REPUBLIC OF KENYA

MINISTRY OF HEALTH

THE KENYA CLIMATE CHANGE AND HEALTH STRATEGY 2024-2029

In Kenya, climate change trends and patterns manifest in observed increasing frequency and more extended periods of extreme weather events (severe droughts, flooding, windstorms, landslides and heatwaves) in vulnerable communities and regions.

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Table of contents

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Acronyms and Abbreviations

ASAL	Arid and Semi-Arid Lands
PWD	People with Disability
NCCHS	National Climate Change and Health Strategy
KCCHS	Kenya Climate Change and Health Strategy
NCCRS	National Climate Change Response Strategy
NCCAP	National Climate Change Action Plans
MoH	Ministry of Health
M&E	Monitoring and Evaluation
AFIDEP	African Institute for Development Policy
LSHTM	London School of Hygiene and Tropical Medicine
SDGs	Sustainable Development Goals
GHG	Greenhouse Gas
H-NAP	Health National Adaptation Plan
MAM	March-April-May
OND	October-November-December
RFV	Rift Valley Fever
RSV	Respiratory Syncytial Virus
WHO	World Health Organization
PM	Particulate Matter
ITCZ	Inter-Tropical Convergence Zone
WASH	Water Sanitation and Hygiene
ATACH	Alliance for Transformative Action on Climate and Health
GCF	Green Climate Fund
HCWs	Health Care Workers
CHVs	Community Health Volunteers
KEMRI	Kenya Medical Research Institute
GEF	Global Environmental Facility
AF	Adaptation Fund

UNFCCC	United Nations Framework Convention on Climate Change
AFR	African Forest Landscape Restoration
NEAP	National Environment Action Plan
NDCs	Nationally Determined Contributions
KHPF	Kenya Health Policy Framework
NHIF	National Hospital Insurance Fund
ToC	Theory of Change
FDI	Foreign Direct Investments
APCDs	Air Pollution Control Devices
EWS	Early Warning Systems
NAPs	National Adaptation Plans
MEAL	Monitoring, Evaluation, Accountability, and Learning
KPIs	Key Performance Indicators
DALYs	Disability-Adjusted Life Years
QALYs	Quality-Adjusted Life Years
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
SIDA	Swedish International Development Cooperation Agency
UNESCO	United Nations Educational, Scientific and Cultural Organization
JICA	Japan International Cooperation Agency
AfDB	African Development Bank
UNDP	United Nations Development Programme
NGOs	Non-Governmental Organisations
PPPs	Public-Private Partnerships
CBO	Community-Based Organisations
GoK	Government of Kenya
UNEP	United Nations Environment Programme
NEMA	National Environment Management Authority
MDA's	Ministries, Departments and Agencies

Key Concepts and Terminologies

Adaptation: Adjustments in natural and human ecosystems to respond to real-time and expected climate stimuli or their effects, which can reduce, harm or exploit beneficial opportunities.

Climate: The average prevailing weather conditions over a period time ranging from months to thousands of years. It includes variables such as temperature, precipitation and wind.

Climate change: Refers to long-term shifts in climate due to human-induced and natural processes. Changes resulting from natural processes are specifically referred to as climate variability.

Climate change impacts on health: Comprises extreme hydro-meteorological events, climate-related diseases, antimicrobial resistance, heat exposure, and mental health, among other effects that altering climate systems poses to human health and health systems.

Climate change management: The mitigation and adaptation of climate change impacts through varied actions, policies, agreements, commitments, strategies and financing.

Climate-sensitive/related diseases: Re-emerging (or emerging) diseases caused by climate change and transmitted by pathogens whose incubation, spread, and lifecycles are influenced by changing climate elements (precipitation, temperature, humidity, wind, drought, flood, etc.).

Environmental risks to health: Are defined as all the environmental, physical, chemical, biological and work-related factors external to a person and all related behaviours. They focus on the part of the environment that can reasonably be modified (WHO Global Strategy on Health, Environment and Climate Change, 2020).

Greenhouse gases: Gases continuously released into the atmosphere, mainly through human activities and natural processes. They lead to the depletion of the ozone layer and periodic climate changes. Such gases include carbon, methane, chlorofluorocarbons, aerosols, and particulate matter.

Health: A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

Human health: The complete state of people's physical, social, and mental well-being and not merely the absence of disease or infirmity.

Mitigation: Actions aiming to reduce and/or stabilise greenhouse gas emission levels to abate climate change impacts.

One health: Recognition of interconnectedness among human, animal and environmental health, calling for a unifying approach of preventing and managing entire health systems against impacts of climate change and other ill-health causations.

Planetary health: Human health and well-being in relation to economic, social, cultural and political systems and the state of natural systems on which human health depends.

Stakeholders: Public or private individual experts or organisations that work together to initiate positive inputs on a particular challenge.

Stakeholder mapping: Identifying stakeholders' degree of power, interest, and vital actions to bring change to a problem for a shared public good.

Stakeholder analysis: An in-depth consideration and structuring of stakeholders' roles, geography of operations, population served and impacts of their roles over a given constraint.

Stakeholder engagement: Bringing together mapped and analysed stakeholders on a common ground to formulate diversified and interrelated strategic solutions.

Strategy: A set of systematically developed actions and directions required for implementation to achieve a system's short-, medium-, and long-term objectives or goals. Theory of Change is a set of intended, intermediate actions and critical activities to achieve desirable results in an existing or emerging problematic situation.

(Climate change) vulnerability: The extent to which human life, livelihood assets and resources are susceptible to the impacts of climate change.

Vulnerability assessment: A measure of the degree or rate at which human life, livelihood assets and resources are susceptible to the impacts of climate change.

Foreword

Climate change and its induced conditions in Kenya have influenced national health status in different ways. For instance, the country exhibits various degrees of exposure to hydro-meteorological events, heat exposure, climate-related diseases, air and water pollution, inaccessibility to healthcare services, destruction of healthcare infrastructure and nutritional inadequacies. Again, based on the precipitation and temperature variations, the northern and north-eastern counties, including the southern tip of coastal counties and south Rift counties are highly exposed to flash floods and extreme heat. Western, Nyanza and the coastal strip remain exposed to seasonal flooding. Furthermore, climate-induced mobility, forced displacement and conflict over water and land resources, during severe drought are rampant in arid and semi-arid areas.

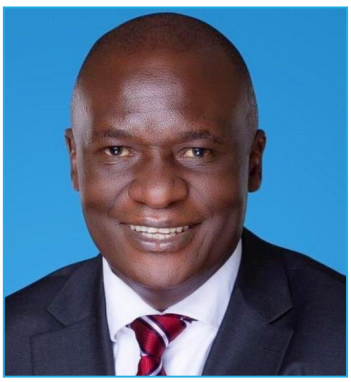
The predisposed climatic conditions identified above, compounded by the fact that there is limited access to and consumption of information through health education, promotion and awareness of climate change effects, act as catalysts that constrain adaptive mechanisms to the phenomenal climatic impacts on health status in Kenya. These conditions significantly affect the exposed populations, especially the highest risk groups, which include women and adolescent girls, children and youth, people with disabilities (PwDs) together with older people, pastoralist communities and urban residents within informal settlements.

Against this backdrop, the National Climate Change and Health Strategy (2024-2029) was deemed vital. The main objectives of the Kenya Climate Change and Health Strategy (KCCHS) is to: 1) Assess the hazards that climate change poses for the population of Kenya and the need for adaptation measures 2) Promote climate change mitigation efforts. These are key to the attainment of the strategy's overall goal. Other than being the health sector policy instrument on climate change, the development of this Strategy emanated from the long understanding of the need to address the direct and indirect health impacts arising from the varied levels of climate change vulnerability to all Kenyan populations.

As the health sector policy instrument on climate change and health, this strategy is expected to guide short-term and long-term actions and priorities in climate change and health in Kenya. It offers the opportunity for health sector players including county departments of health to set out priorities, aspirations, and the vision of health on climate change, therefore, giving the much-needed direction and articulation of the desired vision and mission in this area. As an overarching policy instrument, this strategy will evaluate and respond to the risks posed by climate change to the health of Kenyans and the need for adaptation actions. It encourages ambitious actions on climate change mitigation in health to maximise potential benefits for population and planetary health, including assessing the needed investments and financing to achieve these two goals and their possible health costs and benefits.

Mary Muthoni Muriuki, CBS
Principal Secretary, State Department for Public Health and Professional Standards

Preface



Climate change trends and patterns in Kenya manifest in increased frequencies and extended periods of extreme weather events. Flooding, severe droughts, windstorms, landslides and heat waves in vulnerable communities and regions have become rampant. These events periodically influence the incubation and spread of pathogens such as bacteria, parasites, and viruses, which in turn transmit climate-sensitive diseases to populations affected by extreme weather conditions.

In recent years, the World Health Organization has noted that injuries, morbidity, mortality, displacement, malnutrition and psychosocial health linked to climate change impacts contribute to the burden of diseases among affected populations. The overall effects of climate change are evident in constraining public health care systems as the disease burden increases disproportionately to the resourcing, funding and development of health systems. The competing priorities of funding climate change mitigation and the management of the impacts of climate change on health, therefore, present an unusual challenge for Kenya and other developing countries.

Recognising these impacts on population health and health systems, the Government of Kenya (GoK), through the Ministry of Health, outlined key commitments in the Conference of Parties (COP 26) to strengthen its capacity to manage the health impacts of climate change. The commitments set up an arena to strengthen the health system, thus aligned with crucial government legislations and sector-based policies regarding the response to climate change.

Among the laws, legislations and policies that health systems strengthening are aligned to include The Health Act, The Climate Change Act (2016), The National Climate Change Response Strategy (NCCRS 2010), the Constitution of Kenya 2010, National Climate Change Action Plans (NCCAP 2013-2022), County Integrated Development Plans and Nationally Determined Contributions (updated 2020) among others. Inseparable from these documents are the Sustainable Development Goals (SDGs), especially SDGs 3 (health and wellbeing) and 13 (climate change actions) and the Kenya Government Bottom-up Economic Transformative Agenda (BETA). This strategy, therefore, aims at realising an implementable approach to climate health risks to coordinate adaptation and mitigation of climate change impacts on population health and healthcare services from national to county levels, thus giving this document the credence, it deserves.

Dr Patrick Amoth, EBS
Director General for Health

Acknowledgement

Climate change has significantly affected human health and other sectors in Kenya. The phenomenon has increased the frequency and intensity of extreme weather events such as floods, droughts, and heat waves. These events adversely affect human, animal, and plant health, with increased morbidity and mortality recorded in such scenarios. Human health is particularly exposed to immense threats in these instances, thus calling for a framework with set targets, including monitoring and evaluation approaches to help achieve these targets. The five-year strategy, therefore, is the cornerstone to realising these goals.

Given the above, the Ministry of Health (MoH) appreciates the contributions of all institutions, individuals, and teams that participated in the development of the Kenya Climate Change and Health Strategy, 2024-2029.

Special recognition goes to the Head of the Division of Environmental Health and Sanitation, Mr Anthony Wainaina and the Climate Change and Health Unit technical officers, Mr Lolem Lokolile Bosco, Ms Rose K. Mokaya and Ms Naomi Mutie, for initiating the process of developing this vital document. Further, I appreciate the immense support and valuable input from various MoH divisions and units. Specifically, the ministry recognises the contributions made by partners. It expresses gratitude to the African Institute for Development Policy (AFIDEP) and the London School of Hygiene and Tropical Medicine (LSHTM) for technical support, made possible by a grant from the Children's Investment Fund Foundation (CIFF). In this regard, I point out the specific contributions of Dr Bernard Onyango and Mr Titus Kibaara from AFIDEP and Dr Ariel Brunn from LSHTM. We also pay special recognition to Prof William Ogara, who was the lead consultant in the development of the strategy. Lastly, I would also like to recognise the immense efforts of all the members of the Task force (Annexed) that was set up to develop the strategy.

Together with other stakeholders, their immense support for the process led to the successful completion and delivery of this strategy.

Dr Kamene Kimenye
Ag. Head, Directorate of Public Health and Sanitation

Word from the Head, Division of Environmental Health and Sanitation

This first Kenya Climate Change and Health Strategy 2014 - 2029 provides the overarching framework to implement climate change and health actions in Kenya's health sector and has come at a time the area of climate change and health is receiving significant visibility in Kenya and across the globe. It is aligned to the Kenya's Constitution, Health Policy 2014-2030, the Health Act, the Public Health Act among other legal and regulatory instruments.

The strategy has singled out priority areas of focus and stresses the importance of governance in the delivery of climate change and health interventions in the country. As part of promoting best practice, the development of this strategy is accompanied by phased implementation of the prioritised intervention areas, which are further systematically classified into short-term (2024-2026), mid-term (2026-2030), and long-term (2030-2063). The framework defines remedial measures to challenges and failures with timelines and assigned responsibilities.

This strategy has six main sections: Section one provides the background and rationale for climate change action in the health sector; Section two gives a situational analysis and stakeholder mapping; Section three details the strategic actions for health and climate change in Kenya; Section four outlines the implementation plan; Section five contains the Monitoring and Evaluation (M&E) framework; while Section six delves into resource mobilisation for climate change and health.

The development of this Strategy is a key milestone for the health sector in Kenya as it's the first of its kind. This document will serve as a guide towards the achievement of mitigating, adapting and strengthening lessons learnt from past climate change and health experiences.

As the technical division responsible for matters relating to climate change and health, I wish to commend the efforts of all our climate change and health personnel and stakeholders, I am encouraged by the progress we have made as a country in the space of climate change and health.

Anthony Wainaina
Head, Division of Environmental Health and Sanitation

Executive Summary

The Government of Kenya (GoK), through the Ministry of Health, outlined key commitments at the COP 26 Summit in the quest to strengthen its capacity to manage the health impacts of climate change. The commitments set up an arena for health system strengthening. These are aligned with the following key GoK legislations and sector-based policies regarding response to climate change: Vision 2030, The Constitution of Kenya 2010, the Health Act (2017), The Climate Change Act (2016), The National Climate Change Action Plans (NCCAP 2013-2022), National Climate Change Response Strategy (NCCRS 2010), County Integrated Development Plans and Nationally Determined Contributions (updated 2020). Inseparable from these documents are SDGs, especially 3 (health and wellbeing) and 13 (climate change actions), politico-economic agendas (for example, the Kenya Kwanza government's Bottom-up Transformation Agenda (BETA) on health and climate change responses).

Therefore, the Ministry of Health aims to develop an implementable Climate Change and Health Strategy. The strategy to address climate change's impact on public health in Kenya is also closely aligned with the principles of One Health, which recognise the interconnection of human, animal, and environmental health. By strengthening healthcare systems, enhancing disease surveillance, implementing climate-resilient practices, and promoting sustainability, the strategy not only safeguards human health but indirectly acknowledges the interconnectedness of health across multiple domains.

This strategy is an initiative of the Ministry of Health, Kenya, supported by the African Institute for Development Policy (AFIDEP), in partnership with the London School of Hygiene and Tropical Medicine (LSHTM) to prioritise health within climate change action through the "Making the Case for Planetary Health in Sub-Saharan Africa Project" acknowledging the critical intersection of climate change and public health. The strategy aims to address the escalating health risks due to climate change, fortify healthcare systems against climate-induced challenges, and establish robust governance and leadership frameworks. This plan is informed by extensive research and is designed to be dynamic, adapting to evolving climate and health scenarios.

This strategic plan identifies seven (7) Priority Areas critical to implementing the plan.

- **Healthy energy transition and air quality:** Implementing clean energy and air quality improvements in healthcare, including wind power, solarisation of facilities, and energy-

efficient appliances, enhance public health and environmental sustainability. These initiatives also include retrofitting buildings for energy efficiency and managing health risks related to waste and air pollution control devices.

- **Sustainable and healthy food systems:** Emphasising sustainable and climate-resilient healthy food systems and practices as an avenue to protect and preserve nature, the source of health. Prioritising the strategies advanced here will speed up the transition to healthy, nutritious and sustainable diets in line with the WHO's dietary guidelines. This will, in turn, lead to a reduction of disease risks and significant reductions in GHGs.

- **Water sanitation and healthcare waste management:** Integrating water sanitation and hygiene (WASH) with healthcare waste management to prevent waterborne diseases, ensure access to clean water, and promote environmental conservation through sustainable resource use, recycling, and reuse.

- **Health risks and impact assessments, education, and awareness:** Developing guidance for conducting regular and comprehensive health risk, vulnerability, adaptation, and impact assessments and promoting health education and awareness programmes to empower communities, enhance disaster preparedness, and enable resilient health systems and effective response strategies through integrated data systems and early warning systems.

- **Healthcare resilience and disease surveillance:** Developing healthcare resilience through a cross-sector climate and health curriculum, integrated disease surveillance, disaster management programs, and upgrading health infrastructure to withstand climate challenges while ensuring accessibility of healthcare services.

- **Health research and policy development:** Fostering health research and policy development through collaborative forums, strengthening policy regulation, and embracing a One-Health approach to address climate-health linkages and inform disease prevention and adaptation strategies.

- **Monitoring, Evaluation, Accountability, and Learning (MEAL):** Enhancing transparency and accountability in health sector climate resilience building through robust data systems, focusing on key performance indicators, and aligning strategies with the specific needs and challenges climate change presents.

This strategy is outlined in six sections as follows:

Section 1: Highlights the commitment to developing a sustainable healthcare system that addresses climate change's impact on public health. It acknowledges the challenges posed by extreme weather events and the spread of diseases due to climate change, emphasising the need for health-focused climate action, as pledged in the COP 26 Summit. It further advocates for a One Health approach, integrating human, animal, and environmental health, and aligns with global strategies like the SDGs and the Paris Agreement. It also emphasises planetary health, underscoring the importance of a resilient health system contributing to Kenyans' well-being and global environmental stewardship.

Section 2: This section provides a comprehensive analysis of the global, regional, and national impacts of climate change on health, emphasising Kenya's increasing vulnerability to extreme weather events and related health challenges. It details the hydro-meteorological impacts, the spread of climate-resurging infectious diseases, and the strain on health and nutrition due to climate change. The section highlights Kenya's responses, including establishing a Climate Change and Health Unit, managing healthcare waste, and reducing carbon emissions. It also covers Kenya's contributions and adherence to international climate commitments and the involvement of various stakeholders in developing the Climate Change and Health Strategy, focusing on adapting and mitigating the health impacts of climate change.

Section 3: This section details the strategic actions of the Kenya Climate Change and Health Strategy, focusing on setting short-, medium- and long-term goals for health-related climate action. It emphasises cross-sector collaboration, public education, and policy integration, targeting key investment areas such as low-carbon healthcare, climate resilience, and leadership. Critical interventions include promoting clean energy, sustainable agriculture, improved water sanitation, healthcare waste management, comprehensive health risk assessments, and strengthening healthcare systems for climate resilience. The strategy also involves a robust monitoring and evaluation framework to track progress and ensure effective implementation.

Section 4: This section outlines the implementation plan for the Strategy. It details priority intervention areas, activities, responsible parties, expected outputs, and timelines over five years. Key areas include developing a low-carbon sustainable health system, enhancing climate-smart health practices, and promoting leadership for a climate-smart health system. Activities range from creating awareness and monitoring greenhouse gas emissions to training health workers and managing air pollution. The plan also focuses on strengthening healthcare resilience, public health education, and integrating climate change considerations into governance and policy. A robust monitoring, evaluation, and learning framework is proposed

to track progress and make necessary adjustments. This comprehensive implementation plan is designed to systematically address the health impacts of climate change in Kenya.

Section 5: This section is on monitoring, evaluation, and learning for the Strategy. It establishes performance indicators and metrics to assess the effectiveness of climate change and health systems. These indicators cover various categories, such as climate-related mortality and morbidity, heat-related illnesses, air quality, water and sanitation, food safety, disaster preparedness, public health education, mental health, climate-resilient infrastructure, research, waste management, community engagement, data management, gender and social inclusion, learning, and financial management. Each category has specific metrics and means of verification, with different reporting frequencies ranging from weekly to annually. This section emphasises regular monitoring and systematic evaluation as crucial for adapting strategies and maintaining resilient healthcare systems in the face of climate change.

Section 6: This section details resource mobilisation for climate change and health initiatives in Kenya. It identifies diverse funding sources, including government financing, international grants and aid, philanthropic foundations, climate finance mechanisms, NGOs, research grants, and bilateral agreements. The plan emphasises leveraging public-private partnerships and blended financing models, such as Green Bonds and Carbon Markets, to broaden funding opportunities. The Ministry of Health also aims to explore collaborations with government departments, community organisations, and public campaigns to enhance funding for climate change and health projects.

In summary, this strategy represents a comprehensive, multi-faceted approach to tackling the significant challenges climate change poses to public health in Kenya through proactive interventions, resilient infrastructure, informed policy-making, and collaborative efforts.

SECTION 1

Introduction

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1.1 Background

The Kenya Ministry of Health (MoH) is mandated to build a progressive, responsive and sustainable healthcare system to achieve the highest health standards for all populations as articulated in the Constitution, 2010. Over the past years, the MoH has developed and acknowledged several policies and laws targeting the attainment of equitable, affordable and accessible quality healthcare for all. Such milestones have been made possible through increased investments in healthcare resources, including service delivery, health information research, quality assurance and standards, monitoring and evaluation, leadership and governance, healthcare financing, health products and technologies and supply chain.

In Kenya, climate change trends and patterns manifest in observed increasing frequency and more extended periods of extreme weather events (severe droughts, flooding, windstorms, landslides and heatwaves) in vulnerable communities and regions. These events periodically influence the incubation and spread of pathogens such as parasites, bacteria and viruses, which in turn transmit climate-sensitive diseases to populations affected by the extreme weather conditions. The World Health Organization, for the past three years, has noted that injuries, morbidity, mortality, displacement, malnutrition, and psychosocial health linked to climate change contribute to the burden of diseases among affected populations. The overall effects of climate change are evident in constraining public healthcare systems as the disease burden increases disproportionately, affecting health systems' funding, resourcing, and development. Therefore, the competing priorities of funding climate change mitigation and management of climate change's impacts on health present an unusual challenge for Kenya and other developing countries.

Having recognised the impacts of climate change on population health and health systems, the GoK, through the Ministry of Health, outlined critical commitments at the Conference of Parties (COP) 26 Summit to strengthen its capacity to manage the health impacts of climate change. The commitments set up an arena for health system strengthening, as stated in section 1.3 of this chapter. These are aligned with the following key GoK legislations and sector-based policies regarding response to climate change: Vision 2030, The Constitution of Kenya 2010, the Health Act (2017), The Climate Change Act (2016), The National Climate Change Action Plans (NCCAP 2013-2017;2018-2022), National Climate Change Response Strategy (NCCRS 2010), County Integrated Development Plans and Nationally Determined Contributions (updated 2020). Inseparable from these documents are SDGs, especially 3 (health and wellbeing) and 13 (climate change actions), as well as global, regional and national politico-economic commitments and agendas (for example, implementing the BETA agenda at national and sub-national levels). The MoH, therefore, aims to develop an implementable climate change and health strategy aligned to the relevant policies and laws based on best global practices and climate action priorities in health.

Global greenhouse gas emissions and atmospheric concentrations are still rising and well over the levels required to meet the mitigation goals outlined in the 2015 Paris Agreement. However, the Kenyan government passed the Climate Change Act of 2016 (4) in accordance with the Paris Agreement's goal, enacting the aspirations and objectives of the NCCRS (2010) and the NCCAP (2013-2017; 2018-2022).

1.2 Rationale for Climate Change Action in the Health Sector

One of the most critical concerns facing the world today is climate change, and the response to it presents significant prospects for health improvement through the low-carbon transition. A planet-wide health approach considers the adverse effects on many of the natural systems humans depend on and the direct and indirect impacts of macro-environmental and social variables on human health. Extreme heat, droughts, and flooding are examples of direct effects that put people under physical and mental strain. Among the many indirect effects are those that change the spread of diseases like Anthrax, Rift Valley fever, malaria, dengue, and other vector-borne illnesses.

In addition, if crops fail and livestock die due to drought and other natural disasters, Kenya's development plan for food security may be jeopardised. They might also hinder efforts to achieve Universal Health Coverage (UHC) if hospitals are rendered inoperable or damaged by flooding.

Therefore, the main objectives of a climate change and health strategy for Kenya would be:

- To assess the hazards climate change poses to the Kenyan population and the need for adaptation measures. To inform the creation of policies throughout the economy, the health sector plays a critical role in contributing to the development of evidence about the health costs and benefits of those activities.
- To promote climate change mitigation efforts, the health sector must set an example by reducing its emissions to become more robust to the negative consequences of climate change. The health sector is a significant contributor to greenhouse gas (GHG) emissions. With proof of the ancillary impacts (the "co-benefits") for health, it also plays a vital role in directing the creation of national and municipal policies on climate change mitigation in all sectors.
- To guide climate mitigation and adaptation governance and leadership within the health sector, with all NDCs sectors and with all other stakeholders.

In the spirit of "health in all sectors," MOH has contributed to several essential development plans, such as Vision 2030, and has given adaptation and mitigation measures priority through Kenya's COP26 Health Programme targets and COP28 climate and health declaration to: (i) plan to undertake the Vulnerability and Adaptation Assessment; (ii) develop a Health National Adaptation Plan (H-NAP); (iii) publish an action plan for a sustainable low carbon health system.

To achieve these ambitions, MOH needs a framework that identifies urgent priorities and directs short-, medium- and long-term actions at the intersection of health and climate change.

1.3 One Health Framework

The strategy to address climate change's impact on public health in Kenya closely aligns with the principles of One Health, which recognise the interconnection of human, animal, and environmental health. Noting that over 60% of emerging infectious diseases originate from animals, mainly from wildlife, underscores the need to strengthen healthcare systems, enhance disease surveillance, implement climate-resilient practices, and promote sustainability. This strategy, therefore, not only safeguards human health but also indirectly acknowledges the interconnectedness of health across multiple domains. This multidisciplinary approach and emphasis on stakeholder collaboration underscore the strategy's alignment with the One Health framework, ultimately contributing to the broader goal of holistic health and environmental well-being. One Health offers an approach to yield added value from the collective strengthening of human, animal, and environmental health systems to enable their coordination and collaboration to address threats at the human-animal-environment interface for effective prevention, detection, response and recovery. This means working at these sectors' interfaces to achieve shared objectives.

The current One Health Strategic Plan for the Prevention and Control of Zoonotic Diseases in Kenya (2021-2025) conforms with the Constitution of Kenya 2010. It is aligned with sectoral, regional and global strategies and policies. The Strategic Plan encourages County governments to domesticate and use it to address zoonotic diseases. However, it is important to note that the One Health concept applies beyond zoonotic diseases and applies to a wide range of climate and health issues. In Kenya, for example, the concept has been extended to address research on pollution, toxic algal blooms and the human-wildlife conflict.

In implementing the One Health Approach in the KCCHS, aligning the objectives with the Quadripartite One Health Joint Action Plan of Action (2022-2026), the UN SDGs, the UN Paris Agreement on Climate Change and other global commitments is essential.

1.4 Planetary Health

The concept of planetary health is deeply intertwined with the Kenya Climate Change and Health Strategy, as both address the intricate relationship between environmental conditions and human health outcomes. Planetary health focuses on the impact of human-driven changes to Earth's natural systems on human health and the well-being of all life on the planet. The KCCHS recognises these impacts and aims to create a resilient health system that can adapt to and mitigate the health effects of climate change. By aligning with the broader principles of planetary health, Kenya's approach ensures that its policies protect its citizens' health and contribute to the stewardship of the global environment. This linkage demonstrates an understanding that Kenyans' well-being depends on the sustainable management of natural resources and the stability of the Earth's climate system, which are essential elements of planetary health.

SECTION 2

Situational and Stakeholder Analyses

Photo credit: Roschetzkyi/Stockphoto

2.1 Global Context

The natural variations of the earth's climate attracted scientific attention in the 1980s due to anthropogenic activities that generate greenhouse gases, leading to warmer global temperatures and rising sea levels. Additionally, natural processes such as volcanic eruptions and shifting in the earth's orbit have resulted in changes in climatic conditions. The average rate of global warming, beginning in 1981, has been increasing at the rate of 0.18°C per decade (NOAA, 2021). Considering warming patterns between 1880 and 2022, the latter was the warmest globally, with a surface temperature record of 0.86°C warmer than even the 2010 average temperature of 0.72^{0}C, a global mean temperature which also surpassed that of 2005 (0.67^{0}C).

The human cost of droughts, floods, fires, extreme weather, desertification, loss of biodiversity, sea-level rise, water scarcity, and declining fishery and agricultural productivity is significantly huge. This is about $1.2 trillion annually, equivalent to about 1.6% of global GDP (DARA, 2nd Edition, 2012). The WHO estimates show that 3.6 billion people already live in areas highly susceptible to climate change, with approximately 250,000 additional deaths per year from undernutrition, malaria, diarrhoea and heat stress alone between 2030 and 2050.

2.2 Regional Context

The publication of the sixth report of the Intergovernmental Panel on Climate Change in 2022 provides a sobering assessment of the scope of climate change impacts on the African continent[1]. The report indicates that climate change will negatively affect terrestrial, freshwater and ocean ecosystems, affecting agriculture and nutrition, infectious disease burdens, heat impacts, mental health, and human displacement. In addition, rampant deforestation, use of fossil fuels and other land use changes exacerbate climate variability. The effects of climate change are thus expected to gradually deteriorate population and health systems, agriculture and food security, and poverty, among others. For example, the World Food Programme in 2021 related Madagascar's food crisis to climate change as opposed to conflicts. From the 19th to 21st century, surface temperature has generally increased by approximately 1° C in Africa but locally reached about 3° C in the Sahel region (Niang et al., 2014).

Like other regions on the continent, East Africa bears indicators of climate change associated with prolonged droughts and frequent flooding, which adversely affect agriculture and related modes of food production and distribution. For example, sub-Saharan African countries exhibit ineffective public healthcare systems, making them vulnerable to climate-related diseases

[1]IPCC, 2022: Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. Cambridge University Press, Cambridge, UK and New York, NY, USA, 3056 pp., doi:10.1017/9781009325844.

such as malaria, dengue fever, diarrhoea, typhoid and Rift Valley Fever (RVF). According to WHO (2021), 90% of malaria is prevalent in Africa, affecting hot and wet climates as well as highland regions. Apart from the impacts on public health, agriculture and food-related matters have also been significantly impacted. The International Food Policy Research Institute (2021) noticed that climate change has been responsible for maize yield losses in many parts of Ethiopia, Kenya, Uganda, Tanzania and the Democratic Republic of Congo, etc.

2.3 National Context

The forecast for Kenya shows that the country is likely to experience a temperature rise of between 1.5°C to 3.4°C degrees by 2100, resulting in mean air temperatures between 27°C and 29°C. Climate change trends and patterns in the country manifest in increased frequency and extended periods of extreme weather events (severe droughts, flooding, windstorms, landslides and heat waves) in vulnerable communities and regions. The occurrence of these events periodically influences the incubation and spread of pathogens such as parasites, bacteria and viruses, which in turn transmit climate-sensitive diseases to several populations affected by the extreme weather conditions.

The World Health Organization, for the past three years, has noted that injuries, morbidity, mortality, displacement, malnutrition, and psychosocial health conditions linked to climate change contribute to the burden of diseases to the affected populations. The overall effects of climate change constrain the health care systems as the increase in disease burden due to climate change further strains funding, resourcing and development of health systems. Therefore, the competing priorities of funding climate change adaptation, mitigation and management of climate change's impacts on health present an unusual challenge for Kenya and other developing countries.

2.4 Impacts of Climate Change on Health in Kenya

2.4.1 Hydro-meteorological Impacts

Floods

Erratic and unpredictable rainfall seasonally causes floods in several counties and cities such as Nairobi and Mombasa that face flash floods that are contributed to by poor drainage systems. Major flood-prone regions include the Lower Tana Basin, Lake Victoria Basin, Northern and North-eastern areas, and the south Rift Valley counties of Narok and Kajiado. Flood frequencies have been high. For instance, from 1990 to 2015, Kenya experienced 43 flood events (an average of 1.65 annually), affecting over 68,000 people (GoK, 2023). Floods affect health in terms of fatalities, population displacement, and household and other asset

damage. In 2018, about 183 lives were lost in 40 counties, while more than 225,000 people (145,000 children) were displaced in the same counties.

Additionally, 21,700 acres of cropland were destroyed, and over 19,000 livestock died. In 2020, nearly 800,000 people were affected in 29 counties, 300 lives were lost, and 100,000 people were displaced. Recently, 55,002 people were affected by floods, and 4,752 acres of farmlands were damaged in 13 counties.

Drought

An estimated 6.5 million people bear the impacts of severe droughts annually in Kenya. Water scarcity affects vulnerable populations, especially in arid and semi-arid (ASAL) regions. Similar to floods, low agricultural productivity, livestock deaths, forced migration, and conflicts result from droughts (GoK, 2018, NCCAP II). The GoK declared a national drought emergency that affected 23 counties between 2014-2018. Between 2019 and February 2023, about 508,104 people in 5 counties were displaced. Lack of water and pasture resulted in the loss of 2.5 million heads of cattle in 2021 (MoEF, 2022). To survive, drought-affected populations develop harmful coping mechanisms such as transactional sex, early marriage and teenage pregnancies (Opiyo et al., 2014; Fiorella et al., 2015). Forced displacement has been frequenting several counties in the northern and north-eastern regions as families separate and seek water and food elsewhere during severe droughts, as shown in Table 1 below.

County	Sub-County details	Absentees (Households)	Arrivals (Households)	Returnee (Households)	Foreign Nationals (Households)
Samburu	3 Sub-Counties 110 sub-locations 686 settlements	7,879	9,736	4,772	15
Marsabit	9 sub-Counties 134 Sub-Locations 1,045 Settlements	9,134	6,232	5,219	1,452
Isiolo	3 Sub-Counties 88 Sub-Locations 566 Settlements	4,067	4,852	2,070	157
Turkana	7 Sub-Counties 174 Sub-Locations 1,867 Settlements	21,044	22,627	18,816	1,005
Garissa	356 Settlements	42,500 households	34,169	26,172	3,510 with 3,180 in Garissa township

Source: IOM (2023)

Violent conflicts and human security

Prolonged climate disasters such as droughts increase the vulnerability of Kenyan populations to violent conflicts over both land and water resources. Cross-border and inter-community conflicts over few water sources and scarce pasture engulf ASAL areas. Shifting grazing routes between pastoralists and crop growers often trigger conflicts characterised by injuries, forced displacement and fatalities, as has been the case in the upper and lower Tana basin. The UK DFID (2019) also affirmed that grazing on private lands (ranches, farms and homes) causes violent conflicts and loss of herders' cattle. This has been common in Laikipia County during severe droughts. The magnitude of drought determines the level of conflict in affected areas, as demonstrated in Figure 1 (Refer to the annexe)

2.4.2 Climate-resurging Infectious Diseases

Periodic changes in weather elements over a given region pose manifestations of environmental pathogens that influence the transmission and affection rates of existing diseases or new ones emerging. The World Health Organization recognises that during and post-climate change disasters and/or extreme events, there are associated re-surgent antimicrobial resistance, zoonotic, vector-, food- and water-borne infectious diseases. As such, survival of disease-causing pathogens depends on the intensity and magnitude of climate extreme event occurrence and the pace at which public health units respond to the affected population. This strategy delves into identifying and reviewing critical climate-related re-emerging infectious diseases on Kenyan population health, thus opening the window for redress through guided strategic focus.

Vector-borne Diseases

Changes in temperature, rainfall patterns and humidity influence the incubation and spread of vectors such as *Anopheles, Culex, Aedes* and other mosquito species that transmit climate-related infectious diseases such as malaria, dengue fever, yellow fever, chikungunya, zika and elephantiasis. In Kenya, western regions still face high mortalities, especially in children < 5 years, due to malaria (Kapesa et al., 2018). The coastal areas also experience continuous malaria transmission throughout the year, while western highlands record seasonal malaria during long rains of March-April-May. Based on studies by Githeko et al. (2011), minimum temperatures of 16-190C enable transmission of highland malaria, which has been in Kenya for the last 20 years. ASALs, including Baringo County, also often face seasonal malaria transmission during and after rains.

Dengue fever infection is associated with temperature changes. A Temperature record of 11.90C enables the survival of *Aedes aegypti* mosquitoes that transmit the dengue fever virus. Kenya witnessed the first outbreak of dengue fever in 1982 in Malindi. A 2005 survey also detected its transmission in coastal and inland parts of the country. In 2012, a dengue fever

outbreak was experienced in northern Kenya and Mombasa (Chepkorir et al., 2014). In 2019, 10-20% of Kenyan children tested positive for Dengue fever (RCRC-IFRC 2021). It is projected to increase in 2050 onwards due to changes in climate in many parts of the country. Yellow fever, another infectious disease, is transmitted by *Aedes aegypti* mosquito varieties, which often bite humans in one blood meal during the daytime (Ahmed & Memish, 2017). Breeding of such mosquito species is aided by heavy rainfall and variation in immediate surface air temperature.

Food- and Water-borne Diseases

Floods and droughts prevent affected populations from accessing safe and nutritious food and safe water for personal and household consumption. Sanitary facilities are destroyed during floods, polluting underground and surface water sources communities consume. Cholera, bloody diarrhoea, dysentery, typhoid, salmonella, and gastrointestinal infections are associated with floods and droughts.

In Kenya, between 1971-2010, 828,522 clinically suspected cases and 2641 deaths were of cholera; in 1997-199 (after the 1997 El Nino rains), 26,901 cases and 1362 deaths from cholera while in 2007-2009 (following the 2006 El Nino rains), 16, 616 cases and 454 deaths were recorded, (Mutonga et al., 2014). In 2018, heavy rainfall resulted in floods in 5 counties where cholera outbreak cases were reported (GoK, 2023, NCCAP, III Draft). Cholera hotspots include Nairobi, Nyanza, coastal regions, ASALs and refugee camps. The long rainfall season of March-April-May (MAM) and the October-November-December (OND) short rains, sea surface temperature variations and El Nino Southern Oscillations relate to cholera incidences (Stoltzfus et al., 2014). Prolonged droughts subject communities to using contaminated water.

Bloody diarrhoea correlates with rainfall and temperature variations, which favour the thriving of *Shigella* species and *E.histolytica* bacteria. Over 1.7 billion cases of diarrheal diseases occur globally per year, with 800,000 deaths of children < 5 years old, mostly in developing countries (Njuguna et al., 2016). This results in about 1 billion people needing access to safe drinking water. In Kenya, most communities resort to unimproved communal water sources whose quality deteriorates during droughts and floods. Acute bloody diarrheal cases are thus common in Coast, Western, Nyanza, Nairobi and ASAL regions. Osiemo et al. (2019) note that typhoid is prevalent during the dry season, while diarrhoeal diseases frequent dry wet seasons.

Zoonotic diseases

Changes in temperature and rainfall trends and patterns influence the re-emergence of zoonotic diseases such as Rift Valley fever (RVF)). Ecological and climatic conditions like heavy rainfall and floodwaters support the breeding of *aedes* mosquito species that transmit RVF during dry periods (Redding et al., 2017). The disease transmission from livestock to

humans occurs through the consumption of infected livestock products. In Kenya, Abdi et al. (2015) observed that little knowledge of RVF transmission, signs and symptoms, and high mortality rate in livestock was known in northern Kenya, especially in Garissa County. The loss of livestock caused by RVF leads to the drastic collapse of the livelihoods of pastoralist communities whose income, food and nutrition depend on livestock products.

Respiratory Infections and Air pollution

Scientific evidence proves a relationship between certain respiratory tract infections and climate change. Low temperatures < 1.18^{0}C and low humidity < 11g/kg significantly increase the risks of influenza (Emukule et al., 2016). Kenya registers two influenza epidemics in a year: February-March and July-November, as shown in Figure 3 of the Annexes. Acute lower respiratory tract infection also affects children< 1 year and Immuno-compromised patients. It is transmitted by Respiratory Syncytial Virus (RSV), whose viability and survival of up to 12 hours are enhanced by lower humidity. Additionally, variations in wind speed and rainfall facilitate RSV infections (Nyoka et al., 2019). The virus is highly transmitted in saliva and nasopharyngeal secretions when infected persons are exposed to higher temperatures.

Globally, the combined effects of ambient and indoor air pollution are associated with 6.7 million premature deaths annually, representing 1 in 8 of all deaths (WHO 2022). It is also important to note that over 90% of people breathe outdoor air, with pollution exceeding WHO air quality targets (Wise 2023).

In Africa, about 1.1 million deaths were air pollution in 2019, with household air pollution accounting for 697,000 deaths and the rest caused by ambient air pollution (Fisher et al., 2021). Globally, indoor air pollution alone contributes to 4 million deaths/year due to smoke from biomass fuel used for cooking. In Kenya, approximately 80% of the population, especially in rural areas, rely on biomass as the household primary source of cooking energy (Carvalho et al., 2019). This results in approximately 23,000 deaths annually, per estimates from the Kenya Ministry of Health (HAP Training Guide, 2021). Particulate matter ($PM_{2.5}$) and carbon monoxide from incomplete diesel combustion from vehicles, heavy-duty diesel burning boilers, generators, thermal electric power plants, and burning waste contribute to outdoor air pollution. Particulate matter poses risks to premature deaths through the manifestation of cardiopulmonary disease and lung cancer (Gatari et al., 2019).

2.4.3 Health and Nutrition

Extreme weather parameters such as temperature, precipitation, droughts and climate-sensitive disease prevalence significantly contribute to high under-five mortality rates in developing countries (Wakefield et al., 2019). Frequent drought and extreme flood events affect food availability, prices and access, influencing pregnant and lactating mothers' dietary needs

and weight. This, in turn, may lead to the delivery of low-birth-weight babies. Bakhtisiyarava et al. (2017) study contends that a third of children in Africa were stunted in 2016 due to undernutrition. Their research in Kenya further noted that food croppers had heavier babies than cash croppers and pastoralists; however, the former farmers exhibit small plots and less access to fertilisers and irrigation systems. Their crops, therefore, face heat stress during droughts, leading to low yield, dietary diversity and low birthweight delivery.

Extreme precipitation and temperature influence the water use behaviours of several Kenyan rural populations. An estimated 34% of rural residents often reduce groundwater use (e.g., hydraulic hand pumps, springs) during wet seasons compared to dry spells, including drought events. This signals a shift from improved to unimproved water source use during heavy rains, resulting in risks to shigellosis and E. histolytica bacteria associated with open-source and container-stored waters (Thomson et al., 2019).

2.4.4 Heat Exposure

In Kenya, northern and north-eastern areas and some parts of south Rift Valley and western Kenya yearly experience heat exposure (Asefi et al., 2018). From 1979 to 2012, the annual number of heat stress days in Kenya rose from 0 to 23, meaning that some parts of the country were facing apparent temperatures greater than 39^0C. Risks to heat-related deaths are likely because of heat exhaustion and stroke arising from increased body temperature over 40.6^0C, (Bakshi et al., 2019). Extreme cold temperature is also associated with hypothermia, a drop in core body temperature < 35^0C, posing risks to cold snaps and mortality.

2.5 Climate Change Vulnerabilities and Risks in Kenya

Kenya exhibits different degrees of exposure to hydro-meteorological events, climate-related diseases, heat exposure, air pollution and nutritional inadequacies. Based on the precipitation and temperature variations above, the northern and north-eastern counties, the southern tip of coastal counties, and south Rift Valley counties like Narok and significant swaths of Kajiado are highly exposed to flash floods and extreme heat. In contrast, Nyanza, Western, and the coastal strip face remain exposed to seasonal flooding. These are occasioned by two rainy seasons during which flash floods and massive deluges cause fatalities and destruction of property and livelihoods of the affected populations, especially in flood-prone areas of northern, north-eastern, eastern, coastal strip, Narok, Kajiado, Western and Nyanza. These conditions are illustrated in Figure 2 of the Annexes.

2.5.1 Sensitivity

Dependents presently dominate Kenya's population. Children under 15 constitute an estimated 49% of the population, while older persons age 65 and above constitute another 2%. The Kenya Demographic and Health Survey (KDHS) 2022 estimated that a combination of all dependents (children and elderly 65+ years old) was 37% in urban and 48% in rural areas. Female-headed households constituted a third of Kenya's population (36% in rural and 31% in urban areas). Over 54% of the urban population was in the highest wealth quintile compared to just 3% of the rural population, as indicated in Figure 4 (a) and (b) of the Annexes.

Significant disparity exists in poverty indices among 47 counties in Kenya. High poverty levels dominate northern, eastern and substantial parts of the coastal counties (Marigi, 2017). Patches of moderate to low poverty indices are evident in the Western, Central, Rift Valley and Nairobi areas. This translates to inadequate and/or low household income and minimal access to other basic necessities, including decent livelihoods. Despite high poverty indices in northern and eastern parts of Kenya, the unprivileged populations are sensitive to climate disaster events such as droughts and flash floods, in addition to outbreaks of resurging climate-related infectious diseases and heat exposures. The reverse is low sensitivity in Western, Nyanza, Central Rift Valley, Nairobi and Mount Kenya counties with dense populations. However, populations around Lake Victoria Basin (all Nyanza, Nairobi and Busia counties), Tana delta and other regions remain exposed to flooding and vector- and water-borne disease prevalence. Some counties of Rift Valley, such as Elgeyo-Marakwet and Mount Kenya regions (Kirinyaga and Muranga), are exposed to landslides exacerbated by erratic rainfall.

2.5.2 Adaptive Capacity

Before, during and after climate disasters and other impacts, the ability to cope with different extreme events is crucial in preventing fatalities and loss of property and livelihoods. Coping range, that is, the ability to survive with slight to moderate variations in extreme weather events, could be expanded depending on adaptation and mitigation measures implemented or shrunk by an increase in intensity of climate stimuli and incapacitated infrastructure put in place (Horgarth et al. 2014). Limited access to and consumption of information through education and awareness (literacy levels) are catalysts that constrain adaptive mechanisms for climate change impacts on health. Contributed to, by minimal or zero access to healthcare services, improved water, sanitation and hygiene, clean energy and dietary food components, counties in the northern, eastern and southern strip of coastal regions exhibit the least adaptive capacity to climate change impacts on health.

2.5.3 Vulnerability

Kenya receives bimodal rainfall seasons, long rains (March, April and May) and short rains (October, November and December). Western, Nyanza, central Rift Valley regions and coastal strip have received high mean annual total rainfall> 800mm for the last 30 years; see Figure 5a (Annexes). Larger sections of ASAL areas such as northern, north-eastern and eastern often experience low average annual rainfall <600mm. During the two rainy seasons, flash floods and massive deluges cause fatalities and destruction of property and livelihoods of the affected populations in flood-prone areas of northern, north-eastern, eastern, coastal strip, Narok, Kajiado, Western and Nyanza. There have been anomalous changes in mean annual and decadal surface air temperature trends in Kenya between 1951 and 2020. The mean annual temperature has increased consistently over the last two decades, with the highest record of 26^0C in 2020, Figure 5b. This affects the northern, north-eastern and eastern regions, exposing populations to heat stress and other effects such as heat strokes. Despite variations in vulnerability, all Kenyan populations are susceptible to the impacts of climate change on health, either directly or indirectly (Figure 5c).

2.6 High-risk Areas and Populations

Every county in Kenya is susceptible to climate change impacts because all counties annually receive bimodal rainfall and continuous temperature variations due to the country's position relative to the Equator and the constant shifting of the Inter-tropical Convergence Zone (ITCZ). Although about 80% of the country's total land coverage is ASAL, which is vulnerable to climate change (WFP, 2020), the susceptibility rate differs depending on the occurrence frequency, magnitude and intensity of extreme weather events. Most populations at risk include women and adolescent girls, children and youth, people with disabilities (PwDs), older people, pastoralist communities and urban residents in informal settlements (RCRC-IFRC, 2021).

Women and Girls

Drought affects women and adolescent girls' personal hygiene and sanitation. Women in drought-prone areas often wake up early and walk long distances to look for water. Reports indicate that only 14% of women have access to safe water in rural parts of Kenya (UNDP, 2020). Water scarcity during droughts subjects adolescent girls to physical insecurity and abuse of their sexual and reproductive health rights as they are sometimes forced into pre-mature marriages or transactional sex for food, water, money and other basic necessities. Food unavailability, especially during floods and droughts, compromises women's livelihood, considering their primary roles as food and care providers in the households. Some of the affected women resort to harmful coping mechanisms such as transactional sex (Opiyo et al., 2014; Fiorella et al., 2015).

Important to also note is those most vulnerable like pregnant women and newborns, who are increasingly vulnerable as temperatures continue to increase. Research shows that extreme heat exposure leads to adverse pregnancy outcomes (pre-term births, low birth weight, gestational diabetes and hypertension, and stillbirths). This affects breastfeeding and has other physiological impacts to newborns

Children, Youth, Elderly and PwDs

A report by the Kenya Food Security Steering Group, 2022 on Long Rains Season Assessment noted that in 2022 February- July alone, the number of children aged 6-59 months old requiring treatment for acute malnutrition in the whole country increased from 754,906 to 884, 464. The Elderly, PwDs, children and youth are physically and psychologically at risk of shocks from droughts, floods and climate-related conflicts. These include the inability to seek refuge during extreme climate disasters, flooding of schools and WASH facilities, inadequate food, and family separations, among other impacts. These population groups are also vulnerable to seasonal incidences of climate-resurging disease prevalence (e.g., malaria, cholera, dengue fever, diarrheal diseases, etc.), air pollution, heat exposure and other impacts of climate change on human health.

Pastoralist Communities

During severe droughts, climate-induced mobility, forced displacement, and conflict over water and land resources frequent the ASAL regions, which most pastoralists occupy in Kenya. As mentioned earlier in the impact of climate change on health in section 3.1, conflict related to climate change sometimes affects crop growers because of the shrunken grazing corridors, making herders animals graze on crops while passing by during migrations, (Medina et al., 2022). In a few cases, the search for pasture extends to private homes and enclosed plots of land, leading to violent conflicts characterised by injuries and fatalities.

2.7 MoH Response to Climate Change and Health

The Ministry of Health in Kenya recognises the significant impact of climate change on public health. In response, the Ministry has launched several initiatives to mitigate these effects and safeguard the Kenyan populace's health. These initiatives include:

Establishing the Climate Change and Health Unit

The Climate Change and Health Unit is domiciled under the Division of Environmental Health and Sanitation and was expressly established to coordinate and support efforts to mainstream climate change concerns and actions within the health sector. Among its key achievements, the unit has:

- Established and convenes the Climate Change, Health and Energy Technical Working Group (TWG), which meets quarterly. The TWG, which is composed of stakeholders from the government Ministries, Departments and Agencies (MDAs), civil society and the private sector, meets as a community of practice to, among others, network and share knowledge on the latest developments at the intersection of climate change and health, The TWG has collectively contributed to the development of this strategy.

- Co-convened the first and second Scientific Conference on Health and Climate Change in December 2019 and 2023 respectively. These conferences aim to share knowledge and learnings to fill one of the critical gaps – evidence for policy and action on climate change and health. The third edition is planned for October 2024.

- Collaborated with partners, including the WHO Afro and Kenya Country Offices, to provide technical support to develop the capacity of health care workers (HCWs) to develop proposals to leverage climate financing mechanisms such as the Green Climate Fund (GCF) for the health sector in Kenya.

- Spearheaded Kenya joining the Alliance for Transformative Action on Climate and Health (ATACH). This initiative, championed by the WHO, aims to realise the ambitions set at COP26 to build climate-resilient and sustainable health systems. As part of this initiative, Kenya was one of the WHO Member States that committed to these ambitions during COP26 in Glasgow, Scotland.

- At the global level, Kenya has become a champion of prioritising health in climate change action. In 2023, the country joined the COP28 presidency, the UAE, and other champion countries to develop the climate change and health declaration, which was endorsed by 120 countries at COP28. In addition, Kenya, with Barbados, Fiji, Kingdom of Monaco, Netherlands, Peru, UAE and the UK, engaged in developing a new World Health Assembly (WHA) Resolution on Climate and Health, to be endorsed at the 77th WHA in May 2024.

Reduce Emissions by the Health Sector

The healthcare sector is a key contributor to GHG emissions globally and has been urged to implement policies and actions to reduce its GHG emissions as a mitigation strategy. To this end, the MoH in Kenya has:

- Implemented a clinical waste management project that installs non-burn technology (microwave non-burn equipment) in healthcare facilities across the country to manage medical waste contributing to GHG emissions. The ministry has rolled out biomedical

waste microwave non-burn equipment in 15 counties and intends to scale up the initiative to all 47 counties.

- Trained 46 healthcare workers and professionals from 16 counties on using a decarbonisation tool to measure GHG emissions in healthcare facilities with plans to upscale the technique to the entire country.

Reducing the Impact of Air Pollution

To reduce the impact of air pollution on the health of Kenyans, MoH has:

- Developed a training manual on Household Air Pollution for use by community health volunteers (CHVs) to create demand for the uptake of clean cooking and lighting energy, contributing to the reduction of indoor air pollution.
- Embarked on developing a 5-year Household Air Pollution (HAP) Strategy to address the negative impacts of indoor air pollution on health in the country.
- An Africa Region Air-Pollution Centre of Excellence has been established through a partnership between the Kenya Medical Research Institute (KEMRI) and the University of Liverpool and funding from the UK National Institute for Health Research (NIHR). Housed at the KEMRI Centre for Respiratory Disease Research in Nairobi, the Centre is expected to contribute to vital research to address the disease burden from air pollution exposure in the region.

Climate Change Disease Surveillance and Response

Disease surveillance and response are critical areas for addressing the threat of climate change to health in the country. As a result, the MoH is collaborating with other MDAs and partners to strengthen and set up early warning systems.

- In particular, the MoH collaborates with the Kenya Meteorological Department and WHO to strengthen the country's Early Warning Systems for climate-sensitive disease outbreaks such as highland malaria.
- MoH is also a key actor in the Kenya Climate Change and Health Research collaboration, which has developed a National Climate-Health Research Network composed of multidisciplinary stakeholders. The network seeks to address the challenges of climate change and health and understand the causal pathways between climate change-related exposures and health outcomes.

Progress in Conference of Parties (COP26) Commitments

During COP26, the Kenyan Government committed to strengthening the healthcare system's resilience to withstand climate change's impacts. These commitments included:

- Conducting a comprehensive Vulnerability and Adaptation Assessment to evaluate the vulnerability of the healthcare system to climate change and identify necessary adaptation and mitigation measures.
- Developing a Health National Adaptation Plan (HNAP) based on the insights gained from the vulnerability assessment.

The government is also dedicated to fostering a sustainable, low-carbon healthcare system that aligns with the emission targets set by the Paris Agreement. These commitments include:

- Initiating a baseline assessment to analyse GHG emissions within our healthcare system, encompassing healthcare facilities and supply chains.
- Publishing a detailed action plan outlining the strategies and steps to establish a sustainable, low-carbon healthcare system while also considering the healthcare sector's role in reducing exposure to air pollution through its operations.
- Striving to achieve net-zero emissions within the healthcare sector.

Additionally, the government aims to use the Vulnerability and Adaptation assessment, Health National Adaptation Plan, and action plan for a sustainable, low-carbon healthcare system to facilitate access to climate change funding for healthcare. This includes seeking support from climate change multilateral funding mechanisms, such as submitting project proposals to entities like the Global Environmental Facility (GEF), Green Climate Fund (GCF), Adaptation Fund (AF), or the GCF Readiness program and the National Treasury climate finance funding streams.

The MoH is at various stages of implementing these commitments and achieving their stated goals. Over the next five years, the KCCHS is expected to catalyse and accelerate these ambitions in a structured and collaborative manner in which the MoH will partner with MDAs and other stakeholders from across sectors.

2.8 Policy and Regulatory Frameworks to Address Climate Change and Health

Over the years, Kenya has been a dedicated champion of efforts to address climate change. As a result, the country is a signatory to various global commitments and frameworks to address climate change. The country has a raft of laws and policies to enable it to combat

climate change and its impacts. The robust framework of policies, regulatory measures, and international commitments provides a strong platform on which the country and the KCCHS can build to decisively prioritise health in climate change action and harness cross-sectoral cooperation and synergies in addressing the nexus of climate change and health. This section outlines these commitments, policies and legal frameworks.

2.8.1 International Commitments and Agreements

- The 1987 Montreal Protocol on Substances which Deplete the Ozone Layer. Kenya joined it at the Kigali Amendment in 2018.
- The 1994 United Nations Framework Convention on Climate Change (UNFCCC) that aims to prevent hazardous human interruptions on climate parameters. Kenya ratified it in 1994.
- The 2001 Stockholm Convention on Persistent Organic Pollutants. Kenya joined in 2004.
- The Kyoto Protocol of 1997 which stipulates shifting from and minimising GHGs emitted in accordance with every country's set reduction target. Kenya ratified it in 2005.
- The Climate and Clean Air Coalition, established in 2012, aims to reduce short-cycled pollutants to improve health and sustainable development. Kenya joined in 2012.
- The Sendai Framework for Disaster Risk Reduction, 2015 to 2030, to curb disaster risks and improve resilience. Kenya was enjoined in 2015.
- The 2015 Paris Agreement whose main thrust is to hold the increase in the global average temperature to below 2^0C above pre-industrial levels. Kenya ratified it in 2016.
- The UN 2030 Sustainable Development Goals (17 SDGs) adopted by Kenya in 2015. Goals 3 (Good health and well-being) and 13 (climate change action) align with the KCCHS development.
- The 2021 Conference of Parties (COP26) Climate Change and Health Commitments. Kenya committed to 'Low-carbon climate resilient health systems by 2030.'
- World Health Assembly Resolution on Climate Change and Health, 2008.
- WHO Global Strategy on Health, Environment and Climate Change, 2020.
- WHO plan of action on climate change and health in small island developing States 2019–2023 (WHA 72/16)

- WHO Alliance on Transformative Action on Climate Change and Health (ATACH).
- WHA76.17 (2023) Resolution on the impact of chemicals, waste and pollution on human health
- The Draft WHA 77 Climate Change and Health Resolution, 2024

2.8.2 Regional Policies and Commitments

- The East African Community Climate Change Policy and Strategy (2010) is a guide for member countries and stakeholders in preparing and implementing collective measures on climate change within the East African region.
- The African Forest Landscape Restoration Initiative (AFR100) that aims to restore Africa's 100 million hectares of land by 2030.
- Africa Union, Agenda 2063. It calls on member states to implement climate change actions in Africa.
- The Africa Climate Summit, 2023 focused on pathways to net zero GHG emissions, adaptations, and collective climate financing.
- Libreville Declaration on Health and Environment, 2008. This regional policy agreement provides a cohesive and integrated framework to address human health and environmental linkages on the continent.
- The AFRO Regional Strategy for the Management of Environmental Determinants of Human Health in the African Region 2022 – 2032

2.8.3 Kenya National Climate Change Policies and Legal Frameworks

- **The Health Act No. 21 of 2017:** On Part VIII, 68 (2) (b), the Ministry of Health is mandated to effect measures to reduce morbidity and mortality from water-, food- and vector-borne diseases and mitigate the health effects of climate change. In section 69 (a-m) of the Act, the Ministry shall also put in place appropriate mechanisms for the prevention and management of environmental health risks to deter outbreaks and spread of environmentally related diseases.
- **Climate Change Act, No. 11 of 2016:** Climate change resilience and low carbon development for sustainable development.

- **National Climate Change Response Strategy, 2010 (the First climate change strategy document in Kenya):** Integrating climate change and health policy decisions into government planning and development.
- **County Governments Act, 2012:** County Integrated Development Plans must incorporate climate change actions into development programs.
- **NCCAP (2013-17):** A roadmap for adaptation and mitigation actions on climate change in Kenya.
- **Environmental Management and Coordination Act, 2015:** Environmental safeguard against degradation. It is also a legal framework for executing the National Environment Action Plan (NEAP).
- **NAP 2015-30:** Short-, medium, and long-term macro-level climate change adaptation actions and sub-actions in all planning and development sectors.
- **Climate Risk Management Framework (2017):** This framework integrates disaster risk reduction, climate change adaptation, and sustainable development at the national and county levels.
- **Nationally Determined Contributions (Updated NDCs 2020):** Adaptation (Climate Change resilience in Vision 2030 Medium-Term Plans). Mitigation (32 % GHG emission reduction by 2030 relative to the business-as-usual scenario of 143Mt CO_2e).
- **NCCAP 2018-22:** Mainstreaming climate change adaptation into the health sector and improving urban solid waste management.
- **National Climate Finance Policy (2018):** Climate financing mobilisation for Kenya's low carbon climate resilient development goals
- **Second Medium-Term Plan of Vision 2030:** Mainstreaming climate change in national planning and development.
- **Climate Change (Amendment) Bill, 2023:** This bill amends the Climate Change Act, 2016 (sections 2, 3, 4, 6, 8, 9, 10, and 13), positioning Kenya as a key player in carbon trading in Africa.

2.8.4 Kenya Vision 2030, Climate Change and Health

The Kenya Vision 2030 aims to transform Kenya into an industrialised middle-income economy with a clean and secure environment that supports the high quality of life for its population. Health is one of the Social Pillars of Vision 2030, whose key targets by 2030 include improved

provision of health services and technology, enhanced human resource capacity and rolling out of universal health coverage for all 47 counties. The Kenya Climate Change and Health Strategy aligns with Vision 2030, giving out prospects to lessening the impacts of climate change on health by 2030 through feasible adaptation and mitigation actions.

2.8.5 The Constitution of Kenya 2010

The right to health is a fundamental human right guaranteed in the Kenya Constitution. Article 43 (1) (a) of the Constitution provides that every person has the right to the highest attainable standard of health, which includes the right to health care services, including reproductive health care. In addition, Article 46 of the constitution states Kenya's obligation to protect consumer rights, health rights, and economic interests. Therefore, the health sector is mandated to implement the principles in Articles 10 and 232, Chapters 6 and 12 of the Constitution, among others, and establish the framework necessary to support their implementation. Towards this end, the Country formulated the Health Policy and the Health Act No. 21 of 2017. Through this policy and Act, among other relevant constitutional provisions and legal statutes, the health sector adaptations and mitigation to climate change impacts on health could be initiated.

2.8.6 The Kenya Health Policy, 2014–2030 and Climate Change

The Kenya Health Policy 2014-2030 succeeded the Kenya Health Policy Framework (KHPF) (1994-2010), marking improvements in health indicators such as infectious diseases and child health. Two essential obligations in Kenya Health Policy 2012-2030: 1) achieving fundamental human health rights as stipulated in the Constitution of Kenya 2010 and 2) health sector contribution to economic development as envisioned in Vision 2030. The KCCHS addresses climate-related re-emerging infectious diseases and other health impacts of climate change being aligned to the Health Policy priority five (5) on minimisation of exposures to health risks, serves as one of the avenues to facilitate sustained cost savings measures, which will ensure that resources meant for universal health coverage aren't diverted to respond to climate change emergencies and impacts.

This will guarantee the country's attainment of the highest possible standard of health in a responsive manner by 2030. The strategy will achieve this through the outlined strategies that climate-proof the health sector while at the same time working towards strengthening vibrant population health that spurs the country's economic development.

2.9 Summary of Opportunities and Threats

Environmental Factor	Opportunities	Threats
Political	· Government commitment to addressing climate change and improving public health. · Participation in international agreements like the Paris Agreement and the SDGs that offer opportunities for funding and collaboration. · Advocacy by health professionals and organisations in Kenya can influence political decisions. · Financial support and technical assistance from international donors and organisations. · Decentralisation approach can address region-specific vulnerabilities and opportunities. · Ongoing efforts to expand access to healthcare through the NHIF/SHIF present opportunities for integrating climate-resilient healthcare into insurance schemes. · Close collaboration with relevant government agencies.	· Fragmentation and lack of coordination among different government agencies and departments. · Limited budget allocations. · Frequent changes in government leadership can disrupt long-term planning and strategy implementation. · Political influence exerted by special interest groups, can hinder the adoption of climate-friendly policies and regulations. · Lengthy approval procedures and administrative obstacles may impede progress. · A lack of public demand for climate-resilient healthcare systems and policies · The capacity of government institutions and agencies to effectively address climate change and health.
Economic	· Potential for attracting investments in green technologies and sustainable healthcare practices. · Investment in research and development of climate-resilient healthcare technologies. · Climate-resilient agricultural practices can boost food security and lead to surplus production. · Participation in carbon trading markets and offset programs can generate revenue. · Leveraging private sector investments for climate-resilient healthcare infrastructure and services. · Accessing climate finance mechanisms, such as the Green Climate Fund for climate adaptation projects. · Climate-resilient insurance products and risk reduction mechanisms can promote economic stability.	· Limited financial resources and competing budgetary priorities within the government. · Additional investments to bridge regional disparities. · Reliance on agriculture, which is highly vulnerable to climate change impacts. · Risks associated with climate change can deter Foreign Direct Investment (FDI) and disrupt supply chains, impacting the economy. · The upfront costs of retrofitting or building Climate resilient hospitals and clinics may strain financial resources. · Climate-related agricultural challenges can lead to food insecurity, increasing malnutrition and the prevalence of diet-related health issues.

Social	· Building awareness, involving communities in decision-making, and incorporating traditional knowledge can enhance the strategy's effectiveness. · Strengthening human resources in the healthcare sector. · Fostering collaboration among various sectors can lead to integrated solutions that address both climate and health challenges. · Strengthening community resilience can reduce vulnerability and improve response capabilities. · Recognising and respecting cultural beliefs and practices can foster trust and acceptance of climate-resilient healthcare interventions. · Collaborations between public and private sectors in health and environmental initiatives can leverage resources, expertise, and innovation for social benefit.	· A lack of public awareness about the interconnections between climate change and health can hinder the adoption of climate-resilient behaviours and practices. · Limited access to essential resources such as clean water and nutritious food can undermine efforts. · Language and cultural differences may present communication challenges. · Climate-related stressors, such as displacement or loss of livelihoods, can have significant mental health implications. · Gender disparities in decision-making and access to resources can affect the ability of vulnerable groups to adapt to climate-related health challenges.

Technological	· Robust health information systems can enhance data collection, monitoring, and surveillance. · GIS technology can be utilised for mapping climate-sensitive health risks, identifying vulnerable populations, and optimising the allocation of healthcare resources and services. · Technological advancements in weather forecasting and early warning systems can provide timely information on extreme weather events. · Sophisticated climate modelling tools can predict future climate-related health risks and vulnerabilities. · Investing in renewable energy sources can enhance the resilience of healthcare facilities. · Innovative water purification and sanitation technologies can reduce the risk of waterborne diseases associated with climate change. · Development and use of mobile apps for health surveillance and reporting can enable reporting disease outbreaks or health emergencies promptly. · Remote sensing can assist in tracking disease vectors like mosquitoes and their breeding habitats, aiding in vector-borne disease prevention and control.	· Uneven access to technology and the internet, can limit the reach of technological solutions in remote or underserved areas. · Inadequate technology infrastructure, including power supply and network infrastructure. · The maintenance and sustainability of technology-based solutions, such as solar-powered equipment or electronic health records systems. · skills gap can limit the potential benefits. · Implementing and maintaining climate-resilient healthcare technologies can be resource-intensive.
Ecological	· Ecosystem-based health interventions leverage natural ecosystems for disease control and health improvement. · Preserving natural habitats can reduce the risk of zoonotic disease transmission and maintain ecosystem services. · Promoting sustainable agricultural practices, improve food security and reduce the environmental impact of agriculture. · Implementing effective waste management and recycling programs can reduce environmental pollution and health risks associated with improper waste disposal. · Expanding the use of renewable energy sources, can reduce greenhouse gas emissions, improve air quality, and promote overall health.	· Loss of biodiversity can increase the risk of zoonotic diseases and disrupt ecosystem services. · Ecological changes, can lead to shifts in the distribution of disease vectors like mosquitoes and ticks. · Deforestation and changes in land use can result in reduced forest cover and loss of natural habitats, leading to increased carbon emissions. · Poor air quality can lead to respiratory illnesses and other health issues. · Increased waste generation and improper disposal can lead to environmental pollution and harm ecosystem health.

Legal and Regulatory	· The existence of national climate change policies and frameworks. · Improved public health outcomes by mitigating the health impacts of environmental degradation. · Compliance with these mandates can enhance climate resilience. · Regulations that mandate the reporting and monitoring of climate change and health data can support evidence-based decision-making and early warning systems for health-related climate risks. · International Commitments can serve as a basis for aligning national legal and regulatory frameworks with global climate and health goals.	· Fragmentation and lack of coordination among various government Ministries, Departments and Agencies (MDA's) can create regulatory gaps and inconsistencies. · Weak enforcement mechanisms for environmental and health regulations can lead to non-compliance by individuals and industries. · Lengthy regulatory approval processes for healthcare projects and climate adaptation initiatives can slow down the implementation of urgently needed measures. · Resistance from industries or interest groups can slow down or prevent the enactment of necessary legal changes. · Vulnerable populations may have limited access to legal remedies or redress mechanisms.

2.10 Stakeholder Analysis and Consultation in the Development of the Strategy

In the context of climate change and health actions, a stakeholder is an individual, a group or entity with mutual interconnectedness with others, including a community, in managing the health impacts of climate change. The development of this Strategy involved two major activities: first, mapping and analysing key stakeholders (see table 2 in the annexe) using the Salience Model to determine their interest and power in playing their adaptation and mitigation roles on climate change and health in Kenya. Second, internal task force participatory meetings and external consultations of the analysed stakeholders (refer to figure 6 in annexe) to invoke their effectiveness in developing KCCHS, collaborative planning and coordinated activities at national and county governments and resource mobilisation for the implementation of this Strategy.

This strategy will guarantee the country's attainment of the highest possible standard of health in a responsive manner by 2030

Photo credit: Sushi7688/GettyImages

SECTION 3

Strategic Actions for Health and Climate Change in Kenya

3.1 Vision of the KCCHS Strategy

This Strategy envisions implementing high-quality, efficient and effective sustainable climate change and health actions in Kenya to eliminate environmental risks to health caused by the changing climate and underlying determinants.

3.2 Objectives of the KCCHS Strategy

i. To set out near-term and longer-term goals on climate change and health actions in Kenya, underpinned by scientific evidence.

ii. To outline a plan of action to deliver those goals, including through:

- Identifying and prioritising adaptation actions with benefits to health and healthcare delivery in Kenya.
- Supporting generation and synthesis of evidence on the health consequences of mitigation actions.
- Identifying and working with key stakeholders.

iii. To identify resources needed to support proposed policies.

iv. To communicate the commitment of the MOH in carrying out adaptation and mitigation interventions and its plan of action.

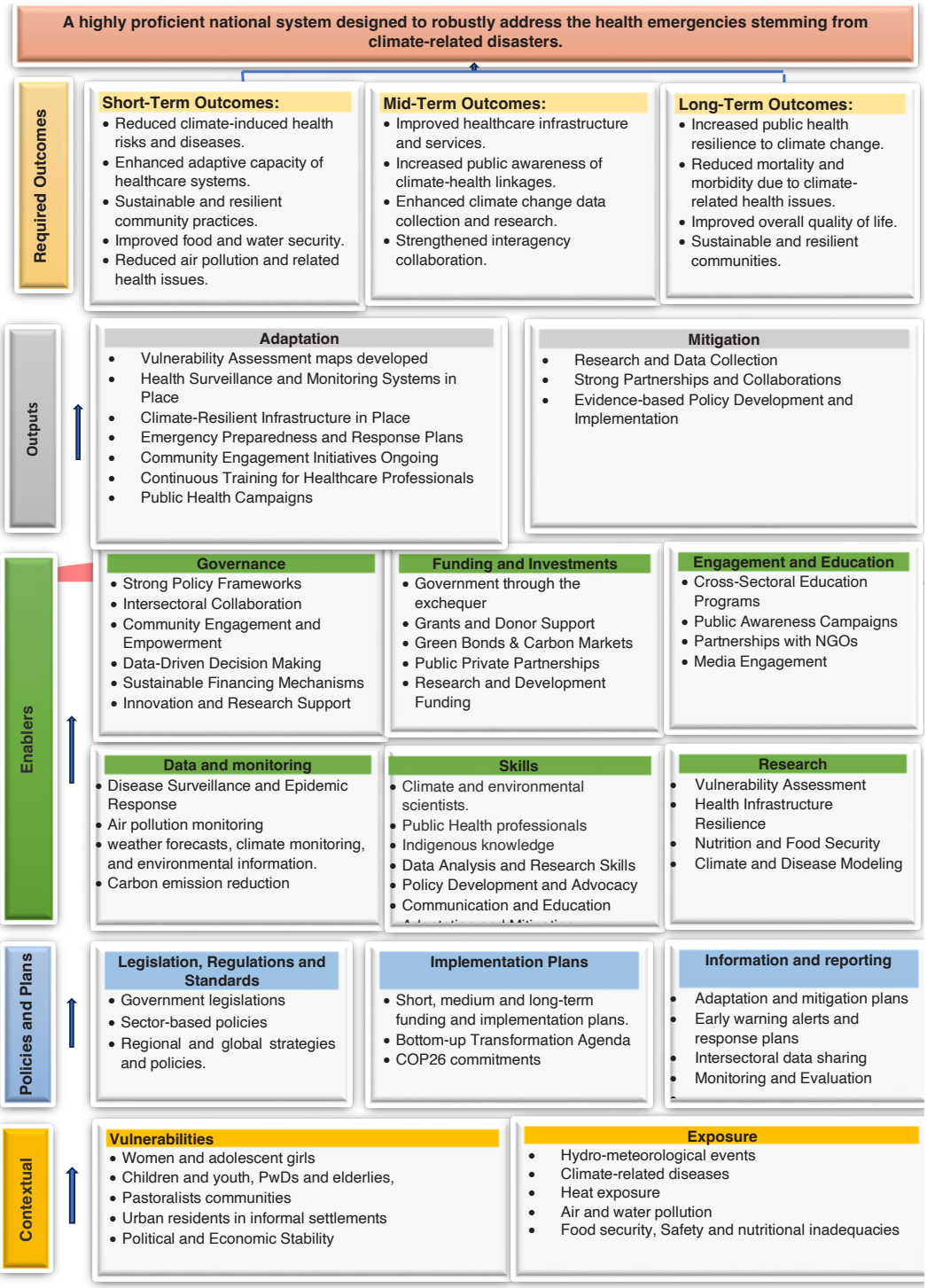
3.3 Theory of Change

The rationale behind the theory of change (ToC) in the KCCHS presents a structured and coherent pathway, highlighting the sequence of inputs, activities, outcomes, and impacts that the strategy aims to achieve. It clearly outlines how the strategy is expected to create positive change and resilience in the Kenyan healthcare system amidst climate-related challenges. This approach considers a wide range of climate-related health risks, including diseases, malnutrition, and extreme weather events.

Collaboration is the cornerstone of this strategy. The ToC interconnects various sectors, including health, agriculture, environment, water, industry, housing, transport, energy, waste, and more, focusing on adaptation and mitigation and emphasising health integration. It is conceptualised as a multi-layered approach to sustainability and climate resilience. It recognises that these sectors are interdependent. For example, energy-efficient housing reduces energy demand, which in turn impacts respiratory health. Similarly, sustainable transport systems can reduce emissions and improve air quality, positively contributing to public health, and waste management influences environmental and public health.

Public education is prioritised to empower communities to protect their health, and integrating climate-health considerations into policies ensures systematic addressing of these factors in governance and decision-making. A robust monitoring and evaluation system is in place to track progress and assess impact, emphasising accountability and continuous improvement. Finally, research and collaboration are encouraged to deepen understanding and foster evidence-based solutions and global engagement. The strategy recognises the importance of international partnerships in effectively addressing climate-related health challenges. It also acknowledges external factors, such as international climate agreements, socio-economic stability, and advancements in climate science and technology, underscores their influence on the strategy's effectiveness. In summary, the KCCHS ToC offers a proactive, comprehensive, and collaborative approach to safeguarding public health in the face of climate change.

The Theory of change logic model as a guiding framework



3.4 Areas of Investment

The GoK's efforts to address the nexus between climate change and health systems are commendable. The country has taken significant steps to recognise the potential impact of climate change on public health and is actively implementing measures to mitigate these effects. By identifying the urgency of climate change and its potential impact on health, Kenya's efforts reflect a holistic and forward-thinking approach to safeguarding public health in the face of climate change challenges. Nonetheless, several noteworthy gaps have been identified.

These gaps that require investments fall under three strategic focus areas;

Strategic Focus Area 1: Low-carbon footprints in healthcare

Strategic Focus Area 2: Adaptive and climate-resilient health systems

Strategic Focus Area 3: Governance and leadership

3.3.1 Gaps Related to Low Carbon Footprint in Healthcare

- Limited access to and adoption of clean energy sources.
- Lack of adequate air pollution control infrastructure in urban areas
- Limited investment in transportation options to minimise greenhouse gas emissions.
- Inadequate adoption of sustainable and climate-resilient agricultural practices to mitigate food security risks caused by climate change

3.3.2 Gaps Related to Climate Resilience

- There has been insufficient assessment of climate change impacts on health, including current and future risks, to provide the basis for investments in the health sector.
- Inadequate healthcare infrastructure and equipment (microwave healthcare waste management).
- Limited resources for training and recruitment to strengthen the capacity of professionals on climate-health nexus.
- Limited sustainable food production, safety and human nutrition
- Inadequate advocacy and awareness

- Adequate public health awareness and communication among students and communities regarding the health risks associated with climate change are needed.
- Limited capacity for disease surveillance and early warning systems.
- Minimal climate change-health databases
- Inadequate access to clean drinking water and sanitation facilities in many regions, leading to waterborne diseases and increased healthcare costs

3.3.3 Gaps Related to Governance and Leadership

- Inadequate inter-ministerial coordination mechanisms to institutionalise and mainstream Climate and Health at the national and county levels,
- Limited resources for training, research and innovation.
- Limited monitoring and evaluation system to track the implementation and impact of the strategy.
- Need for strengthening of the implementation of the international agreements and partnerships.

3.4 Interventions

This strategy is designed to help systematically address existing gaps, reinforce ongoing efforts and initiatives, and ensure comprehensive preparedness for and responsiveness to evolving climate-related challenges to protect the population's well-being and enhance resilience. The intervention areas below have been prioritised from the investment areas in the previous section. They are meant to guide the development and implementation of the priority areas for the KCCHS, ensuring that it is comprehensive, responsive, and adaptable to the evolving challenges of climate change on public health in Kenya.

3.4.1 Recommended Priority Action Areas

i. Healthy energy transition and air quality

Integrating clean energy initiatives and air quality improvements represents a transformative approach to sustainable development and public health. Wind power generation and the solarisation of health facilities are pivotal in this shift, including adopting solar Li-ION battery recharging systems for electric bikes, which are crucial in health outreach and emergency scenarios. Using energy-efficient appliances and solar-powered boreholes within healthcare

facilities conserves energy. Retrofitting buildings to minimise energy loss is another vital step in ensuring that healthcare services are energy-efficient and environmentally responsible. Incorporating circular resource solutions further optimises healthcare operations, aligning with sustainable practices. Crucial to this paradigm is managing population health risks and waste, which involves the safe use and disposal of Li-ION batteries for electric mobility and the upgrading of incinerators with advanced air pollution control devices (APCDs). Additionally, implementing solar-powered systems for: powering critical health care equipment and devices or vaccines storage in health facilties, borehole water harvesting and storage exemplifies a commitment to resource sustainability, underscoring the critical link between clean energy, environmental stewardship, and health.

ii. Sustainable and climate-resilient healthy food systems for safe food, human nutrition and health

Sustainable and climate-resilient agricultural practices are crucial for securing safe food production and maintaining adequate human nutrition in the face of climate change. These practices include diversifying crops for climate resistance, implementing soil conservation to preserve fertility, and using water-efficient irrigation. Organic farming reduces reliance on harmful chemicals, enhancing environmental and human health. Agroforestry, which integrates trees into agricultural landscapes, contributes to carbon sequestration and biodiversity conservation. Collectively, these strategies ensure the resilience of food systems against climatic stresses, contributing to a sustainable ecosystem that supports diverse, nutritious food production and the well-being of current and future generations.

iii. Water sanitation and hygiene; and healthcare waste management

Water, sanitation and hygiene (WASH) and effective healthcare waste management are fundamental to public health and environmental conservation. WASH initiatives are instrumental in providing access to clean water and promoting proper sanitation and hygiene practices, crucial in preventing waterborne diseases. This is complemented by efficient healthcare waste management practices, including the safe disposal of medical sharps, pharmaceuticals, and chemical waste to prevent infections, protect health workers, and minimise environmental pollution. Additionally, implementing safe water treatment solutions in public facilities and households is critical to ensuring access to clean and safe drinking water, a cornerstone of public health. Alongside these measures, adopting circular resource solutions in waste management and water reuse systems represents a forward-thinking approach, emphasising the sustainable use of resources through recycling and reusing waste materials, thus reducing environmental impact and conserving fresh water. The synergy between WASH, healthcare waste management, safe water treatment, and circular resource solutions creates a holistic strategy that protects public health and promotes sustainable resource use and environmental stewardship.

iv. Resilient health care systems and healthy, resilient and liveable working, conveyancing, and recreational facilities and other closed and open urban spaces

Healthcare resilience, bolstered by integrated disease surveillance and response, is essential in tackling the health implications of climate change. This comprehensive approach includes the development of a cross-sector climate and health curriculum aimed at enhancing climate literacy at both community and national levels through pre-service and in-service training. Simultaneously, strengthening integrated data systems within Early Warning Systems is crucial for disaster preparedness, enabling prompt and effective responses from populations and health facilities. Disaster management extends to various key areas: implementing climate rehabilitation programs for addressing mental health and trauma, economic rehabilitation for climate survivors, and ensuring climate justice to prevent discrimination and harmful norms. Additionally, upgrading health infrastructure to withstand extreme weather events is critical for maintaining continuous healthcare services. The use of climate health impact evaluation tools is vital for informing urgent policy-making, while the application of Geographic Information Systems (GIS) for Health aids in mapping health migration, ensuring that healthcare services remain accessible in the face of changing environmental conditions. Together, these strategies form a robust framework for enhancing healthcare resilience against the multifaceted challenges posed by climate change.

v. Comprehensive health risks and impact assessments, integrated disease surveillance and early warning systems to inform timely preparedness, surveillance and response Decisions

Comprehensive health risk and impact assessments, combined with health education, promotion, and awareness, play a pivotal role in safeguarding public health. These assessments evaluate potential health risks and impacts from various factors, enabling informed decision-making and effective response strategies. Health education and awareness campaigns are crucial for empowering individuals and communities with knowledge and skills to manage health risks proactively. In addition, strengthening integrated data systems in Early Warning Systems (EWS) for disaster preparedness is critical. These systems use data analytics and forecasting to predict and mitigate the impacts of potential disasters, thereby enhancing community preparedness and resilience. By integrating health data into these systems, authorities can better anticipate health-related emergencies, allocate resources efficiently, and implement targeted interventions. This synergy between health risk assessments, educational initiatives, and advanced EWS contributes significantly to populations' overall health and safety, particularly in regions prone to natural disasters or health crises.

vi. Strengthen technical, professional and organisational capacities, communication and awareness creation

Strengthening technical, professional and institutional capacities and ensuring sustained population-wide advocacy and awareness creation is critical to influencing behaviour change and mindsets. This will go a long way in creating a smooth multi-sectoral approach to implementing climate change and health actions in Kenya. Key areas of focus in this approach include enhancing human resource skill building, training and education, organisational capacity development and communication and awareness creation.

vii. Health research and development, policy integration and partnership and resource mobilisation for climate change adaptation and mitigation in health

Establishing a secretariat for a hybrid learning collaborative or forum in health research and policy development is vital to sharing transdisciplinary research findings on Climate and Health (CxH). This platform would facilitate the translation of evidence from research into actionable strategies, such as the innovative release of Wolbachia-infected mosquitoes to curb dengue fever transmission and the expansion of seasonal malaria chemoprevention in flood-prone areas. Additionally, there's a pressing need to strengthen policy regulations that address climate-health linkages. This involves enhancing adaptation policies, including National Adaptation Plans (NAPs), Health National Adaptation Plans (HNAPs), Nationally Determined Contributions (NDCs), and embracing a One-Health approach.

viii. Monitoring, Evaluation, Accountability, and Learning

In Monitoring, Evaluation, Accountability, and Learning (MEAL) within the health sector, enhancing transparency and accountability is paramount for advancing the climate resilience-building agenda. This involves developing and implementing robust data systems and analytics, which are essential in informing transdisciplinary or cross-sectoral policies. Such systems should focus on key performance indicators (KPIs) related to climate-related diseases alongside metrics like Disability-Adjusted Life Years (DALYs), Quality-Adjusted Life Years (QALYs), and assessments of vulnerability and exposures. This data-driven approach allows for a more precise and effective response to the health impacts of climate change, ensuring that strategies and interventions are evidence-based and aligned with the specific needs and challenges posed by a changing climate. The integration of comprehensive MEAL frameworks thus plays a critical role in shaping effective health policies and actions for climate resilience.

This strategy also proposes formulating Theories of Change (ToC) for all sectors, encompassing both adaptation and mitigation aspects. Particular emphasis is placed on integrating climate change and health as pivotal, cross-cutting elements within each sector. Subsequently, these

comprehensive ToCs for each respective sector should be utilised to enhance and explicitly align with the monitoring and evaluation strategies, including developing specific plans and indicators.

Phased Implementation of the Prioritised Intervention Areas

The intervention areas mentioned above are further systematically classified into short-term (2024-2026), mid-term (2026-2030), and long-term (2030-2063) interventions based on the strategies and strategic actions to be implemented.

Short-Term (2024-2026)

The short-term interventions prioritise mitigating immediate health risks attributed to climate change, concurrently fostering resilience and bolstering the capacity for sustained long-term solutions. The short-term strategies and associated strategic actions for 2024-2026 represent a holistic framework tailored to address climate change-related health risks within Kenya effectively.

Mid-Term (2026-2030)

Drawing from the short-term strategies and actions, the mid-term interventions, extending until 2030, centre on enhancing resilience, reducing vulnerability, and effectively mitigating the enduring health challenges associated with climate change.

Long-Term (2030-2063)

The long-term strategy leverages the foundation laid by the short-term and mid-term strategies and their corresponding actions to effectively address climate-related health risks in Kenya up to 2063. The overarching objective centres on establishing enduring and resilient systems capable of withstanding the challenges posed by climate change.

The following table details the KCCHS's short-, medium-, and long-term needs, strategies, and actions.

Identified Needs/Gaps		Strategies & Actions		
		Short-Term (2024-2026)	Mid-Term (2026-2030)	Long-Term (2030-2063)
1	**Healthy energy transition and air quality**	**Strategy** Encourage faster adoption of clean energy sources including household clean cooking and reduce air pollution in line with the WHO air quality guidelines and standards. **Actions:** - Develop household air pollution, energy transition and health strategy and guidelines - Encourage household use of clean cooking energy for lighting, cooking (such as such as biogas, solar, electricity), space heating and cooling - Enhance clean energy conservation and utilization efficiency measures - Implement emissions standards in the health industry, institutions and other industries. - Promote the use of electric and hybrid vehicles. - Expand coverage and regularly monitor and report on air quality. - Take into consideration air pollution reduction measures for vulnerable populations (e.g., infants, respiratory disease patients) and people in vulnerable occupations (e.g., outdoor workers), such as providing advice on avoiding places with high levels of air pollution. - Implement labelling scheme for cooking devices and fuels with information for consumers on whether device emissions are safe for health - Promote the use of, and financial support for, low-emission fuels and energy sources, and renewable combustion-free power sources (like solar or wind); through use of incentives - Encourage health-protective behaviour appropriate to the local setting, such as cooking outdoors, improving ventilation, spending less time close to the smoky cooking and heating hearths, drying fuel wood before use and using lids on pots to shorten cooking time - Capacity building and awareness raising on health effects of air pollution and personal measures to reduce air pollution. - Continued provision of support, inclusive information and participatory decision-making among other healthy energy	**Strategy** Transition to a sustainable and low-carbon energy for health and household clean cooking, transportation, processing and manufacturing systems. **Actions:** - Implement or revise policies to promote renewable energy and air quality, like the developed air pollution, energy transition and health strategy, guidelines and laboratory testing standards for cookstoves and fuels. - Enforce stricter emissions standards and air quality monitoring, forecasting and early warning plans to support community's preparedness and response to dust storms or other forms of air pollution - Promote the use of, and financial support for, low-emission fuels and energy sources, and renewable combustion-free power sources (like solar or wind); through use of incentives. - Capacity building and awareness raising on health effects of air pollution and personal primary prevention personal to reduce air pollution. - Invest in research and development of clean energy technologies. (including the safe disposal/ recycling of such technologies).	**Strategy** Sustainable and low-carbon energy, household clean cooking and air quality, processing and manufacturing and transportation systems achieved. **Actions:** - Strict enforcement of emissions standards and air quality monitoring, ensuring clean air and public health.
		transition initiatives geared toward decarbonization and ensuring environmentally sustainable health systems. - Implement public health dust forecasting and surveillance programmes including early warning systems and short-term air pollution action plans to alert the population to stay indoors and take personal measures to minimize exposure.		

Identified Needs/Gaps		Strategies & Actions		
		Short-Term (2024-2026)	Mid-Term (2026-2030)	Long-Term (2030-2063)
2	**Sustainable and climate resilient healthy food systems for safe food, human nutrition and health;**	**Strategy** Put public health measures in place to ensure safety and quality of food across the value chain, value addition and preservation technologies. **Actions:** - Revise or develop new public health plans, strategies and guidelines or standards aligned to the sustainable and climate resilient healthy food systems. - Provide public health training and support all to ensure sustained and climate resilient healthy food systems for safe and quality food for health such as the use of drought-resistant crop varieties, public health and climate smart integrated pesticide management systems. - Work closely with Ministry of Agriculture and Livestock Development to strengthen the food security monitoring system to reduce food insecurity, nutrient loss and food waste. - Implement policies and actions to create healthy, safe and sustainable food environments like strengthening of food safety, quality control and surveillance systems or restriction in marketing of foods contributing to unhealthy unsustainable diets or reformulation to gradually reduce saturated fat, sugars and salt/sodium and trans-fat from foods and beverages, among others. - Work closely with fisheries sub sector to preserve fish habitats and promote sustainable and healthy fisheries for human health.	**Strategy** Adoption of climate-resilient and healthy food systems. **Actions:** - Scale-up sustainable and climate resilient healthy food systems that includes public health strategies and measures to ensure safety and quality of food across the value chain, value addition and preservation technologies.	**Strategy** Climate-resilient healthy food systems fully adopted. **Actions:** - Adopting climate-resilient agricultural practices that enhance food safety and nutrition while reducing greenhouse gas emissions. - Continued provision of resources and information on safe food handling, storage, and preparation to reduce foodborne illnesses and food waste
3	**Climate Resilient and Sustainable Water, Environmental Sanitation and Hygiene; Healthcare Waste; Vector and** **Vermin Management and Services.**	**Strategy** Implement WASH activities **Actions:** - Integrate climate adaptation and mitigation measures into WASH planning in communities, schools, health care facilities, workplaces and public places - Ensure that water sources remain reliable and safe under changing climatic conditions. - Promote climate-resilient WASH practices, including rainwater harvesting, water conservation, and disaster preparedness. - Invest in the development and upgrading of climate-resilient water supply and distribution. - Include safe and sustainable drinking water, sanitation and	**Strategy** Implement WASH activities **Actions:** - Integrate and implement climate adaptation and mitigation measures into WASH planning and policies, ensuring that water sources remain reliable and safe under changing climatic conditions. - Promote climate-resilient WASH practices, including rainwater harvesting, water conservation, and disaster preparedness. - Invest in the development and upgrading of climate-resilient water supply and distribution.	**Strategy** WASH activities embedded in public health policy and planning. **Actions:** - Implement a comprehensive waste minimization and segregation program within healthcare facilities. - Invest in advanced waste treatment

		hygiene in relevant health policies, strategies and programmes, e. g the revision of the Kenya Environmental and sanitation investment strategy should ensure inclusion of climate and WASH in the revised edition. - Promote sustained protection of drinking-water supplies using Water Safety Plans (WSPs) - Work closely with the water sector to ensure implementation of drinking-water quality regulations and standards - Implement climate smart sanitation safety planning and support households to incrementally improve their sanitation facilities to meet minimum safety requirements while ensuring avoidance of open defecation. - Ensure rapid and safe wastewater disposal		technologies that are environmentally friendly and have lower carbon footprints. - Proper municipal and other environmental solid waste management
		Strategy Prioritize environmental sound management of chemicals and waste through adoption of best available technologies and best environmental practices such as waste to energy or safe recycling or reuse of treated wastes. **Actions:** - Develop or update policies, guidelines and actions across relevant sectors that reduce harmful exposure to all types of obsolete chemicals and solid waste, particularly for children. - Promote waste treatment systems based on available BAT and BEP - Identify e-waste streams and formalize and regulate waste management and recycling to ensure safe treatment of e-waste. - Promote waste segregation system at the point of generation, ensuring that waste is sorted into categories such as infectious, hazardous, and non-hazardous.	**Strategy** Enforce waste reduction and efficient waste treatment methods, such as recycling and waste segregation. **Actions:** - Sustained investment to strengthen partnerships and collaboration in the development, updating and implementation of regulatory frameworks. - Revise guidelines, designs, specifications and siting of health care waste infrastructure, equipment and services in line with projected climate risks. - Promote waste segregation system at the point of generation, ensuring that waste is sorted into categories such as infectious, hazardous, and non-hazardous. - Regularly educate staff about recycling procedures and place recycling bins conveniently throughout the facility.	**Strategy** Waste reduction and efficient waste treatment methods embedded in the healthcare framework. **Actions:** - Continue strengthening the policy space - Promote waste segregation system at the point of generation, ensuring that waste is sorted into categories such as infectious, hazardous, and non-hazardous.

Identified Needs/Gaps		Strategies & Actions		
		Short-Term (2024-2026)	Mid-Term (2026-2030)	Long-Term (2030-2063)
		- Regularly educate staff about recycling procedures and place recycling bins conveniently throughout the facility. - Actively promote waste avoidance and reduction initiatives within the healthcare facilities and households, such as the use of reusable medical equipment, adoption of environmentally preferable purchasing and green procurement. - Invest in strengthening of partnerships and collaboration in the development and updating of regulatory frameworks, including development of chemical policy and the harmonization of protocols for national human biomonitoring and surveillance programmes particularly for chemicals of concern such as cadmium, lead, mercury, highly hazardous pesticides and endocrine disrupting chemicals - Build capacities to ensure occupational safety and health and work improvements of health workers and other workers, including in public health emergencies. - Promote screening and biomonitoring of harmful waste exposure in target populations accompanied with environmental monitoring (e.g. of water, soil, air) - Support the inclusion of health priorities in all policies relevant to chemicals and waste.	- Actively promote waste reduction initiatives within the healthcare facility, such as the use of reusable medical equipment.	- Regularly educate staff about recycling procedures and place recycling bins conveniently throughout the facility. - Actively promote waste reduction initiatives within the healthcare facility, such as the use of reusable medical equipment.
		Strategy Promote climate smart integrated vector and vermin /pests' management **Actions:** - Promote an adaptive and integrated approach and interventions to local circumstances in the management of vectors, pests and vermin of public health concern guided by operational research and subject to routine monitoring and evaluation. - Promote and embed IVM principles in designing policies and legislation in health and all relevant agencies, organizations and civil society.	**Strategy** Sustained implementation of climate smart integrated vector and vermin /pests' management **Actions:** - Implement and embed and public health policies and legislation in health and all relevant agencies, organizations and civil society.	**Strategy** Fully adopt climate smart integrated vector and vermin /pests' management **Actions:** - Continue implementing IVM and public health policies and legislation in health and all relevant agencies, organizations and civil society.

4	**Adaptive and Resilient Healthcare and Healthy Liveable, working, conveyancing and recreational facilities and other closed and open urban spaces**	**Strategy** Tackle major risks to health and changing environments by building, creating and enhancing safe and healthy living and working environments including conveyances to improve people's lives today and in the future **Actions:** - Develop Environmentally sustainable and Healthy Health institutions, housing and liveable work spaces and other spaces guidelines and standards - Integrate climate smart health considerations into housing, urban and conveyances planning policies to deliver highly connected, mixed use, compact, healthy and climate smart housing, neighbourhoods and conveyances that are economically and socially viable and that promote active living, sustainable mobility, energy efficiency, healthy diets and that facilitate easy access to essential services. - Prioritize active and sustainable mobility as preferred mode of travel in relevant transport, spatial and urban planning policies. - Promote and improve walking and cycling infrastructure for all people through creation of town/urban/citywide access to safer walking, biking, nature, public spaces and public transport to support mobility, physical activity, recreation, access to services and social interactions, and to reduce the use of energy and resources - Improve access to socially inclusive, open quality and green spaces for all. - Mainstream and adopt people-centred "right to health" framework that has a common vision for social cohesion and healthy equity, which include the right to access, use and transformative urban environments - Ensure access to affordable housing and conveyances, which are not crowded and take into account all minimum requirements for climate resilient, healthy and liveable, conveyancing and working spaces/infrastructure, like the indoor temperatures and thermal insulation are adequate, put measures to prevent and control dampness and moulds growth, be equipped with safety devices, and where disease vectors are controlled. - Implement appropriate training and education curricula within the housing and construction sectors to address the relevance of building quality and its links to health - Raise awareness among building owners, health sector and building users about their respective responsibility for	**Strategy** Continued tackling of major risks to health and changing environments by building, creating and enhancing safe and healthy living and working environments including conveyances to improve people's lives today and in the future **Actions:** - Implement Environmentally sustainable and Healthy Health Institutions, housing and liveable work spaces and other work spaces guidelines and standards - Integrate climate smart health considerations into housing, urban and conveyances planning (specifications, designs) and policies to deliver highly connected, mixed use, compact, healthy and climate smart housing, neighbourhoods and conveyances that are economically and socially viable and that promote active living, sustainable mobility, energy efficiency, healthy diets and that facilitate easy access to essential services. - Prioritize active and sustainable mobility as preferred mode of travel in relevant transport, spatial and urban planning policies. - Promote and improve walking and cycling infrastructure for all people through creation of town/urban/citywide access to safer walking, biking, nature, public spaces and public transport to support mobility, physical activity, recreation, access to services and social interactions, and to reduce the use of energy and resources - Improve access to socially inclusive, open quality and green spaces for all. - Mainstream and adopt people-centred "right to health" framework that has a common vision for social cohesion and healthy equity, which include the right to access, use and transformative urban environments - Ensure access to affordable housing and conveyances, which are not crowded and take into account all minimum requirements for climate resilient, healthy and liveable housing, conveyances and working	**Strategy** Continued and sustained tackling of major risks to health and changing environments by building, creating and enhancing safe and healthy living and working environments including conveyances to improve people's lives today and in the future **Actions:** - Strict enforcement of healthy liveable, working, conveyancing and recreational facilities and other closed and open urban spaces policies, guidelines and standards including updating where need be.

Identified Needs/Gaps		Strategies & Actions		
		Short-Term (2024-2026)	Mid-Term (2026-2030)	Long-Term (2030-2063)
		providing healthy workplaces or living environments that are free of excessive moisture and molds	spaces/infrastructure, like the indoor temperatures and thermal insulation are adequate, be equipped with safety devices, and where disease vectors are controlled. - Continued capacity building and advocacy on living environments - Jointly manage environmental determinants of health linked to climate change with other sectors.	
		Strategy: Enhance healthcare facilities and systems to withstand climate-related health emergencies and shocks. **Actions:** - Upgrade infrastructure in healthcare facilities to withstand extreme weather events. - Stockpile essential medical supplies- - Establish rapid response teams. - Regular trainings for healthcare professionals on climate related emergency disaster response. - Strengthen partnerships with NGOs for resource support.	Strategy: Sustained enhancement of healthcare facilities and systems to withstand climate-related health emergencies and shocks. **Actions:** - Upgrade infrastructure in healthcare facilities to withstand extreme weather events. - Stockpile essential medical supplies- - Establish rapid response teams. - Regular trainings for healthcare professionals on climate related emergency disaster response. Strengthen partnerships with NGOs for resource support.	Strategy: stricter enhancement of healthcare facilities and systems to withstand climate-related health **Actions:** - Strict adherence to the laid down actions.
		Strategy: Enhanced adaptation and increased resilience to heat related events **Actions:** - Designate Health Agency to coordinate with other suporte response activities and disseminate information about heat-related health impacts. - Fore warn and regularly Inform the public of anticipated heatwaves and how long they are forecasted to last - Communicate clear messages of the dangers of heatwaves, emphasizing that health protection is the first priority. Where possible, postpone outdoor or sporting activities during the heat of the day, including at schools. - Communicate clear messages of the dangers of heatwaves, emphasizing that health protection is the first priority. Where possible, provide public health advisories of the reason to postpone outdoor or sporting activities during the heat of the day, including at schools. - Inform caregivers and those responsible for particularly vulnerable populations of the risks and appropriate responses to heatwaves.	Strategy: Continued implementation of the enhanced adaptation and increased resilience to heat related events **Actions:** - Implement relevant actions	Strategy: Strict adherence to the enhanced adaptation and increased resilience to heat related events **Actions:** Strict adherence to Implementation of the relevant actions

		- Prevent heat stress in outdoor workers; through where possible engineering controls, changing work practices and shifts including an ad.		
5	**Comprehensive Health Risk & Impacts Assessments, Integrated Disease Surveillance and Early Warning Systems to inform timely preparedness, surveillance and response decisions**	**Strategy** Develop guidance to conduct a thorough assessment of current and future health risks related to climate change and integrate them into existing priority health programmes like the universal health coverage. **Actions:** - Strengthen the multidisciplinary team of climate scientists, healthcare professionals, and epidemiologists. - Collect and analyse data to identify climate-related health risks. - Develop Health Impact Assessments (HIAs) regulations and guidelines and use the HIA guidelines to conduct HIA for new mitigation and adaptation policies and programmes/projects in health and all health-determining sectors, particularly the NDCs sectors. - Periodic update of the vulnerability maps and risk assessments for different regions in Kenya. - Collaborate with international organizations to manage environmental determinants to health and for data and resource sharing. - Conduct periodic health, economic and environmental impact assessments of future and existing policies and interventions	**Strategy** Periodic and continued assessment as planned and adaptation to evolving climate-related health risks. **Actions:** - Update risk assessments including analysis of seasonal trends and vulnerability maps annually. - Foster partnerships with international organizations for ongoing data sharing. - Develop a national climate health risks and disaster database.	**Strategy** Vulnerability and adaptation assessments findings informs key decisions in the evolving climate-related health risks and the assessment be regularly conducted. **Actions:** - Strict adherence to annual preparation of Vulnerability assessments and vulnerability maps - Continued strong partnerships with international organizations for ongoing data sharing - A national climate health database in place and strictly updated as per available guidance.
		Strategy Integrated Disease Surveillance, Early Warning and response: Enhance disease surveillance and early warning to detect climate-related outbreaks including implementing vector biology climate-change related activities. **Actions:** - Upgrade disease monitoring systems with a focus on vector-borne -, water-borne, air- borne or food-borne, zoonotic, respiratory and mental diseases. - Regular trainings of healthcare workers in early detection and response.	**Strategy** Climate informed Integrated Disease Surveillance, Early Warning and response: Enhance disease surveillance and early warning to predict, detect, prepare, and respond to climate risks and disasters including implementing vector biology climate-change related activities. **Actions:** - Upgrade disease monitoring systems with a focus on vector-borne -, water-borne, air-	**Strategy** Sustained advanced climate health ready infrastructure and disease surveillance and response system with evolving technologies. **Actions:** - Regular assessment of health facilities for readiness against

Identified Needs/Gaps		Strategies & Actions		
		Short-Term (2024-2026)	Mid-Term (2026-2030)	Long-Term (2030-2063)
		- Strengthen collaboration with Kenya Meteorological Department and other institutions including NGOs, for climate-disease modelling. - Prepare health sector contingency plans for extreme weather events including risk reduction, preparedness and response. - Invest in early warning reporting systems for climate related disease outbreaks and enhancing emergency preparedness and response reporting system including upgrading existing reporting systems for early detection of unusual disease patterns - Integrate climate data into existing monitoring, early warning, surveillance, and data collection systems, including data disaggregated by sex, age, disability and any other relevant factor, where appropriate, to enable evidence-based decision-making and targeted interventions that respond to the impacts of climate	borne or food-borne, zoonotic, respiratory and mental diseases. - Regular trainings of healthcare workers in early detection and response. - Strengthen collaboration with Kenya Meteorological Department and other institutions including NGOs, for multisectoral climate-disease modelling and risk management approaches to health, like risks related to disasters, water, waste, food and air pollution. - Invest in early warning reporting systems for climate related disease outbreaks and enhancing emergency preparedness and response reporting system including upgrading existing reporting systems for early detection of unusual disease patterns - Integrate climate data into existing monitoring, early warning, surveillance, and data collection systems, including data disaggregated by sex, age, disability and any other relevant factor, where appropriate, to enable evidence-based decision-making and targeted interventions that respond to the impacts of climate - Establish climate-informed preparedness plans, emergency systems and community-based disaster and emergency management plans for outbreaks and emergencies triggered by climate variability.	climate impacts and continuous upgrades of healthcare infrastructure that is built to withstand extreme weather events, with a strong emphasis on renewable energy sources, green building practices, and efficient resource utilization. - Embrace modern early warning systems and emergency preparedness plans to respond effectively to climate-related disasters
6	**Strengthen technical and professional and organizational capacities, communication and awareness creation**	**Strategy** Human resource skill building, training and education. **Actions:** - Training courses on climate change and health topics targeting health personnel are conducted. - Incorporate climate change and health into curricula of both secondary and/or tertiary levels.	**Strategy** Human resource skill building, training and education **Actions:** - Conduct regular stress tests for healthcare infrastructure. - Invest in renewable energy and backup power solutions for hospitals. - Collaborate with universities/colleges to offer climate-resilience training for healthcare workers. - Develop a disaster recovery plan for the healthcare sector	**Strategy** Human resource skill building, training and education **Actions:** - Establish a comprehensive training and certification program for healthcare professionals to prepare them for climate-related health challenges, disease outbreaks and health emergencies.

		Strategy Organizational capacity development **Actions:** - Contingency plans for the deployment of sufficient health personnel in case of acute shocks, such as extreme weather events and outbreaks are developed at the relevant level (i.e., national, subnational, local). - Realistic and innovative capacity-building plans (e.g., from capacity or vulnerability and adaptation assessments) are developed to address identified human resources and institutional capacity gaps. - Contingencies, adaptation costs and potential losses and damages from climate change are incorporated by management staff into investment plans. - Ensure political commitment and effective leadership to build climate resilience.	**Strategy** Implement appropriate Organizational capacity **Actions:** - Implement advanced digital surveillance tools for early detection. - Enhance laboratory capabilities and data sharing with neighbouring countries. - Establish a rapid response team dedicated to climate-related health threats. - Strengthen collaboration with Kenya Meteorological Services, communities and environmental organizations.	**Strategy** Sustained Organizational capacity development and implementation **Actions:** - Empower and capacitate institutions and staff responsible for disaster surveillance, preparedness and response, ensuring a coordinated and rapid response to climate-related health emergencies.
		Strategy: Communications and awareness raising **Actions:** - Develop and implement communication strategy on climate risks to health. The strategy to outline the scope of information for diverse audiences (e.g., media, public, health personnel and other sectors) and events, including who should communicate, and the means of and tools for communication. - Establish community engagement and feedback mechanism on how to conduct regular awareness campaigns on TV, radio, and social media, regular community workshops and trainings of community health promoters (CHPs) and rest of residents. - Strengthen and support implementation of the “Health in All Policies” approach at the national and county levels through appropriate joint - Engage other sectors and communities in the development of climate and health policies, fostering recognition of health co-benefits and sustainable behaviour in line with the national context and priorities; - Internal and external communication plans (including the development of knowledge products) are developed and implemented to raise awareness of health and climate change, and response options targeting key audiences, such as health professionals and decision-makers, communities, the media and other sectors. - Health professionals, the media and community leaders are trained in risk communication, including communication of uncertainty. - Stakeholder forum on protecting health from climate change is established as a way to engage health-determining sectors and the community.	**Strategy:** Implementation of Communications and awareness raising actions **Actions:** - Implement actions prioritized in communication strategy on climate risks to health.	**Strategy:** Update and strictly implement communications and awareness strategy and actions respectively **Actions:** - Strict Implementation of actions prioritized in communication strategy on climate risks to health.

Identified Needs/Gaps		Strategies & Actions		
		Short-Term (2024-2026)	Mid-Term (2026-2030)	Long-Term (2030-2063)
7	**Health Research and development, Policy Integration and partnership and resource mobilization for Climate Change adaptation and mitigation in health**	**Strategy** Development of research agenda to guide research implementation to inform policy and practice including shared research and practice knowledge. **Actions:** - Work closely with Air-Pollution Centre of Excellence that supports air pollution research to develop research agenda to guide research implementation. - Facilitate regular meetings and workshops among stakeholders to foster evidence and knowledge sharing and practice. - Allocate funds for climate-health research projects. - Share findings and best practices nationally and internationally. - Encourage joint initiatives to address shared challenges. - Encourage collaboration between policy-makers, researchers and developers in order to accelerate the translation of evidence to policy and innovation in the field of climate and health. - Continue working and partnering with the WHO Alliance for Transformative Action on Climate and Health (ATACH) for continued exchange of knowledge and best practices. - Support research and development of new health programmes to prevent, test and treat climate-sensitive diseases, with special attention of enabling equitable access of the tools by those hit hardest by climate-sensitive diseases, like those affected by NTDs and climate risks.	**Strategy** Implementation of research findings to inform policy and practice. **Actions:** - Encourage the development of collaborative research projects and funding. - Develop joint initiatives for data collection and analysis. - Utilize a variety of advocacy tools, such as policy briefs and public awareness campaigns,	**Strategy** Implementation of research findings to inform policy and practice. **Actions:** - Continued operationalization and upgrading of the established national centre for environmental determinants of health and climate and health research and innovation to act as hub to address Kenya's specific and regional climate and environmental -health challenges. - Foster continuous research, data sharing, and collaboration among stakeholders, including the establishment of a national climate-health data repository. - Institutionalize climate and health considerations in all counties, national and regional policies, fostering a climate-resilient and sustainable future
8	**Monitoring, Evaluation, Accountability, and Learning**	**Strategy** Establish a robust monitoring and evaluation system on climate change and health. **Actions:** - Design key performance indicators (KPIs) for climate-health initiatives. - Create a reporting and evaluation framework. - Conduct regular assessments and adjust strategies accordingly. - Communicate progress to stakeholders.	**Strategy** Continuously update and upgrade the monitoring and evaluation system. **Actions:** - Develop a central dashboard for real-time tracking and reporting. - Conduct comprehensive mid-term assessments of progress and challenges. - Establish an independent oversight body for accountability. - Regularly communicate results and gather public input.	**Strategy** Continuously update and upgrade the monitoring and evaluation system. **Actions:** - Maintain a robust, ongoing monitoring and evaluation system to track the implementation and impact of the strategy, adjusting policies and practices as needed.

SECTION 4

Implementation Plan

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4.1 Implementation Plan, Timelines and Responsibilities

Priority Intervention Areas	Activities	Responsible	Output	Timelines (Year)				
				1	2	3	4	5
1. Low Carbon sustainable health system								
Clean Energy and Air Quality	• Creation of awareness to promote clean energy projects, such as solar and wind power. • Monitor GHGs emissions in health facilities. • Training Health workers on decarbonisation tool. • Promote and adopt the use of electric and hybrid vehicles. • Expand coverage and regularly monitor and report on air quality. • Training of CHPs on household air pollution	MOH, Energy, COG, MOE	• Health facilities /households use clean energy such as solar power, wind power, biofuels, electricity • Health Facilities monitoring and reporting GHG emissions. • Health workers trained on use of decarbonisation tool and reporting • Electric and hybrid vehicles used.					
	Implement the WHO Air Pollution Roadmap by developing and implementing a 5-year Household Air Pollution Strategy	MOH, Energy, COG, MOE	• HAP strategy developed • CHPS trained on household air pollution • Household transition to use of clean cooking • Robust tracking and surveillance of air quality.					

Prioritise environmentally sound management of chemicals and waste through adoption of best available technologies and best environment practices such as waste segregation, climate compliant waste to energy system and recycling	• Promote waste treatment system based on available BAT and BEP, like adoption of non-burn technology in treatment of medical waste. • Promote waste segregation system at the point of generation, ensuring that waste is sorted into categories such as infectious, hazardous, and non-hazardous. • Regularly educate staff about recycling procedures and place recycling bins conveniently throughout the facility. • Actively promote waste reduction initiatives within the healthcare facility, such as the use of reusable medical equipment.		• Non burn waste treatment equipment/system in all the 47 counties installed and using a pooled system for multiple health facilities.	X	X	X	X	X
	• Develop an action plan setting out a roadmap to a sustainable low carbon health system including green supply chains.							
2. Climate smart resilient and adaptive health system								
Promote sustainable and climate smart -resilient Health practices	Management of natural and human-induced extreme weather and climate events/disasters	Kenya Red Cross, National Disaster Command Center, MOH, MoWT. CoG	. Disaster response hastened . Adaptation to climate change in place					

	• Training of farmers on safe food production (e.g., good post-harvest handling of crops, safe use of pesticides and veterinary drugs. • Develop IEC materials on safe food production.	MOH, MOALD, COG, MOE	• Farmers trained on safe food production • IEC Materials developed	X	X	X	X	X
	• Establishment and operationalisation of the Food Safety and Climate Change and Health Committee. • Adoption of farming technologies reducing emissions e.g. organic farming for minimising the use of fertilizers, and pesticides, covering manure storage facilities.	MOH, MOALD COG, MOW, MOE	• Coordination mechanism for food safety and climate change and health established at the County and National level	X	X	X	X	X
	Use of high-quality animal feeds to reduce methane emission during enteric fermentation.	MOH/MOALD, COG, MOE	Safe technologies adopted	X	X	X	X	X
	• Integration of climate adaptation and mitigation measures into WASH planning, • Guidelines for climate change-resilient WASH infrastructure for health facilities, schools and communities developed and implemented. • Standards for biodegradable sanitary pads are developed and implemented.	MOH, MOALD, COG, MOE, MOW	• Improved quality and stability of water supplies. • Decreased vulnerability and improved resilience of WASH infrastructure. • Increased capacity of WASH systems for disaster preparedness and response.	X	X	X	X	X

Comprehensive Health Risk and Impacts Assessment and Integrated Disease Surveillance and response	• Collection, analysis and data updated to identify climate-related health risks. • Updated vulnerability maps and risk assessments for different regions in Kenya.	MOH, MOE, MOALD, MOW, COG	• A comprehensive collection and analysis of existing data yielding clear identification of climate-related health risks. • Updated vulnerability maps and risk assessments for various regions within Kenya, reflecting the latest climate impact data.	X	X	X	X	X
	Promote climate smart Integrated vector and vermin management	MOH, MOE, MOALD, MOW, COG		X	X	X	X	X
	• Enhance disease surveillance to detect climate-related outbreaks including vector-borne, water-borne, air-borne, food-borne, zoonotic, respiratory, and mental health conditions.	MOH, MOALD, MOW, MOE, COG	• A state-of-the-art monitoring and reporting systems capable of effectively tracking climate related diseases and unusual patterns for prompt action.	X	X	X	X	X
Strengthening Healthcare Resilience, Public Health Education, Promotion and awareness	• Regular and comprehensive training programs • Enhance healthcare facilities and systems to withstand climate-related health emergencies	MOH, MOE, MOALD, MOW, COG	• Improved skill set among healthcare professionals for disaster response. • Enhanced durability and resilience of healthcare facilities, • A robust operational rapid response teams ready to act in the event of a disaster.	X	X	X	X	X
	• Conduct community workshops, regular, trainings, awareness campaigns on TV, radio, and social media. • Incorporate climate health education into school curricula.	MOH	• Communities understanding of climate change, its impact on health, and the actions they can take to adapt and mitigate these impacts. • Successful integration of climate-related health topics into the education system.	X	X	X	X	X

3. Leadership for climate smart health system								
Governance, leadership and Policy Integration on Climate Change adaptation and mitigation	• Advocate for climate and health priorities in national and county policymaking. • Establish/strengthen inter-departmental committees for coordination.	MOH	• Ecosystem-based strategies in place i.e. protecting and restoring natural ecosystems like wetlands, forests, and coastal areas.	X	X	X	X	X
Health Research and Development	• A National Climate-Health Research Network that promotes multidisciplinary collaboration between researchers, policymakers, and stakeholders is developed and implemented.	MOH	• Research findings informing policy and practice					
Monitoring, Evaluation and Learning	• Design key performance indicators (KPIs) for climate-health initiatives. • Create a reporting and evaluation framework • Conduct regular assessments and adjust strategies accordingly. • Communicate progress to stakeholders.	MOH	A robust monitoring and evaluation system on climate change and health that supports policy implementation.	X	X	X	X	X

SECTION 5

Monitoring Evaluation and Learning

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5.1 Performance Indicators and Metrics

Performance indicators and metrics are vital for assessing the efficiency and influence of climate change and health systems. These metrics are pivotal in monitoring progress and pinpointing areas requiring focused interventions and investments. They equip policymakers, healthcare providers, and other stakeholders with the means to assess the effectiveness of their initiatives and make informed, data-driven decisions. Regular and systematic monitoring and evaluation are paramount in the adaptive management of strategies and policies, safeguarding the resilience of healthcare systems in the context of climate change.

Performance Indicators and Metrics

Category	Metrics and Indicators	Means of Verification	Frequency of reporting
Climate-Related Mortality and Morbidity	• Incidences of climate-related diseases for instance, vector borne diseases e.g., malaria, dengue fever etc. • Hospital admissions for injuries, water-borne and respiratory conditions during extreme weather events. • Number of heat advisories issued by the Kenya Meteorological Department (KMD) • Number of heat related deaths	• National Health Records • Ministry of Health • Disease surveillance Systems (MOH 505) (MOH 504)	Weekly/Monthly/ Annually
Heat-related	• Incidences and severity of heat-related illnesses • Number of heat advisories issued and public responses	• MOH/county health departments report • MOV: - RUSH RMTIS - DHIS2, KHIS, WHO, UN agencies, World bank KMD, UNEP, NEMA, Private sectors player in the climate change and Health Space. MOV -Kenya Climate Risk outlook profile. • State of Environment (SOE) Report	Monthly/Annually

Air Quality	• Number of health workers trained on household air pollution monitoring • MOV – training reports, Photos, No. of air quality monitoring gadgets installed, list participants • Number of institutions / households that regularly monitor and report on air quality • Number of air quality gadgets installed for measuring air quality in health facilities in the counties • Number of households adopting clean household energy technologies • Number of transport energy stations with installed e-energy charging systems and number of e-vehicles in every county	• MOV –Monitoring of air quality Reports, Photos, list of names of institutions, locations where AQM(Air Quality Management) is carried out and Number of health workers trained on use of the decarbonisation tool for GHGs monitoring • MOV – Reports, pictures, list of participants Air monitoring devices installed • Environmental Regulatory Agencies • Air quality Monitoring Stations • Ministry of Environment, Climate Change and Forestry • Ministry of Roads and Transport and its energy regulatory agencies	Daily/Annually
Water and Sanitation	• Percentage of population accessing clean and safe drinking water • Incidences of waterborne diseases e.g. cholera, typhoid. • Percentage of sanitation coverage and improvement • Volumes of safe water (litres/ cubic meters) harvested or saved by communities per county • Presence of household hand washing facility • No exposed human excreta at household and community level	• Latrine use/utilisation is measured by indirect absence of open defecation or presence of baby excreta/diapers/ by presence of hand washing with soap • Number of facilities using solar energy in water distribution and treatment • Water surveillance and samplingMOV- surveillance records, water sampling and testing (chemical and bacteriological)	Annualy

Food Safety and Quality Control	• Number and type of Food surveillance done • Number and type of food samples taken • Incidences of food contamination recorded per month • Incidences of food borne diseases recorded per month	• MOV – Food surveillance reports • Chemical and bacteriological results • MOH 708 • Food Inspection reports • National Surveys • Food analysis reports	Monthly/Daily/ Bi-Annually
Disaster Preparedness and Response	• Number of households/ people evacuated from disaster and flood prone areas. • Repositioning of emergency public health commodities • Number of national (PHEOC & NOC) and county response teams activated and deployed • Number emergency budgets prepared and supported • Number of disaster related events reported in DDSR / NOC /PHEOC • Response time and effectiveness of emergency healthcare services • Number of community drills	MOV Reports, Alerts, Advisory • Emergency Services • Disaster Management Agencies • Community Surveys	Quarterly/Annually
Public Health Education	• Number of sensitisation sessions on climate change held • Number of Public Health education campaigns held	• Health Education Programs • Public Awareness Campaigns • Surveys	Annually
Mental Health	• Number of wellness centers established in MDAs / Counties • Number of workers attending rehabilitation Centres	MOV – Captured under MOH reporting systems • Mental Health Services • Community Support Pro grams • Surveys	Quarterly/ Annually

Climate-Resilient Infrastructure	• Number of health infrastructure that are climate resilient	- Health infrastructure inspection reports	Annualy
Climate and Health Research	• Number of researches done on climate change andhealth • Number of policies developed or reviewed • Number of MOUs signed to address Climate change and Health funding	• Number of Research papers • Number of climate change and health research institutions • Policy documents	Quarterly/ Annually
Waste management	• Number of clinical waste microwaves installed in healthcare facilities • Volumes (tones) of waste treated through non-burn technologies, volumes of waste diverted from the landfill through reuse and recycling • Number of strategies and policies adapted and implemented in healthcare systems.	• Emissions Reports • Health Policy Documents	Annualy
Community Engagement	• Number of climate change and health information centers	• MOV- Number of climate change and health information centers established	Quarterly
Data Management	• Availability and accessibility of climate and health data • Quality and timeliness of data reporting • Data-driven decision-making and policy adjustments	• Health Information Systems • Data Management Reports • Policy Reports	Monthly/Quarterly
Gender disability,y social inclusion and equity	• Assessing equitable distribution of healthcare resources • Reduction in health disparities related to climate change impacts	• Equity Assessments • Health Disparity Reports • Health Resource Allocations • Affirmative action mainstreamed in the strategy	Annualy

Learning and Knowledge Management	• Number of reports, policy briefs, or other informational materials published and distributed on the subject. • Number of training sessions conducted and the number of individuals trained • Community feedback or testimonials regarding the usefulness and applicability of the knowledge provided.	• Monitoring and Evaluation Reports • Community Feedback Mechanisms • Expert Reviews and Consultations • Data Analytics • Policy Analysis	
Financial	• Allocation and utilisation of financial resources for climate change health systems • Efficiency and effectiveness of resource allocation	• Budget Reports • Financial Audits • Performance Assessments	Quarterly/ Annually

SECTION 6

Resource Mobilisation for Climate Change and Health Financing

Photo credit:BillionPhotos/CanvaPro

6.1 Budgeting and Funding Sources

The sources of funding for climate change and health initiatives can be diverse, encompassing a range of channels and mechanisms. These sources include the Government through the exchequer and multilateral climate finance instruments. Additionally, traditional development partners, both bilateral and multilateral, are increasingly aligning climate change within their strategic focus areas, further contributing to the available funding pool.

6.1.1 Government Financing

The GoK funds the government projects through the exchequer, a system that helps ensure transparency, accountability, and responsible financial management, ultimately contributing to the country's socioeconomic progress and public welfare. By channelling funds through the exchequer, the Government can allocate resources to different sectors based on their importance and urgency.

6.1.2 Grants and Donor Support

International Grants and Aid from Development Partners: Seek grants and financial support from international organisations, such as the United Nations, World Bank, UNDP, AfDB, DANIDA, GIZ, JICA, UNESCO, SIDA, USAID, UNICEF and other bilateral aid agencies. These organisations often provide funding for climate change adaptation and public health projects.

Philanthropic Foundations: Philanthropic organisations and foundations such as the Bill and Melinda Gates Foundation focus on public health, environmental conservation, or climate change. They provide valuable support, expertise, and resources to enhance the effectiveness of climate change and health initiatives.

Climate Funds: Climate finance mechanisms, such as the Green Climate Fund (GCF) and Global Environment Facility (GEF), provide financial support for climate adaptation and mitigation projects. Kenya can access such funds for relevant initiatives.

Domestic and International NGOs: Partner with Non-Governmental Organisations (NGOs) active in health, climate change, and environmental conservation. NGOs may provide funding and expertise for on-the-ground activities.

Research Grants: Seek research grants from institutions and agencies that fund climate change and health research. This can help support the generation of data and evidence required for policy development.

Bilateral Agreements: Explore bilateral agreements with other countries that have a vested interest in climate change and health. These agreements can involve financial support and knowledge exchange.

6.1.3 Public-Private Partnership

There is a growing emphasis on leveraging the private sector to extend the scope of financing. Blended financing models, which combine public and private resources, have gained prominence. Capital markets, featuring financial instruments such as Green Bonds and Carbon Markets, represent attractive avenues for investment in climate change and health endeavours. Public-Private Partnerships (PPPs) present collaborative opportunities that can drive funding towards critical initiatives.

6.1.4 Other Resources

The other available resource opportunities that the Ministry of Health will explore include partnerships with other government departments, CBOs, and local communities, as well as public awareness campaigns to encourage individual and corporate donations or contributions to climate change and health initiatives.

Conclusion

The findings in this strategy document underscore the critical and immediate need to address climate change's profound impact on public health. As the planet undergoes unprecedented environmental shifts, the ramifications for human well-being are increasingly evident. Rising temperatures, extreme weather events, altered disease patterns, environmental degradation and disruptions to essential services all pose substantial threats, most especially to the vulnerable populations who are disproportionately affected.

However daunting these challenges may be, they also provide the need for action and innovation. The findings reveal the vulnerabilities we face and the opportunities to build resilient health systems, engage in sustainable practices, and foster interdisciplinary collaboration. These opportunities will help reduce greenhouse gas emissions, enhance healthcare infrastructure, implement public health programs, conduct vital research, and foster collaboration among diverse stakeholders.

The One Health approach, emphasising the interconnectedness of human, animal, and environmental health, emerges as a pivotal strategy in this endeavour. It is a holistic perspective that will guide in crafting resilient healthcare systems, sustainable practices, and community engagement efforts that will prove essential in the future. With this, the Ministry of Health should prioritise mitigation and adaptation measures, public awareness campaigns, research, and robust data collection. Alongside protecting current and future generations, these actions will also provide the potential to create healthier, more sustainable, and more resilient societies.

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Annexes

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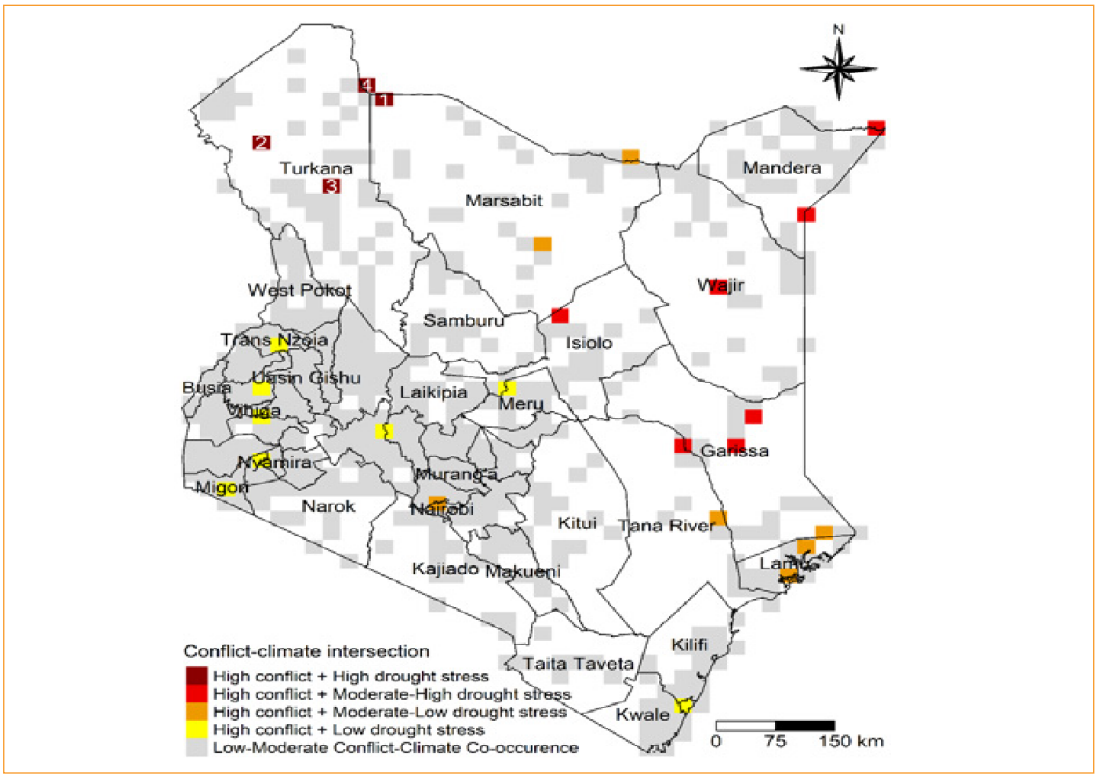
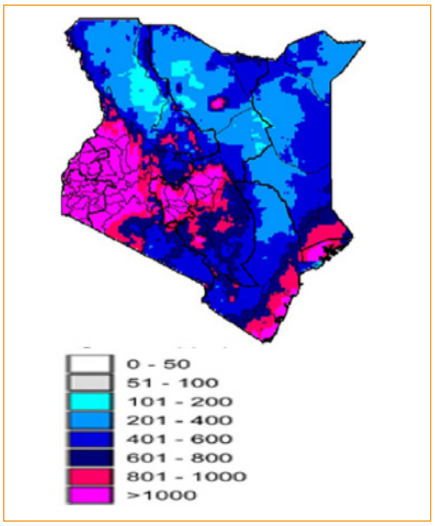
Figure 1. Climate security hotspots in Kenya



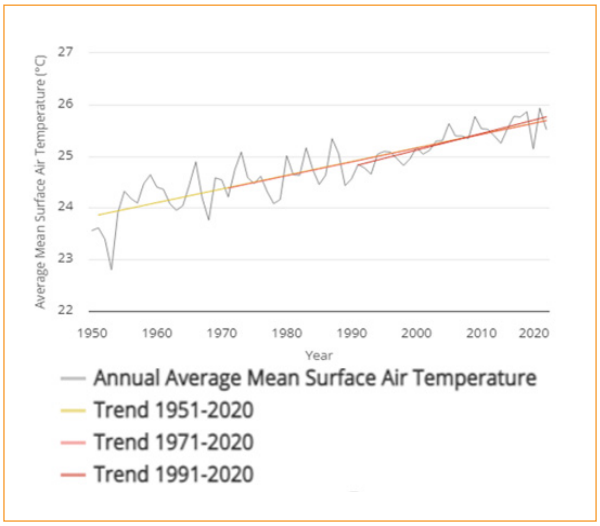
Source: (Medina et al., 2022)

Figure 2a: Average annual rainfall distribution 1960-2014 in Kenya



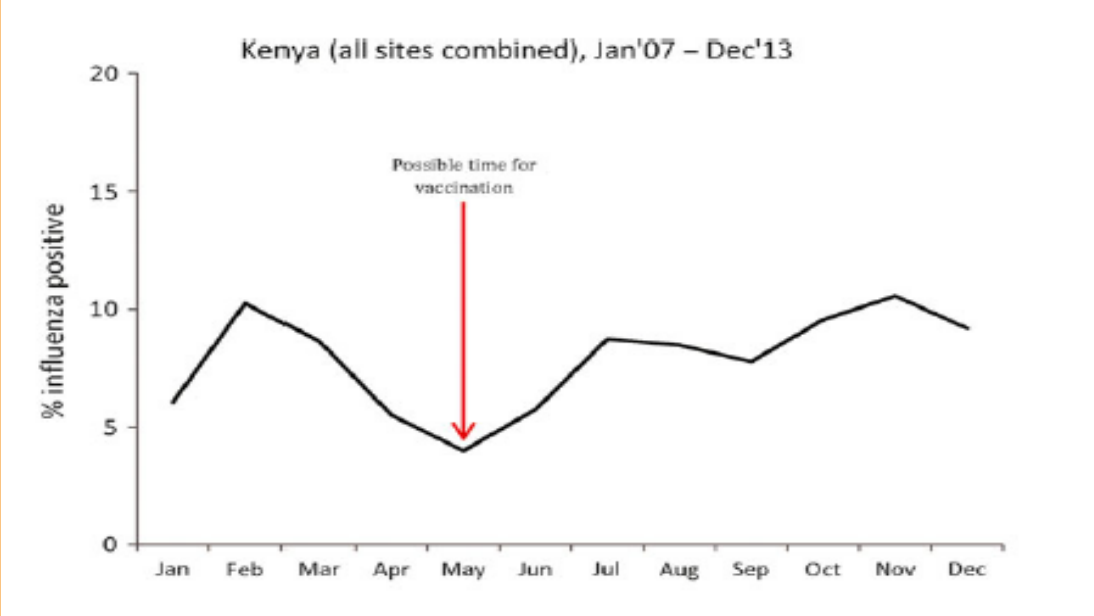
Source: Marigi, (2017)

Figure 2b: Average mean surface air temperature annual and decadal trends 1950-2020 in Kenya



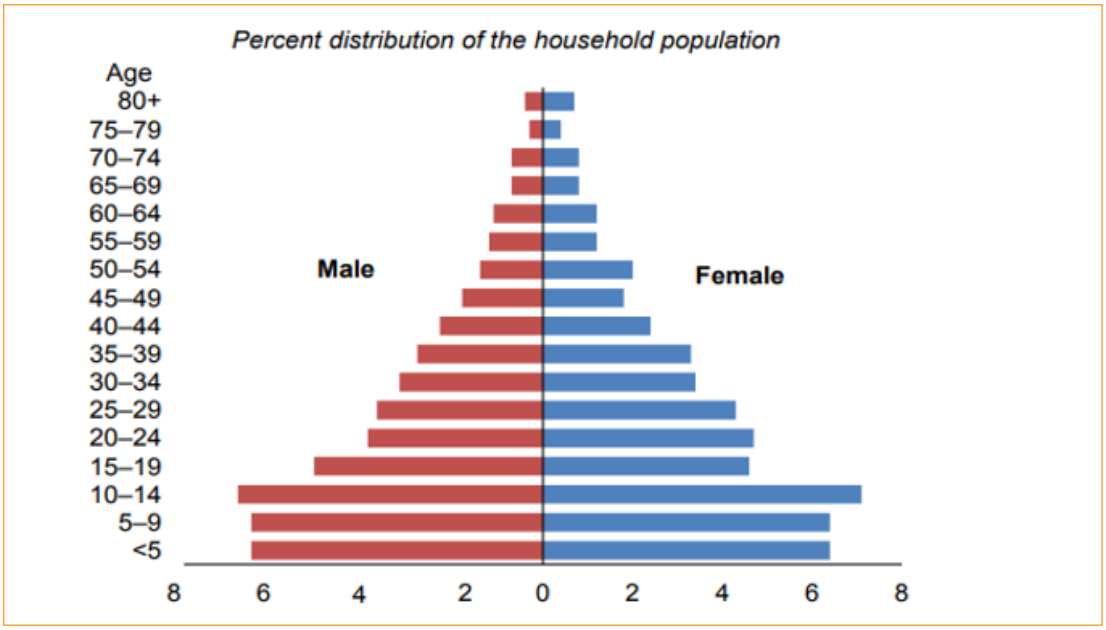
Source: World Bank Climate Change Knowledge Portal

Figure 3: Monthly seasonal influenza trend in Kenya



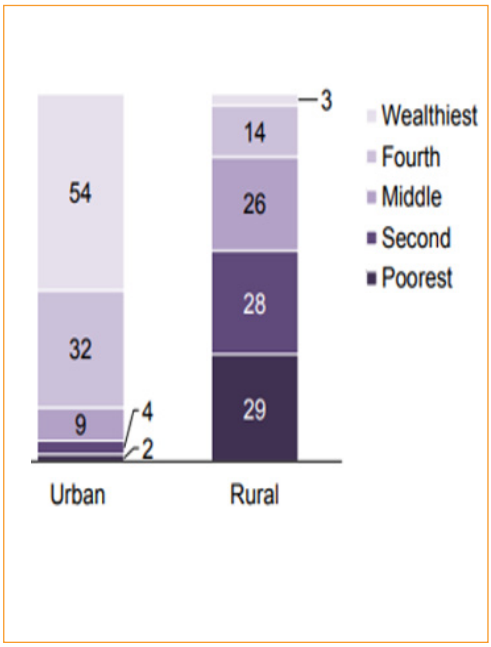
Source: Emanuel et al., (2016)

Figure 4a: Population pyramid showing percentage distribution of household population in Kenya, 2022



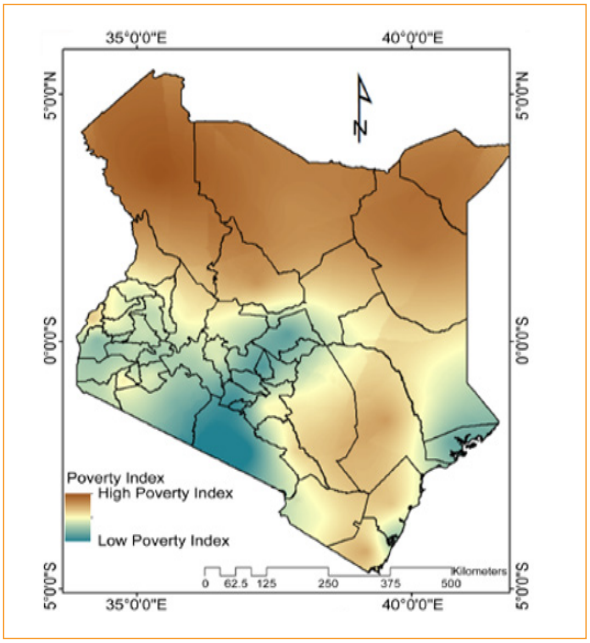
Source: KNBS Demographic and Health Survey 2022

Figure 4b: Household wealth by residence in Kenya, 2022



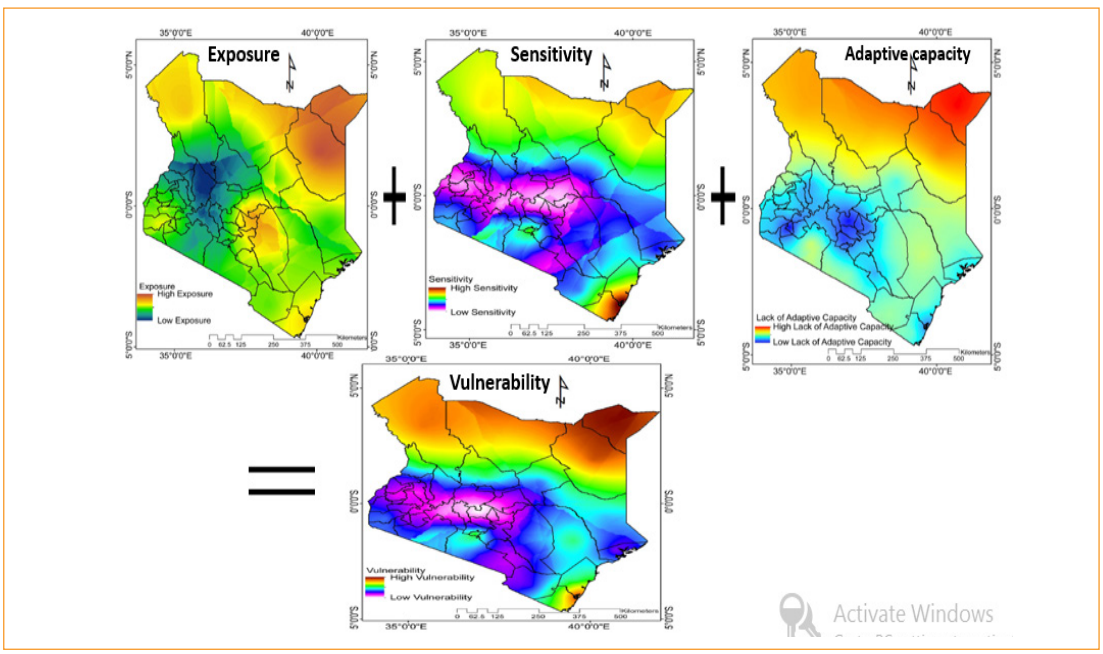
Source: KNBS Demographic and Health Survey 2022

Figure 4c: Poverty index in Kenya



Source: Marigi, (2017)

Figure 5: Vulnerability (exposure, sensitivity and adaptive capacity) of Kenya to climate change and health impacts



Source: Adapted from Marigi (2017)

Figure 6: Stakeholder Consultation Process in the Development of KCCHS 2023-2027

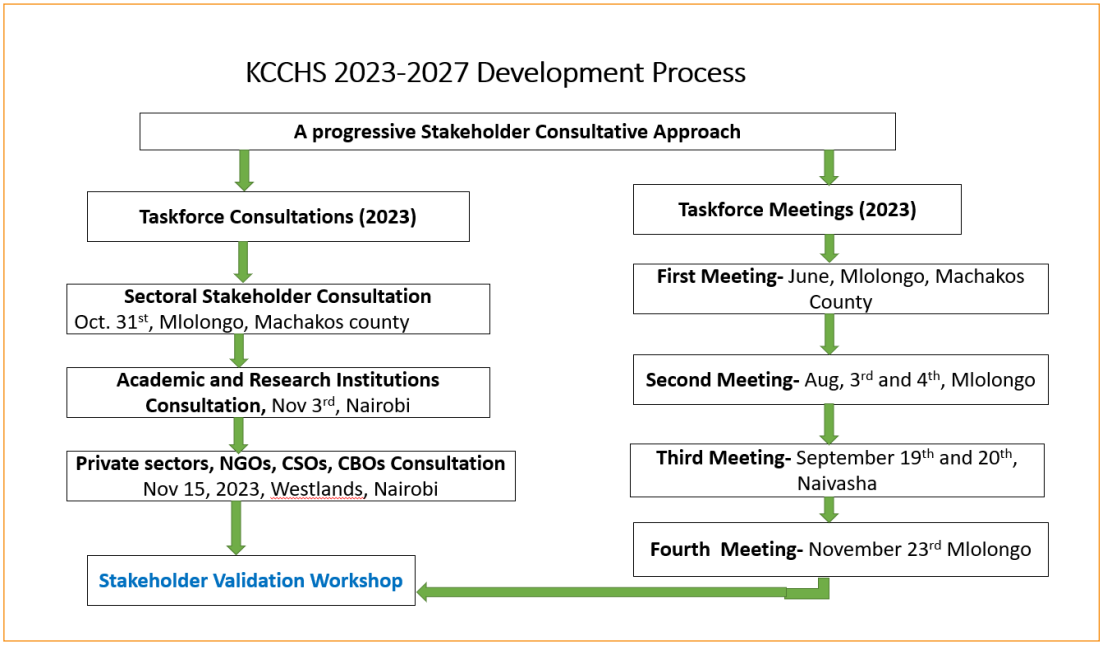


Table 2: Analysed Stakeholders on climate change and health actions in Kenya

Categories	Stakeholders	Key climate change and health Actions
Ministries, Departments and Agencies (MDAs)	• Ministry of Health and its para-statals • Ministry of Environment, Climate Change and Forestry • Ministry of Water, Sanitation and Irrigation • Ministry of Energy and Petroleum • Ministry of Roads and Transport • Ministry of Agriculture and Live-stock Development • The National Treasury and Eco-nomic Planning • Department of Devolution and ASALs • National Environmental Manage-ment Authority • Kenya Meteorological Depart-ment • Other MDAs	- Different MDAs perform different but interrelated sectoral adaptation and mitigation roles - Roles not limited to: environmental protection and conservation, access to WASH services, climate-related disease surveillance and response, climate monitoring, climate-smart agriculture, energy conservation and use efficiencies, financial allocation among others.
Private Sector	• Kenya Private Sector Alliance (e.g. Kenya Association of Manu-facturers, Delloite etc.) • Kenya Climate Change Innova-tion Center • Africa Bioenergy Programs Limited • Niko Green • Spectrum Consulting	- Generation of climate change solu-tions - Resource mobilisation both financial and technological for climate change action - Support incubation, capacity building and grant awards to SMEs to develop climate-smart innovations - Initiate and advance operations to adopt circular economy - Drive awareness on climate change risks and opportunities for adaptive mechanisms for businesses

Civil Society Organisations	• Kenya Red Cross Society • Kenya Climate Change Working Group • Kenya Green Belt Movement • African Centre for Technology Studies • Sustainable Energy Access Kenya • Clean Cooking Alliance	- Advocate for climate change adaptation and mitigation actions including policy formulation and implementation - Advocacy revolves around the following: environmental conservation (tree planting, water conservation, access to and use of clean energy etc.); mainstreaming livelihood and gender into climate change responses; funding climate change research and innovation projects and supporting vulnerable populations during climate change extreme events.
Non-governmental Organisations	• Technoserve • Pathfinder • Care International Kenya • Purpose • Oxfam • UN-Habitat, WFP • Pan African Climate Justice Alliance • Climate Network Africa • Greenpeace Africa • Mazingira Institute • **African Institute for Development Policy.**	- Drive support programmes to support vulnerable populations in ASAL and marginalised areas - Develop approaches to address climate and environmental challenges - Champion for nationwide access to WASH, energy and health services - Enhance environmental justice and protection - Design solutions for small-scale livelihood asset improvement (crops, livestock and business) against risk of climate change - Empowering women and youth on climate resilience actions

Academic and Research Institutions	• Kenya Medical Research Institute • African Population and Health Research Center, • University of Nairobi - Institute of Climate Change and Adaptation • Aga Khan University • Kenya Forestry Research Institute • Center for Sustainable Development and Resilience • International Livestock Research Institute • Stockholm Environment Institute, Africa • Kenya Institute for Public Policy Research and Analysis • Kenya Industrial Research Development Institute	- Conduct research on environmental issues including climate-related disease transmission and health outcomes - Research on climate change adaptation and mitigation measures from national to community levels - Policy formulation on climate change and health actions - Funding climate change research and innovation projects/programmes/ initiatives - Promote One Health approaches to manage food safety, antimicrobial resistance, zoonoses, vector etc. - Livelihood asset development e.g. animal and crop productivity
Women Groups/ Associations	• Women and Girls in Climate Change Kenya • Totum Women Group (West-Pokot County) • Womankind Kenya • Rural Women Energy Security	- Address climate change impacts on women in terms of livelihood, WASH services and emergency interventions - Women integration into environmental protection and green infrastructure initiatives - Women empowering economically, socially and good leadership inclusivity
Youth Groups	• Kenya Youth Biodiversity Network • Youth for Green Action Kenya • Global Alliance for Green and Gender Action • Youth4Nature Kenya • African Youth Initiative on Climate Change	- Incorporate youth into national and international environmental policy formulation, advocacy and implementation - Develop youth capacity, seal knowledge gaps and resource constraints for incubation of green projects that provide solutions to climate change - Empower youth involvement into environmental conservation and protection.

Annex: List of KCCHS Taskforce Members

S/N	Name	Institution
1	Susan Mutua	Ministry of Health, Environmental Health and Sanitation
2	Anthony Wainaina	Ministry of Health, Environmental Health and Sanitation
3	Janet Mule	Ministry of Health, Environmental Health and Sanitation
4	Rose Mokaya	Ministry of Health, Environmental Health and Sanitation
5	Naomi Mutie	Ministry of Health, Environmental Health and Sanitation
6	Lolem Lokolile Bosco	Ministry of Health, Environmental Health and Sanitation
7	Lilian Ousa	Ministry of Health, Environmental Health and Sanitation
	Brendah Obura	Ministry of Health, Food Safety and Quality Control
8	Julia Rotich	Ministry of Health, Division of Nutrition
9	Nicholas Mwikwabe	Kenya Medical Research Institute (KEMRI)
10	Dr. James Kaoga	University of Nairobi
11	Dr. Jefferson Nthanga	State Department of Veterinary
12	Caroline Muthoni	Aga Khan University
13	Benard Onyango	AFIDEP
14	Titus Kibaara	AFIDEP
15	Sammy Sikinyi	Ministry of Environment, Climate Change and Forestry, Climate Change Directorate (CCD)
16	Saada Mohammed	The National Treasury and Economic Planning
17	Emmah Mwende	Ministry of Health, Environmental Health and Sanitation
18	Anita Kamanda	Ministry of Health, Environmental Health and Sanitation
19	Naomi Chelagat	Ministry of Health, Environmental Health and Sanitation
20	Ariel Brunn	London School of Hygiene and Tropical Medicine (LSHTM)
21	Martin Muchangi	AMREF Health Africa
22	Priscilla Nyambura	Ministry of Health - Planning department
23	Douglas Rabura	Ministry of Energy and Petroleum (MOEP)
24	Antonios Kolimenakis	World Health Organization African Regional Office (WHO-AFRO)
25	Evans Kituyi	Dale Agro LTD/Consultant
26	Ibrahim Basweti	Ministry of Health, Environmental Health and Sanitation
27	Romanus Opiyo	Stockholm Environment Institute (SEI)
28	Solomon Nzioka	WHO-Kenya Country Office
29	Prof. William Ogara	KCCHS Lead Consultant
30	Joab Odero	KCCHS Consulting Team
31	Justus Ogando	Spectrum Africa Climate Health Initiative

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