengthen early warning systems and communication structures in terms of Tsunami warnings and sea related events targeted toward the tourism sector. ■ Diversify tourism products to strengthen tourism resilience.	8.9

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Strengthen implementation of the Wildlife Conservation and Management Act of 2013, and associated regulations	■ Strengthen the guidelines for management of wildlife to minimize human wildlife conflicts, with emphasis on: ● Promoting zoning schemes through land suitability mapping and integrated spatial planning that resolve space and water use conflicts; ● Promoting and supporting multiple uses of ecosystems, to reduce selective pressure; ● Supporting programmes to address human/wildlife conflicts; ● Strengthening conflict resolution mechanisms; and ● Promoting access to, and establishing, benefit sharing schemes	13.2 14.2 15.9 16.6
Promote alternative livelihoods	■ Integrate ecosystem-based and community-based adaptation approaches, to reduce natural resource-based conflicts. ■ Strengthen mechanisms for rehabilitation and co-management of coastal ecosystems, and sharing of benefits. ■ Establish community managed areas (CMAs) in marine and terrestrial environments. ■ Develop and implement schemes on Payment for Environmental/Ecosystem Services (PES) ■ Promote public-private partnerships (PPPs) in the conservation and management of resources. ■ Expand fishing zones in the coastal waters.	1.4 1.5 14.2

Relevant Institutions: State Department for Fisheries, Aquaculture and the Blue Economy; Council of Governors; County Governments; CSOs/NGOs/Multilateral Agencies; Community Forest Associations; Kenya Forestry Research Institute; Kenya Meteorological Department; Kenya Wildlife Service; Kenya Forest Service; Kenya Marine and Fisheries Research Institute; Local Communities; Ministry of Environment and Forestry; National Museums of Kenya; National Environment Management Authority; Ministry of Lands and Physical Planning; Private Sector; Tana and Athi Rivers Development Authority; Water Resources Authority; Coast Development Authority; Ministry of Tourism and Wildlife; Kenya Ports Authority; Kenya Maritime Authority; Institute of Climate Change and Adaptation (of University of Nairobi); Department of Remote Sensing and Resource Surveys; Centre for Remote Sensing; The National Treasury and Planning; Ministry of Education; Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works

Image/Photo courtesy of the CORDIO EA

1.7.14 Cross-Cutting Actions (CCD, KMD, NEMA, KIRDI, CoG, GYVGs

a. Enabling actions for the Climate Change Directorate (CCD)

Strategic Action Area 12: CCD Enabling Actions.

Strategic Objective 12	Mainstream climate change adaptation in the environment and climate change

Issue/ problem:	Need for upscale of County climate change planning and finance mechanisms and strengthening community-based preparedness and response units

Big 4 Pillars:  Food and Nutrition Security  Universal Health Coverage  Affordable Housing  Enhanced Manufacturing

SDGs: 

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Implement the *Climate Change Act, 2016* and the *Climate Finance Policy, 2018*	■ Operationalise the climate change coordinating institutions stipulated in the Climate Change Act 2016. ■ Review and Update NAP. ■ Develop adaptation and resilience indicators ■ Participate in negotiations on adaptation at the international level. ■ Develop and operationalise an M&E system for adaptation. ■ Strengthening of the Climate Change Directorate and climate change units in Ministries, Counties, Departments, and State Agencies (MCDAs). ■ Operationalise the National Climate Change Resource Centre (NCCRC) and Portal. ■ Support the National and County financing systems for climate finance. ■ Build capacity, particularly in fiduciary management skills, to enable institutions disburse, absorb, and manage large projects and large funds, in a transparent and accountable manner. ■ Strengthen transparency and accountability. ■ Establish a platform for open and transparent stakeholder dialogue on climate finance.	13.2 13.3 13.a 13.b

Relevant Institutions: Climate Change Directorate, Ministry of Environment and Forestry, The National Treasury and Planning, Council of Governors; County Governments; CSOs/NGOs/ Multilateral Agencies; Private Sector

b. Enabling actions for the Kenya Meteorological Department (KMD)

Strategic Action Area 13: KMD Enabling Actions.

Strategic Objective 13

Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all Counties

Issue/ problem: Need for improved provision and uptake of climate information services relevant to livelihoods at County level to inform decision making; upscale of County climate change planning and finance mechanisms; and strengthening of community-based preparedness and response units

Big 4 Pillars: Food and Nutrition Security; Universal Health Coverage; Affordable Housing; Enhanced Manufacturing

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Provide Climate Information Services (CIS) that inform decision making for governments, businesses and households	■ Modernise KMD climate information systems and services. ■ Develop County Climate Information Service Plans (CCISP). ■ Expand the collection network and weather observing systems for climate monitoring data. ■ Strengthen the capacity of County Meteorological Directorates, to improve climate information services. ■ Engage traditional weather forecasters and systems in National climate change adaptation initiatives by developing a partnership model for engagement between traditional weather forecasters and the Kenya Meteorology department. ■ Strengthen the network for early warning and climate information services by improving the provision of Climate Information Service and enhancing integration of local/indigenous knowledge into early warning systems. ■ Enhance participatory scenario planning with communities. ■ Support the unpacking of meteorological language and the translation of downscaled climate information into Kiswahili and local languages.	3.d 13.1 13.2 13.3

Relevant Institutions: Ministry of Environment and Forestry, Kenya Meteorological Department, Climate Change Directorate, Council of Governors, County Governments; CSOs/ NGOs/Multilateral Agencies; Private Sector

c. Enabling actions for the National Environment Management Authority (NEMA)

Strategic Action Area 14: NEMA's Enabling Actions.

Strategic Objective 14

Mainstream climate change adaptation in the environment sector

Issue/ problem: Need to upscale County climate change planning and finance mechanisms, and strengthen community-based preparedness and response units

Big 4 Pillars: Food and Nutrition Security; Universal Health Coverage; Affordable Housing; Enhanced Manufacturing

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Counties better ready to implement climate change actions	■ Mainstream climate change risks and vulnerability assessments in all forms of assessment, i.e., EIAs and EAs. ■ Climate-proof and retrofit NEMA-owned buildings and facilities, to strengthen their resilience. ■ Monitor, report, and enforce compliance with the Climate Change Act 2016	17.18

Relevant Institutions: National Environment Management Authority, Climate Change Directorate; CSOs/NGOs/Multilateral Agencies; Private Sector

Image/Photo courtesy of the Min. of Environment

d. Enabling actions for the Kenya Industrial Research and Development Institute (KIRDI)

Strategic Action Area 15: KIRDI Enabling Actions - Technology and Innovation.

Strategic Objective 15

Operationalise the Science, Technology, and Innovation (STI) Act of 2013: Support, accelerate, encourage and enable innovation promoting and facilitating enhanced action on technology development and transfer

Issue/ problem:

1. Fragmented STI sector
2. Unclear national research agenda
3. Weak institutional frameworks for STI
4. Poor linkage between industry and research institutions
5. Inadequate funding/ overreliance on external resources (STI Act 2013 stipulates 2 per cent of GDP)

Big 4 Pillars:


Food and Nutrition Security


Universal Health Coverage


Affordable Housing


Enhanced Manufacturing

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Build the capacity of KIRDI to enhance its National Designated Entity (NDE) role	■ Update the country's technology needs assessment (TNA) to help identify the technological priorities to be supported by the NDE work.	1.4, 2.a, 5.b, 9.b, 12.a, 17.6, 17.7
	■ Resource mobilise for NDE by lobbying for adequate funds from the Exchequer to support the NDE functions.	9.5, 9.b
	■ Popularise KIRDI as a NDE Climate Technology Centre and Network (CTCN), among the private sector, academia; CSOs/NGOs and within Government departments.	9.5, 9.b
Support the innovation and development of climate-smart technologies and capacities that promote climate resilient development	■ Support traditional food preservation technology, particularly among the pastoralists who could keep meat for more than six months (Marginalised groups).	2.1, 2.2, 2.4, 12.3
	■ Support innovation and development of appropriate technologies and capacity that promote climate resilient development (see *NAP*).	9.5, 13.1
	■ Promote the development of locally available technologies in support of adaptation to climate change (see *NAP*).	9.5, 13.1
	■ Promote and facilitate transfer of appropriate technologies to the most vulnerable *(see NAP).*	1.4, 1.5, 17.7
	■ Upscale (and protect) successful climate change technologies and innovations *(see NAP)*	9.5, 13.1

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Promote and facilitate the transfer of appropriate technologies to the most vulnerable. **Promote the development and use of Traditional and idegineous technologies in support of adaptation to climate change.**	■ Ensure intellectual property laws protect climate innovation and technology. ■ Identify and promote climate change adaptation attributes in emerging technologies to support quality of life and overall socio-economic development.	17.6 17.7
Promote a national innovation culture that facilitates access to information by all innovation stakeholders, for purposes of supporting the coordination and identification of opportunities	■ Operationalise fully the country's National Innovation System (NIS), to be informed by a systemic assessment of requisite linkages and connectivity of the system and the market context in which innovation stakeholders operate. This also includes strengthening the capacity of universities and research institutes to transform their ideas into commercially scalable innovations. ■ Promote dialogue sessions with the government, academia Civil Society, and the business community, with the active participation of relevant experts. ■ Undertake annual surveys to establish factors that hamper innovation and entrepreneurship, with special focus on the regulatory and administrative burden. ■ Prioritise for action the challenges faced by innovative start-ups and the innovation activity of SMEs in general, differentiating between the challenges that have a regulatory character from those that require intervention in such other areas as access to finance or specialised skill sets.	9.5 9.b

Relevant Institutions: Kenya Industrial Research and Development Institute (for Science, Technology and Innovation); Ministry of Industry; Ministry of Trade and Co-operatives; County Governments; CSOs/NGOs/Multilateral Agencies; Private Sector

e. Enabling actions for Devolution – Council of Governors

Strategic Action Area 16: Council of Governors' Enabling Actions.

Strategic Objective 16

Empower vulnerable people in counties to reduce their vulnerability to climate change issues

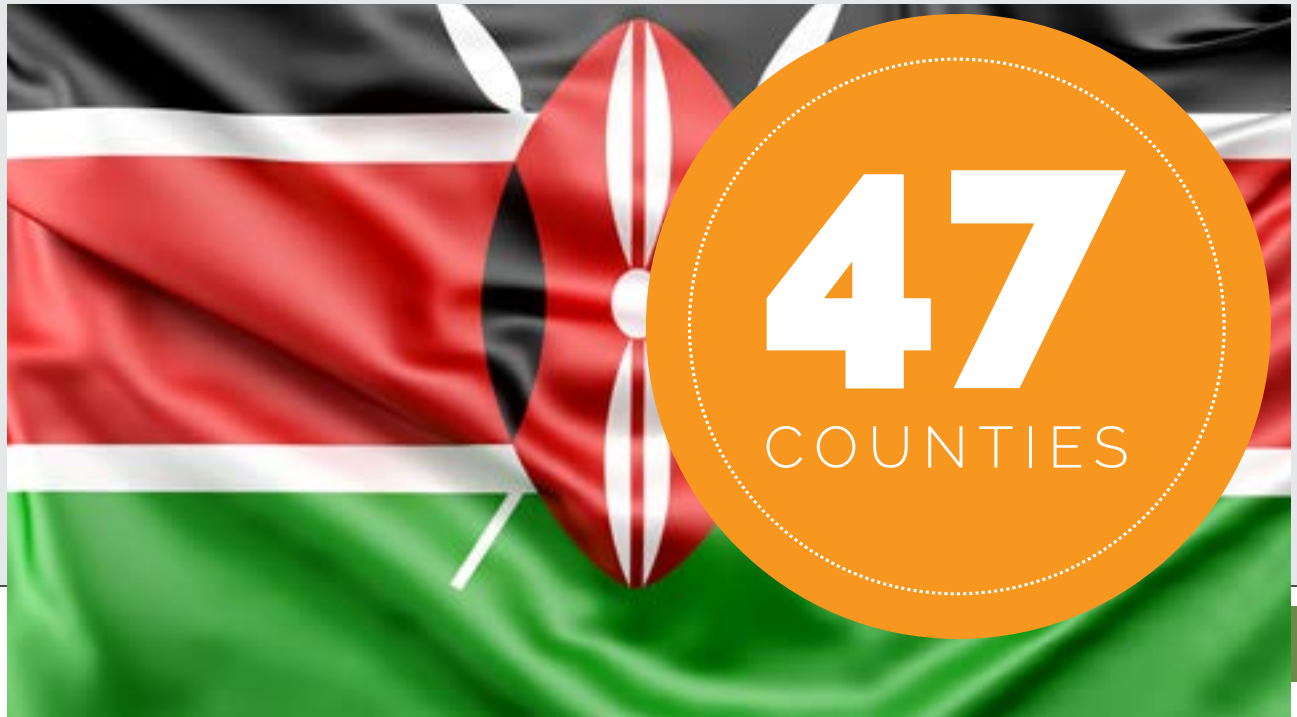
Issue/ problem: Existing climate change policies, strategies, plans and programmes are national level, and require to be cascaded to local levels so that their benefits are felt by Kenyans, particularly those vulnerable to impacts of climate change

Big 4 Pillars: Food and Nutrition Security; Universal Health Coverage; Affordable Housing; Enhanced Manufacturing

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Mainstreaming climate change adaptation in CIDPs and Sector Plans	■ Support counties to domesticate national climate change policies, strategies, plans and programmes ■ Support counties to implement prioritised climate change actions actions in the domesticated county policies, strategies, plans and programmes	17.1 17.9 17.18 17.19

Relevant Institutions: Council of Governors; County Governments, State Department for Devolution, Climate Change Directorate, Ministry of Environment and Forestry, Ministry of The National Treasury and Planning, Private Sector, CSOs/NGOs/Multilateral Agencies



f. Gender, Youth and Other Vulnerable Groups

Strategic Action Area 17: Gender, Youth, Disabled and Other Vulnerable Groups (GYDVGs).

Gender, Youth, and Other Vulnerable Groups[11] include children and young people.[12] These groups are particularly vulnerable to climate variability and change, and often have the least access to, and control of, such resources as capital, credit, and land. They live in areas exposed to climate hazards and risks, including arid lands, and urban poor areas. They are therefore less able to cope with climate shocks and stresses. Adaptation Actions under the Gender, Youth, and Other Vulnerable Groups sector are presented in Strategic Action Area 17.

Strategic Objective 17

Empower men, women, children, orphans, people with disabilities, the marginalised, minorities and people displaced as a result of Climate Change to reduce their vulnerability to climate change issues

Issue/ problem: Climate Change Impacts exacerbates the vulnerabilities of men, women, children, orphans, people with disabilities, the marginalised minorities and displaced people.

Big 4 Pillars: Food and Nutrition Security; Universal Health Coverage; Affordable Housing; Enhanced Manufacturing

SDGs:

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Strengthen the adaptive capacity of vulnerable groups*[13]	■ Support counties to domesticate national policies, strategies, plans and programmes ■ Support counties to implement prioritised actions in the domesticated county policies, strategies, plans and programmes	17.1 17.9 17.18 17.19

[11] *While Vulnerable – orphans, persons living with disabilities, the aged, widows, widowers, internally and externally displaced persons, marginalised persons and pastoralists living in ASALs*

[12], [13] *Vulnerable groups that include vulnerable men, women, children, orphans, people with disabilities, the marginalised, minorities and people displaced as a result of Climate Change. They lack adequate resources to adapt to Climate Change, hence the need for various action to reduce their vulnerability*

Opportunity/ Main Action	Sub Actions and Targets/ Expected Results by June 2023	SDG Targets
Strengthen the adaptive capacity of vulnerable groups*[13]	■ Review and mainstream climate change adaptation in, and implement, all policies, strategies, plans, and programmes at County level focused on gender, children, youths, and other vulnerable groups. ■ Expand Social Protection Safety Net Programmes, and insurance mechanisms, to cover all Counties, and to include all climate change risks as part of their inclusion criteria. ■ Facilitate access to climate change funds for vulnerable groups, to enable them tap opportunities for climate resilient livelihoods. This will be achieved through approaches that include: ● Establishing affordable and accessible credit lines for the poor, youth, and other vulnerable groups in all Counties; and ● Enhancing access of Gender, Youth, Disabled, and other Vulnerable Groups (GYDVGs) to climate change funds to strengthen their ability to better their lot	1.4,1.5, 5.5 5.b 5.c 10.2 13.1 13.3
Support the strengthening of resilience for communities in drought-prone areas. *Linked to EDE Pillar 3*	■ Ensure that all vulnerable groups have equal rights to economic resources, and access to basic services, ownership and control over land and property, inheritance, natural resources, appropriate technology and financial services, including finance, by June 2023. ■ Strengthen local institutions, mechanisms and processes that build resilience to flood risks ■ Promote and support robust community-based institutions and organisations to strengthen flood anddrought risk preparedness and response. ■ Strengthen community-led management of water points. ■ Strengthen the coordination of resilience-building institutions, including knowledge management and information flow. ■ Support the strengthening of delivery of such critical social services as health, nutrition, water, sanitation, hygiene, and education in at least 23 drought prone Counties.	1.1, 1.2, 1.4, 1.5 2.1,2.2, 3.2 3.3 4.7 6.1 6.2 13.1 13.3
Support peace building in drought-prone counties. Linked to EDE Pillar 1	■ Strengthen peace infrastructure and, mainstream peacebuilding and community security in the development agenda in conflict-prone Counties to prevent and / or enhance responses to conflicts. ■ Support the provision of information to facilitate concerted and timely action by relevant stakeholders at all levels.	16.1

Relevant Institutions: Ministry of Public Service; Youth and Gender; Council of Governors; County Governments; CSOs/NGOs/Multilateral Agencies; the Private Sector; Ministry of Education

CHAPTER FOUR

DELIVERING ADAPTATION ACTIONS

Image/Photo courtesy of the Adaptation Consortium

4.1 Introduction

Adaptation is what Kenya prioritises in its climate change action, with mitigation pursued largely as an additional benefit. This underpins ATAR 2018–2022, which is to be jointly implemented by the National and County Governments toward building Kenya's resilience to climate change. The Climate Change Act 2016 presents opportunity for both levels of Government to play key roles in delivering and coordinating adaptation actions in the country, right from the national level to the community levels. Actions in ATAR 2018-2022 have been aligned with the roles articulated in the Climate Change Act. For effective delivery of ATAR 2018-2022, planned actions will require to be developed into programmes, projects and activities, and responsibilities for their implementation assigned in line with the Climate Change Act.

Implementation of projects or programmes requires an implementation framework to guide for all participating actors and sectors, and an appropriate coordination mechanism. Where necessary, for purposes of implementing this ATAR, County legislatures will pass legislation that gives more detail on matters contained in the Climate Change Act, for the specific Counties. At the national level, the Act provides for the establishment of Regulations to guide implementation by the institutions, agencies, and structures that the Act has created.

4.2 Technology Development, Innovation, and Transfer

Attaining Kenya's adaptation goal will require development, transfer, and dissemination of environmentally sound technologies, innovations, and management practices (TIMPs), so as to reduce vulnerability to climate change, and promote sustainable development. Specific technologies will be decided upon at the activity design and implementation stages because adaptation needs have a context specific nature (UNEP, 2011; GoK, 2013d, 2013e; Parry, 2016). The government will promote local climate change adaptation innovation for technologies in support of the actions identified in chapter 3, including strengthening the CTCN NDE in terms of technology, promotion of local innovation, promotion of research and development in adaptation technology, and strengthening relevant adaptation technology institutions. These technologies will be responsive to gender and intergenerational equity.

The Kenya Industrial Research and Development Institute (KIRDI) is the National Designated Entity (NDE) for Kenya under the Climate Technology Centre and Network (CTCN), which is the operational arm of the technology mechanism of the UNFCCC. KIRDI has put in place plans for strengthening its NDE capabilities, for technology development and transfer (Ndirangu and Schaer, 2017). Other research institutions that will require capacity strengthening alongside KIRDI include, the Kenya Agriculture and Livestock Research Organization (KALRO), Kenya Forestry Research Institute (KEFRI), and Kenya Marine and Fisheries Research Institute (KMFRI).

4.3 Capacity Development

Institutional and technical capacity development will be required for effective delivery of the proposed adaptation actions. This will include operationalisation and strengthening of the institutional structures established under the Climate Change Act 2016, including the National Climate Change Council (NCCC), CCD, NEMA, Climate Change Fund (CCF), Kenya Institute of Curriculum Development (KICD), CoG, CCUs both at the National and County levels. Development of the capacities of other relevant public and Non-state actor institutions, including KMD, so that they effectively deliver the proposed actions, will be critical. Capacity building approaches will ensure gender and intergenerational equity.

There will be need to enhance the capacity of all actors in the implementation of ATAR 2018-2022 for the development of bankable adaptation project proposals, and converting adaptation actions into business cases, so as to tap into the available funding sources.

4.4 Climate Finance and Resource Mobilization

Based on the estimates in NAP, Kenya will require KES 255 Billion per annum, which amounts to KES 1.3 Trillion over the next five years, toward the implementation of adaptation actions proposed in ATAR 2018-2022. It is expected that this financing will come from public and private sources, both domestic and international. The multilateral funding institutions that will be key to this include the operating entities of the UNFCCC financial mechanism, namely Global Environment Facility (GEF) and Green Climate Fund (GCF). The Adaptation Fund of the UNFCCC will be an important source of funding for the adaptation actions.

The National Treasury and Planning is Kenya's National Designated Authority (NDA) for GCF. NEMA is currently the only direct access entity accredited with GCF. It also serves as the National Implementing Entity (NIE) for the Adaptation Fund, while the Ministry of Environment and Forestry is the National Designated Authority (NDA). GEF also funds adaptation projects with the Ministry of Environment and Forestry being the national focal point. Accredited national, regional, and multilateral entities support implementing institutions to access financial support from the different Funds.

The Climate Change Act 2016 establishes the Climate Change Fund (CCF) as the financing mechanism for priority climate change actions and interventions. Urgent action needs to be taken to operationalise the Fund. Counties also play an important role in the implementation of adaptation actions. Several of them have already established County Climate Change Funds (CCCFs), which dedicate a specific proportion of the county revenue to address climate change. Counties that have not done this need to be encouraged to take similar actions.

Kenya has a vibrant private sector that has continued to play an active role in climate change initiatives. There is need to enhance public sector support to leverage private sector investments in climate change adaptation. There is also need to build capacity for the development of bankable adaptation project proposals toward converting planned adaptation actions into business cases, for tapping into the available funding sources. Climate finance should take into consideration gender and inter-generational equity.

Image/Photo courtesy of the Adaptation Consortium

4.5 Coordination for Implementation of Adaptation Actions

The delivery mechanism for ATAR 2018-2022 is anchored in the structures created by the Climate Change Act 2016. The Act establishes the NCCC chaired by the president. The key responsibility of NCCC is to provide overarching national coordination of climate change action. The Climate Change Directorate (CCD) is the government lead agency on national climate change plans and actions, for purposes of delivering an operational coordination mechanism. CCD is also the secretariat to NCCC. The Act obligates State Departments and National Government Public Entities to establish Climate Change Units, and allocate them adequate technical and financial resources.

The Ministry of Environment and Forestry has established a multi-stakeholder cross- sectoral National Adaptation Coordination Committee to coordinate all adaptation issues, and also act as the Adaptation Technical/Thematic Working Group for the NCCAP development process. The Committee will act as the technical team advising on adaptation actions in Kenya. Among the tasks to be performed by the committee include, oversight, direction and guidance on adaptation issues, review of NCCAP and NAP, and assessment of levels of mainstreaming of adaptation issues in Medium Term Plans. Currently, the Committee has representation from the following institutions:

A. National Government
   1. Ministry of Agriculture, Livestock and Fisheries and Irrigation
   2. Ministry of Energy
   3. Ministry of Water and Sanitation
   4. Ministry of Environment and Forestry (NEMA, KMD, KWS, KFS)
   5. Ministry of Transport, Infrastructure, Housing and Urban Development and Public Works
   6. Health
   7. Ministry of Devolution and the ASALs (NDMA/NDOC)
   8. National Commission for Science, Technology and Innovation (NACOSTI), KALRO, KEFRI, KEMRI, KIRDI, KMFRI

B. Devolved/County Government
   1. Council of Governors

C. Non-State Actors (NSAs)
   1. Private Sector (KEPSA)
   2. Civil Society
   3. Faith-Based Organizations (FBOs)
   4. Academia / Technical Institutions
   5. Disaster Preparedness (Kenya Red Cross)
   6. Marginalised Communities

Figure 4.1 illustrates the coordination mechanism established by the Climate Change Act

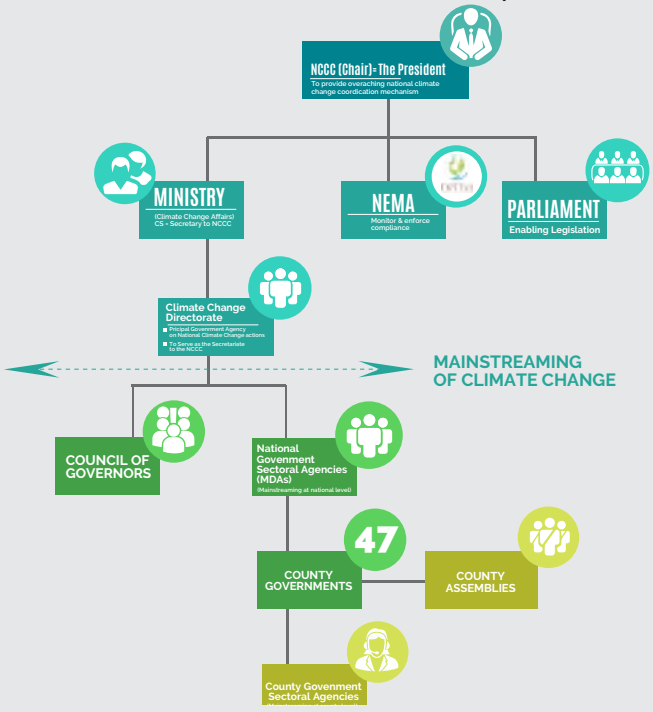


Figure 4.1: *Climate Change Institutional Coordination Structures in Climate Change Act 2016 (GoK, 2016a).*

4.6 Mainstreaming Adaptation

The Climate Change Act 2016 obligates the mainstreaming of adaptation actions in development planning, budgeting, and implementation processes by the National and County governments. Based on this, climate change is recognised as a cross-cutting thematic area in MTP III (GoK, 2017e). In developing ATAR 2018-2022, the Adaptation Technical/Thematic Working Group worked with Sector Working Groups to mainstream climate change adaptation actions in all sectors of the Kenyan economy.

4.7 Monitoring and Evaluation of Adaptation Actions

Monitoring and Evaluation (M&E) of adaptation is necessary to demonstrate whether benefits of adaptation interventions are being realised, and that lessons learnt are assisting in the improvement of sector adaptation plans and programmes.

The Climate Change Act 2016 provides for the coordination of Measurement, Reporting, and Verification processes by the Climate Change Directorate. The Directorate is required to coordinate adherence to the country's international obligations, including reporting requirements. In addition, the *Act* establishes climate change duties for public and private entities, and requires all entities to regularly report on their climate change actions. Further, the Cabinet Secretary in charge of climate change affairs is required to make regulations to guide the Measurement, Reporting, and Verification of climate change actions. The Cabinet Secretary is also required to report on a bi-annual basis to parliament on status of implementation of international and national obligations to respond to climate change, and the progress towards attainment of low carbon climate resilient development.

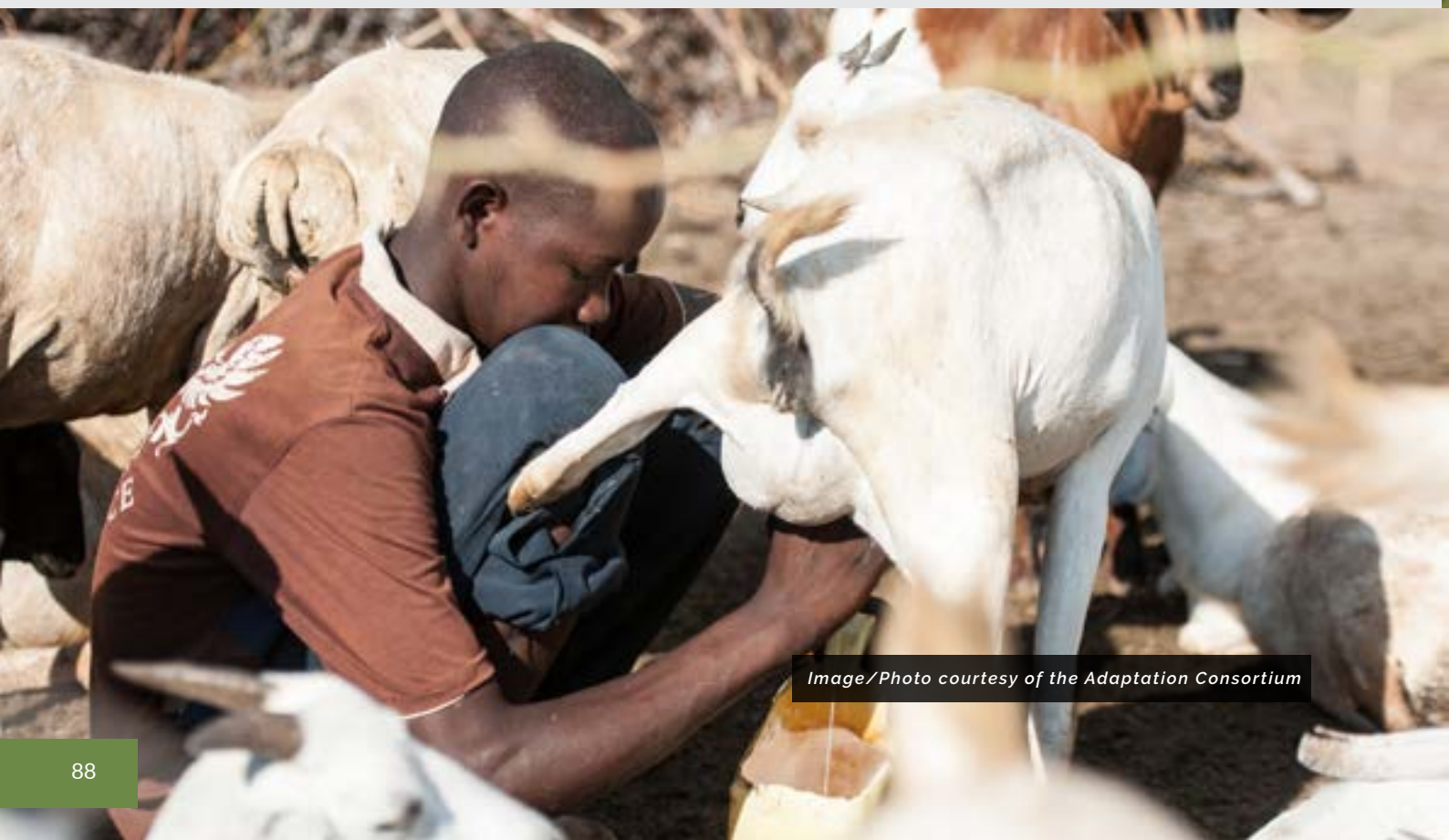
A National Performance and Benefit Measurement Framework (NPBMF) was developed under *NCCAP 2013-2017*. NPBMF is an integrated framework for monitoring, evaluating, and reporting progress on mitigation and adaptation actions, and the synergies and support between them. The system is also referred to as MRV+. To operationalise the system, regulations will be developed in line with the *Climate Change Act 2016*.

Image/Photo courtesy of the Adaptation Consortium

In implementing M&E of adaptation actions, CCD will develop internal systems for MRV+, and link the MRV+ system to the National Integrated Monitoring and Evaluation System (NIMES) and the County Integrated Monitoring and Evaluation System (CIMES), in close collaboration with the Monitoring and Evaluation Department (MED) (GoK, 2016h). At the National level the government is in the process of expanding the scope of NIMES, while at the County level, Counties are putting in place CIMES. The State Department for Planning and Statistics, through MED, coordinates the implementation of NIMES. Some of the actions that will be undertaken to ensure operationalisation of the M&E system are:

1. Update of the design of the national adaptation MRV+/M&E system to respond to the requirements of the Climate Change Act 2016 on M&E for adaptation.
2. Anchoring of the updated adaptation M&E system to the climate change governance structures provided for in the Act.
3. Alignment and integration of the CCD adaptation M&E system with those of Ministries, Counties, Departments, and Agencies (MCDAs), and NSAs.
4. Strengthening of, and support for, CCUs in the MCDAs, to effectively undertake adaptation M&E at their respective levels.
5. Develop regulations to operationalise the proposed Adaptation M&E System, in line with the Act.
6. Identify and define key adaptation targets and indicators for the proposed adaptation actions. Establish baselines for the identified, defined adaptation indicators.
7. Define the overarching target and a universal indicator for adaptation actions in all sectors, to help in assessing progress toward the overarching adaptation outcome.
8. Align the sector indicators from local to national level, to the identified and defined overarching indicator at the national level.
9. Harmonise and link the adaptation indicators to MTP III indicators, the updated national adaptation MRV+/M&E system, and the SDG indicators that Kenya has selected for monitoring and reporting.
10. Undertake a phased implementation of the developed Adaptation M&E Framework, depending on the level of readiness per county.
11. Track, measure, report, and evaluate the indicators and the support for the implementation of ATAR 2018-2022, while taking into account gender and intergenerational equity.

Progress on the implementation of ATAR 2018-2033 will be reviewed on a bi-annual basis, as required by Section 13(7) of the Climate Change Act, 2016.



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ATAR 2018 – 2022 IMPLEMENTATION MATRIX

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ATAR 2018 – 2022 Implementation Matrix

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
Drought Risk Management: Ending Drought Emergencies	**Issue/problem: The i**ncidence, frequency, and magnitude of drought disasters have increased, which exacerbates the vulnerability of many populations around the country. **Strategic Objective:** To reduce the vulnerability of communities to drought-related disasters, through such improved institutional resilience mechanisms as preparedness and response, at all levels (National, County, and Community)					**70,609,265,067**
	Mainstream climate risk management (CRM) and climate change adaptation (CCA) in all relevant policies, plans, budgets, and activities	Number of policy instruments mainstreamed with CRM and CCA	Policies, plans, budgets, and activities relating to at least 23 counties reviewed at National, and respective County and Community levels	Access to climate information improved	NDMA/ CoG	
	Integrate climate change scenarios and climate early warning in spatial planning by promoting zoning schemes through land suitability mapping and integrated spatial planning, to resolve space and water use conflicts	Number of Counties with climate risk scenarios integrated in their Spatial Plans	Climate-resilient spatial planning promoted, and the Spatial Plans integrated with climate risk scenarios implemented		NDMA/ CoG	
	Update drought hazard maps	Number of drought-prone areas on updated drought hazard maps	Updated drought hazard maps in place, and being used		NDMA/ CoG	
	Strengthen and expand downscaled drought early warning, preparedness, and response mechanisms countrywide	Number of Counties with functional and effective drought early warning systems (EWSs) Number of recipients of climate information that are factoring the climate early warning information in their decisions on risk management	Strengthened and expanded downscaled drought EWS in place in all counties Between 1,000,000 and 2,000,000 vulnerable people and other stakeholders factoring climate early warning information in their decisions on risk management		NDMA/ CoG	
	Strengthen the provision of early warning information on drought and food security, for at least 23 Counties	Timeliness and quality of monthly early warning information on drought and food security	Improved reliability and timeliness of bulletins for monthly and bi-annual early warning information on drought and food security		NDMA/ CoG	
	Operationalise the National Drought Contingency Fund (NDCF) in at least 23 Counties, to support the scaling up of adaptive social safety nets,[14] and strengthen broader resilience by operationalisation of CCCFs	Number of households accessing the devolved financial mechanism (County Climate Change Funds)	NDCF and CCCFs Operational and, 300,000 to 800,000 relevant people accessing the devolved funds In 2018 to 2023, respectively.	Improve access to climate finance	NDMA/ CoG	
	Increase the number of ELIGIBLE beneficiaries of social protection mechanisms and other safeguards	Number of people receiving social protection services	Eligible people accessing social protection services. Targets: HSNP: From: 100,000 to 150,000 for regular beneficiaries, and 90,000 to 130,000 for scalability beneficiaries;	Improved access to social protection services	NDMA/ CoG	

[14] The National Social Safety Net Programme (NSNP) comprises four cash transfer programmes namely: Hunger Safety Net Programme Cash Transfers (HSNP-CT); Orphans and Vulnerable Children- Cash Transfers (OVC-CT), Older Persons- Cash Transfers (OP-CT) and Persons with Severe Disability- Cash Transfers (PWSD-CT). One of the social protection initiatives NDMA implements is the Hunger Safety Net Project (HSNP) of the National Social Safety Net Programme (NSNP).

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			NSNP: From 4,017,759 beneficiaries in 2017 to 4,280,000			
	Promote and strengthen at least 2 to 3 value chains for emerging climate-resilient livelihoods in at least 23 counties	Number of beneficiaries, especially in the targeted 23 Counties, participating per promoted value chain/climate-resilient livelihood	At least 3 livelihoods and at least 2 value chains promoted and strengthened for emerging climate-resilient livelihoods in at least 23 counties	Strengthened climate-resilient value chains	NDMA/ CoG	
	Support a balanced, spatio-temporally well-distributed availability of water and forage (within the pastoral system, between pastoralists and farmers, between people and wildlife, and across Kenya's borders) in at least 23 drought-prone Counties	Distances to useable water points and grazing zones in pastoral Counties, particularly the 23 that are drought-prone	Spatio-temporal availability of water and forage improved: Distances to useable water points and grazing zones in pastoral counties reduced	Reduced inter-communal competition over natural resources	NDMA/ CoG	
	Promote renewable energy technologies, mobile health, and veterinary and communications services to mobile pastoralists in at least 23 drought prone Counties	Number of relevant people, especially those in 23 drought-prone Counties, accessing renewable energy technologies, mobile health, and veterinary and communications services	Renewable energy technologies, mobile health, veterinary and communications services provided to vulnerable communities in at least 23 drought-prone Counties	Strengthened provision of social services for mobile pastoralists	NDMA/ CoG	
	Support implementation of approved *DRM Policy* and completion and enactment draft DRM Bill	Approved DRM Policy being implemented, and the draft DRM Bill completed and enacted	The *DRM Act* in place and being implemented, and the *DRM Policy* being implemented	Improved DRM Governance that is aligned to the *Sendai Framework for drought-risk reduction (DRR) of 2015*	NDMA/ CoG	
	Strengthen local institutions for	Number of institutions strengthened for	At least 100 local, community-based	Water governance improved for both	NDMA/ CoG	

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	community-led management of water points	community-led management of water points	institutions and organizations managing water-points (at least 2 supported per county) strengthened	levels of government in all counties		
	Operationalise drought risk preparedness and response at both levels of government	Levels of drought risk preparedness and response at both levels of government, including available documentation on the same	Drought risk preparedness and response operationalized	Drought risk preparedness and response strengthened	NDMA/ CoG	
	Develop a framework for measuring climate risk resilience	A framework for measuring climate risk resilience in place	The framework is being applied to measure climate risk resilience	Kenya's reporting mechanism for SDG 13 strengthened	NDMA/ CoG	
	Establish an open platform for sharing of relevant information on climate risk	A platform for sharing climate risk-relevant information in place	The platform is being used by actors to share climate risk-relevant information	Climate Risk Information and Knowledge Management Strengthened	NDMA/ CoG	
	Develop a GIS-based tool for real-time mapping and monitoring of drought hazards	A GIS-based tool for real-time drought hazard mapping and monitoring in place	The GIS-based tool is being applied to map and monitor real-time drought hazard	Drought risk preparedness and response strengthened	NDMA/ CoG	
	Support County Governments in at least 23 drought-prone Counties to strengthen the institutions for inter-communal conflict management in their Counties	Number of institutions in at least 23 drought-prone Counties that have been strengthened for inter-communal conflict management in their respective Counties	County Governments of at least 23 drought-prone Counties supported to strengthen institutions in their respective Counties, for inter-communal conflict management in the Counties	Reduced incidences of drought-induced conflict (human/ human and human/ wildlife) and insecurity in at least 23 drought-prone Counties	NDMA/ CoG	
	Support the implementation of projects that target at-	Number of projects that target at-risk youth or that reward peace efforts	Projects that target at-risk youth or that reward peace efforts	Increased gainful engagement among the youth, and	NDMA/ CoG	

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	risk youth or which reward peace efforts at the County level	implemented at the county level	implemented at the county level	improved local county peace and security		
	Convene a policy dialogue on sustainable balance of land use in rangelands (*for pastoralists, agro pastoralists, ranchers and conservationists*), and co-develop and implement robust grazing management plans, including contingency plans	Number of policy dialogues on sustainable balance of land use in rangelands (*for pastoralists, agro pastoralists, ranchers and conservationists*) conducted Number of stakeholders and engagements involving the co-development and implementation of robust grazing management plans, including contingency plans	Policy dialogue concluded, the policy in place and being implemented Robust grazing management plans, including contingency plans in place, and being implemented,	The most sustainable range land-use model determined and adopted	NDMA/ CoG	
Flood Risk Management	**Issue/problem**: The incidence, frequency, and magnitude of flood disasters have increased, which exacerbates the vulnerability of many populations around the country.					56,394,324,267
	Strategic Objective: To reduce the vulnerability of communities to flood-related disasters, through such improved institutional resilience mechanisms as preparedness and response, at all levels (National, County, Community)					
	Mainstream climate change adaptation in, and implement, all existing Flood and Landslide Management Plans	Number of existing Flood and Landslide Management Plans mainstreamed with climate change adaptation, and being implemented	Flood and Landslide Management Plans with climate change adaptation mainstreamed being implemented	Reduced flood disaster risk	WRA / CoG	
	Develop and implement climate-proofed design, siting, construction, and maintenance codes and standards for all flood and landslide control infrastructure	Reference document on implementing climate-proofed design, siting, construction & maintenance of flood & landslide control infrastructure in place	Reference document on implementing climate-proofed design, siting, construction, and maintenance of flood and landslide control infrastructure being used	Enhanced climate-resilience of all flood and landslide control infrastructure	WRA / CoG	
	Rehabilitate, strengthen,	Number of hitherto degraded	Rehabilitated,	Reduced Ffood	WRA / CoG	

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	and protect degraded flood management structures, to harvest, store, and use flood waters upstream	flood management structures that have been rehabilitated, strengthened, and protected	strengthened, and protected flood management structures in Kenya	disaster risks		
	Establish a standing arrangement for routine maintenance of flood and landslide control structures countrywide	Documented proof of the standing arrangement	A standing arrangement for routine maintenance of flood and landslide control structures in Kenya in place, and being used	Reduced flood disaster risks	WRA / CoG	
	Strengthen the capacity of Counties to plan, contract, and supervise the implementation of climate-proofed infrastructure	Number of Counties demonstrating ability to plan, contract, and supervise the implementation of climate-proofed infrastructure	Counties competent in planning, contracting, and supervising the implementation of climate-proofed infrastructure	Improved climate-proofing of flood-risk infrastructure	WRA / CoG	
	Develop a GIS-based tool for real-time mapping and monitoring of floods hazard	A GIS-based tool in place for real-time mapping and monitoring of flood hazards	The GIS-based tool is being used	Reduced flood disaster risks	WRA / CoG	
	Strengthen institutional mechanisms for proactive community-based flood early warning systems in flood-prone areas in at least half of the flood-prone Counties	Number of institutional mechanisms in flood-prone areas in at least half of the flood-prone Counties strengthened to undertake proactive community-based flood early warning	Increased number of households better able to cope with flood-related risks	Reduced flood disaster risks	WRA / CoG	
	Expand best-practice social protection mechanisms (adaptive social safety nets) and	Number of Counties and people benefiting from best-practice social protection mechanisms (adaptive social	Increased number of Counties and people benefiting from best-practice social	Expanded social protection mechanisms	WRA / CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	measures to poor and vulnerable people countrywide	safety nets) and measures	protection mechanisms			
	Promote insurance services alongside social protection services, for those able to take insurance cover	Number of Counties and people benefiting from insurance services alongside social protection services, for those able to take insurance cover	Increased number of Counties and people benefiting from insurance services alongside social protection services		WRA / CoG	
	Establish a Flood (and Drought) centre for modelling, forecasting, preparedness, and response	A centre for modelling, forecasting, preparedness, and response in place	The centre in use for modelling, forecasting, preparedness, and response to floods and drought	Reduced flood disaster risks An integrated watershed management approach embraced in various catchments	WRA / CoG	
	Develop and implement a regulatory Enforcement Plan for flood situations	A regulatory Enforcement Plan for flood situations in place	The regulatory Enforcement Plan for flood situations in use		WRA / CoG	
	Support integrated ecosystem-based approach to watershed, drainage basin, flood, and landslide management, through enhancement of structural/ mechanical designs	Number of Counties and watersheds/ecosystems where integrated approaches to watershed/ecosystem, drainage basin, flood, and landslide management are being supported through enhancement of structural/ mechanical designs	Counties better implementing integrated approaches to watershed/ ecosystem, drainage basin and flood management through enhancement of structural/ mechanical designs		WRA / CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	Support such local community flood management institutions as Water Resources User Associations (WRUAs) to help affected communities	Number of such management institutions as WRUAs supported to help affected communities	Such local community flood management institutions as WRUAs *effectively* helping affected communities	Strengthened ability of affected communities to better cope with flood-risks	WRA / CoG	
	Promote and support at least 100 robust community-based institutions and organizations (at least 2 per county) to strengthen community-led flood management in flood- prone areas	Number of community-based institutions and organizations in each County promoted and supported to strengthen community-led flood management of flood-prone areas (flood risk preparedness and response initiatives)	Supported community-based institutions and organizations strengthening community-led flood management		WRA / CoG	
	Initiate policy dialogue to harmonise the various disaster and Contingency Funds into an all-inclusive Fund that covers floods and drought disasters	Number of dialogues held on harmonising the various disaster and Contingency Funds into an all-inclusive Fund initiated and the decisions made thereto	The various disaster and Contingency Funds harmonised into one Fund that covers droughts, floods, and other climate risks	Improved access to climate finance	WRA / CoG	
Agriculture, Food, and Nutrition Security	**Issue/problem**: Climate change is negatively impacting agricultural productivity, food and nutrition security, and the resilience of value chain actors, including households (farmers, pastoralists and fisher communities)					28,057,935,199
	Strategic Objective: Increase food, nutrition, and income security through enhanced productivity and resilience of value chains in the agricultural sector					
	Support the capacity building of County officials and local communities, to improve technical services for climate risk management in agro-food systems in all	Number of Counties supported by capacity-building officials and local communities of the Counties	Supported Counties engaged in improving technical services for climate risk management in agro-food systems	Enhanced capacity of Counties and communities to prepare and respond to climate risks	MALFI / CoG	

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	Counties					
	Strengthen and cascade the downscaling of agro-weather/climate information services to sub-counties in all Counties	Number of Counties with strengthened and cascaded downscaling of agro-weather/climate information services to their respective sub-counties	Counties engaged in strengthening and cascading the downscaling of agro-weather/climate information services to their respective sub-counties	Increased local uptake and application of downscaled of agro-weather/climate information services	MALFI / CoG	
	Promote the uptake of climate-oriented agricultural input subsidies and agricultural insurance	Number of beneficiaries accessing climate-oriented agricultural input subsidies and agricultural insurance	Beneficiaries accessing • Input subsidies from 239,000 to 311,300 farmers • Crop insurance from 280,000 farmers to 3,500,000 farmers • Livestock insurance from 18,000 to 105,750 farmers	Improved access to climate finance	MALFI / CoG	
	Strengthen government-supported advocacy for agricultural insurance,	Number and types of advocacy interventions for agricultural insurance implemented	Innovative agricultural insurance products available through sustainable PPP	Sustainable PPP for agricultural insurance in place and being effectively utilised	MALFI / CoG	
	Develop insurance packages/products for the fisheries sub-sector	Number of insurance packages/products developed for the fisheries sub-sector			MALFI CoG	
	Implement the *National Land Policy (NLP)* and the *Sustainable Land Management (SLM) Policy*, to conserve, stabilise and strengthen the resilience of watersheds	Elements of NLP and SLMP implemented Number of households practicing, and acreage under, SLM for agricultural production	Increased uptake of elements of NLP and SLM Policy	Increased adoption of SLM principles and practices	MALFI / CoG	
Sector	**Actions**	**Key Performance Indicators**	**Expected Output(s)**	**Expected Outcomes**	**Key* Responsible Agencies**	**5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)**
	Increase the area under integrated soil nutrient management practices by 250,000 acres	Number of acres under integrated soil nutrient management practices	Agricultural land users supported to increase the area under integrated soil nutrient management practices		MALFI / CoG	
	Reclaim 130,000 acres of degraded land for climate-smart agricultural production using agro-ecology principles	Number of acres of degraded land reclaimed using agro-ecology principles, for climate-smart agricultural production	130,000 acres of degraded land reclaimed using agro-ecology principles, for climate-smart agricultural production	Increased adoption of SLM principles and practices	MALFI / CoG	
	Increase the farm area under conservation agriculture to 250,000 acres	Number of acres of farm area under conservation agriculture	250,000 acres of farm area put under conservation agriculture		MALFI / CoG	
	Strengthen the sustainability of pastoralism through local institutions and social structures that govern the mobility of pastoral livestock, based on the *ICPALD Transhumance Protocol*	Number and type of local institutions and social structures strengthened to sustainably govern the mobility of pastoral livestock; based on the *ICPALD Transhumance Protocol*	ICPALD Transhumance Protocol on mobility of pastoralists and their animals in the Horn of Africa being implemented	The ICPALD Transhumance Protocol on mobility of pastoralists and their animals in the Horn of Africa, which is a Regional Policy Framework, promoted and facilitated	MALFI / CoG	
	Support integrated rehabilitation of at least 25,000 acres of rangeland, including by range reseeding, maintenance of fodder banks, and strategic reserves in at least 23 Counties in ASALs	Number of acres of hitherto degraded rangelands in at least 23 Counties in ASALs that have been rehabilitated	At least 25,000 acres of hitherto degraded rangelands rehabilitated	Strengthened rangeland use management systems	MALFI / CoG	
	Invest in rangeland health for sustainable	Rangeland condition: State of soil stability, state of	Rangeland health increased for		MALFI / CoG	

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	pastoralism, to supply "organic" livestock products (meat, milk, fat, hides and fibre)[15] to local and international markets	watershed/ hydrologic function, integrity of nutrient cycles and energy flow, and biotic integrity (presence of functioning recovery mechanisms) for a given rangeland unit (e.g. a grazing zone)	assessed rangeland units (e.g. a grazing zone)			
	Support the strengthening of market systems, improvement of market infrastructure, and market information, for pastoral livelihood product value chains	Number of pastoral individuals accessing better and more rewarding markets for their products Number of pastoral product value chains developed and linked to markets	Increased number of pastoral individuals accessing better and more rewarding markets for their products	Improved access to markets, market linkages, and market opportunities	MALFI / CoG	
	Support such viable, non-"pastoral-overlap" outlets as growing of Acacia for Gum Arabic, for at least 100 herders who want to exit pastoralism, to reduce pressure on, and increase flexibility in, pastoralism	Number of herders supported to exit pastoralism and adopt "non-pastoral-overlap" livelihoods	At least 100 exit herders in pastoral Counties supported to grow Acacia for Gum Arabic	Alternative livelihoods, like as growing of Acacia for Gum Arabic by herders, resulting in reduced pressure on, and increased flexibility in pastoralism	MALFI / CoG	
	Develop national guidelines on climate-smart standards for cage fish farming	Documentation on climate-smart standards for cage fish farming in place	Climate-smart standards for cage fish farming being implemented using the developed documentation	Climate-smart fisheries promoted and strengthened	MALFI / CoG	
	Increase the number of climate-smart cages for fish farming from 3,450 to 8,000	Number of climate-smart cages for fish farming	Number of climate-smart cages for fish farming increased from 3,450 to 8,000		MALFI / CoG	
	Increase the number of	Number of fish ponds	Number of fish		MALFI / CoG	

[15]Facilitate effective market linkages for products from camels, indigenous poultry, beekeeping, and rabbits, emerging livestock - quails, guinea fowls, and ostriches among others

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	fish ponds by 16,000		ponds increased by 16,000			
	Increase the total area under agroforestry at farm level by 200,000 acres	Area under agroforestry at farm level	An additional 200,000 acres at farm level under agroforestry	Tree cover increased	MALFI / CoG	
	Promote and strengthen on-farm water harvesting and storage, soil moisture conservation, efficient water use, waste water recycling; and Promote community-managed climate-smart irrigation systems and infrastructure, and area under irrigation and other forms of agricultural use/ production in all Counties	Volume of water (in million m^3) harvested or desalinised and stored; acreage under irrigation; production efficiency (%) and floodplain acreage cultivated under flooding Number of institutions/value chain actors and households harvesting and storing water for irrigation and other forms of agricultural use/ production Amount of water (in million m^3) desalinised for agricultural use in the coastal zone	Increase to 500,000 of the institutions/value chain actors and households harvesting water for agricultural use/production, and from 480,000 to 1.2 million the acreage under irrigation Increased production efficiency from irrigated fields: From 50 per cent to 90 per cent Controlled flooding technology applied to improve production through floodplain farming	Increased availability of water through promotion and strengthening of water-smart technologies and practices	MALFI / CoG	
	Increase annual water harvesting and storage in ASALs by 25 per cent from 16 million cubic metres to 20 million cubic metres; and 700 million cubic metres through large multipurpose dams	Amount of water harvested and stored using various water harvesting and storage facilities	Increased volume of water harvested and stored using small dams, pans, river drenching, and large multipurpose dams		MALFI / CoG	

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	Support implementation of the *Water Act (No. 43 of 2016)* for increased food production	Specific clauses in the *Water Act* pertaining to agriculture identified and their implementation planned for	Identified elements of the *Water Act* pertaining to agriculture implemented		MALFI / CoG	
	Support Counties to undertake studies on water budgeting for agricultural enterprises	Number of Counties supported to undertake studies on water budgeting for agricultural enterprises	Counties supported to undertake studies on water budgeting for agricultural enterprises adopting findings from the studies	Counties implementing recommendations of findings from studies on water budgeting for agricultural enterprises	MALFI / CoG	
	Support at least 521,500 households (small-scale farmers, pastoralists and fisher communities) to transition to diversified, specialised, market-oriented enterprises in at least 13 adaptive priority commodity value chains	Number of supported to transition to diversified, specialised, market-oriented enterprises	At least 521,500 households supported to transition to diversified, specialised, market-oriented enterprises	Households (small-scale farmers, pastoralists and fisher communities) transitioning to diversified, specialised, market-oriented enterprises in adaptive priority commodity value chains	MALFI / CoG	
	Lobby for zero rating of tax on the development of traditional, climate resilient crop value chains	Number of crop value chain products zero rated	Increasing number of traditional, climate resilient crop value chain products zero rated		MALFI/ CoG	
	Strengthen funding in commodity extension and research for adaptive crops/livestock/fish types, to enhance evidence-based decision-making	Amount of funds allocated to extension and research for adaptivecrops/livestock/fish types	Adaptive types of crops/livestock/fish identified and promoted		MALFI / CoG	
	Promote PPP in post-harvest handling, marketing, and market distribution	Number of PPPs established in post-harvest handling, marketing, and market distribution infrastructure	PPPs established in post-harvest handling, marketing and market		MALFI / CoG	
Sector	**Actions**	**Key Performance Indicators**	**Expected Output(s)**	**Expected Outcomes**	**Key* Responsible Agencies**	**5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)**
	infrastructure, to reduce losses from 40 per cent to 15 per cent		distribution infrastructure			
	Include drought tolerant pulses/ legumes in the gazette listed Strategic Food Reserves, and contract farmers and commercial off-takers for the targeted food commodities	Gazette Notice listing drought tolerant pulses/ legumes in Strategic Food Reserves Number of farmers and commercial off-takers contracted for the targeted food commodities	Gazette Notice issued, listing drought tolerant pulses/ legumes in Strategic Food Reserves Farmers and commercial off-takers contracted for the targeted food commodities		MALFI / CoG	
	Develop and promote the adoption of such effective, climate-smart post-harvest technologies as milk coolers, green energy powered cold storages, solar crop driers, etc. by at least 2 million farmers	Number and type of effective, climate-smart post-harvest technologies developed and promoted	Milk coolers provided to dairy farming communities to reduce milk loss by 6 per cent; and other climate post-harvest technologies, like green energy powered storages, solar crop driers, etc., developed, promoted, and adopted by at least 2 million farmers	Reduced post-harvest losses	MALFI / CoG	
	Establish price stabilisation schemes and strategic livestock-based food reserves in pastoral Counties	A price stabilization schemes and strategic livestock-based food reserves in place in pastoral Counties	Expanded establishment of abattoirs and cold storage facilities in pastoral Counties	Functional price stabilisation schemes and strategic food reserves in operation in pastoral Counties	MALFI / CoG	
	Develop an inclusive warehouse receipt system	An inclusive warehouse receipt system in place	Farmers and traders using the developed inclusive warehouse receipt system		MALFI / CoG	
	Promote the up-scaling	Number and types of climate	A pilot project on	Greater adoption of	MALFI / CoG	

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	of climate resilient fisheries strategies/ technologies and, climate resilient fish species	resilient fisheries strategies/ technologies, and climate resilient fish species identified for upscaling	climate-resilient fish species, and related value chains, developed and implemented	climate resilient fisheries and fish species		
	Establish networks and structures for strengthened data collection and information dissemination	Number and types of networks and structures established for data collection and information dissemination	Networks and structures established for data collection and information dissemination	A platform developed for sharing of up to date data and information on agriculture and nutrition, based on the Global Open Data for Agriculture and Nutrition (GODAN)	MALFI / CoG	
	Support funding for research to identify and reduce market inefficiencies along priority actions	Amount of funds allocated for research to identify and reduce market inefficiencies along priority actions	Market inefficiencies identified and reduced along priority actions	Incomes increased	MALFI / CoG	
	Develop and implement a policy on climate-smart agricultural data and statistics	Number and nature of engagements and decisions made regarding a policy climate-smart agricultural data and statistics	Policy on climate-smart agricultural data and statistics in place	Policy on climate-smart agricultural data and statistics in use, resulting in improved agricultural data, information, and knowledge management	MALFI / CoG	
	Support the development of agriculture advisory services, innovation, multi-stakeholder dissemination, and advocacy platforms	Nature and quality of support provided for the development of agriculture advisory services, innovation, multi-stakeholder dissemination and advocacy platforms	Functional agriculture advisory services, innovation, multi-stakeholder dissemination and advocacy platforms in place	Improved coordination and functionality of agriculture advisory services, innovation, multi-stakeholder dissemination and advocacy platforms	MALFI / CoG	
	Strengthen financial mobilisation and support to the priority actions	Nature and quality of support given toward financial mobilisation and the priority actions	A decentralized, streamlined, and ring-fenced county-based climate risk funding mechanism	Improved access to finance, and support to the priority actions	MALFI / CoG	

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			for agricultural sector established under KCSAS/ KCSAIF			
	Downscale and cascade KCSAS, KCSAIF, ASTGS and the *Climate Change Act Nº 11 of 2016* to Counties, sub counties and wards, and support the harmonisation of county legislation in favour of cottage agricultural industries	Number of Counties, sub-counties, and wards where KCSAS, KCSAIF, ASTGS and the *Climate Change Act Nº 11 of 2016* has been downscaled and cascaded to; and the nature and quality of support provided toward the harmonization of county legislation in favour of cottage agricultural industries	Elements of KCSAS, KCSAIF, ASTGS and the *Climate Change Act Nº 11 of 2016* being effectively implemented in Counties, sub-counties, and wards	Coordination and partnerships streamlined and supported to harmonize and decentralize climate-smart policies, strategies, legal guidelines and implementation frameworks	MALFI / CoG	
	Mainstream climate change adaptation in agricultural extension, by reviewing the *National Agricultural Sector Extension Policy (NASEP)* to support the harmonisation and decentralisation of climate-smart policies, strategies, legal guidelines and implementation frameworks	The process for reviewing *NASEP* developed, approved, and implemented; Draft *NASEP* with mainstreamed climate change adaptation in agricultural extension in place approved	Reviewed *NASEP* mainstreamed with climate adaptation in agricultural extension approved and in use	Climate change adaptation in agricultural extension anchored in policy	MALFI / CoG	
	Develop and implement climate change adaptation-compliant design and construction codes and standards for all agricultural infrastructure	Number and nature of engagements and decisions toward developing and implementing climate change adaptation-compliant design and construction codes and standards in place for all agricultural infrastructure	Climate change adaptation-compliant design and construction codes and standards in place for use in all agricultural infrastructure	Strengthened climate-proofing for all agricultural infrastructure	MALFI / CoG	
	Support the development of climate-smart	Number of agriculture faculties of learning supported to develop	All agriculture faculties of learning with curricular on	climate smart agriculture mainstreamed in	MALFI / CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	agriculture curriculum in all agriculture faculties of learning in the education and training sector	climate-smart agriculture curricular	climate smart agriculture	agriculture faculties of learning		
Energy	**Issue/problem**: Current energy sources are expensive and often disruptive					116,962,948,700
	Strategic Objective: Ensure an electricity supply mix based mainly on renewable energy, and is resilient to climate change and, promote energy efficiency					
	Enhance climate proofing of energy infrastructure along the energy supply chain	Number, types, and size of climate-proofed energy infrastructure	Existing infrastructure assessed for climate-proofing, and new infrastructure designed, sited, and constructed according to new climate-proofing requirements	Energy infrastructure climate-proofed along the energy supply chain Energy security increased to a more resilient level	MoE/ CoG	
	Use concrete poles to replace wooden poles	Number of concrete poles used to replace f wooden poles			MoE/ CoG	
	Optimise existing hydropower plants	Number of existing hydropower plants optimized Frequency of power outages			MoE/ CoG	
	Establish and implement climate-change risk-based construction standards for energy infrastructure	Compliance with specifications in the climate-proofing construction code Proportion of renewable energy in the total energy mix, especially geothermal, which does not depend on climatic risks			MoE/ CoG	
	Improve water management and conservation	Efficiency of water management in energy installations	Efficiency of water management in energy installations increased	Improved water security	MoE/ CoG	
	Rehabilitate, conserve and protect 1000 hectares of water catchment areas that feed into the hydro-power reservoirs	Number of hectares of water catchment areas rehabilitated, conserved, and protected	1000 hectares of water catchment areas rehabilitated, conserved, and protected	Environmentally sustainable practices promoted in the energy sector	MoE/ CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	1. Prioritise geothermal energy as a climate resilient energy 2. Substitute thermal power plants with geothermal plants 3. Increase other climate change resilient renewable energy technologies	Share of geothermal energy and other climate- resilient renewable energy technologies in the energy mix	Increased share of geothermal energy and other climate-resilient renewable energy technologies in the energy mix	Energy provision diversified across sources and technologies	MoE/ CoG	
	Update the Integrated Energy Policy to factor in climate risks in energy planning	Number and nature of e engagements and decisions leading to the updating of the energy policy; and draft updated policy	Updated energy policy being applied to climate-proof the energy sector	Energy security increased to a more resilient level	MoE/ CoG	
	Develop a climate-resilient policy to guide vegetation management, wayleaves acquisition and corridors for energy infrastructure	Number and nature of engagements and decisions leading to the development of the climate-resilient policy	The climate-resilient policy in place and being used to guide vegetation management, wayleaves acquisition and corridor for energy infrastructure	Improved vegetation management, wayleaves acquisition, and corridors for energy infrastructure	MoE/ CoG	
	Conduct public awareness on climate change adaptation for the energy sector	Number of awareness events conducted on climate change adaptation for the energy sector	Increased awareness on climate change adaptation by the energy sector	Improved climate change-informed service delivery	MoE/ CoG	
Forestry	**Issue/problem**: Forest services are crucial to sustainable development and the well-being of people, but forests in Kenya are being lost through degradation and land use change.					4,240,998,033
	Strategic Objective: Increase Kenya's forest cover to 10% of the country's total land area					
	Protect an additional 100,000 hectares of	Number of hectares of additional forests protected;	An additional 100,000 hectares of	Land/forest cover increased per county	MEF/ KFS/ CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	forests, through community/ participatory forestry management, and financial innovations, including payments through PES	and the community participatory forest management initiatives and financial innovations employed in the exercise	forests protected	resulting in at least 10% of Kenya's land area being forest Increased resilience		
	Restore up to 200,000 hectares of forest on degraded landscapes (in ASALs, rangelands, woodlands/forests, wetlands, and croplands, etc.): Initiate restoration processes on 33 per cent of land area in at least 7 counties	Number of hectares of forest restored on degraded landscapes (in ASALs, rangelands, etc.)	200,000 hectares of forest restored on degraded landscapes; and restoration processes on 33 per cent of land area in at least 7 Counties initiated		MEF/ KFS/ CoG	
	Establish additional 100,000 hectares of forest achieved through afforestation/ reforestation/ silviculture/ agroforestry across the country	Number of hectares of additional forest achieved through afforestation/ reforestation/ agroforestry	100,000 hectares of land of forest achieved through afforestation/ reforestation/ agroforestry across the country		MEF/ KFS/ CoG	
	Maintain watershed health (water quality and site productivity) through increased vegetation cover	Watershed condition: State of soil stability, state of watershed/ hydrologic function, integrity of nutrient cycles and energy flow, and biotic integrity (presence of functioning recovery mechanisms) for a given watershed (e.g. a water tower or drainage basin)	Watershed health maintained for assessed watersheds		MEF/ KFS/ CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	Increase the area under private sector-based industrial plantation from 71,000 hectares to at least 121,000 hectares	Number of Ha under private sector-based industrial plantation	Area under private sector-based industrial plantation increased from 71,000 hectares to at least 121,000 hectares	Land/forest cover increased per county Resilience increased	MEF/ KFS/ CoG	
	Establish at least 2,000 hectares of nature-based (non-wood forest products) enterprises across the country, to promote non-wood forest products and increase forest cover	Number of hectares of nature based (non-wood forest products) enterprises established	2,000 hectares of nature based (non-wood forest products) enterprises established across the country		MEF/ KFS/ CoG	
	Increase number of communities engaged in such pro-forest related services as bee keeping, eco-tourism, agroforestry	Number of communities engaging in such pro-forest related services as bee keeping, eco-tourism, agroforestry	Increased number of communities engaged in such pro-forest related services as bee keeping, eco-tourism, agroforestry	Land/forest cover increased per county Resilience increased	MEF/ KFS/ CoG	
	Establish standards and regulations for sustainable management of forestry (moving from voluntary to regulated)	Documentation in place containing the standards and regulations for sustainable management of forestry	Standards and regulations for sustainable forestry management in place and are being applied in the management of forest units		MEF/ KFS/ CoG	
	Review, mainstream climate change adaptation into, and implement, forestry strategies and plans	Number and nature of engagements and decisions on the review and of climate change mainstreaming into, and implementing, forestry strategies and plans	Reviewed and updated forestry strategies and plans in place, and are being implemented		MEF/ KFS/ CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
Health	**Issue/problem**: Increased climate variability is projected to lead to increased deaths arising from malnutrition, malaria, diarrhoea, and heat stress due to air pollution, unsafe drinking water, insufficient food and insecure shelter					1,336,719,400
	Strategic Objective: Mainstream climate change adaptation into the health sector					
	Scale-up community level interventions on climate-sensitive diseases, through awareness projects countrywide	Number of Counties scaling up community level interventions on climate-sensitive diseases Number and types of climate-sensitive diseases being addressed	Counties are scaling up community level interventions on climate-sensitive diseases, for example reducing malaria incidence from 225 to 100 per 1,000 persons	Reduced incidences of climate-sensitive diseases	MoH/ CoG	
	Increase the uptake and utilisation of treatment services in areas prone to climate-sensitive diseases	Number of treatment services recorded per County in areas prone to climate-sensitive diseases	Uptake of treatment services per County increased in areas prone to climate-sensitive diseases	Reduced incidences of climate-sensitive diseases	MoH/ CoG	
	Develop a climate change information and communication strategy	Number and nature of engagements and decisions leading to the development of the climate change information and communication strategy	A climate change information and communication strategy in place, and is being implemented		MoH/ CoG	
	Support Counties to play their devolved function roles in addressing climate-sensitive health issues, e.g. diseases	Number of Counties supported to play their devolved function roles in addressing climate-sensitive health issues, e.g. diseases	Counties better able to play their devolved function roles in addressing climate-sensitive health issues, e.g. diseases		MoH/ CoG	
	Incorporate materials on climate-related health risks in 20 training programmes for health workers	Nature of training materials on climate-related health risks incorporated in training programmes for health workers	20 training programmes for health workers incorporated with materials on climate-related health risks	Strengthened capacity of health workers on climate-related health risks	MoH/ CoG	
	Provide support to	Number of colleges and	Colleges and	Strengthened capacity	MoH/ CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	develop training manuals, and integrate climate and health into curricula, of health related colleges and universities	universities supported to develop training manuals and integrate climate risks into their health curricula Nature of support provided to health-related colleges and universities to develop manuals, and integrate climate and health into their curricula	universities with training manuals, and climate and health integrated in their curricula	of health professionals on health-risks of climate change		
	Strengthen the health of vulnerable people in drought-prone areas (Counties), to provide a strong foundation for increasing resilience to drought	Number of vulnerable people in drought-prone areas (counties) supported health-wise to better cope with drought	Vulnerable people in drought-prone areas (counties) better able to cope with drought	Strengthened health and resilience to drought for vulnerable people in drought-prone areas (Counties)	MoH/ CoG	
	Design appropriate measures for surveillance and monitoring of climate change-related diseases, in order to enhance early warning systems	Number and types of appropriate measures built into the design of the surveillance and monitoring programme of climate-related diseases	Appropriate measures built into the design of the surveillance and monitoring programme for climate change-related diseases, with indicators, and incorporated into HMIS system	Improved surveillance, response, and monitoring of climate change-related diseases	MoH/ CoG	
Human Settlement, Urban Development, and Housing (including waste management infrastructure)	**Issue/problem**: Climate change is negatively impacting urban areas, including housing and infrastructure (roads, buildings, storm drainage)					155,440,606,967
	Strategic Objective: Improve the resilience and adaptive capacities of urban areas, by enforcing standards for housing in anticipation of climate change impacts					
	Adapt and enforce climate-smart, green building design and construction codes and	A document in place elaborating green building design and construction codes and standards for all	The green building design and construction codes and standards	Strengthened management of urban flooding in major urban centres, towns	SDHUD/ CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	standards for all urban infrastructure to align with projected future climate conditions and extreme weather events	urban infrastructure that aligns with projected future climate conditions and extreme weather events	adapted and enforced for all urban infrastructure to align with projected future climate conditions and extreme weather events	,and cities		
	Construct levees in urban rivers that flood frequently	Number of levees constructed per river in urban areas	Levees constructed in urban rivers that flood frequently		SDHUD/ CoG	
	Rehabilitate all degraded storm water drains in at least seven (7) urban centres, to control risk from urban flooding (cross-collaboration with WRA)	Number of degraded storm water drains rehabilitated	All degraded storm water drains rehabilitated in at least seven (7) urban centres		SDHUD/ CoG	
	Construct flood-ways to divert flood waters in major flooding urban centres, towns, and cities in the country	Number of flood-ways constructed to divert flood waters in major flooding urban centres, towns, and cities in the country	Flood-ways constructed to divert flood waters in major flooding urban centres, towns, and cities in the country		SDHUD/ CoG	
	Rehabilitate Nairobi Dam, and stabilise the Nairobi River catchment	Number and type of engagements and decision leading to rehabilitation of Nairobi Dam, and stabilization of the Nairobi River catchment	Nairobi Dam rehabilitated and Nairobi River catchment stabilised		SDHUD/ CoG	
	Rehabilitate the entire 'natural infrastructure' within urban centres, towns, and cities, including green spaces, to reduce flooding	Number and type of engagements and decisions leading to the rehabilitation of 'natural infrastructure' within urban centres, towns, and cities	Natural infrastructure within urban centres, towns, and cities rehabilitated		SDHUD/ CoG	
	Mainstream Climate Change Adaptation into the *National Waste Management Strategy* and align County-based waste management plans and other relevant policies to it	Number and type of engagements and decisions leading to the mainstreaming of Climate Change Adaptation mainstreamed into the National Waste Management Strategy	the National Waste Management Strategy and county-based waste management plans mainstreamed with Climate Change Adaptation	Urban waste management infrastructure climate-proofed in all major urban centres, towns, and cities	SDHUD/ CoG	
	Mainstream Climate Change Adaptation into County waste recovery and disposal laws and regulations	Number of County waste recovery and disposal laws and regulations in which climate change adaptation has been mainstreamed	County waste recovery and disposal laws and regulations with climate change adaptation mainstreamed therein		SDHUD/ CoG	
	Construct at least one climate-proofed sanitary landfills in Nairobi, Mombasa, and Kisumu	Number of climate-proofed sanitary landfills constructed in Nairobi, Mombasa, and Kisumu	At least one climate-proofed sanitary landfill is constructed in Nairobi, Mombasa ,and Kisumu		SDHUD/ CoG	
	Transform all waste dumpsites into climate-proofed landfills in at least 5 County headquarters, based on the level of waste generated	Number of waste dumpsites transformed into climate-proofed landfills	Waste dumpsites in at least 5 County headquarters transformed into climate-proofed landfills		SDHUD/ CoG	
Manufacturing	**Issue/problem**: Inefficient use of resources					3,898,766
	Strategic Objective: Promote the growth of the green industry to drive jobs in the manufacturing sector					
	Increase the number of companies participating in efficient water-use initiatives to 200 (to include 200 water audits)	Number of companies participating in efficient water-use initiatives	Number of companies participating in efficient water-use initiatives increased to 200 (to include 200 water audits)	Improved water-use and resource efficiency in the manufacturing sector	KIRDI, KAM, KEPSA, CoG	
	Subsidize water harvesting components to incentivise water	Types of water harvesting components subsidized to incentivise water harvesting	Water harvesting components subsidised to		KIRDI, KAM, KEPSA, CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	harvesting by participating companies	by participating companies	incentivise water harvesting by participating companies			
	Develop and implement climate change adaptation-compliant design and construction codes and standards for all infrastructure in the manufacturing sector	Climate change adaptation-compliant design and construction codes and standards in place for application in all infrastructure in the manufacturing sector	Climate change adaptation-compliant design and construction codes and standards developed and in use for all infrastructure in the manufacturing sector	Enhanced climate proofing for all infrastructure in the manufacturing sector, which creates an enabling environment for climate-resilience of private sector investment	KIRDI, KAM, KEPSA, CoG	
	Build the capacity of the private sector (formal and informal) to enhance the resilience of their investments e.g. through identification of new products and services that are more resilient to climate change impacts	Number of private sector companies whose capacity has been built to enhance the resilience of their investments impacts	Capacity of the private sector (formal and informal) built to enhance the resilience of their investments	Climate-resilient investments in the manufacturing sector, leading to competitiveness of manufactured products	KIRDI, KAM, KEPSA, CoG	
	Demonstrate an operational business case for private sector investment in adaptation	Number and quality of bankable concepts and proposals on climate adaptation business for private sector buy-in	Stand-out operational business cases for private sector investment in adaptation in place	Increased private sector investment in adaptation enterprises	KIRDI, KAM, KEPSA, CoG	
	Develop fiscal incentives and measures to encourage businesses to undertake investment in adaptation and resilience-building	Number and type of fiscal incentives and measures developed to encourage businesses to undertake investment in adaptation and resilience-building	Fiscal incentive and measures to encourage investment in adaptation and resilience-building in place		KIRDI, KAM, KEPSA, CoG	
	Eco-label industrial products to promote green procurement, especially by public procurement agencies	Number of industrial products eco-labeled to promote green procurement	Industrial products eco-labeled to promote green procurement	Industrial symbiosis promoted	KIRDI, KAM, KEPSA, CoG	
	Climate-proof waste management infrastructure for waste exchange clearance centres in Special Economic Zone (SEZ)	Number of waste exchange clearance centres whose waste management infrastructure is climate-proofed	Waste management infrastructure for waste exchange clearance centres in Special Economic Zone (SEZ) climate-proofed	Enhanced climate-proofing of vulnerable infrastructure	KIRDI, KAM, KEPSA, CoG	
	Climate-proof waste management infrastructure for waste management facilities in SEZ (effluent treatment plants)	Number of climate-proofed waste management infrastructure for waste management facilities in SEZ (effluent treatment plants)	Climate-proofed waste management infrastructure for waste management facilities in SEZ (effluent treatment plants)		KIRDI, KAM, KEPSA, CoG	
	Climate-proof waste management infrastructure to create 20,000 decent green jobs	Number of decent green jobs created as a result of climate-proofing of waste management infrastructure	20,000 decent green jobs created as a result of climate-proofing waste management infrastructure		KIRDI, KAM, KEPSA, CoG	
	Strengthen academia-industry-government-civil society collaboration to boost research and innovation	Number of actors participating in the academia-industry-government-civil society collaboration	Academia-industry-government-civil society collaboration strengthened	Strengthened research and innovation, for productivity and competitiveness	KIRDI, KAM, KEPSA, CoG	
Transport and infrastructure	**Issue/problem**: Disruption of transport systems by extreme climate events					342,745,863,599
	Strategic Objective: Establish efficient, safe, world-class transportation systems and logistics services that can withstand projected impacts of climate change					
	Mainstream climate change adaptation in, and implement, the *Integrated National Transport Policy*	Number and type of engagements and decisions made toward mainstreaming climate change adaptation in the *Integrated National Transport Policy,* and implementing the *Policy*	Climate change adaptation mainstreamed in the *Integrated National Transport Policy*, and the *Policy* implemented	Climate change adaptation mainstreamed into the transport sector	MoTIHUD, KENHA, KURA, KERRA, CoG	
	Mainstream climate	Number and type of	The *Blue Economy*	Strengthened climate-	MoTIHUD,	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	change adaptation in, and implement, the *Blue Economy Strategy* and Maritime Service	engagements and decisions made toward mainstreaming climate change adaptation in the *Blue Economy Strategy* and Maritime Service	*Strategy* and Maritime Service with Climate change adaptation mainstreamed in it is in place, and being implemented	proofing of the transport and other infrastructure	KENHA, KURA, KERRA, CoG	
	Develop and apply standard guidelines for design and climate-proofing of transport and other infrastructure (both existing and new)	Documentation in place with standard guidelines for design and climate-proofing of transport and other infrastructure (both existing and new)	Standard guidelines for design and climate-proofing of transport and other infrastructure (both existing and new) in place, and being implemented		MoTIHUD, KENHA, KURA, KERRA, CoG	
	Climate-proof at least 4000 km of roads and, where feasible, upscale the construction of roads to systematically harvest water and reduce floods	Kilometers of roads climate-proofed Kilometers of roads systematically constructed to harvest water and reduce floods	At least 4000 km of roads climate-proofed Roads being systematically constructed to harvest water and reduce floods		MoTIHUD, KENHA, KURA, KERRA, CoG	
	Support the climate-proofing of national and county infrastructure projects (especially for water, energy, transport and ICT) to facilitate resilience building	Number of National and County infrastructure projects (especially for water, energy, transport and ICT) supported to climate-proof	National and County infrastructure projects (especially for water, energy, transport and ICT) climate-proofed		MoTIHUD, KENHA, KURA, KERRA, CoG	
	Strengthen the capacity of at least 23 Counties to plan, contract, and supervise the implementation of climate-proofed infrastructure	Number of Counties with strengthened capacity to plan, contract, and supervise the implementation of climate-proofed infrastructure	Strengthened capacity of at least 23 Counties to plan, contract and supervise implementation of climate-proofed infrastructure		MoTIHUD, KENHA, KURA, KERRA, CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	Explore the feasibility of designing and constructing roads to systematically harvest water during floods	Documentation in place articulating the feasibility of designing and constructing roads to systematically harvest water during floods	Feasibility of designing and constructing roads to systematically harvest water during floods determined		MoTIHUD, KENHA, KURA, KERRA, CoG	
Water and Sanitation	**Issue/problem**: Access to, and quality of, water is projected to decline because of climate change-induced drought and reduction of glaciers					56,394,324,267
	Strategic Objective: Enhance the resilience of the water sector by ensuring adequate access to, and efficient use of, water for agriculture, manufacturing, domestic, wildlife, and other purposes					
	Mainstream climate change adaptation in, and implement, the *National Water Master Plan*	Number of engagements and decisions toward mainstreaming of climate change adaptation in the *National Water Master Plan*, and in its implementation	The National Water Master Plan with climate change adaptation mainstreamed in place, and being implemented	climate-proofed water infrastructure Enhanced water security. Increased per capita water storage capacity	MoW&S, WRA, NWSA, CoG	
	Develop and implement climate change adaptation-compliant design and construction codes and standards for all water resources infrastructure	Document in place detailing the climate change adaptation-compliant design and construction codes and standards for all water resources infrastructure	Climate change adaptation-compliant design and construction codes and standards is being implemented	Increased per capita water supply for agriculture, manufacturing, domestic, wildlife, and other uses, despite climate change.	MoW&S, WRA, NWSA, CoG	
	Increase the number of climate-proofed water harvesting and water storage infrastructure from 700 to 2,000	Number of climate-proofed water harvesting and water storage infrastructure	Number of climate-proofed water harvesting and water storage infrastructure increased from 700 to 2,000	Improved annual per capita water availability through the development of climate-proofed water infrastructure (mega dams, small dams, water pans, untapped aquifers)	MoW&S, WRA, NWSA, CoG	
	Increase annual per capita water availability (harvested, abstracted[16] and stored) from 647 m^3	Per capita water availability	Annual per capita water availability (harvested, abstracted[17] and		MoW&S, WRA, NWSA, CoG	

[16] Ensure that underground water abstraction is accompanied by aquifer recharge points
[17] Ensure that underground water abstraction is accompanied by aquifer recharge points

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	to 1000 m^3		stored) increased from 647 m^3 to 1000 m^3			
	Increase the number of people and entities accessing good quality water for domestic, agricultural, and industrial use from 58% to 65%	Number of people and entities accessing good quality water for domestic, agricultural, and industrial use	Increase from 58% to 65% of people and entities accessing good quality water for domestic, agricultural, and industrial use		MoW&S, WRA, NWSA, CoG	
	Climate-proof the construction and maintenance of at least 12 (at most 36)[18] multipurpose dams, small dams, water pans and *in situ* water harvesting and storage structures countrywide	Number of multipurpose dams, small dams, water pans, and *in situ* water harvesting and storage structures climate-proofed	The construction and maintenance of at least 12 (at most 36) multipurpose dams, small dams, water pans and *in situ* water harvesting and storage structures climate-proofed		MoW&S, WRA, NWSA, CoG	
	Mainstream disaster risk reduction (DRR) measures in planning and service delivery in the water sector	Number of engagements and decisions toward mainstreaming DRR and service delivery in the water sector	DRR measures mainstreamed in the water sector planning and service delivery, particularly in vulnerable, high risk regions	Disaster resilience strengthened in the water sector	MoW&S, WRA, NWSA, CoG	
	Access at least 2 untapped aquifers	Number of accessed untapped aquifers	At least 2 untapped aquifers accessed	Improved water security	MoW&S, WRA, NWSA, CoG	
	Undertake national hydrogeological surveys to identify strategic aquifers	Number of national hydrogeological surveys undertaken to identify strategic aquifers	The strategic aquifers identified through national hydrogeological surveys			
	Undertake a national	Number of ground water surveys undertaken to	Water abstraction levels established		MoW&S, WRA, NWSA,	

[18]12 multipurpose dams (Thwake, Thiba, Radat, Gogo, Thuci, Kaiti, Lowaat, Rupingazi, Thambana, Maara, Kithino, Kamumu) under construction and 36 in the pipeline

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	ground water survey to establish abstraction levels against recharge, and map locations and buffer zones suitable for direct artificial groundwater recharge and other priority interventions	establish water abstraction levels against recharge, and map locations and buffer zones suitable for direct artificial ground water recharge and other priority interventions	against recharge based on a national ground water survey Mapped out locations and buffer zones suitable for direct artificial ground water recharge and other priority interventions		CoG	
	Develop at least 56 ecosystem-based adaptation and integrated sub-catchment management plans, and implement at least 236 other sub-catchment management plans	Number of ecosystem-based adaptation and integrated sub-catchment management plans developed Number of other sub-catchment management plans implemented	At least 56 ecosystem-based adaptation and integrated sub-catchment management plans developed, and at least 236 other sub-catchment management plans implemented	Planning for water security strengthened	MoW&S, WRA, NWSA, CoG	
	Establish at least 300,000 on-farm ponds in at least 15 counties for on-farm (*in-situ*) agricultural water harvesting	Number of on-farm ponds established Number of counties covered in the establishment of on-farm agricultural water harvesting	At least 300,000 on-farm ponds established in at least 15 counties for on-farm (*in-situ*) agricultural water harvesting	Water security improved	MoW&S, WRA, NWSA, CoG	
	Increase the number of pro-poor water harvesting-based livelihood resilience programmes	Number of pro-poor water harvesting-based livelihood resilience programmes	Increased number of pro-poor water harvesting-based livelihood resilience programmes			
	Support improved water-harvesting-based livelihood systems on at least 60,000 hectares of	Number of hectares of improved water-harvesting-based livelihood systems that have been supported	At least 60,000 hectares of land with improved water-harvesting-based livelihood systems		MoW&S, WRA, NWSA, CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	land through land reclamation		through land reclamation			
	Support and strengthen local communities to protect at least 5 water catchment areas	Number of water catchment areas protected	At least 5 water catchment areas protected		MoW&S, WRA, NWSA, CoG	
	Develop a water utility creditworthiness index, and a financial instrument for adaptation	Number of engagements and decisions made toward developing the water utility creditworthiness index and a financial instrument for adaptation	A water utility creditworthiness index and a financial instrument for adaptation in place		MoW&S, WRA, NWSA, CoG	
	Promote efficient use of water: Reduce water wastage and non-revenue water from the current 43 per cent (unbilled and unaccounted for) to 20 per cent	Percentage reduction in water wastage and non-revenue water	Water wastage and non-revenue water reduced from the current 43 per cent (unbilled and unaccounted for) to 20 per cent	Water security improved	MoW&S, WRA, NWSA, CoG	
	Conduct awareness campaign for water use efficiency, including awareness on the uptake of recycled water for secondary water uses	Number and type of awareness campaign events held on water efficiency, including uptake of recycled water for secondary water uses	Awareness campaign conducted for water use efficiency, including uptake of recycled water for secondary water uses		MoW&S, WRA, NWSA, CoG	
	Introduce innovation in water tracking and leakages identification and reporting	Types of innovations identified for water tracking and leakages identification and reporting	Innovation in water tracking and leakages identification and reporting introduced		MoW&S, WRA, NWSA, CoG	
	Develop and implement an integrated water management strategy for rangeland	Number of engagements and decisions made toward the development and implementation of the	A strategy for integrated water management strategy for	Improved water access for wildlife and pastoral livestock	MoW&S, WRA, NWSA, CoG	
Sector	**Actions**	**Key Performance Indicators**	**Expected Output(s)**	**Expected Outcomes**	**Key* Responsible Agencies**	**5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)**
	economy (wildlife and pastoral livestock)	strategy in place for rangeland economy	rangeland economy (wildlife and pastoral livestock) in place, and being implemented			
	Restore degraded rangeland units through planting indigenous trees, and constructing artificial water dams for wildlife use (in collaboration with NDMA)	Number of degraded rangeland units (e.g. grazing zones) restored through planting indigenous trees, and constructing artificial water dams for wildlife use	Degraded rangeland units (e.g. grazing zones) restored through planting indigenous trees, and constructing artificial water dams for wildlife use (in collaboration with NDMA)	Improved rangeland health and condition	MoW&S, WRA, NWSA, CoG	
	Identify and map locations suitable for harvesting flood water in rangelands, and use them to harvest water for livestock and wildlife use	Number of processes/steps used to identify and map out locations that are suitable for harvesting of flood water in range lands	Locations suitable for harvesting flood water in rangelands identified, mapped and , and used to harvest water for livestock and wildlife use	Improved access to water in rangelands by livestock and wildlife	MoW&S, WRA, NWSA, CoG	
	Zero rate taxes of water harvesting and storage equipment to stimulate water harvesting, both in households and institutions, both at rural and urban areas	Types of water harvesting and storage equipment zero rated	Water harvesting and storage equipment zero rated to stimulate water harvesting	Increase water harvesting and resource suse efficiency	MoW&S, WRA, NWSA, CoG	
	Review by-laws that prohibit water harvesting in urban areas like in Nairobi	Number of by-laws reviewed to enhance water harvesting in urban areas like Nairobi	Water-related by-laws reviewed to enhance water harvesting		MoW&S, WRA, NWSA, CoG	
	Develop a policy to make water harvesting mandatory for	Number of engagements and decisions made toward the development of a policy to make water harvesting	A policy in place to make water harvesting mandatory for		MoW&S, WRA, NWSA, CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	institutions and households that consume over 20 m^3 per month or to have a 60 – 40 per cent balance between tap and harvested water respectively	mandatory for institutions and households that consume over 20 m^3 per month or to have a 60 – 40 per cent balance between tap and harvested water respectively	institutions and households that consume over 20 m^3 per month or to have a 60 – 40 per cent balance between tap and harvested water respectively			
	Enforce laws on urban planning and storm water management in urban areas, including desilting of drainages and riparian protection	Number of law enforcement events relating to urban planning and storm water management in urban areas, including desilting of drainages and riparian protection	Laws on urban planning and storm water management in urban areas enforced		MoW&S, WRA, NWSA, CoG	
	Formulate policy for recycled water pricing and beneficiary sectors such as construction, watering flower beds, and car washes	Number of engagements and decisions made toward the formulation of a policy for recycled water pricing and beneficiary sectors	A policy in place for recycled water pricing		MoW&S, WRA, NWSA, CoG	
	Develop a national framework for waste water management	Number of engagements and decisions made toward the development of the national framework for waste management	A national framework for waste water management in place		MoW&S, WRA, NWSA, CoG	
Tourism	**Issue/problem**: Climate change affects a wide range of such environmental resources that are critical attractions for tourists as wildlife, biodiversity, and water resources					76,889,214,633
	Strategic Objective: Enhance the resilience of the tourism and wildlife value chains					
	Develop and implement a climate change adaptation strategy for tourism sub-sector through review and updating of tourism sector policies, laws,	Engagements and decisions made toward the development of a climate change adaptation strategy for the tourism sub-sector	A climate change adaptation strategy for tourism sub sector in place, and being implemented	The resilience of the tourism sub-sector enhanced	MoT&W, KWS, KTB, CoG	
Sector	**Actions**	**Key Performance Indicators**	**Expected Output(s)**	**Expected Outcomes**	**Key* Responsible Agencies**	**5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)**
	regulations, guidelines, governance ,and funding processes					
	Identify and support climate-proofing of tourism infrastructure (e.g. roads, bridges) located in flood prone areas	Number and type of tourism infrastructure located in flood-prone areas that is climate proofed	Increased number of tourism infrastructure in flood-prone areas climate proofed		MoW&S, WRA, NWSA, CoG	
	Develop and implement climate resilient action plans for the tourism sub-sector	Number of climate resilient action plans developed for the tourism sub-sector and implemented	Climate resilient action plans for the tourism sub-sector in place, and being implemented		MoT&W, KWS, KTB, CoG	
	Coordinate the response to climate change at all levels of tourism management	Number and types of response to climate change undertaken at all levels of tourism management	Coordinated response to climate change at all levels of tourism management		MoW&S, WRA, NWSA, CoG	
	Enhance the climate resilience of diversified tourism products	Number of new/diversified tourism products whose resilience to climate change has been enhanced	New/diversified tourism products that are resilient to climate change		MoT&W, KWS, KTB, CoG	
	Strengthen the sensitisation of citizens on impacts of climate change on wildlife so as to motivate their action toward safeguarding wildlife and tourist sites from impacts of climate change	Number and types of citizens sensitisation events aimed at motivating them wildlife and tourist sites from impacts of climate change	Citizens sensitised to safeguard wildlife and tourist sites from impacts of climate change		MoT&W, KWS, KTB, CoG	
	Support the improvement of drainage along roads in tourist attraction sites, and along tourism routes	Length of roads in tourist attraction sites and along tourism routes that have been supported in drainage improvement	Drainage along roads in tourist attraction sites and along tourist routes improved	Enhanced climate-proofing of infrastructure in and/or leading to tourist attraction sites	MoT7W, KWS, KTB, CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	Establish early warning systems and communication structures targeting tourism actors	Number of engagements and decisions made toward establishing early warning systems and communication structures targeting tourism actors	Early warning systems and communication structures targeting tourism actors established	The resilience of tourism to impacts of climate change strengthened	MoT&W, KWS, KTB, CoG	
	Prepare and implement (in collaboration with KWS) climate-risk based ecosystem management plans for all ecosystems supporting tourism and wildlife	Number of engagements and decisions made toward the preparation and implementation of climate-risk-based ecosystem management plans for tourism and wildlife	Climate-risk based ecosystem management plans in place for all ecosystems supporting tourism and wildlife, and are being implemented	Sustainable ecosystem-based adaptation underpinned by sound climate-risk-based ecosystem management plans	MoT&W, KWS, KTB, CoG	
	Support the enhancement of water storage in tourist attraction sites to support wildlife during drought	Number of tourist attraction sites with enhanced water storage to support wildlife during drought	Tourist attraction sites equipped with enhanced water storage facilities to support wildlife during drought	Improved water security for sustainable wildlife	MoT&W, KWS, KTB, CoG	
Wildlife	**Issue/problem**: Climate change affects a wide range of such environmental resources that are critical attractions for tourism as wildlife, biodiversity, and water resources					4,240,998,033
	Strategic Objective: Enhance the resilience of the tourism and wildlife value chains.					
	Finalize and implement the *Kenya Wildlife Climate Change Adaptation (Conservation and Management) Strategy*	Number of engagements and decisions made toward the finalisation and implementation of the *Kenya Wildlife Climate Change Adaptation (Conservation and Management) Strategy*	The *Kenya Wildlife Climate Change Adaptation (Conservation and Management) Strategy* finalised and implemented	Enhanced resilience of wildlife and biodiversity	MoT&W, KWS, KTB, CoG	
	Restore ecosystem functioning: Conserve at least 20 per cent of terrestrial and inland water, and 15 per cent	Number and types of ecosystem units restored/conserved	At least 20 per cent of terrestrial and inland water, and 15 per cent of coastal and marine areas		MoT&W, KWS, KTB, CoG	
Sector	**Actions**	**Key Performance Indicators**	**Expected Output(s)**	**Expected Outcomes**	**Key* Responsible Agencies**	**5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)**
	of coastal and marine areas, through effectively and equitably managed, ecologically representative and well connected systems of protected areas		conserved, especially areas of particular importance for biodiversity and ecosystem services, restored/conserved			
	Supplement watering sources for wildlife	Number and type of watering sources for wildlife	Watering sources for wildlife increased	Enhanced access to water for wildlife	MoT&W, KWS, KTB, CoG	
	Protect and manage large and biodiverse landscapes	Number, type and hectares of large biodiverse landscapes protected and managed	Large and biodiverse landscapes protected and managed		MoT&W, KWS, KTB, CoG	
	Increase the size of protected areas, where feasible	Number of hectares of additional protected areas	Additional hectares of protected areas	Improved habitats (space and security) for wildlife	MoT&W, KWS, KTB, CoG	
	Increase connectivity among protected areas and conservancies; Manage translocation	Number and type of connectivities among protected areas and conservancies	Improved connectivity among protected areas and conservancies		MoT&W, KWS, KTB, CoG	
	Manipulate habitats to enhance adaptation: Mainstream climate change adaptation into and implement existing species-specific, habitat-specific management plans	Number of habitats manipulated to enhance adaptation	Enhanced adaptation to climate change impacts for habitats due to their manipulation		MoT&W, KWS, KTB, CoG	
	Maintain and increase the population of critically endangered and endangered species of wildlife (sixth schedule of *Wildlife Act 2013*); Prioritize recovery funding for listed species: Strengthen	Number and types of critically endangered and endangered species of wildlife whose population is maintained and/or increased	Populations of critically endangered and endangered species of wildlife being maintain and/or increased		MoT&W, KWS, KTB, CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	partnerships for species recovery; Promote more monitoring and adaptive management for species recovery					
	Integrate ecosystem-based adaptation and community-based adaptation approaches to reduce natural resource based conflicts in rangelands: Identify and effectively conserve 30,000 hectares of wildlife habitats to support a broad range of wildlife and plants under changed conditions	Number of hectares of wildlife habitats conserved to support a broad range of wildlife and plants under changed conditions	At least 30,000 hectares of wildlife habitats conserved to support a broad range of wildlife and plants under changed conditions		MoT&W, KWS, KTB, CoG	
	Implement adaptive wildlife management strategy in 10 Protected Areas;	Number of Protected Areas where adaptive wildlife management strategy is being implemented	At least 10 Protected Areas having the adaptive wildlife management strategy implemented in them		MoT&W, KWS, KTB, CoG	
	Improve the resilience of coral reef ecosystems by increasing areas under effective coral reef management from 10 per cent from the current base line	Areas under effective coral reef management	At least additional 10 per cent of coral reef ecosystems under effective coral reef management		MoT&W, KWS, KTB, CoG	
	Reduce area under invasive plant species in Protected Areas (listed in the 7th schedule of the Wildlife Act, 2013) by 50 per cent of	Area under invasive plant species in Protected Areas	At least 50 per cent reduction in the area under invasive plant species in Protected Areas		MoT&W, KWS, KTB, CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	current coverage:					
	Implement finalised climate-resilient ecosystem, fire, and flood management plans	Number of engagements and decisions made toward the implementation of finalized climate-resilient ecosystem, fire, and flood management plans	Finalised climate-resilient ecosystem, fire, and flood management plans being implemented		MoT&W, KWS, KTB, CoG	
	Reduce risk of human-wildlife conflict by 50 per cent of current baseline:	Number of human-wildlife conflicts	50 per cent reduction in the risk of human-wildlife conflict from current baseline	Reduction in human-wildlife conflicts	MoT&W, KWS, KTB, CoG	
	Design and develop a strategy for wildlife and livestock to co-exist harmoniously in rangelands through niche differentiation and functional resource heterogeneity: Develop adaptive grazing management plans	Number of engagements and decisions made toward the design and development of a strategy for wildlife and livestock to co-exist harmoniously in rangelands through niche differentiation and functional resource heterogeneity Adaptive grazing management plans	A strategy d for wildlife and livestock to co-exist harmoniously in rangelands through niche differentiation and functional resource heterogeneity Adaptive grazing management plans in place		MoT&W, KWS, KTB, CoG	
	Incorporate wildlife considerations in the preparation of County Spatial Plans: Integrate wildlife issues in all 47 County Spatial Plans.	Number of Counties with wildlife considerations incorporated in their County Spatial Plans.	Wildlife issues integrated in all 47 County Spatial Plans.		MoT&W, KWS, KTB, CoG	
	Implement the *National Wildlife Corridors and Dispersal Areas Report*	Number of engagements and decisions made toward implementation of the *National Wildlife Corridors and Dispersal Areas Report*	The *National Wildlife Corridors and Dispersal Areas Report* implemented		MoT&W, KWS, KTB, CoG	
	Recover encroached areas to facilitate their conversion back to wildlife corridors.	Number and sizes of encroached areas recovered and converted back to wildlife corridors.			MoT&W, KWS, KTB, CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	Secure 20 per cent of dispersal corridors and migratory pathways that have been identified in the Report	Size of secured dispersal corridors and migratory pathways	At least 20 per cent of dispersal corridors and migratory pathways that have been identified in the *National Wildlife Corridors and Dispersal Areas Report* secured		MoT&W, KWS, KTB, CoG	
	Enhance private sector involvement in wildlife to encourage buy-in and funding	Extent of private sector involvement in wildlife issues	Enhanced private sector involvement in wildlife		MoT&W, KWS, KTB, CoG	
	Develop and operationalise at least 5 new conservancies	Number of new conservancies developed and operationalied	At least 5 new conservancies developed and operationalised.		MoT&W, KWS, KTB, CoG	
	Enhance wildlife entrepreneurship among at least 10 communities	Number of communities where wildlife entrepreneurship has been enhanced	Wildlife entrepreneurship enhanced among at least 10 communities		MoT&W, KWS, KTB, CoG	
	Increase the number of wildlife protection zones outside the existing protected areas (parks)	Number of new wildlife protection zones outside the existing protected areas (parks)	Increased wildlife protection zones outside the existing protected areas (parks)		MoT&W, KWS, KTB, CoG	
	Establish transboundary collaboration frameworks between Kenya and Tanzania: Harmonize and mainstream climate change adaptation into and implement at least four transboundary wildlife policies and strategies between Kenya and Tanzania,	Number of engagements and decisions made toward the establishment of transboundary frameworks between Kenya and Tanzania, and Kenya and Uganda	Transboundary collaboration frameworks between Kenya and Tanzania, and Kenya and Uganda, established		MoT&W, KWS, KTB, CoG	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	and between Kenya and Uganda					
Marine and Coastal Resources	**Issue/problem:** Effects of climate change negatively affect maritime and shipping activities, which impacts cruise tourism, and maritime and port infrastructure					334,896,617,201
	Strategic Objective: Mainstream climate action in the Blue Economy, through climate-smart aquaculture and fishing technologies, and green port initiatives					
	Develop and implement a strategy for protection of the shoreline from impacts of climate change	Number of engagements and decisions made toward the development and implementation of the strategy for protection of the shoreline from impacts of climate change	A strategy is in place for protection of the shoreline from impacts of climate change, and is being implemented	The resilience of the coastal and marine zone strengthened	State Department of Fisheries, NEMA, KWS,	
	Develop and implement coastal and marine disaster preparedness and response plans	Number of engagements and decisions made toward the development and implementation of coastal and marine disaster preparedness and response plans	Coastal and marine disaster prepared and response plans in place, and being implemented		State Department of Fisheries, NEMA, KWS, MoT&W, CoG, KFS, KMFRI	
	Strengthen implementation of *The Wildlife Conservation and Management Act of 2013*, and associated regulations, at the coast	Number of engagements and decision made toward strengthening implementation of the *Wildlife Conservation and Management Act of 2013*, and associated regulations, at the coast	implementation of *The Wildlife Conservation and Management Act of 2013*, and associated regulations, at the coast strengthened			
	Mainstream Climate Change Adaptation into and implement *Integrated Shoreline Management Strategy for Marine and Coastal Zone*	Climate Change Adaptation mainstreamed into Integrated Shoreline Management Strategy for Marine and Coastal Zone and implemented	Climate change adaptation mainstreamed in the *Integrated Shoreline Management Strategy for Marine and Coastal Zone*; and the *Strategy* is being implemented		State Department of Fisheries, NEMA, KWS, MoT&W, CoG, KFS, KMFRI	
	Include climate change	Number of EIAs for marine	Climate change		State	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	considerations in the Environmental Impact Assessment (EIA) of Marine and Coastal Zone development projects, and implement the recommendations	and coastal zone development projects that have climate change considerations, and the recommendations from the assessments	considerations included in EIAs for marine and coastal zone development projects, and the recommendations in the EIAs implemented		Department of Fisheries, NEMA, KWS, MoT&W, CoG, KFS, KMFRI	
	Develop a systematic climate-resilient conservation plan for the transboundary marine and fresh water conservation areas between Kenya and Tanzania	Number of engagements and decisions toward the development of a systematic climate-resilient conservation plan for the transboundary marine and fresh water conservation areas between Kenya and Tanzania	A systematic climate-resilient conservation plan in place for the transboundary marine and fresh water conservation areas between Kenya and Tanzania		State Department of Fisheries, NEMA, KWS, MoT&W, CoG, KFS, KMFRI	
	Support the implementation of management plans to rationalize diversion and damming of rivers (Tana Delta Management plan/ Sabaki Estuary management plan) and flood control	Number of engagements and decisions made toward support for the implementation of management plans to rationalise diversion and damming of rivers (Tana Delta Management plan/ Sabaki Estuary management plan) and flood control	The implementation of management plans to rationalise diversion and damming of rivers (Tana Delta Management plan/ Sabaki Estuary management plan) and flood control supported		State Department of Fisheries, NEMA, KWS, MoT&W, CoG, KFS, KMFRI	
	Develop and implement the Integrated Water Resource Management (IWRM) Strategy for Tana and Athi basins; Promote IWRM strategies to safeguard water quality	Number of engagements and decision made toward the development and implementation of IWRM) Strategy for Tana and Athi basins, and promotion of IWRM strategies to safeguard water quality	IWRM Strategy in place for Tana an Athi basins and is being implemented	Enhanced resilience of the coastal and marine zone	State Department of Fisheries, NEMA, KWS, MoT&W, CoG, KFS, KMFRI	
	Design and implement a plan for sustainable extraction of	Number of engagements and decision made toward the design and implementation of	A plan in place for sustainable extraction of		State Department of Fisheries,	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	groundwater to control the problem of saltwater intrusion into freshwater aquifers, and to protect water catchments	a plan for sustainable extraction of groundwater to control the problem of saltwater intrusion into freshwater aquifers, and to protect water catchments	groundwater to control the problem of saltwater intrusion into freshwater aquifers; and is being implemented		NEMA, KWS, MoT&W, CoG, KFS, KMFRI	
	Identify and develop alternative sources of freshwater to reduce pressure on groundwater sources: alternative water sources e.g. water pans, dams, boreholes, roof water harvesting, etc.	Number of engagements and decision made towards the identification and development of alternative sources of freshwater to reduce pressure on groundwater sources: alternative water sources e.g. water pans, dams, boreholes, roof water harvesting, etc.	Alternative sources of freshwater identified and developed to reduce pressure on groundwater sources: alternative water sources e.g. water pans, dams, boreholes, roof water harvesting, etc.	Enhanced water security	State Department of Fisheries, NEMA, KWS, MoT&W, CoG, KFS, KMFRI	
	Rehabilitate degraded water sources e.g. de-silting of dams	Number of degraded water sources rehabilitated	Degraded water sources rehabilitated			
	Encourage the adoption of water recycling and water saving practices	Number of engagements and decisions made toward encouragement of water recycling and water saving practices	Increased espousal of water recycling and water saving practices			
	Develop and implement climate change adaptation-compliant design, siting and construction codes and standards for all marine and coastal infrastructure	Number of engagements and decisions made toward the development and implementation of climate change adaptation-compliant design, siting and construction codes and standards for all marine and coastal infrastructure	Climate change adaptation-compliant design, siting and construction codes and standards for all marine and coastal infrastructure in place, and is being applied	Coastal infrastructure climate-proofed	State Department of Fisheries, NEMA, KWS, MoT&W, CoG, KFS, KMFRI	
	Climate-proof and maintain roads, buildings, and drainage structures, especially	Number of climate proofed and maintained roads, buildings, and drainage structures	Roads, buildings, and drainage structures, especially the Port of Mombasa is climate-			

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	the Port of Mombasa		proofed			
	Mainstream climate change adaptation in, and implement, the *National Mangrove Ecosystem Management Plan*	Number of engagements and decisions made toward the mainstreaming of climate change adaptation in the *National Mangrove Ecosystem Management Plan*	Climate change adaptation mainstreamed in the *National Mangrove Ecosystem Management Plan*	Enhanced resilience of mangrove forests and coastal terrestrial forests	State Department of Fisheries, NEMA, KWS, MoT&W, CoG, KFS, KMFRI	
	Restore and co-manage degraded mangrove forests and coastal terrestrial forests using a multi-sectoral approach to guide and regulate the multiple activities carried out in these habitats	Number of hectares and type of forest restored and co-managed using a multi-sectoral approach to guide and regulate the multiple activities carried out in these habitats	Degraded mangrove and coastal terrestrial forests restored and co-managed			
	Mainstream the management of mangroves and coastal forests into coastal land use planning	Number of engagements and decisions made toward the mainstreaming of mangroves and coastal forests into coastal land use planning	Management of mangroves and coastal forests mainstreamed into coastal land use planning		State Department of Fisheries, NEMA, KWS, MoT&W, CoG, KFS, KMFRI	
	Diversify tourism products to strengthen tourism resilience	Number of engagements and decisions made toward diversifying tourism products	A number of new tourism products introduced to enhance the resilience of tourism	A resilience of the tourism sub-sector		
	Strengthen guidelines for the management of wildlife to minimise human wildlife conflicts	Number of engagements and decisions made toward the strengthening of guidelines for the management of wildlife to minimise human wildlife conflicts	Guidelines for the management of wildlife strengthened to minimise human wildlife conflicts			
	Integrate ecosystem-based and community-based adaptation approaches to reduce natural resource based conflicts	Number of engagements and decisions made toward integrating ecosystem-based and community-based adaptation approaches to reduce natural resource based conflicts	Reduced natural resource-based conflicts due to espousal of integrated ecosystem-based and community-based adaptation approaches	Reduced conflicts over natural resources	State Department of Fisheries, NEMA, KWS, MoT&W, CoG, KFS, KMFRI	
	Strengthen mechanisms for rehabilitation and co-management of coastal ecosystems, and sharing of benefits	Number of engagements and decisions made toward the strengthening of mechanisms for rehabilitation and co-management of coastal ecosystems, and sharing of benefits	Strengthened mechanisms for rehabilitation and co-management of coastal ecosystems, and sharing of benefits	Coastal ecosystems rehabilitated and co-managed, and benefits are shared		
	Establish community managed areas (CMAs) in marine and terrestrial environments; and Promote and support multiple uses of ecosystems to reduce selective pressure	Number of community managed areas (CMAs) established in marine and terrestrial environments; and type and nature of promotion and support made toward multiple uses of ecosystems for reduction in selective pressure	Community managed areas (CMAs) are established in marine and terrestrial environments; and multiple uses of ecosystems promoted and supported to reduce selective pressure	Ecosystem resilience strengthened		
	Develop and implement schemes for Payment for Environmental/ Ecosystem Services (PES)	Number of engagements and decisions made toward the development and implementation of schemes for Payment for Environmental/ Ecosystem Services (PES)	Schemes for Payment for Environmental/ Ecosystem Services (PES) developed and implemented			
	Promote PPPs in the conservation and management of resources	Number and size/capacity of PPPs in the conservation and management of resources established	Functional PPPs established in the conservation and management of resources	Increased private sector participation in the conservation and management of resources		
	Expand the fishing zones in coastal waters	Number of Kilometers of fishing zones in coastal waters	Fishing zones in coastal waters expanded	Increased benefit from the Blue Economy		

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
CCD	**Issue/problem:** Limited scale of county climate change planning and finance mechanisms; and weak community-based preparedness and response units					4,261,710,681
	Strategic Objective: Upscale county climate change planning and finance mechanisms; and strengthen community-based preparedness and response units					
	Operationalise the *Climate Change Act N° 11 of 2016*	Number of climate change coordinating institutions proposed in the *Climate Change Act 2016* operationalised	*Climate Change Act N° 11 of 2016* operationalised	Enhanced climate change coordination functioning institutions	CCD	
	Review and update *NAP*	Number of engagements and decisions made toward the review and updating of *NAP*	Reviewed and updated *NAP* in place	Adaptation actions in *NAP* updated	CCD	
	Develop adaptation and resilience indicators	Number of engagements and decisions made toward the development of adaptation and resilience indicators	Adaptation and resilience indicators in place	Enhanced tracking of adaptation actions using adaptation and resilience indicators	CCD	
	Develop and operationalise an M&E system for adaptation	Number of engagements and decisions made toward the development and operationalization of the M&E system for adaptation	An M&E system for adaptation in place and operationalised	M&E system for adaptation functioning	CCD	
	Develop subsidiary legislation on adaptation	Number and nature of subsidiary legislation on adaptation	Subsidiary legislation on adaptation in place	Climate change adaptation firmly anchored in law	CCD	
	Operationalisation of the National Climate Change Resource Centre and Portal	Number of engagements and decisions made toward operationalization of the National Climate Change Resource Centre and Portal	The National Climate Change Resource Centre and Portal operationalised	Enhanced access to climate change resources and information	CCD	
	Operationalise the Climate Change Fund	Number of engagements and decisions made toward the operationalisation of the Climate Change Fund	The Climate Change Fund operationalised	A functional Climate Change Fund	CCD	
	Strengthening of the Climate Change Directorate and climate change units in the	Number of engagements and decisions made toward the strengthening of the Climate Change Directorate and	The Climate Change Directorate and climate change units in the MCDAs	Enhanced effectiveness in the delivery of climate change action	CCD	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	MCDAs	climate change units in the MCDAs	strengthened			
	Participate in negotiations on adaptation at the international level	Number of adaptation-related negotiation that Kenya participates in Number of participants attending the negotiations	Negotiations on adaptation participated in at the international level	Kenya uses experiences from the negotiations to improve National and County climate action processes	CCD	
	Establish a platform for open and transparent stakeholder dialogue on climate finance	Number of engagements and decisions made toward the establishment of an open and transparent stakeholder dialogue on climate finance	Platform for open and transparent stakeholder dialogue on climate finance established	Increased access to information on climate finance	CCD	
KMD	**Issue/problem:** Need for improved provision and uptake of climate information services relevant to livelihoods at County level to inform decision making; and need for the upscaling of County climate change planning and finance mechanisms, and strengthening community-based preparedness and response units					4,948,990,121
	Strategic Objective: Strengthen resilience and adaptive capacity to climate related hazards and natural disasters in all Counties					
	Modernise KMD's climate information systems and services	Number, nature, and type of inputs used to modernise KMD climate information services	KMD climate information systems and services modernised	KMD climate information systems and services delivering improved climate information products: Precision, clarity and timeliness of downscaled climate early warning increased	KMD	
	Strengthen the provision of Climate Information Services (CIS) and early warning systems (EWS) that inform decision-making for governments, businesses and households	Number and types of CIS and EW events and processes undertaken	CIS and EW provided to inform decision-making for governments, businesses and households	Decisions being made are based on CIS and EW provided	KMD	
	Develop County Climate Information	Number of Counties with CCISPs	CCISPs developed	Counties are implementing the	KMD	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	Service Plans (CCISP)			CCISPs		
	Expand climate monitoring, data collection network and weather observing systems	Nature of expansion of the climate monitoring, data collection network and weather observing systems	Expanded climate monitoring data collection network and weather observing systems	KMD climate information systems and services delivering improved climate information products	KMD	
	Strengthen the capacity of County meteorological directorates to improve CIS	Number of Counties with meteorological directorates having strengthened capacity to improve CIS	Strengthened capacity of County meteorological directorates	CIS by county meteorological directorates improved	KMD	
	Engage traditional weather forecasters and systems in national climate change adaptation initiatives through a partnership model by the traditional weather forecasters and the Kenya Meteorology Department	Number and type of collaboration and partnership events where traditional weather forecasters and systems are engaged in National climate change adaptation initiatives	Traditional weather forecasters and systems are engaged in national climate change adaptation initiatives through collaboration and partnerships	Role of traditional weather forecasters and systems affirmed in national climate change adaptation initiatives	KMD	
	Enhance integration of local/indigenous knowledge into early warning systems to improve CIS providers network (CISPN)	Number of engagements and decisions made toward enhanced integration of local/indigenous knowledge into early warning systems to improve CIS providers network (CISPN)	CISPN improved, and integration of local/indigenous knowledge into early warning systems enhanced	Climate early warning and climate information services enhanced through integration of local/ indigenous knowledge	KMD	
	Enhance participatory scenario planning with communities	Number of participatory scenario planning events held with communities	Participatory scenario planning with communities enhanced	Climate early warning and climate information services strengthened	KMD	
	Support the unpacking of meteorological language and the translation of downscaled climate information into Swahili and local languages	Number of events convened for the unpacking of meteorological language and the translation of downscaled climate information into Swahili and local language; and number of products released	Meteorological language and the translation of downscaled climate information into Swahili and local languages supported and unpacked		KMD	
NEMA	**Issue/problem:** Need to monitor and enforce compliance with the *National Climate Change Act* , and mainstream climate change risks in environmental assessments					4,240,998,033
	Strategic Objective: Mainstream climate change adaptation in the environment sector					
	Monitor, report and enforce compliance with *Climate Change Act Nº 11 of 2016*	Number and quality of monitoring, reporting on, and enforcement of the *Climate Change Act*	Compliance with *Climate Change Act Nº 11 of 2016* enforced	*Climate Change Act Nº 11 of 2016* fully implemented	NEMA	
	Mainstream climate change risks and vulnerability assessments in all forms of assessment: in EIAs and EAs	Number and forms of assessments in which climate change risks and vulnerability are mainstreamed	Climate change risks and vulnerability assessments mainstreamed in all forms of assessment	*Climate Change Act Nº 11 of 2016* fully implemented		
KIRDI (for Science, Technology and Innovation)	**Issue/problem:** Fragmented STI sector; Unclear national research agenda; Weak institutional frameworks for STI; Poor linkage between industry and research institutions; Inadequate funding/ overreliance on external resources (*STI Act 2013* stipulates 2per cent of GDP)					742,621,900
	Strategic Objective: Operationalise the *STI Act of 2013*					
	Update the country's technology needs assessment (TNA)	Number of engagements and decisions made toward updating of the country's TNA	TNA updated	Updated TNA put to use	KIRDI	
	Support innovation and development of climate-smart technologies and capacity that promote climate resilient development	Number of climate-smart technologies and capacity that promote climate resilient development supported	Innovation and development of climate-smart technologies and capacity that promote climate resilient development supported	Technology developed and transferred	KIRDI	
	Support traditional food preservation technology	Number, nature and types of traditional food preservation	Traditional food preservation		KIRDI	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	particularly among the pastoralists who could keep meat for more than six months (Marginalised groups)	technologies that have been supported	technologies supported, particularly those among the pastoralists			
	Support innovation and development of appropriate technologies and capacity that promote climate resilient development	Number, nature and types of appropriate technologies innovated and developed Nature and types of capacity developed to promote climate resilient development	Innovation and development of appropriate technologies and capacity that promote climate resilient development supported		KIRDI	
	Promote development of locally available technologies in support of adaptation to climate change	Number, nature and types of locally available technologies whose development is promoted in support of adaptation to climate change	Development of locally available technologies promoted in support of adaptation to climate change		KIRDI	
	Promote and facilitate transfer of appropriate technologies to the most vulnerable	Number, nature and types of appropriate technologies promoted and facilitated for transfer to the most vulnerable	Transfer of appropriate technologies to the most vulnerable promoted and facilitated		KIRDI	
	Upscale (and protect) successful climate change technologies and innovations	Number, nature and types of successful climate change technologies and innovations up scaled (and protected)	Successful climate change technologies and innovations up scaled (and protected)		KIRDI	
	Ensure intellectual property laws protect climate innovation and technology	Number, nature and types of climate innovation and technology protected through patents	Climate innovation and technology protected through patents		KIRDI	
	Identify and promote climate change adaptation attributes in emerging technologies	Number, nature and types of climate change adaptation attributes identified and promoted in emerging	Climate change adaptation attributes are identified and promoted in		KIRDI	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	to support quality of life and overall socio-economic development	technologies to support quality of life and overall socio-economic development	emerging technologies to support quality of life and overall socio-economic development			
	Popularise KIRDI as a CTCN NDE among the private sector, academia; CSOs/NGOs and within Government departments	Number and types of popularization events/products	Reports of popularization campaigns	Increased demand for KIRDI NDE services	KIRDI	
	Operationalize fully the country's National Innovation System (NIS)	Structures and systems in place for the fully operationalized National Innovation System (NIS)	National Innovation System (NIS)fully operationalized	National Innovation System (NIS)fully functioning	KIRDI	
CoG	**Issue/problem:** Climate change policies, strategies, plans and programmes are mostly national; no mechanism in place to track climate change issues, especially finance, at county level					3,620,281,733
	Strategic Objective: Empower the vulnerable groups to reduce their vulnerability to climate change issues					
	Mainstreaming climate change adaptation in CIDPs and Sector Plans	Number of CIDPs and Sector Plans with climate change adaptation mainstreamed	Climate change adaptation mainstreamed in CIDPs and Sector Plans	Climate change adaptation implemented in counties	CoG, County Governments	
	Support Counties to domesticate national policies, strategies, plans and programmes	Number of Counties supported to domesticate national policies, strategies, plans and programmes	Counties supported to domesticate national policies, strategies, plans and programmes		CoG, County Governments	
	Support counties to implement prioritized actions in the domesticated county policies, strategies, plans and programmes	Number of Counties supported to implement prioritised actions in the domesticated County policies, strategies, plans and programmes	Counties supported to implement prioritized actions in the domesticated County policies, strategies, plans and programmes		CoG, County Governments	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
Gender, Youth and Other Vulnerable Groups	**Issue/problem**: Vulnerable children (girls and boys), women, youths (girls and boys), orphans (girls and boys), people with disabilities (women and men), the marginalized, minorities and people displaced as a result of climate change often have least access to, and control of, such resources that are critical for climate change adaptation as capital, credit, and land					9,154,885,100
	Strategic Objective: Empower children (girls and boys), women, youths (girls and boys), orphans (girls and boys), people with disabilities (women and men), the marginalized, minorities and people displaced as a result of climate change to reduce their vulnerability to climate change issues					
	Review and mainstream climate change adaptation in, and implement, all GYVG policies, strategies, plans, and programmes in all Counties	Number of Counties with climate change adaptation mainstreamed into GYVG policies, strategies, plans, and programmes Number of GYVG policies, strategies, plans, and programmes per County with climate change adaptation mainstreamed in them	Counties have mainstreamed climate change adaptation in GYVG policies, strategies, plans, and programmes and are implementing them	Strengthened adaptive capacity of vulnerable groups[19] Increased empowerment of vulnerable groups	Department of GYVG, CoG	
	Strengthen and expand social protection safety net Programme and insurance mechanisms against all climate change risks	Number of vulnerable people accessing benefits in the expanded social protection safety net Programme and insurance mechanisms against climate change risks	Increased numbers of vulnerable people accessing the benefits of expanded social protection safety net Programme and insurance mechanisms against climate change risks		Department of GYVG, CoG	
	Facilitate increased access to climate change funds by vulnerable women, men, youths, and other vulnerable groups	Number of vulnerable women, men, youths, and other vulnerable groups accessing Climate Change Funds	Increased numbers of vulnerable groups accessing climate change funds		Department of GYVG, CoG	

[19](women, orphans and vulnerable children, the elderly, and persons with disability)

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	Ensure all the poor and vulnerable have equal access rights to economic resources, and to such basic services as ownership of and control over land and other forms of property, inheritance, natural resources, appropriate new technology, and financial services, including microfinance	Number of women and men with secure tenure rights to land, with legally recognized Documentation, and who perceive their rights to land as secure	Increased number of the poor and vulnerable with equal rights to economic resources, and access to basic services		Department of GYVG, CoG	
	Support the strengthening of resilience of communities, especially in drought-and-flood-prone areas(in collaboration with WRA)	Number of local institutions, mechanisms, and processes that build resilience to flood risks supported to strengthen	Local institutions, mechanisms, and processes that build resilience to flood risks strengthened	Strengthened coordination of resilience-building institutions	Department of GYVG, CoG	
	Promote and support robust community-based institutions to strengthen flood risk preparedness and response (in collaboration with WRA)	Number of community-based institutions supported to strengthen flood risk preparedness and response initiatives	Community-based institutions better able to strengthen flood risk preparedness and response initiatives	Community water governance strengthened	Department of GYVG, CoG	
	Strengthen peace infrastructure and mainstream peacebuilding and community security in the development agenda in conflict-prone Counties to prevent, and enhance responses to, conflicts	Strengthen peace infrastructure and mainstream peacebuilding and community security in the development agenda in conflict-prone counties	Peacebuilding and community security mainstreamed in the development agenda in conflict-prone Counties	Strengthened community peace infrastructure in conflict-prone Counties	Department of GYVG, CoG	
	Support the	Number of Counties with	Delivery of critical	Strengthened adaptive	Department	

Sector	Actions	Key Performance Indicators	Expected Output(s)	Expected Outcomes	Key* Responsible Agencies	5 Year Budget Estimate iterated from *NAP 2015-2030* (in KES)
	strengthening of such delivery of critical social services as health, nutrition, water, sanitation, hygiene, and education in at least 23 drought prone Counties (in collaboration with NDMA)	strengthened delivery of critical social services (e.g. health, nutrition, water, sanitation, hygiene, and education)	social services (e.g. health, nutrition, water, sanitation, hygiene, and education) strengthened in at least 23 drought-prone Counties, in collaboration with NDMA	capacities of vulnerable groups	of GYVG, CoG	
	Strengthen knowledge management and information flow for decision-making	Number of GYVG programmes linked to CCD knowledge management and information platform	GYVG programmes linked to CCD Knowledge management and information platform		Department of GYVG, CoG	
Total						**1,275,183,201,700**

Image/Photo courtesy of the Kenya Red Cross

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Glossary of Terms Used in the Report

Term	Definition
Adaptation	Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory, autonomous and planned adaptation
Adaptation - Anticipatory	Adaptation that takes place before impacts of climate change are observed. Also referred to as proactive adaptation
Adaptation – Autonomous	Adaptation that does not constitute a conscious response to climatic stimuli but is triggered by ecological changes in natural systems and by market or welfare changes in human systems. Also referred to as spontaneous adaptation
Adaptation – benefits	The avoided damage costs or the accrued benefits following the adoption and implementation of adaptation measures
Adaptation – costs	Costs of planning, preparing for, facilitating, and implementing adaptation measures, including transition costs.
Adaptation – Planned	Adaptation that is the result of a deliberate policy decision, based on an awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve a desired state
Adaptation options	The array of strategies and measures that are available and appropriate for addressing adaptation needs. They include a wide range of actions that can be categorized as structural, institutional, or social
Adaptive capacity	The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences. The combination of the strengths, attributes, and resources available to an individual, community, society, or organization that can be used to prepare for and undertake actions to reduce adverse impacts, moderate harm, or exploit beneficial opportunities
Agricultural drought	An agricultural drought is the impact of meteorological droughts and hydrological droughts on crop yields. This kind of drought is associated with extreme heat. It occurs when extended dry periods and general lack of rainfall result in a lack of moisture in the root zone of the soil. This severely damages the plants that live in the area
Capacity building	In the context of climate change, capacity building is developing the technical skills and institutional capabilities in developing countries and economies in transition to enable their participation in all aspects of adaptation to, mitigation of, and research on climate change, and in the implementation of the Kyoto Mechanisms, etc.
Climate change	Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.
Climate sensitivity	The equilibrium temperature rise that would occur for a doubling of CO_2 concentration above pre-industrial levels
Climate threshold	The point at which external forcing of the climate system, such as the increasing atmospheric concentration of greenhouse gases, triggers a significant climatic or environmental event which is considered unalterable, or recoverable only on very long timescales, such as widespread bleaching of corals or a collapse of oceanic circulation systems.
Climate variability	Climate variability refers to variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability).
Disaster	A serious disruption of the functioning of the society causing widespread human, material or environmental damage and losses which exceed the ability of the affected community to cope using their own resources
Downscaling	A method that derives local- to regional-scale (10 to 100 km) information from larger-scale models or data analyses. Two main methods are distinguished: dynamical downscaling and empirical/statistical downscaling. The dynamical method uses the output of regional climate models, global models with variable spatial resolution or high resolution global models. The empirical/statistical methods develop statistical relationships that link the large-scale atmospheric variables with local/regional climate variables. In all cases, the quality of the downscaled product depends on the quality of the driving model.
Drought	the naturally occurring phenomenon that exists when precipitation has been significantly below normal recorded levels causing a serious hydrological imbalance that adversely affects land resource production systems
Ecosystem services	Ecological processes or functions having monetary or non-monetary value to individuals or society at large. There are (i) supporting services such as productivity or biodiversity

	maintenance, (ii) provisioning services such as food, fibre, or fish, (iii) regulating services such as climate regulation or carbon sequestration, and (iv) cultural services such as tourism or spiritual and aesthetic appreciation.
Extreme weather event	An extreme weather event is an event that is rare at a particular place and time of year. Definitions of rare vary, but an extreme weather event would normally be as rare as or rarer than the 10th or 90th percentile of the observed probability density function.
Hazard	A potentially damaging physical event, human activity or phenomenon with a potential to cause loss of life or injury, property damage, social and economic disruption, environmental degradation among other effects.
Hydrological drought	Occurs when there are critically low groundwater tables and reduced river and stream flow. Low wintertime snow accumulation in higher elevations can result in this type of drought in nearby lowlands. Hydrological droughts are distinguished by a reduction in water resources in reservoirs, lakes, rivers, underground aquifers and streams
Impacts	Specific effects of hazards or disasters also referred to as consequences or outcomes. The effects of climate change on natural and human systems. Depending on the consideration of adaptation, one can distinguish between potential impacts and residual impacts:
Impacts - Potential	Impacts that may occur given a projected change in climate, without considering adaptation.
Impacts - Residual	The impacts of climate change that would occur after adaptation.
Meteorological drought	A reduction in rainfall over a specific period of time, for example a day, month, season or year. There is no agreement on what the lack of rain or the time without rain should be before it is considered a drought. Usually the area affected determines these especially in non-arid regions. Meteorological drought leads to depletion of soil moisture and this almost always has an impact on crop production
Mitigation	Actions, programmers or policies implemented in advance of a natural hazard or in its early stages, to reduce the degree of risk to the people, property, and productivity capacity
Preparedness	Pre-disaster activities designed to increase the level of readiness or improve operational capabilities for responding to an emergency
Resilience	The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning; or the capacity for self-organization, and the capacity to adapt to stress and change. 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
Response	Actions taken immediately before, during or directly after a disaster to reduce impacts and improve recovery from disaster effects
Risk	Combination of the probability (likelihood) of an event and its consequences: the probability of harmful consequences or loss resulting from the interaction between natural hazards and vulnerable conditions of property and people
Sensitivity	Sensitivity is the degree to which a system is affected, either adversely or beneficially, by climate variability or change. The effect may be direct (e.g., a change in crop yield in response to a change in the mean, range or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea-level rise).
Threshold	The level of magnitude of a system process at which sudden or rapid change occurs. A point or level at which new properties emerge in an ecological, economic or other system, invalidating predictions based on mathematical relationships that apply at lower levels.
Uncertainty	An expression of the degree to which a value (e.g., the future state of the climate system) is unknown. Uncertainty can result from lack of information or from disagreement about what is known or even knowable. It may have many types of sources, from quantifiable errors in the data to ambiguously defined concepts or terminology, or uncertain projections of human behaviour. Uncertainty can therefore be represented by quantitative measures, for example, a range of values calculated by various models, or by qualitative statements, for example, reflecting the judgement of a team of experts.
Vulnerability	A set of conditions resulting from physical, social, economic and environmental factors, which increase the susceptibility of a community to the impact of disasters. Mayalso refer to the characteristics of a person or group in terms of capacity to anticipate, cope with, resist and recover from the impact of natural hazards. The degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity

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