HOMA BAY COUNTY PARTICIPATORY CLIMATE RISK ASSESSMENT REPORT

2023

WORLD BANK GROUP

DANIDA

Sweden Sverige

german cooperation

KFW

Kingdom of the Netherlands

Correct Citation:

County Government of Homa Bay (2023). *County Government of Homa Bay Participatory Climate Risk Assessment Report (Kenya): 2023*
Homa Bay Kenya.

To obtain copies of this publication, please contact:
The County Executive Committee Member
Department of Water, Sanitation, Irrigation, Environment, Energy, Forestry and Climate Change

Contents

List of Tables

List of Panels

Table of Figures

Definition of Terms

Term	Definition
Adaptation	Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.
Adaptive capacity	The ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.
Climate Change	Refers to a change in the climate system that is caused by significant changes in the concentration of greenhouse gases due to human activities, and which is in addition to the natural climate change that has been observed during a considerable period.
Climate Change Mainstreaming	The integration of priority climate change adaptation responses into development, so as to reduce potential development risks and take advantage of opportunities.
Climate Change Vulnerability	The degree to which geophysical, biological and socio-economic systems are susceptible to, and unable to cope with adverse impacts of climate change. Impact here refers to a specific change in a system caused by its exposure to climate change
Climate hazard	A physical process or event (hydro-meteorological or oceanographic variables or phenomena) that can harm human health, livelihoods, or natural resources
Exposure	Refers to whether the asset or system is located in an area experiencing direct effects of climate variables.
Mitigation	Refers to human interventions to prevent or slow down atmospheric GHG concentrations by limiting current or future emissions, and/or enhancing potential sinks for greenhouse gases.
Resilience	Refers to the capacity of social, economic and environmental systems to cope with a hazardous event, trend, or disturbance. It is manifested through responding or reorganizing in ways that assert the essential function, identity, and structure of the system, while also maintaining the capacity for adaptation, learning and transformation
Sensitivity	Refers to how the asset or system fares when exposed to a climate variable.

List of Abbreviations

AFR100	African Forest Landscape Restoration Initiative
CCD	Climate Change Directorate
CCRI	County Climate Resilience Investment grant
CCIS	County Climate Institutional Support grant
CCKP	Country Climate Knowledge Portal
CGHB	County Government of Homa Bay
CO2	Carbon Dioxide
COP	Conference of the Parties to the UNFCCC
EAC	East African Community
FLLoCA	Financing Locally Led Climate Action
GBV	Gender Based Violence
GHG	Greenhouse Gases
HCCCAP	Homa Bay County Climate Change Action Plan
GESIP	Green Economy Strategy & Implementation Plan
GOK	Government of Kenya
ICAO	International Civil Aviation Organization
IPCC	Inter-Governmental Panel on Climate Change
KNBS	Kenya National Bureau of Statistics
MAM	March-April-May rainfall period
NAP	National Adaptation Plan
MSME	Micro Small and Medium Enterprises
NCCAP	National Climate Change Action Plan
NCCRS	National Climate Change Response Strategy
NDC	Nationally Determined Contributions
OND	October-November-December rainfall period
PCRA	Participatory Climate Risk Assessment
PIU	Project Implementation Unit
PWD	People with Disability
SDG	Sustainable Development Goals
TWG	Technical Working Group
UNECD	United Nations Conference on Environment and Development
UNFCCC	United Nations Framework Convention on Climate Change
UN	United Nations
WBG	World Bank Group

Foreword

Homa Bay County sits in the Lake Victoria Basin which is a highly populated zone with immense natural resources for sustaining livelihoods and supporting economic development. Studies have shown that the Lake Victoria Basin is highly vulnerable to the impacts of climate hazards and risks. A combination of demographic, economic and social factors contribute to the vulnerability of the basin to the impacts of climate hazards. Homa Bay County therefore is directly impacted by climate hazards and risks that have been identified to be pre-dominant in the basin. The situation in the county is further aggravated by its location right on the shores of the Lake Victoria which bears the brunt of unsustainable environmentally harmful practices such as unsustainable harvesting of forest resources in areas further away from the lake.

In line with national policies and legislations, the Homa Bay County Government has put in place a policy and legislative framework for addressing the challenges presented by climate hazards in the county. This participatory climate risk assessment report is a manifestation of our commitment to the full implementation of our climate change policy and legislative instruments. We recognize the crucial role of the climate risks assessment in identifying climate hazards and risks; mapping the livelihood resources in the county; identifying existing community adaptation strategies; documenting the communities' proposed climate adaptation investment options; and, setting priorities for climate adaptation investment options for the county.

With the projected increase in the occurrence of climate hazards and the associated demand for more resources to cope with the impacts, we must equally innovate more sustainable means and methods for bridging the financing gap for climate change action. In this respect, I am fully committed to ensuring that Homa Bay County embraces the opportunities for accessing climate action financing such as the one now presented by the Financing Locally Led Climate Action (FLLoCA) program.

H.E. Glady A.N. Wanga
Governor Homa Bay County

Acknowledgement

It has been along and adventurous journey in conducting the Participatory Climate Risk Assessment (PCRA) exercise that has finally crystalized into this PCRA Report. It is a journey that began with preliminary consultations between the County Governments and the Financing Locally Led Climate Action (FLLoCA) Project Implementation Unit (PIU) on the methodologies to be used in conducting the process. Eventually, the FLLoCA PIU prepared the PCRA-CCCAP guidelines to be used in conducting the process. This enabled the County Government of Homa Bay to initiate the PCRA process towards the end of March 2023.

The completion of this report has immensely benefitted from the unwavering commitment of the Governor for Homa Bay County Her Excellency Gladys Wanga towards ensuring that Homa Bay County beats the deadline set for delivering this report, to which I am profoundly grateful.

We recognize the tireless efforts made by the FLLoCA PIU in conjunction with the National Treasury band Planning in ensuring that we have the necessary tools in the form of the guidelines and financial resources in the form of the first disbursement of the County Climate Institutional Support (CCIS) grant to successfully conduct the PCRA process which has further culminated in the formulation of our first County Climate Change Action Plan.

The Technical working Group formed at the very beginning of the PCRA process to guide the process put in tremendous work and I applaud them for their dedication and commitment service especially in delivering this PCRA report.

The staff in my department's section for Environment, Energy, Forestry and Climate Change have spent enumerable hours working on the PCRA process and the finalization of this report. I applaud the efforts of the County Secretary Professor Benard Muok in offering the technical guidance in the preparation of this report; Professor Donald Ogweno the Chief Officer in charge of climate Change for his guidance and advice on the process; and, Mr. Roy Otieno Odongo, the Director in charge of Climate Change for providing the administrative and technical support to the process.

Dr. Joash Aloo (Ph.D)
County Executive Committee Member.
Water, Irrigation, Sanitation, Environment, Energy, Forestry & Climate Change.

The Policy Context of Participatory Climate Risk Assessment

Participatory Climate Risk Assessment (PCRA) is conducted within a framework consisting of global, regional, national and sub-national policies and legislations. The global policy on climate change is anchored under the United Nations Framework Convention on Climate Change (UNFCCC). The Paris Agreement aims to strengthen the global response to the threat of climate change by keeping global temperature rise this century to well below 2^0C above the pre-industrial levels. Other international treaties and conventions on climate change to which Kenya is a part include: The climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants; the Sendai Framework for Disaster Risk Reduction 2015-2030; and, the 2030 Agenda for Sustainable Development.

The National Climate Change Action Plan (NCCAP) 2018-2022 set out to support Kenya' development goals by providing mechanisms and measures to achieve low carbon climate resilient development, in a manner that prioritizes adaptation, and recognizes the essence of enhancing the climate resilience of vulnerable groups, including children, wone, youth, persons with disabilities, the elderly, and marginalized and minority communities.

The National Adaptation Plan (NAP) forms the basis for the adaptation component of Kenya's Nationally Determined Contributions (NDCs). Some of the objectives of the NAP include: Highlighting the importance of adaptation and resilience building actions in development; and, integrating climate change adaptation into national and county level development planning and budgeting processess.

At the sub-national level (County) there is the Homa Bay County Climate Change Policy of 2021 whose overall goal is achieving an industrialized, healthy and wealthy county with adaptive and resilient communities through sustainable development based on a green and blue economy. The policy provides a framework for addressing the numerous climate change challenges in the county with guidance on mainstreaming climate change action into all county development plans, policies and programmes; and, enhancement of community and stakeholder capacity to implement climate change adaptation and mitigation measures. The Homa Bay County Climate Change Act, 2022 provide the appropriate legal framework and mechanism for mainstreaming climate change actions in the county.

Purpose of the PCRA Report

This PCRA report contains the communities' perception of climate risks and hazards and identifies the impacts of the same on the communities and on their livelihood and economic systems. The report gives a snapshot of the vulnerability profiles of marginalized groups in the county by enumerating their exposure to climate risks and hazards and identifying the resources on which they depend. This PCRA report documents the historical climate hazards and risks and brings forth the communities' traditional means and ways of adaptation and coping strategies.

The County Climate Hazard Profile

The County experiences several climate hazards which includes: Droughts; rainstorms; very strong winds; river floods; hailstorms; flush/surface floods; thunder/lightning storms; extremely hot days and nights; lakeshore floods; land fires; heat waves; extremely cold days and nights; and forest fires.

Differentiated Impacts of Climate Hazards and Risks in the County

The county's differentiated impacts of climate hazards and risks is summarized in the tables below based on the two main climate hazards (drought and floods) and their associated risks.

Climatic Event/Hazards	Activity	Direct Impacts	Indirect Impacts
Temperature Drought Extreme temperatures Heat waves	Natural Resources	▪ Loss of soil moisture ▪ Exposure of soil	▪ Low soil/land productivity ▪ Emergence of crop/livestock pests and diseases ▪ Emergence of human parasites such as jiggers
		▪ Destruction of pasture ▪ Reduced quality and quantity of pasture	▪ Loss of livestock due to starvation ▪ Soil erosion ▪ Emergence of livestock pests and diseases
		▪ Inadequate availability of water for domestic use ▪ Drying up of water sources (wells, boreholes, water pans)	▪ Outbreak of diseases ▪ Exposure of women and girls to GBV
		▪ Drying up of livestock watering points ▪ Livestock stunted growth from dehydration	▪ Loss of livestock ▪ Loss of income
		▪ Drying up of trees ▪ Loss of forest undergrowth	▪ Loss of biodiversity ▪ Forced migration of wildlife
		▪ Drying up of wetlands	▪ Loss of food production capacity ▪ Encroachment of wetlands ▪ Loss of biodiversity
		▪ Reduced Water volumes	▪ Encroachment into riparian land
		▪ Loss of livestock	▪ Low livestock productivity

	Livelihood/Productive Activities	▪ Poor livestock health	▪ Loss of income
		▪ Crop failure ▪ Emergence of crop pests and diseases	▪ Loss of income ▪ Food scarcity ▪ High food prices
		▪ Scarcity of supplies ▪ Influx of low priced goods from high productivity areas	▪ Loss of income ▪ Business closures ▪ Shortage of commodities
		▪ Food scarcity ▪ Inadequate water supply ▪ Increased stress on household income	▪ Increased incidences of GBV ▪ Children drop out of school ▪ Malnutrition
		▪ Low water supply for fish ponds	▪ Loss of income ▪ Food scarcity
	Infrastructure and Services	▪ Increased depreciation due to high heat stress	▪ Increased maintenance costs
		▪ Reduced school attendance ▪ Poor sanitation conditions	▪ Increased expenses ▪ High school drop-out rate ▪ Increased demand for health services
		▪ Heat stress on market facilities ▪ Water scarcity	▪ Low market turnovers ▪ Loss of revenue for county government ▪ Loss of income for traders
		▪ Low demand for transportation services	▪ Loss of income
		▪ Increased maintenance costs of communication infrastructure	▪ Increased communication costs for consumers
Precipitation Flooding Hailstorms Extreme rainfall	Natural Resources	▪ Soil erosion ▪ Soil degradation ▪ Destruction of infrastructure ▪ Landslides	▪ Crop failure ▪ Famines ▪ Emergence of crop pests and diseases ▪ Forced migration
		▪ Loss of livestock grazing grounds ▪	▪ Emergence of livestock pests and disease
		▪ Destruction of water infrastructure ▪ Contamination of domestic water sources ▪ Siltation of Water sources	▪ Outbreak of diseases ▪ Scarcity of clean drinking water
		▪ Drowning of livestock ▪	▪ Exposure of livestock to diseases ▪
		▪ Destruction of forest undergrowth ▪ Destruction of trees	▪ Forest degradation ▪ Loss of biodiversity
		▪ Loss of wetland habitats ▪ Washing away of wetland species	▪ Loss of biodiversity ▪ Disease outbreaks
		▪ Increased sedimentation ▪ Rise in the lake water levels	▪ Destruction of property along the lake shores ▪
	Livelihood/productive activities	▪ Death of livestock ▪	▪ Loss of income ▪ Food scarcity
		▪ Crop failure	▪ Loss of income

		▪	▪ Food scarcity
		▪ Access to markets curtailed due to destruction of roads ▪ Loss of incoming earning opportunities	▪ Business losses ▪ Loss of income
		▪ Injury and loss of life ▪ Displacement ▪	▪ Increased exposure to Gender Based Violence ▪ Increased exposure to diseases
		▪ Destruction of fish breeding grounds	▪ Reduced fish stocks
	Infrastructure	▪ Destruction of buildings	▪ Loss of life ▪ Loss of income ▪ Loss of investments
		▪ Destruction of health facilities ▪ Destruction of school facilities	▪ Reduced capacity of handling accidents and emergencies ▪ Loss of lives ▪ Disruption of school calendar
		▪ Destruction of market facilities ▪	▪ Loss of revenue for county government ▪ Loss of income for traders
		▪ Disruption of transport services ▪ Destruction of transport infrastructure (roads, bridges)	▪ High incidences of accident ▪ Loss of income ▪ Loss of lives
		▪ Disruption of communication services ▪ Destruction of communication infrastructure	▪ Poor or no communication ▪ Loss of income earning opportunities ▪ Increased risk of injury or death from climate hazards
		▪ Destruction of sewerage infrastructure (lines and treatment plant)	▪ Poor hygiene and sanitation ▪ Disease outbreaks

County Climate Strategic Adaptation Investment Priorities

The identified investment priorities are hazard based and aligned with the sectors that are vulnerable to the impacts of climate hazards ad risks.

Risk/Hazard	Sector	Priority Area of Investment
(Precipitation) Flooding Rise in lake water levels Changing Rainfall Patterns	Agriculture (Crops)	▪ Promotion of early maturing crop varieties ▪ Building of dykes along river banks ▪ Community education on dealing with flood emergencies ▪ Funding of emergency and disaster response services by the county government
	Livestock	▪ Farmer sensitization on building durable and safer livestock shelters ▪ Capacity building on optimal stock levels ▪ Capacity building on the benefits of keeping improved livestock breeds
	Fisheries	▪ Capacity building on fish farming ▪ Investments in sheltered fish landing grounds ▪ Implementation of fishing holidays
	Water	▪ Expansion of existing water production capacity ▪ Replacement of old water pipes ▪ Construction of more water pans and boreholes
	Health	▪ Establishment of flood emergency rescue centers

		▪ Construction of health facilities on higher grounds ▪ Increased investment in the Health sector
	Environmental Protection	▪ Protection of riparian land from encroachment ▪ Construction of bioengineering infrastructure on river banks ▪ Invest in sustainable waste management systems in the county
	Disaster Management	▪ Investment in flood disaster early warning systems ▪ Investment in disaster risk management services
(Temperature) Droughts Pests and Diseases	Agriculture (Crops)	▪ Cultivation of drought resistant crops ▪ Multi-cropping ▪ Capacity building opportunities for smart agriculture ▪ Development of bulk grain storage facilities ▪ Investment in integrated pest management systems
	Livestock	▪ Promotion of alternative livestock feeds e.g. crop residues ▪ Agroforestry-planting of trees and fodder crops ▪ Exploring means of finding alternative water sources for livestock ▪ Building of livestock auction centers
	Fisheries	▪ Introduction of fish ponds ▪ Sensitization opportunities for alternative livelihoods away from capture fisheries
	Water	▪ Construction of boreholes ▪ Expansion water pans ▪ Capacity building opportunities for rain water harvesting ▪ Irrigation ▪ Upstream water and landscape conservation
	Health	▪ Establishment of more health facilities ▪ Maintenance and improvement of existing health facilities

1.0 Context of the Participatory Climate Risk Assessment (PCRA)

1.1 Background

Climate change is a global phenomenon realized in the 1950s when scientists observed rises in average global temperatures, and evidence of its anthropogenic causes linked to greenhouse gas concentration in the atmosphere. Since 1972, the world has made increasing efforts to address the issue, which reached a turning point in 1992 when the United Nations Conference on Environment and Development (UNECD) - the "Earth Summit" was held in Rio de Janeiro. This led to adoption of the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC called on Governments to work towards stabilizing and even reducing GHGs concentration in the atmosphere at levels that would not interfere with global climate systems. The Kyoto Protocol of 1997 of UNFCCC committed 37 industrialized countries to reduce their GHG emissions by 5.2 % below 1990 levels by 2012. At the 25th Conference of the Parties (COP 25) of the UNFCCC in 2015, the Paris Agreement set out to "*Holding the increase in the global average temperature to well below 2^0C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5^0C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change*[1]".

Homa Bay county continues to experience extreme climatic events such as fluctuating weather conditions and droughts leading to food insecurity, and floods which cause loss in lives and livelihoods, and damage to property. It is therefore a major threat to the county's development and hinders achievement of national and county goals and aspirations as elaborated in Vision 2030 and the Government's Bottom-Up Economic Transformation Agenda for 2023-2027, the Homa Bay County Integrated Development Plan 2022-2027, and the Homa Bay County Governors manifesto 2022-2027. These development plans focus on agriculture and food security; developing the micro, small and medium enterprise (MSME) sector; affordable housing and settlement; universal and quality healthcare; a strong digital economy, and a vibrant creatives-based sector.

The national and county Governments have taken steps to mitigate and adapt to the impacts of climate change through development of national and county policy and legislative frameworks, establishment of relevant institutions, and formulation of plans to implement

[1] The Paris Agreement

relevant policies. The policy and legislative framework for climate action at international, national, and county level are reviewed critically in the next section. However, the plans include the Climate Change Response Strategy 2010; the National Climate Change Framework Policy of 2016; the National Adaptation Plan; the Nationally Determined Contributions (NDCs); the National Climate Change Action Plan (2013-2018 and 2018-2022); the National Policy on Climate Finance; and the Climate Change Act of 2016. At the county level they include the Homa Bay County Risk and Vulnerability Assessment 2022.

The national institutional framework on climate change includes the National Climate Change Steering Committee chaired by the President of the Republic and the National Climate Change Directorate (CCD) charged with the technical and administrative issues on climate change. At the county level, they include the County Climate Change Committee chaired by the Governor; The County Climate Change Technical Committee; and Ward Climate Change Committees.

1.2 Policy Context

The Kenya Constitution 2010 stipulates that all international treaties, conventions, protocols, and agreements to which the country is a signatory, becomes one of Kenya's laws. The major international conventions to which Kenya is signatory comprise UN conventions at the global level; African Union (AU) Policies and strategies at the continental level; and regional ones of the East African Community (EAC) and the Intergovernmental Authority on Development (IGAD). These have then been domesticated at the national level in various policies, legislation, plans and strategy documents. Due to the increasing and cross-sectoral impacts of Climate Change, national development plans now incorporate Climate Action in many of their objectives and strategies, the principal development vision document being Vision 2030, and its associated Medium Term Plan implementation framework.

The constitution provides for County Governments to develop policies, laws, and plans for implementation of their programs. Consequently, there are county level policy and legal instruments with relevance to sub national Climate Change action. The County Integrated Development Plan (CIDP) is the county's principal planning instrument and integrates climate action within various sectors. Various County laws and policies, particular line Climate Change ones, determine many sub national level climate actions. As government actions at the two levels are largely driven by five-year political cycles, manifestos of parties and incumbent political leaders are important policy instruments that drive planning and budgeting, and hence require consideration in analyzing policies on climate change. Table 1

below summarizes the major policies, laws, and plans of major relevance to Climate Change action at global, regional, national, and sub-national levels, and their significance for such actions in Homa Bay County.

Table 1: Global, regional, national, and sub-national policy context

LAWS/POLICY	DESCRIPTION	RELEVANCE TO HOMA BAY COUNTY
Sustainable Development Goals (SDGs)	The goals for climate change (SDG 13) and protecting, restoring, and promoting sustainable use of terrestrial ecosystems (SDG 15) and mainstreaming other relevant goals considering climate change impacts and climate actions across all the SDGs.	The county government of Homa Bay links the Global Sustainable Development Goals within the county multisectoral functions across various departments for their effective implementation.
United Nations Framework Convention on Climate Change (UNFCCC)	This convention was aimed to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with climate systems.	The framework provides and guides all county government planning and actions on climate change.
Kyoto Protocol	Commits developed countries in transition to market economics to reduce the overall GHG emissions	guides county government planning on mitigation actions including carbon trade.
The Paris Agreement	Aims to strengthen the global response to the threat of climate change by keeping global temperature rise to well below 2 degrees above pre-industrial levels.	Guides development of mitigation actions in terms of voluntary contributions at county level. Major impetus for county assessment of emission levels
The Stockholm Convention on Persistent Organic Pollutants	Aimed to eliminate or restrict the production and use of persistent organic pollutants.	Guides county policies on replacement of use of hydrofluorocarbons
The Sendai Framework for Disaster Risk Reduction	Is a voluntary agreement that recognizes that the state has the primary role in reducing disaster risk, but that responsibility should be shared with other stakeholders, including subnational governments, the private sector, and other stakeholders.	Drives county planning on climate related disaster risks such as floods and drought.
African Union's Agenda 2063	Commits member states to climate change action that prioritizes adaptation including a climate-resilient agricultural development program.	Sets targets for national entities developing planning actions to enhance climate mitigation and resilience, which cascades to counties.
The African Forest Landscape Restoration Initiative (Afr100)	Aimed to bring 100m Ha of land in Africa under restoration by 2030.	Sets targets for counties to achieve landscape restoration by improving the forest cover in the county.

Constitution of Kenya 2010	Article 42 of the constitution guarantees every person the right to a clean and healthy environment.	
Kenya Vision 2030 and Its Medium-Term Plans	Third medium term plan recognized climate change as a cross-cutting issue and mainstreams actions in sector plans. The Fourth MTP recognizes climate change mitigation and adaptation as critical in recovery strategies to reposition the economy on a sustainable growth trajectory.	Mainstreaming climate change in all sector plans in the ADP and CIDP Post covid 19 recovery strategy
National Climate Change Response Strategy (2010)	Aimed to advance climate change adaptation and mitigation into all government planning, budgeting, and development objectives. Sets a basis for sub national actions and climate change planning.	Guides county planning and actions on climate change
National Adaptation Plan (2015-2030)	Provides national climate hazard and vulnerability assessment and sets out priority adaptation actions in the planning sectors	Guides the county in developing risk and vulnerability assessment and the participatory climate risk assessment report.
Climate Change Act (No. 11 Of 2016)	Main objective is to enhance climate change resilience and define low carbon pathway for sustainable development of the country.	Provides basis for the development of the Homa Bay Climate Change Act that enhances climate change resilience and low carbon development
Kenya Climate Smart Agriculture Strategy (2017-2026)	The objectives are to adapt to climate change and build the resilience of agricultural systems while minimizing greenhouse gas emissions.	Promotes increased food and nutrition security through enhanced productivity and resilience in Food and nutrition as a key priority action area in the Homa Bay County Climate Change Action Plan.
Climate Risk Management Framework (2017)	Integrates disaster risk reduction, climate change adaptation and sustainable development so that they are pursued as mutually supportive rather than standalone goals.	The county government manages risks such as floods and drought to communities and infrastructure resulting from climate-related disasters as enshrined in the Homabay CCAP.
National Climate Change Framework (2017)	Aims to ensure the integration of climate change considerations into planning, budgeting, implementation, and decision making at the national and county levels across all sectors	Guides the development of ADPs and CIDPs that help the county government in integrating county climate change considerations into planning, budgeting, implementation, and decision making at the county level.
Bottom-Up Economic	The plan identifies five critical	The county climate change action plan

Transformation Agenda 2023-2027 And Homa Bay Governor's Manifesto 2022 - 2023	sectors agriculture, MSME economy, housing, healthcare, and the digital creative economy.	anchors 7 keys sectors namely, disaster risk management, food and nutrition, water and blue economy, forestry wildlife and tourism, health, sanitation and human settlement, manufacturing and lastly energy and transport.
National Climate Change Action Plan (2018-2022)	Aims to further Kenya's development goals by providing mechanisms and measures to achieve low carbon climate-resilient development in manner that prioritizes adaptation.	Guides the county to develop investment priority actions for funding in the County Climate Change Action Plan.
Agriculture Sector Transformation and Growth Strategy 2019-2029	Helps transform agriculture sector and ensure food is affordable	Promotes increased food and nutrition security through enhanced productivity and resilience in Food and nutrition as a key priority action area in the Homa Bay County Climate Change Action Plan.
Climate Smart Agriculture Strategy 2017-2026	Guides actions needed to transform and reorient agricultural systems to effectively support development and ensure food security in changing climate	Promotes increased food and nutrition security through enhanced productivity and resilience in Food and nutrition as a key priority action area in the Homa Bay County Climate Change Action Plan.
Homa Bay County Climate Change Policy 2021	Aims to achieve an industrialized, healthy, and wealthy county with adaptive and resilient communities through sustainable development based on allowing carbon green and blue economy.	Is the base for the formulation of the CCAP, CCF
Homa Bay County Climate Change Act 2022	Provides an appropriate legal framework and mechanism for mainstreaming climate change actions in the county.	Implements the policy and establishes the institutional structures from the county to the ward level.
Homabay Climate Change Fund Regulations 2022	Enables the establishment and management of the county climate change fund 2022 with provisions on sources of fund, mobilization of resources and fund oversight.	Helps in funding the climate change actions
Homa Bay County Climate Change Risk and Vulnerability Assessment	Enables the county to know the status of climatic hazards and risks exposure	Identifies the vulnerable sectors to climate change in the county and risk map of the county for prioritization of mainstreaming of climate change action into county decision making processes.

1.2.1 Cross-Cutting Climate Change Relevant National Plans and Strategies

Table 2: Cross-cutting national plans and strategies

Sector	Climate Change-relevant Plan	Ministry/Department
Agriculture	National Strategy on Genetic Resources within the Context of Climate Change (2016-2021)	Kenya Agricultural and Livestock Research Organisation
Blue Economy (fisheries, coastal zones, marine transport)	Blue Economy Strategy (2017)	Ministry of Agriculture and Irrigation Ministry of Transport, Infrastructure, Housing and Urban Development
Disaster Risk Management	Kenya's Disaster Risk Financing Strategy (2018- 2022) National Disaster Risk Management Policy (2017)	National Treasury Ministry of Interior and Coordination
Drought Management	National Drought Management Authority Act (No. 4 of 2016)	National Drought Management Authority
	Ending Drought Emergencies Strategy	
	Public Finance Management (National Drought Emergency Fund) Regulations, 2018	
Energy	Energy Bill (2017) – Part 3, section 43; Part 4, section 74 (i); and Part 9 address climate change- related issues	Ministry of Energy
Environment	Environmental Management and Coordination Act, 1999 (Cap. 387)	Ministry of Environment and Forestry
	Green Economy Strategy and Implementation Plan (GESIP 2016-2030)	
	Kenya Strategic Investment Framework on Sustainable Land Management (2017-2027)	
Forestry	National Forest Programme (2017) - chapter on climate change	Kenya Forest Service Ministry of Environment and Forestry
	REDD+ Readiness Plan and analysis (2013-2017)	
Health	Health Act (No. 21 of 2017) - section on environmental health and climate change (Part VII, sections 68 and 69)	Ministry of Health
Land Management	National Spatial Plan (2015-2045)	Ministry of Lands and Physical Planning
Transport	Action Plan to Reduce CO2 Emissions from Aviation (2015)	Ministry of Transport, Infrastructure, Housing and Urban Development
Water	Water Act (No. 43 of 2016) – establishes National Water Harvesting and Storage Authority.	Ministry of Water and Sanitation
	Draft Water Harvesting and Storage Policy (2018)	

1.3 Purpose of the PCRA Report

Participatory Climate Risk Assessment (PCRA) is a methodology for assessing climate risks by incorporating community asset mapping, hazard mapping and considerations for marginalized groups (women, children, PWDs and the youth). PCRA documents communities' perceptions of climate risks and the impacts on lives and livelihoods of the people.

The PCRA is a climate action planning approach for the Financing Locally Led Climate Action (FLLoCA) program. The PCRA process utilizes various tools that ensures the participation of local communities and consideration for gender, PWDs, youth and other marginalized groups issues. The PCRA process involves a series of guided steps that end up with the preparation of County level PCRA report. The PCRA report then is used to inform the formulation of the County Climate Change Action Plan (CCCAP).

This PCRA report contains the communities' perception of climate risks and hazards and identifies the impacts of the same on the communities and on their livelihood and economic systems. The report gives a snapshot of the vulnerability profiles of marginalized groups in the county by enumerating their exposure to climate risks and hazards and identifying the resources on which they depend. This PCRA report documents the historical climate hazards and risks and brings forth the communities' traditional means and ways of adaptation and coping strategies. With reference to existing planning documents such as the Homa Bay County CIDP 2023-2027, the report identifies key priority investment areas to enhance climate resillience in the county.

1.4 Key Steps in the County's PCRA Process

The participatory climate risk assessment (PCRA) is underpinned by the eight principles of locally-led climate action, namely: Devolving decision-making to the lowest appropriate level; addressing structural inequalities faced by women, youth, and children; disabled and displaced people, indigenous peoples and marginalized ethnic groups; investing in local capabilities to leave an institutional legacy; building a robust understanding of climate risk and uncertainty; collaborative action and investment; ensuring transparency and accountability; flexible programming and learning; and providing patient and predictable funding that can be accessed more easily.

The PCRA process is part of the participatory climate risk assessment and formulation of county climate change action plans which has three faces. The preparation of this PCRA report followed the steps enumerated below.

A Cross-Sectoral Technical Working Group (TWG) was formed to lead the PCRA process. The TWG was made up of staff drawn from across the key sectors of the county government. Preliminary consultations on the inclusion of members to the TWG was conducted with the respective sectoral heads who gave the permission for their staff to be appointed to the TWG. The identified members of the TWG were then formally appointed by a letter signed by the Chief Officer responsible for climate change in the County. the sectors coopted into the TWG included: Agriculture and livestock; water; environment; health; energy; infrastructure; youth; gender; and the Director in charge of public participation in the county. The TWG was then taken through a two-day training from 4th to 5th April 2023 at Twin Towers Hotel in Homa Bay Town (Panel 1 below) on the application of the PCRA-CCCAP guidelines.

Panel 1: Cross-sectoral technical working group training workshop

A stakeholder Analysis and engagement process was then undertaken that identified all the key stakeholders at all levels of the county (ward, sub-county, and county). the stakeholder analysis included the mapping of marginalized groups (women, PWDs, youth) in the County and how to include them in the PCRA process. This activity was carried out by the TWG after their training.

The identified **stakeholders were then engaged at all levels** beginning from the wards. The wards engagements were amalgamated at the Sub-County level which was followed by engagements at the county level. The stakeholder engagement process was guided by a list of the identified stakeholders with their respective expected contributions to the process.

A data collection and workshop preparation process followed the stakeholder engagement process from 18th to 24th April in the respective Ward Administrator's offices. Here the Homa Bay TWG led the collection of data across the 40 wards aided by the identified stakeholders and the same cohort prepared for the workshop by analyzing the data and preparing presentations for the workshop. The TWG appointed a workshop facilitation team to lead the plenary discussions and the group work sessions. The TWG also reviewed key national development, climate and sectoral plans including the Climate Change Action Plan 2018-2022 and the Homa Bay County CIDP 2023-2027. The TWG also reviewed the community level data in preparation for the workshop.

Some of the ward engagements are shown in Panel 2, Panel 3, Panel 4, and Panel 5 below for Gwassi North, Homa Bay East, Wangchieng and Rusinga Island Wards respectively.

Panel 2: PCRA consultations for Gwassi North ward

Panel 3: PCRA consultations for Homa Bay East ward

Panel 4: PCRA consultations for Wangchieng ward

Panel 5: PCRA consultations for Rusinga Island ward

The Multi-Stakeholder Climate Risk Assessment Workshop was then held on the 10th and 11th May 2023 at Key Place hotel in Homa Bay involving identified stakeholders from the government, the civil society, PWD groups, the FLLoCA (PIU), youth and women. The workshop program was condensed into two days due to resources constraints but adequately covered all the stated workshop objectives that included: conducting a participatory and cross-sectoral holistic assessment of current and likely future climate risks

facing the county; identifying robust, broad thematic adaptation investment areas that can address the current and future climate vulnerabilities of different groups. The workshop resulted in the development of a county climate risk profile and integrated strategic resilience priorities and objectives for the county.

Panel 6 below illustrates how participants at the workshop engaged in group working sessions.

Panel 6: Multi-stakeholder climate risk assessment workshop group sessions




The TWG the embarked on writing the **Climate Risk Assessment Report** that outlined broad strategic adaptation planning priorities for the county over a five-year period. A working group was nominated to work on the report.

2.0 County Climate Hazard Profile

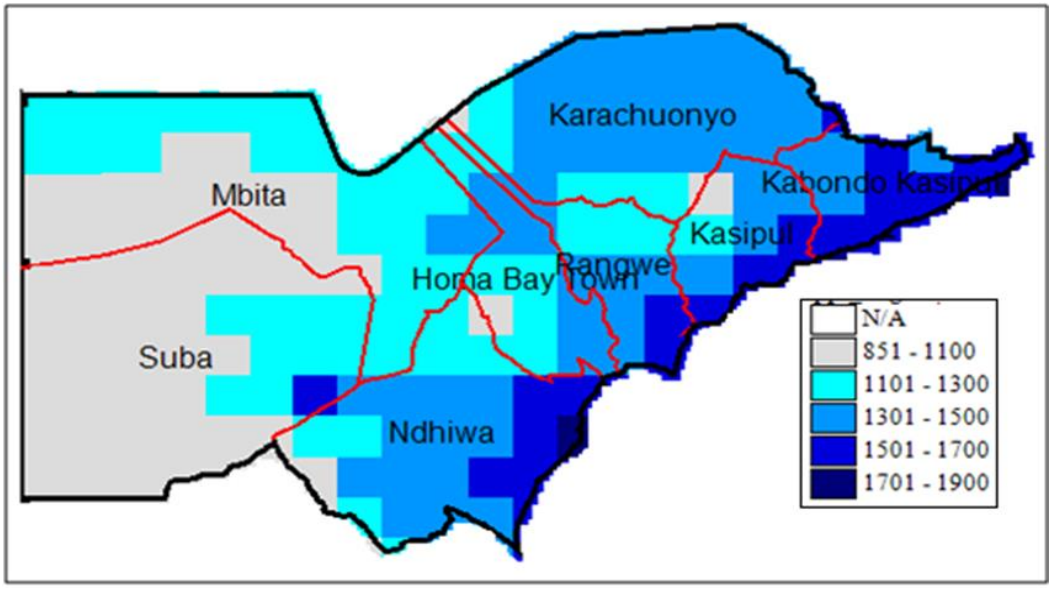
Homa Bay County has an inland equatorial type of climate. The climate is however modified by the effects of altitude and nearness to Lake Victoria which makes temperatures lower than in equatorial climate. The county is divided into two main relief regions namely the lakeshore lowlands and the upland plateau. The lakeshore lowlands lie at an altitude between 1,163 – 1,219 m above sea level and comprise a narrow stretch bordering the Lake Victoria especially in the northern parts of the county. The upland plateau starts at an altitude of 1,219 m with an undulating surface which rises to 2,221 m above sea level.

2.1 Current and Historical Climate Hazards and Trends

2.1.1 Precipitation Trends in Homa Bay County

There is some variation in rainfall throughout Homa Bay County, with the southern areas further from Lake Victoria receiving the most precipitation around 1750 mm, and the northern areas closer to Lake Victoria receiving 1000-1250 mm of precipitation per year. The available rainfall data indicates that the County receives substantial rainfall. According to the Kenya Meteorological Department (KMD) databank, the mean annual rainfall over Homa Bay County is about 1400 mm but spatially is not uniform but varies from 850-1900 mm. Most regions of the county receive rainfall ranging between 1100 and 1500mm. Lower annual rainfall is received over Kanyamwa Kosewe, Kasgunga, Kaksingri West and East, Gwassi South and North, Kwabwai, Central Kanyaluo and Central Kasipul Wards of between 850 and 1100mm. Rainfall above 1500mm is received over Kojwach, Kabondo East and West, South and West Kasipul, East Gem, Kagan, Kabuoch North and Kabuoch/Pala wards. The spatial distribution of the average annual rainfall over Homa Bay County is as shown in Figure 1 below.

Figure 1: Average annual rainfall over Homa Bay County



Source: Kenya Metrological Department (KMD)

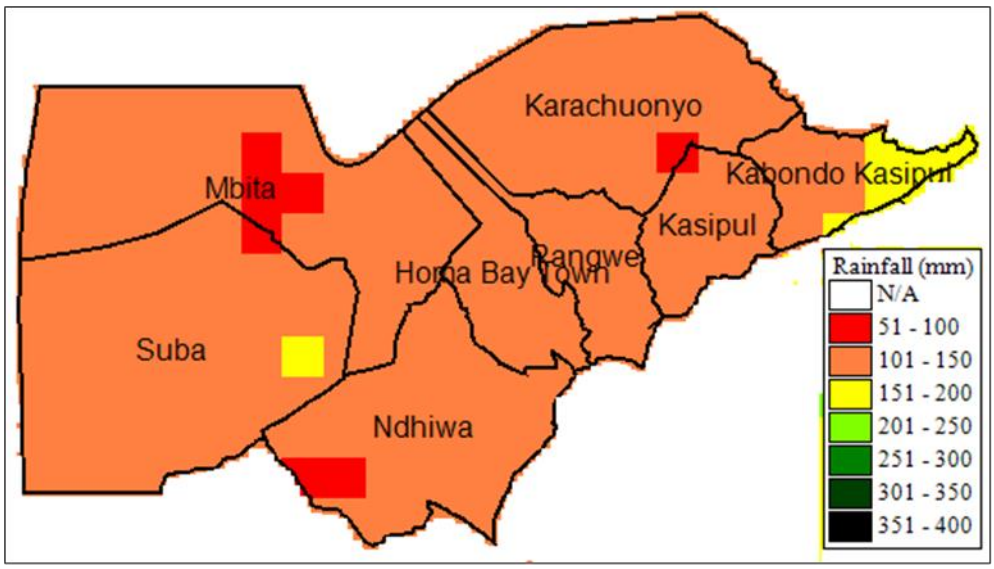
Rainfall Seasons in Homa Bay County

The seasonal migration of the Inter-Tropical Convergence Zone (ITCZ) over Kenya including Homa Bay County results into four distinct seasons, dominated by two rainfall periods. January to February (JF) is generally considered a 'hot dry season', March to May (MAM) known as the 'long rainy season', June to September (JJAS) the 'cold dry season', and October to December (OND) as the 'short rainy season'. The primary peak of the rains occurs during MAM, with a secondary peak during OND.

The "Hot Dry Season" of January to February (JF)

During JF the average total rainfall over the County is about 140mm, this is not spatially uniform but varies from 50 – 200mm. Figure 2 indicates the map of average January to February rainfall over Homa Bay County during the 30-year period (1981- 2010). Most areas over the county receive between 100 and 150mm. However, Kaksingri East, Kabondo West and Kabondo East Wards, receives between 150 and 200mm of rainfall. Low rainfall amounts between 50 and 100mm are received in Kasgunga, Kwabwai and Wangchieng Wards. High average seasonal mean and maximum temperatures are usually recorded during JF period. The average minimum, mean and maximum temperatures recorded based on the 30-year period (1991 – 2020) are 15.9, 23.1 and 30.3°C respectively.

Figure 2: Average Jan-Feb rainfall over Homa Bay County (1981-2010)



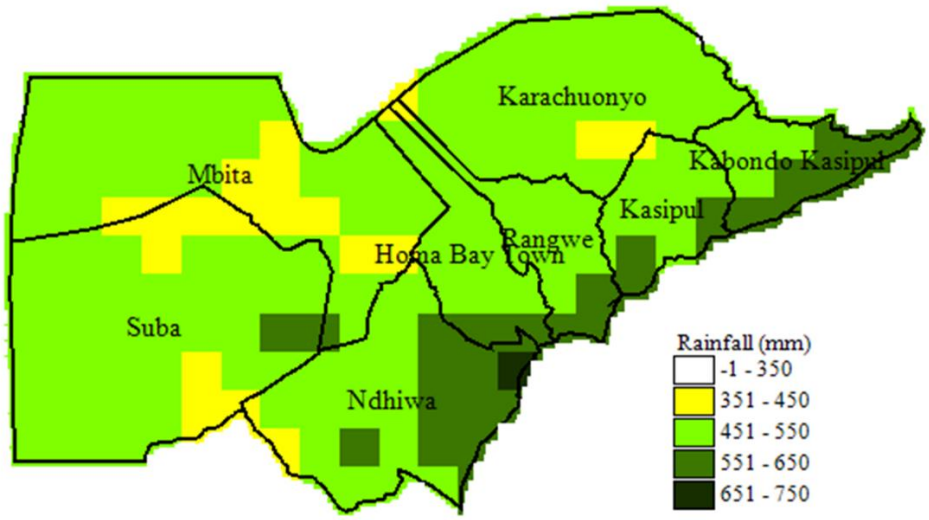
Kenya Metrological Department (KMD)

The Long Rainfall Season (March-April-May-MAM)

The start date of the long rains during MAM normally occurs during the first to second week of March. The rains usually continue into the month of June. There is normally a regular distribution of the rains in time and space with short dry spells of less than 5 days. Homa Bay County receives an average long rainfall total of about 530mm. Although spatially, the amount received are not uniform but varies across the county ranging from 350 – 750mm.

Most areas of the county receive between 450 – 550mm of rainfall. However, Kendu Bay Town, Lambwe, Gembe, Kasgunga, Gwassi South and Kaksingri West Wards receive low rainfall between 350 and 450mm. Higher rainfall amounts above 550m are received over Kaksingri East, Kabondo East, Kabondo West, Kojwach, West Gem, East Gem, West Kasipul, Kabuoch North, Kabuoch/Pala and Kanyadoto Wards. Figure 3 below gives the map of average March to May rainfall over Homa Bay County during the 30-year period (1981- 2010). High average seasonal minimum temperatures are usually recorded during MAM period. The average minimum, mean and maximum temperatures recorded based on the 30-year period (1991 – 2020) are 16.5, 22.8 and 29.1°C respectively.

Figure 3: Average MAM rainfall over Homa Bay County

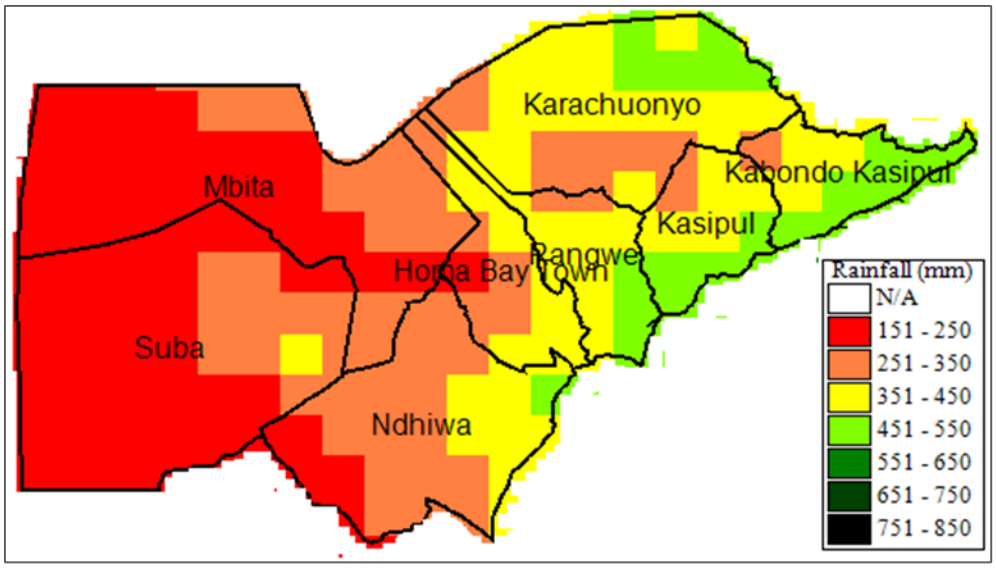


Source: Kenya Meteorological Department (KMD)

June – July – August - September (JJAS) Rainfall Season

During the JJAS period the average total rainfall over the County is about 350mm. Spatially, the amount received are not uniform but varies across the county ranging from 150 to 550mm. During JJAS, Suba North (Mbita), Suba South, and many areas in Ndhiwa and Homa Bay Town Sub-Counties receive lower rainfall of about 250 – 350mm. Many regions in Rangwe, Kasipul and Kabondo Kasipul Sub-Counties receive higher rainfall amounts of between 350 and 550mm. Figure 4 below provides the map of average June to September rainfall over Homa Bay County during the 30-year period (1981- 2010).

Figure 4: Average Jun-Sep rainfall over Homa Bay County (1981-2010)



Source: Kenya Metrological Department (KMD)

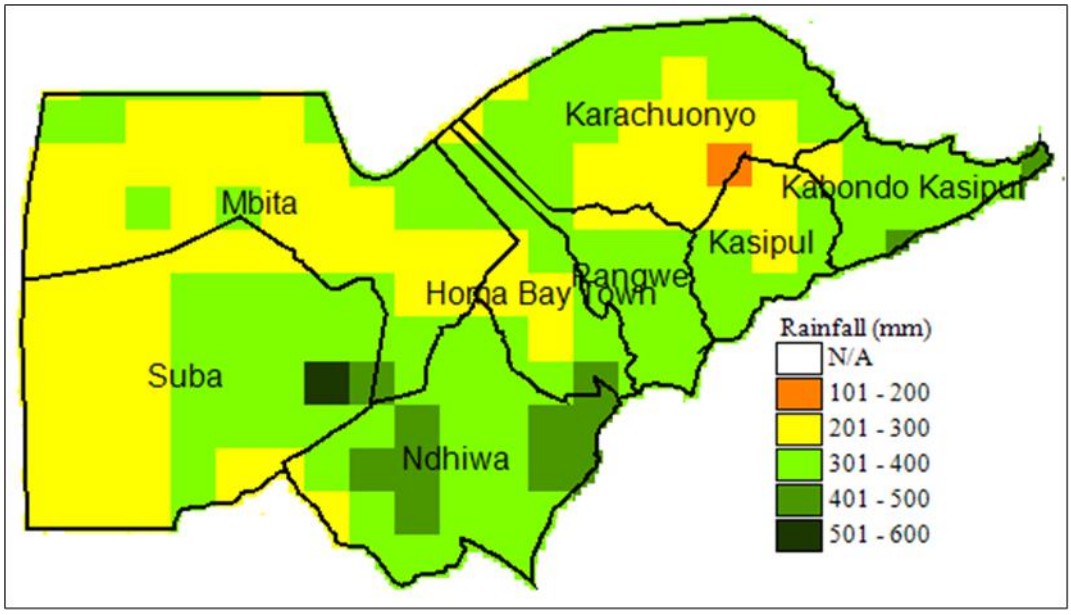
Low average seasonal minimum, mean and maximum temperatures are usually recorded during JJAS period. The average minimum, mean and maximum temperatures recorded based on the 30-year period (1991 – 2020) are 15.4, 21.9 and 28.4°C respectively.

The Short Rainfall Season (October-November-December-OND)

The short rains usually commence during the first to second week of October over Homa Bay County during OND. The rains usually end during the third to fourth week of December. The rains are normally well distributed in time and space with short dry spell of less than 5 days. The county receives an average OND rainfall total of about 380mm, which is not spatially uniform but varies across the county ranging from 100 – 600mm.

Most areas of the county receive between 200 and 400mm, except Othoro in Kabondo east Ward, Kwabwai, Kanyadoto, Kanyamwa Kologi and Kabuoch North Wards which receive between 400 and 500mm. The area of Gwassi Hills in Kaksingri east Ward receives over 500mm, while a part of Wangchieng Ward receive between 100 and 200mm of rainfall. Figure 5 below indicates the map of average October to December rainfall over Homa Bay County during the 30-year period (1981- 2010). The average minimum, mean and maximum temperatures recorded based on the 30-year period (1991 – 2020) are 15.8, 22. 6 and 29.6°C respectively.

Figure 5: Average Oct-Dec rainfall over Homa Bay County (1981-2010)



Source: Kenya Metrological Department (KMD)

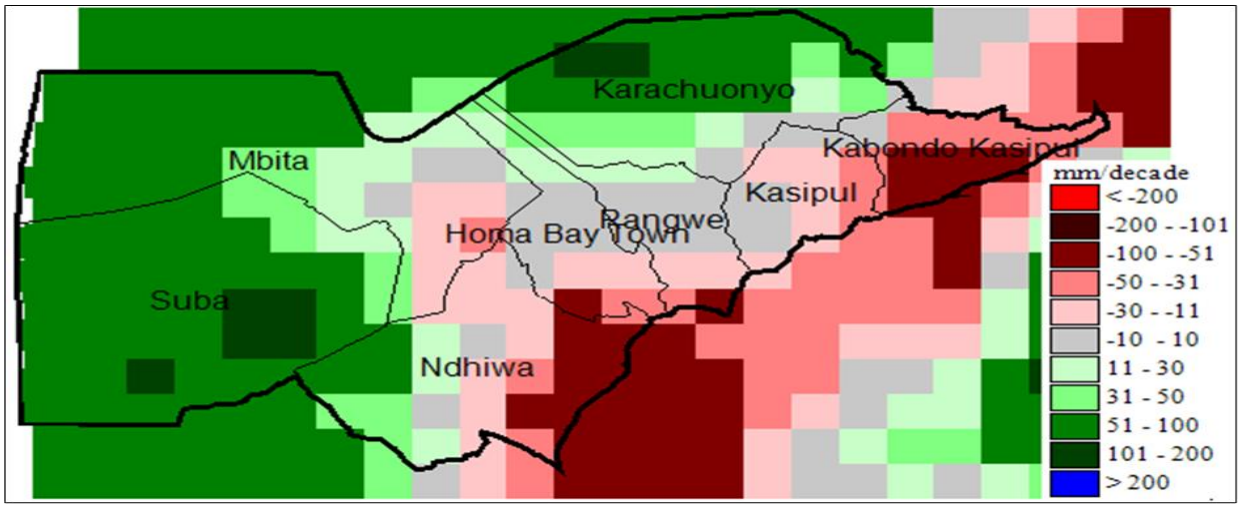
Changes in Distribution and Duration of Seasonal Rains

The time series of annual rainfall for the period 1981 to 2022 showed that rainfall has increased over the county by 11.9mm per year. During the period 1981 – 2008, drought events were prevalent with few or no flood events. However, during the period 2008 – 2022, drought events have reduced while the frequency of flood events has increased. There is a general increase in annual rainfall during the period except during 2006 – 2016, when rainfall reduced. However, the changes in spatial distribution of annual rainfall over the period 1981 to 2017 shows that the low-lying areas around the Lake have shown a tendency for increase in annual rainfall, while the high-altitude areas have an affinity towards reduction in annual rainfall.

Most of Suba South (Gwassi South, Gwassi North, and Kaksingri West wards) and Karachuonyo (West and North Karachuonyo, Central Kanyaluo and Kendu Bay Town wards) Sub-Counties have experienced increase in annual rainfall mainly by 50 – 100mm per decade which is annual rainfall increase of 5 – 10mm per year. The sub-counties of Rangwe, Kasipul, Kabondo Kasipul and Homa Bay Town have either experienced no significant change or reduction in annual rainfall.

A reduction in annual rainfall by 30 – 100mm per decade has been experienced in Kabuoch South/Pala, Kabuoch North, Homa Bay Arujo, West Gem, South Kasipul, East and West Kamagak, Kokwanyo/Kakelo, Kojwach and Kabondo West and East wards. Figure 6 below depicts the map of changes in annual rainfall over Homa Bay County during the 37-year period (1981-2017).

Figure 6: Changes in annual rainfall over Homa Bay County (1981-2017)



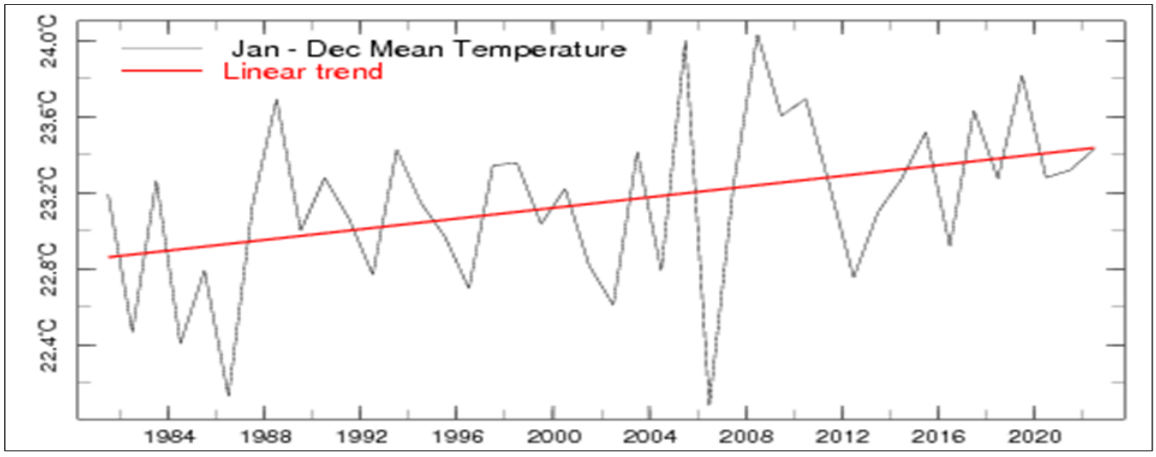
Source: Kenya Metrological Department (KMD) - The light red to deep red colors indicates reducing rainfall, grey color indicates no significant change while light green to dark green colors indicates increase in rainfall.

2.1.2 Temperature Trends in Homa Bay County

Analysis of temperature trends in the county over 42 years (1981 to 2022), showed that the average annual mean temperatures had increased by 0.6°C during the period, with significant increases during the June to September period. The average annual mean temperature increased by 0.14°C per decade. However, during 1983 – 1986, and the period 1988 - 2008 temperatures reduced over the county by 1.0 and 1.7°C respectively.

Figure 7 below gives the time series and trend of average annual mean temperature over the County.

Figure 7: Time series and trend of average annual mean temperature over Homa Bay County (1984-2020)

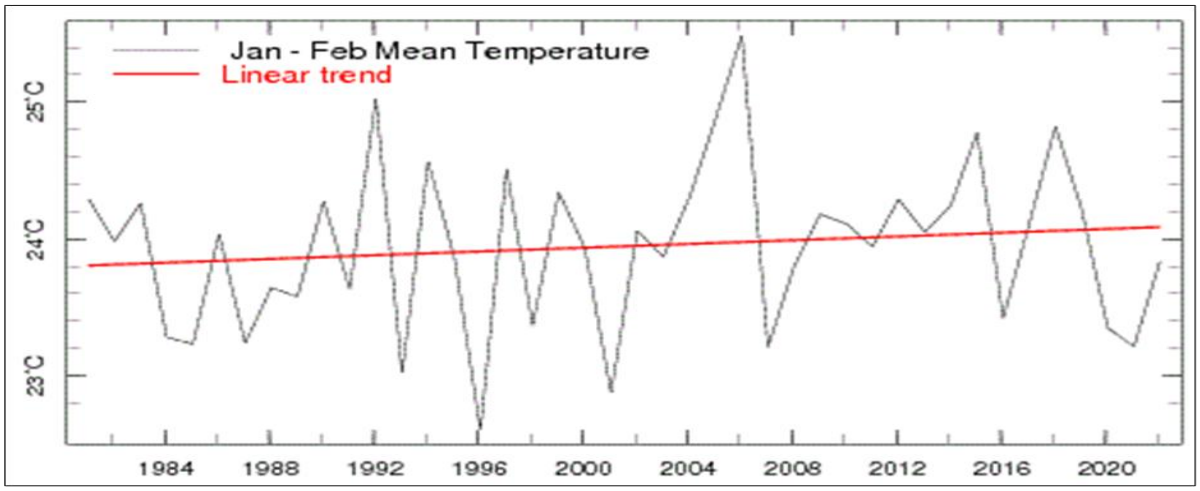


Source: Kenya Metrological Department (KMD)

There was an increase in average mean temperature of 0.3°C during the 42 years, which is about 0.07°C increase per decade during the January to February (JF) period. There was high

variation in high and low average JF mean temperatures between 1992 and 2007, varying between 22.6 and 25.4°C as shown in Figure 8 below.

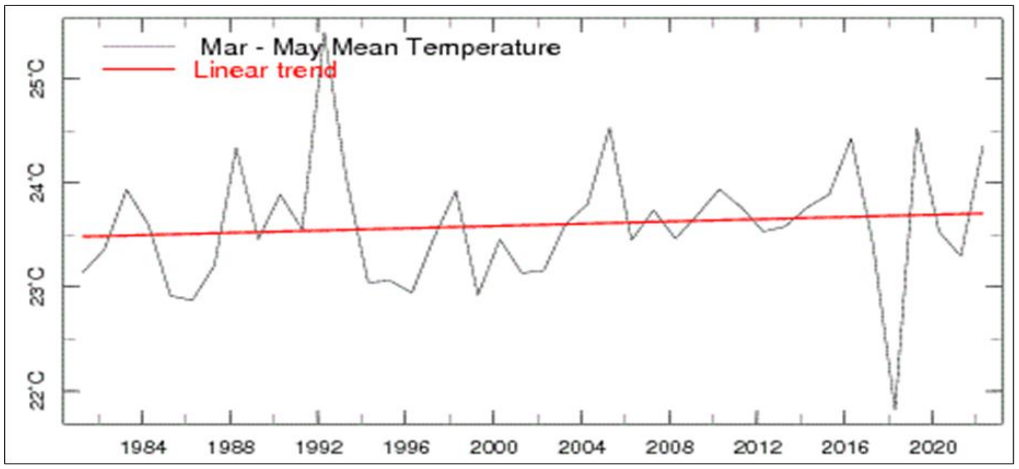
Figure 8: Time series and trend of average Jan-Feb mean temperatures over Homa Bay County (1984-2020)



Source: Kenya Metrological Department (KMD)

There was an increase in average March to May (MAM) mean temperature by about 0.05°C per decade of about 0.2°C during the 42 years. There was a high variation in the average MAM mean temperature increasing by 2.6°C during the period 1986 – 1992 and reducing by 2.5°C during 2016 – 2018. Figure 9 below indicates the time series and trend of average March to May mean temperature over the County.

Figure 9: Time series and trend of average March-May mean temperature over the County.

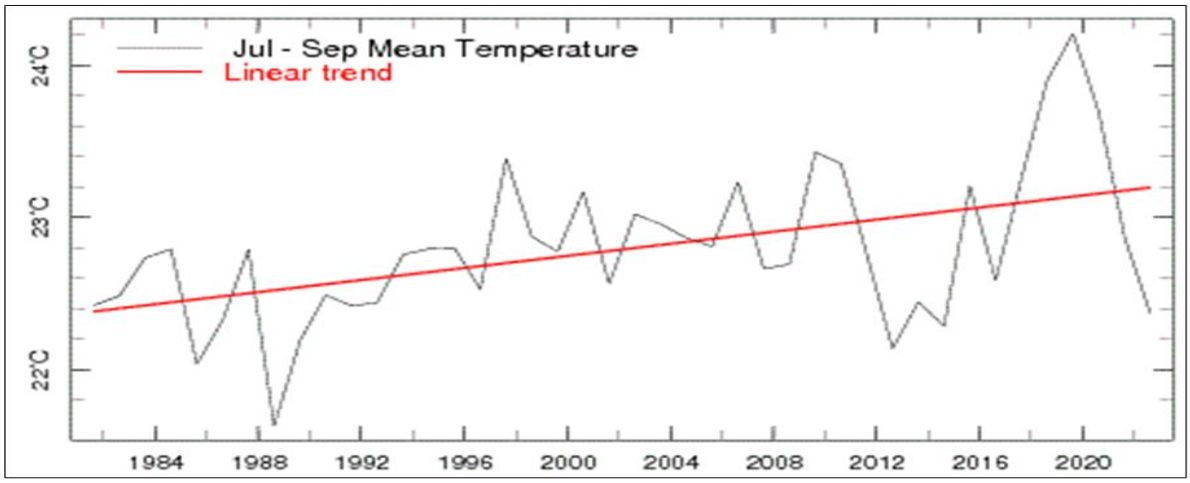


Source: Kenya Metrological Department (KMD)

There was a significant increase in average June to September mean temperature by 0.8°C with temperature increasing by 0.28°C per decade. There was significant temperature increase in average JJAS mean temperature by 2.0°C during 2012 – 2022, with reduction

during 1998 – 2012 and during 2020 – 2022 of about 1.2 – 1.8°C. Figure 10 below indicates the time series and trend of average June to September mean temperature over the County.

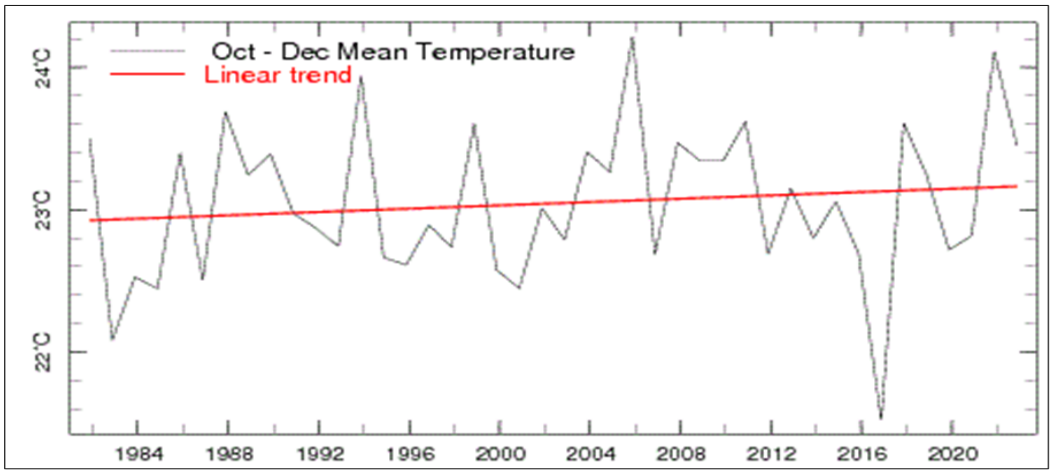
Figure 10: Time series and trend of average Jun-Sep mean temperatures over Homa Bay County (1984-2020)



Source: Kenya Metrological Department (KMD)

There was an increase in average October to December (OND) mean temperature by 0.3°C, with temperature increasing by 0.07°C per decade. There was significant reduction in average OND mean temperature by 2.6°C during the period 2006 – 2017. Figure 11 below gives the time series and trend of average October to December mean temperature over the County.

Figure 11: Time series and trend of average Oct-Dec mean temperature over Homa Bay County



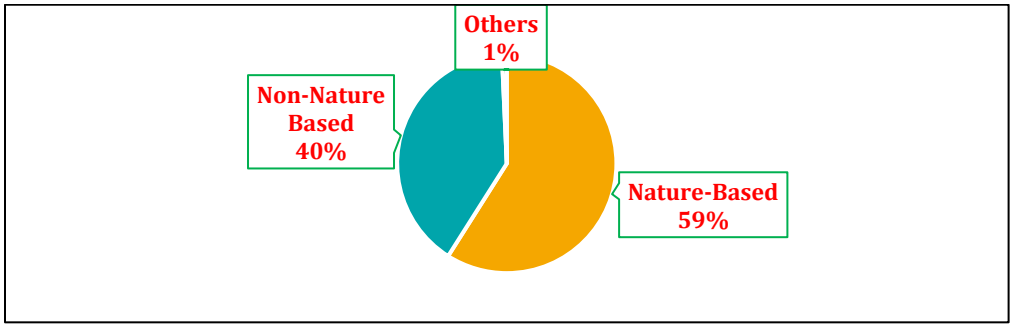
Source: Kenya Metrological Department (KMD)

2.2 Exposure and Vulnerability Profiles of the County

Livelihood Activities

In most wards in the County communities derive their livelihoods from nature based economic/livelihood activities. Thus, almost 60 % of communities in wards derive their livelihoods from nature-based activities while just about 40% of the communities in the wards derive their livelihoods from non-nature-based activities as illustrated in Figure 12 below.

Figure 12: Livelihoods base of communities in the county



A detailed analysis of the two categories of livelihood dependencies is presented in Table 3 below.

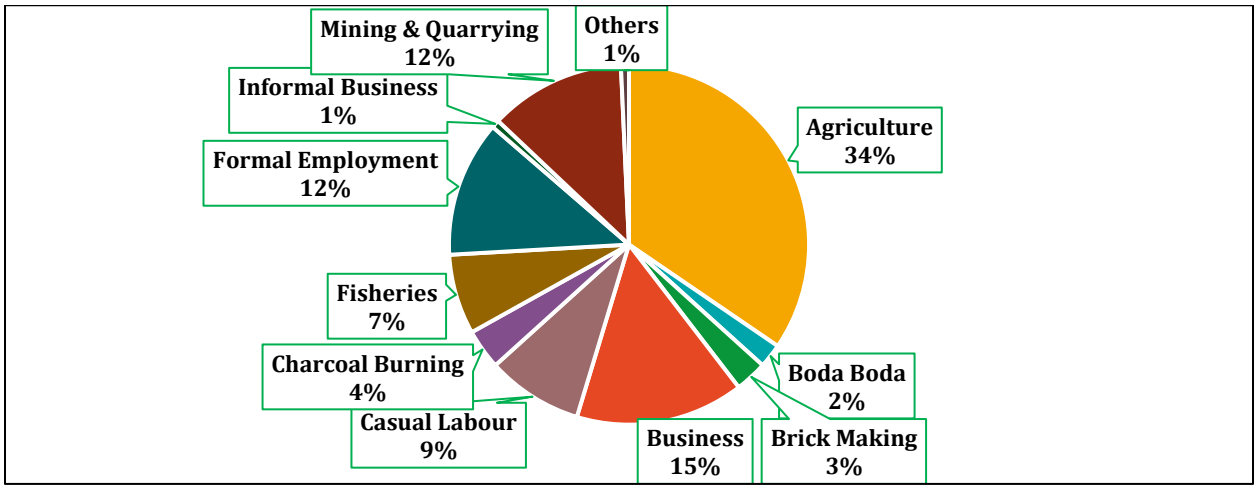
Table 3: Categories of sources of livelihoods in the county

Category	Classification	Activities
Nature Based Livelihood Sources	Agriculture	**Subsistence Farming** ▪ Maize farming ▪ Beans farming ▪ Banana farming ▪ Cassava farming ▪ Groundnuts farming ▪ Sorghum farming ▪ Sweet potatoes farming ▪ Vegetable and legumes farming **Commercial Farming** ▪ Sugarcane farming ▪ Maize farming ▪ Sorghum farming ▪ Poultry farming ▪ Dairy farming
	Fisheries	▪ Capture fisheries ▪ Fishponds ▪ Cage fisheries
	Mining & Quarrying	▪ Brick making ▪ Artisanal gold mining ▪ Sand harvesting ▪ Stone quarrying

	Trees, Vegetation & Forest	▪ Charcoal burning
Non- Nature Based Sources of Livelihood	Business	▪ Small to medium size enterprises ▪ Market traders ▪ Hawking of goods ▪ Trade based businesses (plumbing, masonry, electricians, carpenters) ▪ Juakali artisans ▪ Boda Boda transport operators (owners and riders)
	Employment[2]	▪ Permanent and salaried employment ▪ Temporary wage-earning employment (casual labourers, domestic workers)

Upto 34% of communities in the wards depend on agriculture and related activities for their livelihoods. The communities depending on agriculture given that upto 74 % of the labour force in the county is employed in agriculture.

Table 4: Sources of livelihood for communities in the county



A substantial number of communities derive their livelihoods from mining and quarrying at 12 % while 15 % of communities in the wards depend on business related activities for their livelihoods as illustrated in Table 4 above.

The Profile of Vulnerable Groups to Climate Change in the County

In the community engagement forums and at the county level climate risk assessment workshop, the most vulnerable groups of people to climate change were identified as presented in Table 5 below.

[2] About 74% of the labour force is employed in agriculture (Kenya climate risk profiles Homa Bay County climate risk profile)

Table 5: Vulnerable groups to climate change in the county

	Vulnerable Group	Characteristics	Livelihood/Domestic Roles	Resources that Group relies on
1.	Women	▪ Childbearing ▪ Single mothers ▪ Widowed ▪ Inadequate access to resources ▪ Gender based violence. ▪ Sex workers ▪ Elderly	▪ Small scale traders (mainly in markets) ▪ Subsistence farming ▪ Domestic chores ▪ Care givers ▪ Farm hands	▪ Farmlands ▪ Markets ▪ Water resources (lakes, rivers, forests) ▪ Women groups
2.	People with Disability (PWDs)	▪ Stigmatized ▪ Defilement ▪ Discriminated ▪ Physically challenge ▪ Mental challenges ▪ Street begging ▪ Different mobility styles ▪ Vulnerable to diseases ▪ Limited or no ability to carry out certain activities	▪ Household chores ▪ Manual and low paying jobs ▪ Farm hands ▪ Cobblers ▪ Potters ▪ Repair and maintenance of electronics	▪ Donations from well wishers ▪ Government support ▪ Own labour ▪ Natural resources (Sand, Stones)
3.	Children	▪ Orphaned ▪ Neglected ▪ Child labour ▪ Defilement ▪ Naïve ▪ Voiceless	▪ Household chores ▪ Farmhands ▪ Small scale trading	▪ Government programmes ▪ Caregivers ▪ Natural resources (land, water, forests)
4.	The Elderly	▪ Old to very old age ▪ Old aged, induced disability (blindness, mobility challenges, speech challenges) ▪ Full dependance on caregivers) ▪ Ill health ▪ Cannot easily access resources ▪ abandonment	▪ Mostly play advisory and leadership roles in the family ▪ Are sources of cultural knowledge. ▪ Important sources of historical climate information	▪ Natural resources (livestock, land, water, forests) ▪ Transfers from family members) ▪ Own investments ▪ Government pension schemes ▪ NGO financing schemes
5.	Youth	▪ Resource poor ▪ Full of energy ▪ Have huge potential in unexplored talents ▪ Rush in decision making ▪ At various stages of attaining academic achievements ▪ Prone to engagement in crime and socially deviant behaviors ▪ Adventurous	▪ Casual jobs (farm hands, assistants, construction) ▪ Permanent and salaried employment ▪ Boda Boda riders ▪ Small scale trading ▪ Fishing ▪ Talent based employment (sports, music, film) ▪ Artists ▪ Innovation	▪ Own talents ▪ Academic qualifications ▪ Natural resources (Land, water, livestock, forests) ▪ Government Programmes (youth fund, uwezo fund, tenders)
6.	Resource poor households	▪ Unemployment of the household head ▪ Inability to educate children ▪ Lack of access to productive resources ▪ Lack of adequate land	▪ Engagement in wage paying casual labour jobs ▪ Women are mostly engaged in domestic chores ▪ The men engage in environmentally	▪ Natural resources (land, water, forests, livestock) ▪ Transfers from relatives ▪ Artisanal skills such s tailoring, shoe repair, carpentry, masonry and metal smiths

		▪ Low level of education of household heads ▪ High number of people living in as single household ▪ High dependence on nature based economic activities ▪ High incidences of child labour	destructive activities such charcoal burning, sand harvesting ▪ Small holder farming entirely rain-fed	

These vulnerable groups of people are found in every community in the County and are well embedded in the society. For the PWDs there are institutions established to educate them on both academic and life skills, an example is the Sikri school for the blind and deaf found in Rachuonyo South Sub-County.

The vulnerable groups do not enjoy equal access to and control of important resources and assets in the community making them more vulnerable to climate change. in this regard, women are the most affected since they do not have land ownership rights given the cultural practices on land ownership and inheritance in the county. Similarly, PWDs, the youth and children are discriminated against in resources use and allocation.

On the decision-making front, the vulnerable groups still face challenges since they are not fully consulted and involved in decision making. Again, women are most affected in this regard given the persistent and culturally driven patriarchal tendencies prevalent in the county.

2.3 Differentiated Impacts of Climate Trends and Risks

The impacts of climate hazards and risks in the county have been categorized in line with the two major climate hazards (drought and floods) and their associated risks such as extreme rainfall, flooding, emergence of pests and diseases. The hazards and risks impact key livelihood resources and assets such as land, pasture, water, forests, trade, human settlements and health facilities and systems as enumerated in Table 6 below.

Table 6: Differentiated impacts of climate hazards and risks in the county

Climatic Event/Hazards	Activity	ASSETS	Direct Impacts	Indirect Impacts	Impacted Areas
Precipitation Flooding Hailstorms Extreme rainfall	Natural Resources	Land/Soil	▪ Soil erosion ▪ Soil degradation ▪ Destruction of infrastructure ▪ Landslides	▪ Crop failure ▪ Famines ▪ Emergence of crop pests and diseases ▪ Forced migration	▪ Suba South ▪ Homa Bay Town
		Pasture	▪ Loss of livestock grazing grounds ▪	▪ Emergence of livestock pests and disease	▪ Suba South ▪ Homa Bay Town
		Water (domestic)	▪ Destruction of water infrastructure ▪ Contamination of domestic water sources ▪ Siltation of Water sources	▪ Outbreak of diseases ▪ Scarcity of clean drinking water	▪ Suba South ▪ Homa Bay Town
		Water (livestock)	▪ Drowning of livestock ▪	▪ Exposure of livestock to diseases ▪	▪ Suba South
		Forests	▪ Destruction of forest undergrowth ▪ Destruction of trees	▪ Forest degradation ▪ Loss of biodiversity	
		Wetlands	▪ Loss of wetland habitats ▪ Washing away of wetland species	▪ Loss of biodiversity ▪ Disease outbreaks	
		Lake	▪ Increased sedimentation ▪ Rise in the lake water levels	▪ Destruction of property along the lake shores ▪	
	Livelihood/productive activities	Livestock (herd)	▪ Death of livestock ▪	▪ Loss of income ▪ Food scarcity	▪
		Agriculture	▪ Crop failure ▪	▪ Loss of income ▪ Food scarcity	
		Trade/small business	▪ Access to markets curtailed due to destruction of roads ▪ Loss of incoming earning opportunities	▪ Business losses ▪ Loss of income	
		Domestic and household	▪ Injury and loss of life ▪ Displacement ▪	▪ Increased exposure to Gender Based Violence ▪ Increased exposure to diseases	
		Fisheries	▪ Destruction of fish breeding grounds	▪ Reduced fish stocks	
	Infrastructure	Buildings	▪ Destruction of buildings	▪ Loss of life ▪ Loss of income ▪ Loss of investments	▪
		Service (Education and Health)	▪ Destruction of health facilities ▪ Destruction of school facilities	▪ Reduced capacity of handling accidents and emergencies ▪ Loss of lives ▪ Disruption of school calendar	

		Markets	▪ Destruction of market facilities ▪	▪ Loss of revenue for county government ▪ Loss of income for traders	
		Transportation	▪ Disruption of transport services ▪ Destruction of transport infrastructure (roads, bridges)	▪ High incidences of accident ▪ Loss of income ▪ Loss of lives	
		Communication	▪ Disruption of communication services ▪ Destruction of communication infrastructure	▪ Poor or no communication ▪ Loss of income earning opportunities ▪ Increased risk of injury or death from climate hazards	
		Others (Sewerage infrastructure and services)	▪ Destruction of sewerage infrastructure (lines and treatment plant)	▪ Poor hygiene and sanitation ▪ Disease outbreaks	
Temperature Drought Extreme temperatures Heat waves	Natural Resources	Land/soil	▪ Loss of soil moisture ▪ Exposure of soil	▪ Low soil/land productivity ▪ Emergence of crop/livestock pests and diseases ▪ Emergence of human parasites such as jiggers	▪ All Sub-counties
		Pasture	▪ Destruction of pasture ▪ Reduced quality and quantity of pasture	▪ Loss of livestock due to starvation ▪ Soil erosion ▪ Emergence of livestock pests and diseases	All Sub-counties
		Water (domestic)	▪ Inadequate availability of water for domestic use ▪ Drying up of water sources (wells, boreholes, water pans)	▪ Outbreak of diseases ▪ Exposure of women and girls to GBV	All Sub-counties
		Water (Livestock)	▪ Drying up of livestock watering points ▪ Livestock stunted growth from dehydration	▪ Loss of livestock ▪ Loss of income	All Sub-counties
		Forests	▪ Drying up of trees ▪ Loss of forest undergrowth	▪ Loss of biodiversity ▪ Forced migration of wildlife	All Sub-counties
		Wetlands	▪ Drying up of wetlands	▪ Loss of food production capacity ▪ Encroachment of wetlands ▪ Loss of biodiversity	All Sub-counties
		Lake	▪ Reduced Water volumes	▪ Encroachment into riparian land	All Sub-counties
	Livelihood/Productive Activities	Livestock (Herd)	▪ Loss of livestock ▪ Poor livestock health	▪ Low livestock productivity ▪ Loss of income	All Sub-counties
		Agriculture	▪ Crop failure	▪ Loss of income	All Sub-counties

			▪ Emergence of crop pests and diseases	▪ Food scarcity ▪ High food prices	
		Trade/small business	▪ Scarcity of supplies ▪ Influx of low-priced goods from high productivity areas	▪ Loss of income ▪ Business closures ▪ Shortage of commodities	All Sub-counties
		Domestic and Household	▪ Food scarcity ▪ Inadequate water supply ▪ Increased stress on household income	▪ Increased incidences of GBV ▪ Children drop out of school. ▪ Malnutrition	All Sub-counties
		Fisheries	▪ Low water supply for fishponds	▪ Loss of income ▪ Food scarcity	All Sub-counties
	Infrastructure and Services	Buildings	▪ Increased depreciation due to high heat stress	▪ Increased maintenance costs	All Sub-counties
		Services (Education/Health)	▪ Reduced school attendance ▪ Poor sanitation conditions	▪ Increased expenses ▪ High school drop-out rate ▪ Increased demand for health services	All Sub-counties
		Markets	▪ Heat stress on market facilities ▪ Water scarcity	▪ Low market turnovers ▪ Loss of revenue for county government ▪ Loss of income for traders	All Sub-counties
		Transportation	▪ Low demand for transportation services	▪ Loss of income	All Sub-counties
		Communication	▪ Increased maintenance costs of communication infrastructure	▪ Increased communication costs for consumers	All Sub-counties

2.4 Spatial Distribution of Risks

This section illustrates the spatial distribution of the two major climate risks arising from the two major climate hazards in the county (floods and droughts). Floods are occasioned by a number of conditions including extreme precipitation; rise in lake water levels and overflowing rivers. Droughts on the hand are occasioned by decreased precipitation, prolonged periods of high temperatures and erratic rainfall patterns. These risks have been identified and are their occurrence ae shown per ward alongside the main economic activities in the respective wards. Drought occurs across the county in all the 40 wards while flooding occurs in 25 out of the 40 wards as illustrated in Table 7 below.

Table 7: Spatial distribution of risks/hazards in the wards

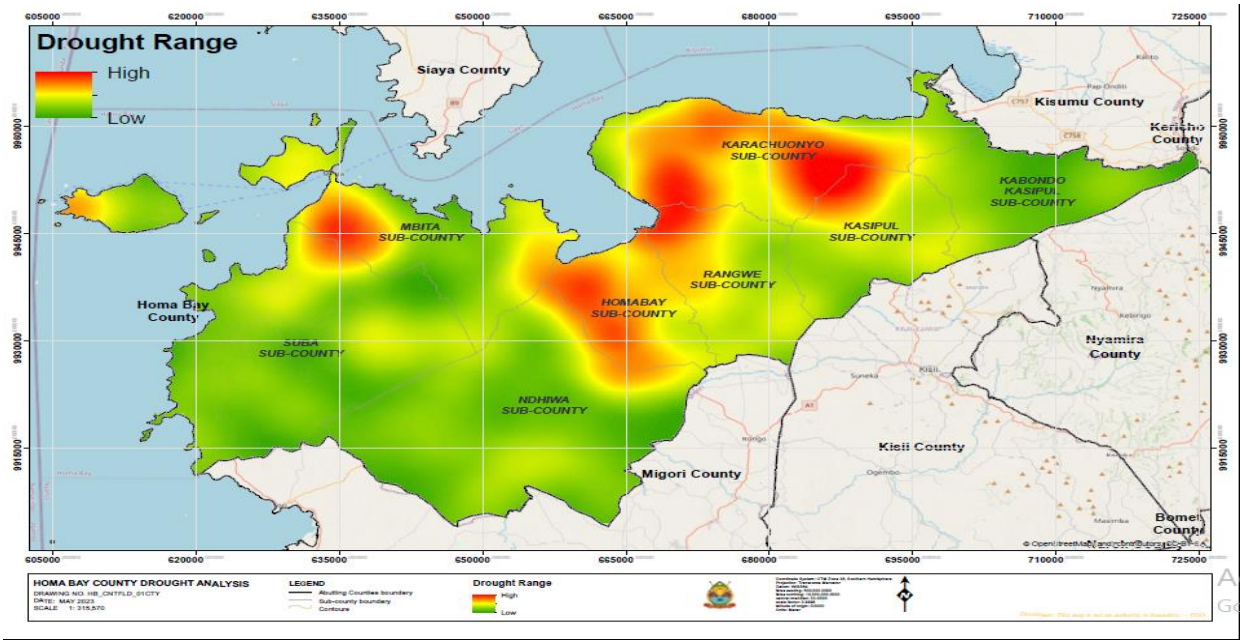
Risk/Hazard				
Sub-County	**Ward**	**Drought**	**Floods**	**Economic Activities**
Rachuonyo North	Kendu Bay Town	Yes	Yes	Fishing; Farming; Small scale businesses; Sand harvesting; Employment
	Wang'chieng'	Yes	Yes	Fishing; Small scale farming; Small scale traders Sand harvesting
	Central Karachuonyo	Yes	Yes	Agriculture; Subsistence farming
	KIBIRI	Yes	Yes	Agriculture; Mining e.g., Quarrying; Sand harvesting Trade SMEs
	Kanyaluo	Yes	Yes	Agriculture; Small businesses; Casual workers; Sale of livestock; Boda boda; Sand harvesting; Quarrying
	West Karachuonyo	Yes	Yes	Agriculture; Fishing; Trade SMEs; Sand harvesting
	North Karachuonyo	Yes	Yes	Farming; Small scale trading
Rachuonyo South	West Kasipul	Yes	No	Agriculture; mining; wages; salaries; livestock rearing.
	South Kasipul	Yes	No	Agriculture; mining; formal employment; informal employment
	Central Kasipul	Yes	No	Agriculture; Charcoal burning; Brick making
	East Kamagak	Yes	No	Agriculture; SMEs; Casual labour
	West Kamagak	Yes	No	Agriculture; Wage labour; Formal employment
Rachuonyo East	Kabondo East	Yes	No	Agriculture; Formal employment; Small scale trading Sand harvesting
	Kabondo West	Yes	No	Agriculture; trade; sand harvesting
	Kokwanyo Kakelo	Yes	No	Agriculture; sand harvesting; brick making; small business enterprises
	Kojwach	Yes	No	Farming; Casual labour; Formal employment
Homa Bay Town	Homa Bay Central	Yes	Yes	Farming; Casual labour; Formal employment
	Arujo	Yes	Yes	Farming; Casual labour; Formal employment; Boda Boda
	Homa Bay West	Yes	Yes	Farming; Formal employment; Casual labour charcoal burning
	Homa Bay East	Yes	Yes	Agriculture; charcoal burning; boda boda transport brick burning; mining; small scale business.
Ndhiwa	Kwabwai	Yes	Yes	Agriculture; livestock production; Poultry farming mining
	Kanyadoto	Yes	No	Farming; Small scale trading; Casual labour Formal employment
	Kanyikela	Yes	Yes	Agriculture; Small medium enterprises; Wage labour Formal employment

	Kabuoch South/Pala	Yes	Yes	Sugarcane farming; Legumes; Cereals; livestock production
	Kanyamwa Kologi	Yes	Yes	Farming; Small scale trade; Juggery
	Kanyamwa Kosewe	Yes	Yes	Agriculture; Small scale trading; Formal employment Wage labour
	Kabuoch North	Yes	Yes	Agriculture; Wage salary; Formal employment
Rangwe	West Gem	Yes	No	Agriculture; Mining of Gold; Small scale businesses Brick Making; Formal employment.
	East Gem	Yes	No	Subsistence farming; Wages from mining Charcoal burning; Small Scale businesses.
	Kagan	Yes	No	Small scale farming; Sand harvesting
	Kochia	Yes	Yes	Agriculture; Fishing; Mining
Suba North	Mfangano Island	Yes	No	Fishing; Businesses; Agriculture; Salary & Wages
	Rusinga Island	Yes	No	Fishing; Farming; Trade
	Kasgunga	Yes	Yes	Jua Kali; Boda Boda; SMEs
	Gembe	Yes	Yes	Agriculture; Fishing; Salary & Wages; Businesses; Charcoal burning; Quarrying
	Lambwe	Yes	Yes	Agriculture; Salary & Wages; Businesses; Mining
Suba South	Gwassi South	Yes	Yes	Agriculture; Wages; Livestock keeping; Salaries; Fishing.
	Gwassi North	Yes	No	Agriculture; Fishing; Charcoal burning
	Kaksingri West	Yes	Yes	Fishing; Farming; Boda boda; Formal employment
	Ruma Kaksingri	Yes	Yes	Farming; Boda Boda; Charcoal burning

Drought Risk in the County

Figure 13 below shows the distribution of drought incidences in the County. Drought affects the entire County.

Figure 13: Occurrence of droughts in the county

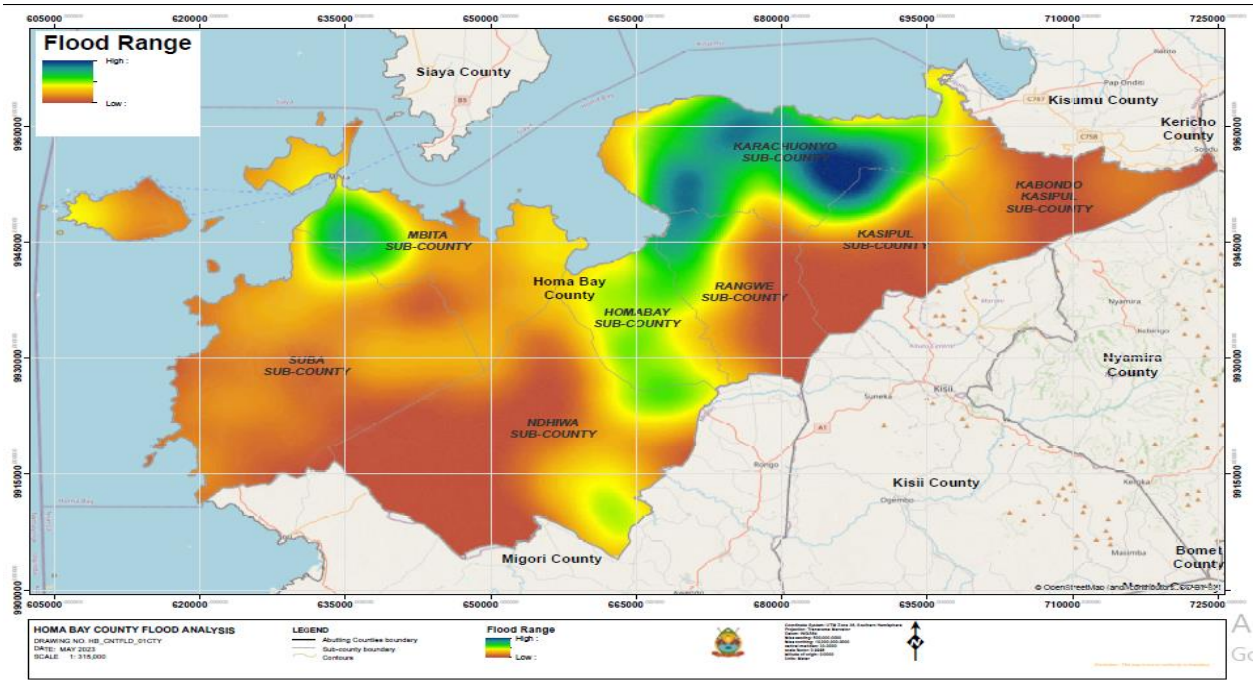


The four sub-counties of Rachuonyo North, Rangwe, Homa Bay Town and Suba North have been historically more than disproportionately impacted by drought incidences.

Flooding Risk in the County

The county experiences flooding mainly in: Kanyamwa Kosewe; Rachuonyo North; Rangwe; Homa Bay Town; Kabuoch-South Pala; and Suba North. Lakeshore flooding occurs in the wards bordering the lake. Wangchieng ward is the most affected in terms of disaster response and management.

Figure 14: Flooding incidences and pattern in Homa Bay County.



3.0 Future Climate Scenarios for the County

3.1 National and Downscaled Climate Change Projections

The Climate of Kenya

Kenya's climate is influenced by global, regional, and localized climate conditions. Some of the variability in the country's climate is due to the El Niño Southern Oscillation which has caused periods of drought and flooding in the country over decades. The El Niño and La Niña episodes have had disastrous effects on the country's economy and infrastructure and caused loss of lives. The El Niño Southern Oscillation periods have caused economic losses and slowed down agriculture value-added growth.

The seasonal migration of the Inter Tropical Convergence Zone (ITCZ) which follows the overhead sun affects weather and climate in the country. Kenya has a diverse topography which influences the significant variations in temperature across the landscape. The highlands experience cooler temperatures than the coastal and lowland zones. Average temperatures range between 18^0C at the higher elevations to 26^0C along the coast. Rainfall varies considerably across the country with less than 250 mm falling in the arid zones in the north to over 2000 mm per year in the central and western parts of the country.

Climate Change Scenarios.

Climate change scenarios or socioeconomic scenarios are projections of future greenhouse gas (GHG) emissions used by climate modelers to assess future vulnerability to climate change. The scenarios and pathways survey any long-term routes and explore the effectiveness of mitigation and this will allow us to envision the future of human environment system. Producing scenarios requires estimates of future population levels, economic activity, the structure of governance, social values, and patterns of technological change.

The future climate change projections are based on the Representative Concentration Pathway (RCP). RCP is a GHG concentration (not emissions) trajectory adopted by the Intergovernmental Panel on Climate Change (IPCC). Four RCP pathways were used for climate modeling and research for the IPCC Fifth Assessment Report (AR5) in 2014. The pathways describe different climate change scenarios, all of which are considered possible depending on the amount of GHG emitted in the years to come. The RCPs – that is RCP2.6,

RCP 4.5, RCP 6.0, and RCP 8.5 – are labelled after a possible range of radiative forcing values that levels off by the year 2100 (2.6, 4.5, 6, and 8.5 W/m^2, respectively).

The higher values mean higher GHG emissions and therefore higher global temperatures and more pronounced effects of climate change. The lower RCP values are more desirable for us as humans but require more stringent climate change mitigation efforts to achieve them. For simplification, these scenarios are referred to as a low (RCP2.6); a medium (RCP4.5) and a high (RCP8.5) emission scenario in this profile. The CMIP5 (Coupled Model Inter-comparison Project phase 5) and global climate models (GCMs) data ensemble were utilized in generating the climate change scenarios. The national climate change projections are provided below.

National Climate Change Projections

Temperature Projections

Temperatures in Kenya are projected to continue increasing nationally by 1.7°C (between 1.2 and 2.2°C) by 2050s and by about 3.5°C (between 2.7 and 5.1°C) at the end of the 21st century, with warming greatest in the west. The number of hot days and hot nights will increase, with hot days projected to rise by 19%-45% of days by mid-century. Hot nights are projected to increase even more rapidly, projected to rise by 45%-75% of nights by 2050, and to increase by 64%–93% of nights by end of century. This will result into increased duration of heat and extreme heat conditions by about 9 to 30 days. The rise in temperature will make cold days and cold nights to become increasingly rare. The temperature projections in Kenya will continue to rise across all emissions scenarios. This will have significant implications for human and animal health, agriculture, and our natural ecosystem.

Precipitation Projections

Precipitation in Kenya is projected to remain highly variable and uncertain. The average rainfall is expected to increase by 2050 (projections range from -3 to +28 percent), especially during the 'short rains' which occur between October and December. Minor increase is projected for March to May. The coast and the highland areas will likely benefit more from the projected increases in the average annual rainfall.

The spatial and temporal distribution are expected to be irregular. Extreme rainfall events (heavy rainfall events) are projected to increase in frequency, duration, and intensity. The period between heavy rainfall events will likely increase, with increased interseason

variability. The duration of dry spells will decrease but there will be increase in severity (-2 to +27 percent). The proportion of heavy rainfall that occurs in heavy rainfall events is likely to increase. The rainfall in the arid zones is generally projected to decrease. The annual average precipitation is expected to increase slightly by the year 2100 under a high emissions scenario (RCP8.5).

Disasters (Increased Frequency)

Kenya is highly exposed to many natural hazards, the most common being floods and droughts. It is estimated that over 70% of natural disasters in Kenya are attributable to extreme climatic events. Typically, major droughts occur approximately every ten years, and moderate droughts or floods every three to four years. Repeating patterns of floods and droughts in the country have had large socio-economic impacts and high economic costs. For example, the 1998 to 2000 drought cost an estimated $2.8 billion, principally due to crops and livestock loss, as well as forest fires, damage to fisheries, reduced hydropower generation, reduced industrial production and reduced water supplies. Recurring disasters, particularly droughts and floods, have significantly impacted livelihoods and the country's economic development agenda. Flood and drought events are becoming more frequent, with drought cycles occurring every 2–3 years instead of every 5–10 years. Future climate change may increase the risk and intensity of extreme weather events, such as droughts and floods potentially worsening impact. Climate impacts are likely to have extreme effects on the poor, the marginalized, aged, and disabled. Such groups have fewer resources to adapt to climatic changes and therefore are more vulnerable to climatic change impacts.

Drought

Drought is the prime recurrent natural disaster in Kenya. Recurrent drought causes severe crop and livestock losses, famine, and population displacement. A severe and prolonged drought from 2008–2011, affected 3.7 million people, caused USD 12.1 billion in damages and losses especially in agriculture and livestock, slowed down the GDP by an average of 2.8 per cent per annum, and cost over $1.7 billion in recovery and reconstruction needs. Droughts affect more people and greatly impacts the economy (loss of 8% of GDP every five years). The frequency of droughts appears to be increasing. The future rising temperatures will further put the 18 or the 20 poorest counties in the arid and semi-arid areas at risk from increased aridity and prolonged drought. The prolonged drought may increase water scarcity which may result in significant economic losses, damage to agricultural lands and infrastructure as well as human casualties.

Floods

Excessive flooding in Kenya occurs relatively frequently (on average every three to four years) and is linked to El Niño or La Niña episodes that can lead to extreme weather in the country and region. Annual rainy seasons in Kenya are becoming progressively wetter, with sudden and/or late onsets bringing with them floods and inundation. Major floods periodically afflict the Winam Gulf of Lake Victoria, Lower Tana basin and the coastal regions. Geographically, the western, northern, eastern, central, and southeastern parts of the country are quite susceptible to seasonal floods in the wet seasons of MAM and OND. Riverine floods are the most dominant floods in Kenya, although the ASALs are particularly vulnerable to flash floods.

Decline of Mount Kenya Glaciers

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

Sea Level Rise

Kenya's coastline is 1,420 kilometers long and sea level rise is a risk to the low-lying areas of the five coastal counties (Kwale, Mombasa, Kilifi, Tana River, Lamu) and the people living there. Sea level rise of 16–42 cm by 2050s in combination with extreme weather events (storms and storm surges) is likely to intensify flooding, with the coastal city of Mombasa particularly exposed (KNAP, 2016). The contamination of freshwater aquifers with saline water intrusion will affect existing water supplies and their infrastructure. Water logging of soils and the resulting salt stress might cause reduced crop production. In addition, the health of coastal populations could be affected because of increasing ground water salinity, which might also lead to permanent inundation of low-lying areas making them uninhabitable, leading to migration of population and possibly the emergence of environmental refugees. Climate change impacts, including increases in sea surface temperature, sea level rise and coastal erosion, will likely put additional pressure on coastal

economies, communities, and ecosystems, including islands, estuaries, beaches, coral reefs and marine biodiversity.

3.2 Homa Bay County Future Climate Scenarios

The temperature and rainfall projections are mainly based on Representative Concentration Pathway (RCP 4.5) [3] and Representative Concentration Pathway (RCP) 8.5 [4] emission scenarios.

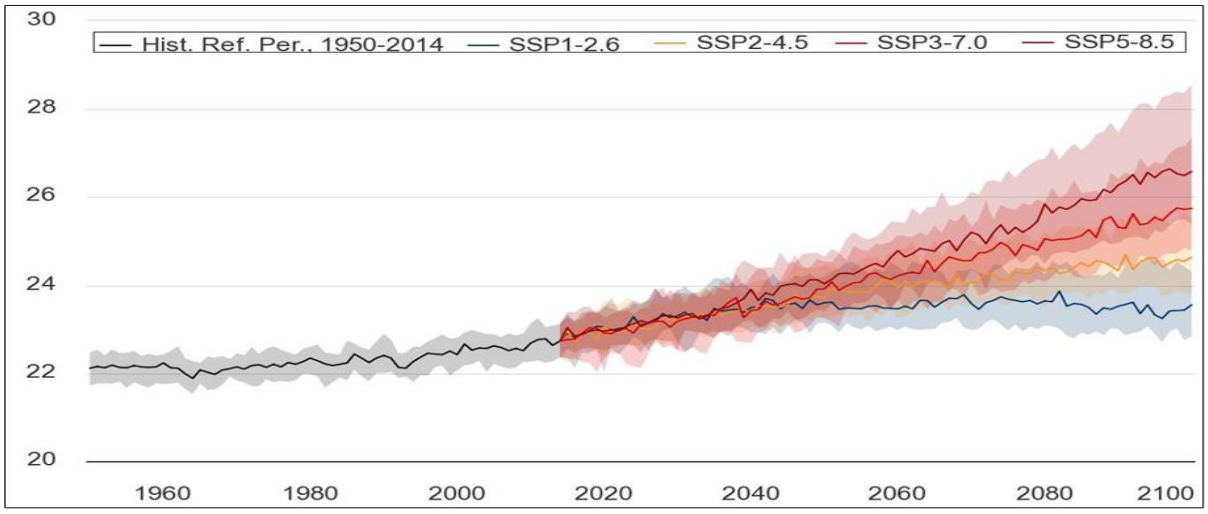
Temperature Projections

The average annual mean surface temperatures in Homa Bay County are projected to continue rising with 0.7°C by 2035 and with about 1.4°C by 2050. Additionally, the average annual mean surface temperature will also continue changing in respect with the various seasons. During JF, MAM, JJAS and OND seasons, average mean surface temperatures are projected to increase with 0.60 – 0.8°C by 2035 and with about 1.0 – 1.7°C by 2050. The average annual and seasonal minimum and maximum surface temperatures are projected to rise with 0.6 – 0.8°C by 2035, and with 1.1 – 1.7°C by 2050.

Figure 15, Figure 16, and Figure 17 below provides historical and projected average mean, minimum and maximum surface air temperature respectively over Homa Bay County across all emission scenarios. Therefore, the number of hot days and nights will increase, with 'hot days' projected to rise by 30% of days by mid-century. Hot nights are expected to increase more quickly, projected to go up by about 50% of nights by mid-century and on 64%–93% of nights by end of century. Cold days and nights are expected to become increasingly rare.

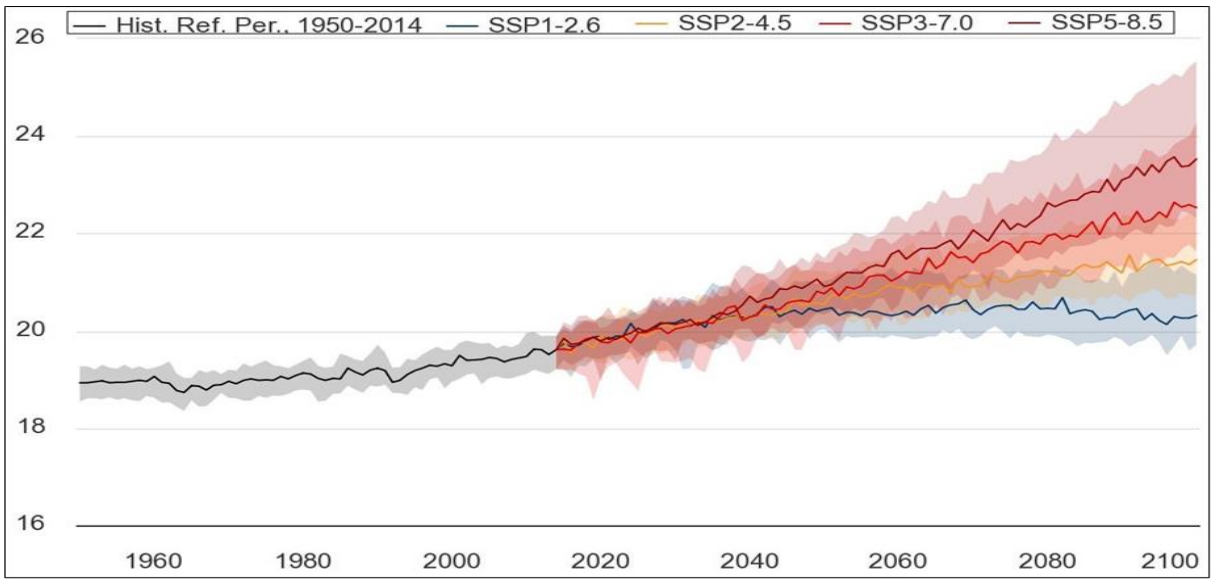
[3] Representative Concentration Pathway (RCP) 4.5 is a scenario of long-term, global emissions of greenhouse gases, short-lived species, and land-use-land-cover which stabilizes radiative forcing at 4.5 Watts per meter squared (W m^{-2}, approximately 650 ppm CO2-equivalent) in the year 2100 without ever exceeding that value.
[4] Representative Concentration Pathway (RCP) 8.5 is a scenario of comparatively high greenhouse gas emissions.

Figure 15: Historical and projected average mean, minimum and maximum surface temperatures (1950-2100)



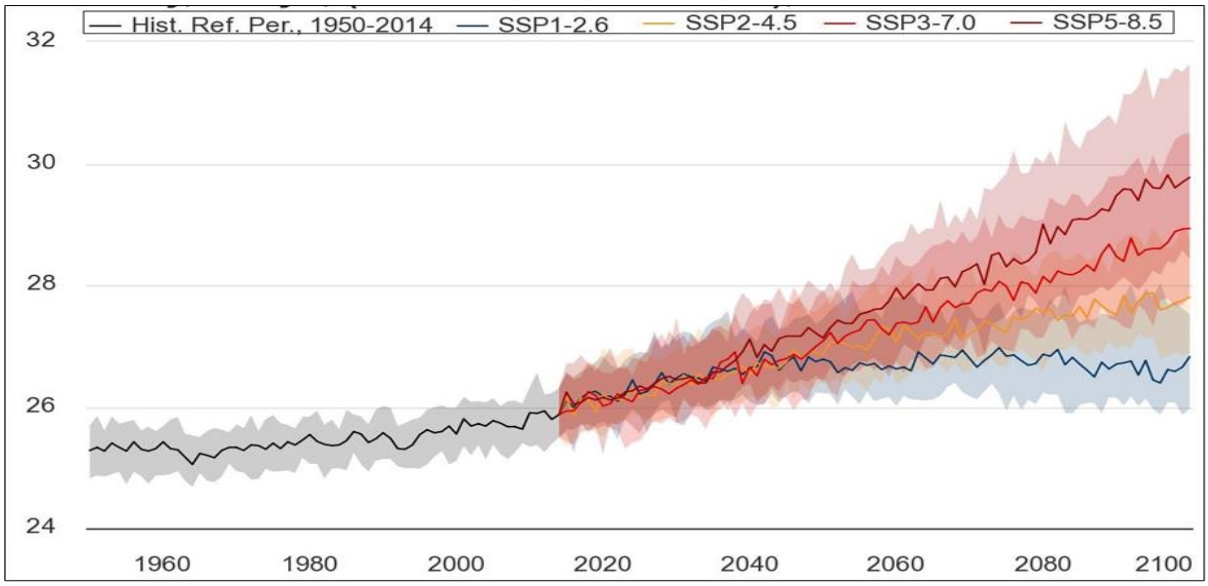
Source: Kenya Metrological Department (KMD)

Figure 16: Historical and projected average mean, minimum and maximum surface temperatures (1950-2100)



Source: Kenya Metrological Department (KMD)

Figure 17: Historical and projected average mean, minimum and maximum surface temperatures (1950-2100)



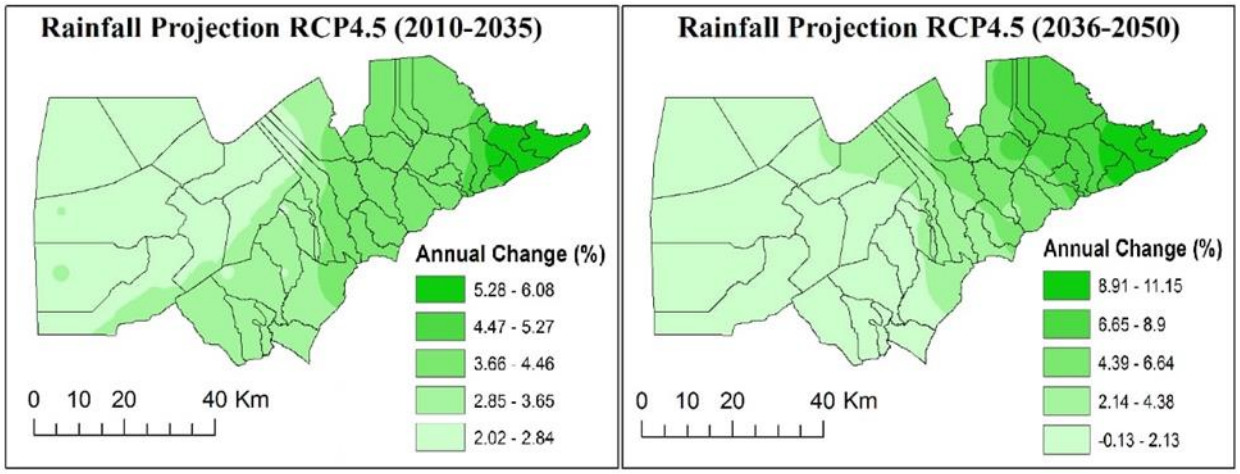
Source: Kenya Metrological Department (KMD)

Precipitation Projections

Homa Bay County annual rainfall is projected on average to increase with about 39.0 – 53.8mm by 2035 and rise with about 71.9 – 126.5mm by 2050. The highest projected increase in rainfall will be experienced over the sub-counties in the eastern side of the county, while sub-counties on the western side of the county will experience minimal increase in annual rainfall based on both the RCP4.5 and RCP8.5 scenarios.

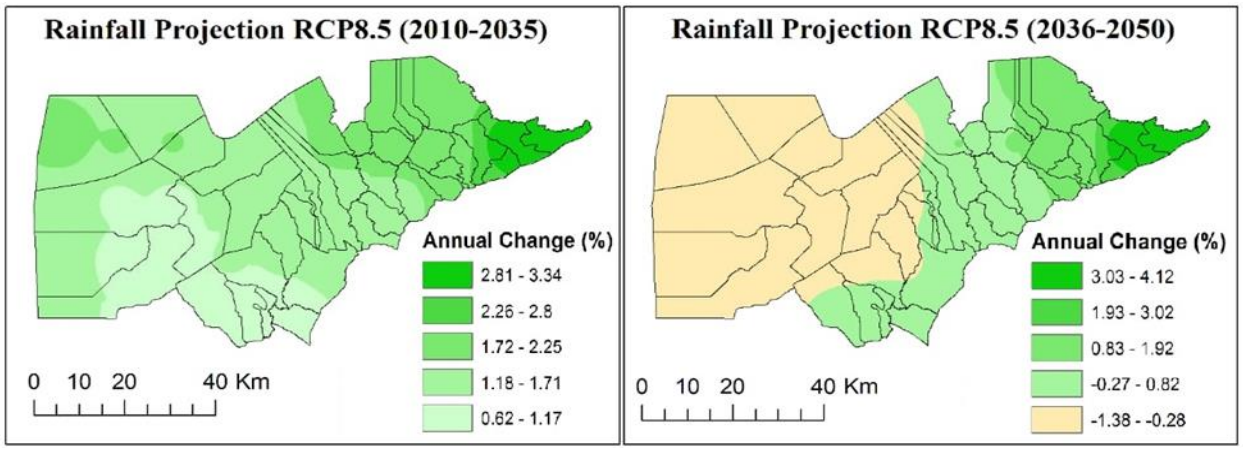
The highest projected percentage increase in annual rainfall will occur over Karachuonyo, Kasipul and Kabondo Kasipul Sub-Counties of 4.5 – 6.1% by 2035 and rise of 6.7 – 11.2% by the year 2050 based on RCP4.5 scenario. However, based on RCP8.5 scenario these sub-counties, although still highest, will experience lower percent increase in annual rainfall of 1.7- 3.3% by 2035, and slight rise of 0.3 – 4.1% by the year 2050. The lowest projected percentage increase in annual rainfall will occur over Suba South and North (Mbita) Sub-Counties of 2.0 – 3.7% by 2035, and then insignificant change of -0.1 – 4.4% by the year 2050 based on RCP4.5 scenario. However, based on RCP8.5 scenario these sub-counties, will expect no significant percentage change in annual rainfall of 0.6- 2.3% by 2035, and a small percent reduction of -0.3 - -1.4% by the year 2050. Figure 18 and Figure 19 below gives the projected percentage change in annual rainfall for the periods 2010-2035 and 2036-2050 over Homa Bay County using RCP4.5 and RCP8.5 emission scenarios respectively.

Figure 18: Projected percentage change in annual rainfall for the periods 2010-2035 (left) and 2036-2050 (right) over Homa Bay County using RCP4.5 emission scenario



Source: Kenya Metrological Department (KMD)

Figure 19: Projected percentage change in annual rainfall for the periods 2010-2035 (left) and 2036-2050 (right) over Homa Bay County using RCP8.5 emission scenario.



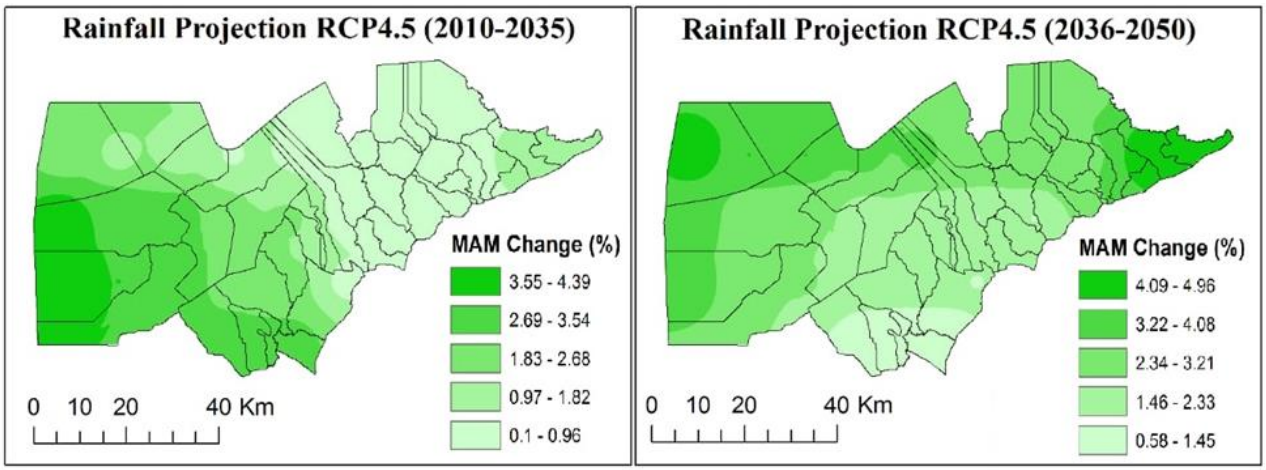
Source: Kenya Metrological Department (KMD)

There are seasonal changes in projected average rainfall amounts across the County. The significant increases in rainfall are expected during JF, MAM and OND with minimal changes or reduction in rainfall during JJAS period. Homa Bay County will expect an average increase in JF rainfall of 21.6 – 23.2mm by 2035 and rise of about 31.0 – 48.5mm by 2050, while the MAM rainfall is projected on average to increase with 7.9 – 18.4mm by 2035 and rise with 20.7 – 25.2mm by 2050.

The MAM rainfall over Ndhiwa Sub-County is projected in percentage terms not to significantly change from 1.0 – 3.5% by 2035, and 0.6 – 2.3% by the year 2050 based on RCP4.5 scenario. However, based on RCP8.5 scenario the sub-county will experience a slight percentage increase in MAM rainfall of 4.2 – 6.7% by 2035, and slow rise of 3.8 – 7.4% by the year 2050. Homa Bay Town and Rangwe Sub-Counties MAM rainfall is not projected to

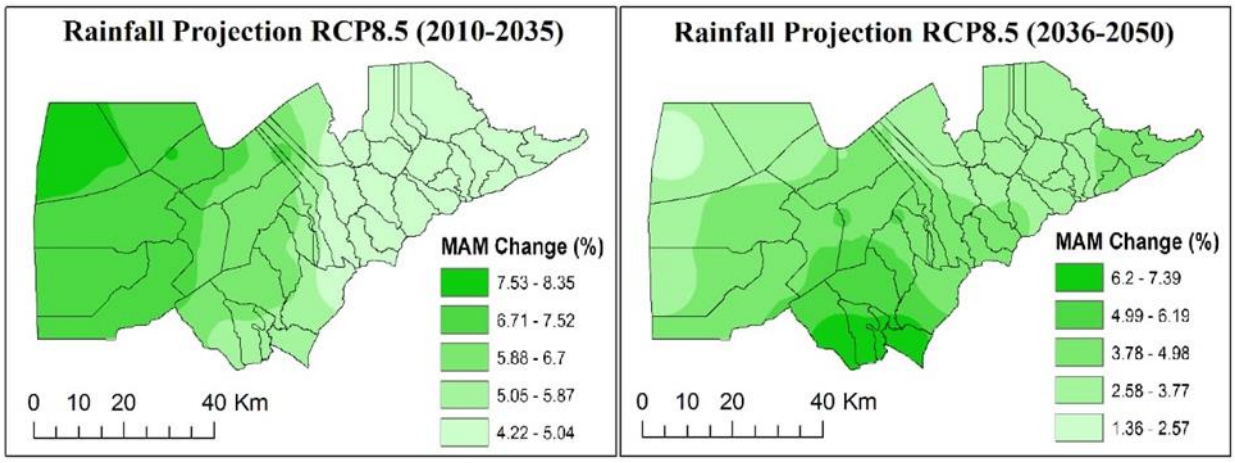
significantly change in percentage from 0.1 – 1.8% by 2035, and 1.5 – 3.2% by the year 2050 based on RCP4.5 scenario. However, based on RCP8.5 scenario these sub-counties, will expect a small percentage increase in MAM rainfall of 4.2 – 5.0% by 2035, and stiller smaller percent increase of 2.6 – 5.0% by the year 2050. Figure 20 and Figure 21 gives the projected percentage change in March to May rainfall for the periods 2010-2035 and 2036-2050 over Homa Bay County using RCP4.5 and RCP8.5 emission scenarios respectively.

Figure 20: Projected percentage change in March to May rainfall for the periods 2010-2035 (left) and 2036-2050 (right) over Homa Bay County using RCP4.5 emission scenario.



Source: Kenya Metrological Department (KMD)

Figure 21: Projected percentage change in March to May rainfall for the periods 2010-2035 (left) and 2036-2050 (right) over Homa Bay County using RCP8.5 emission scenario.

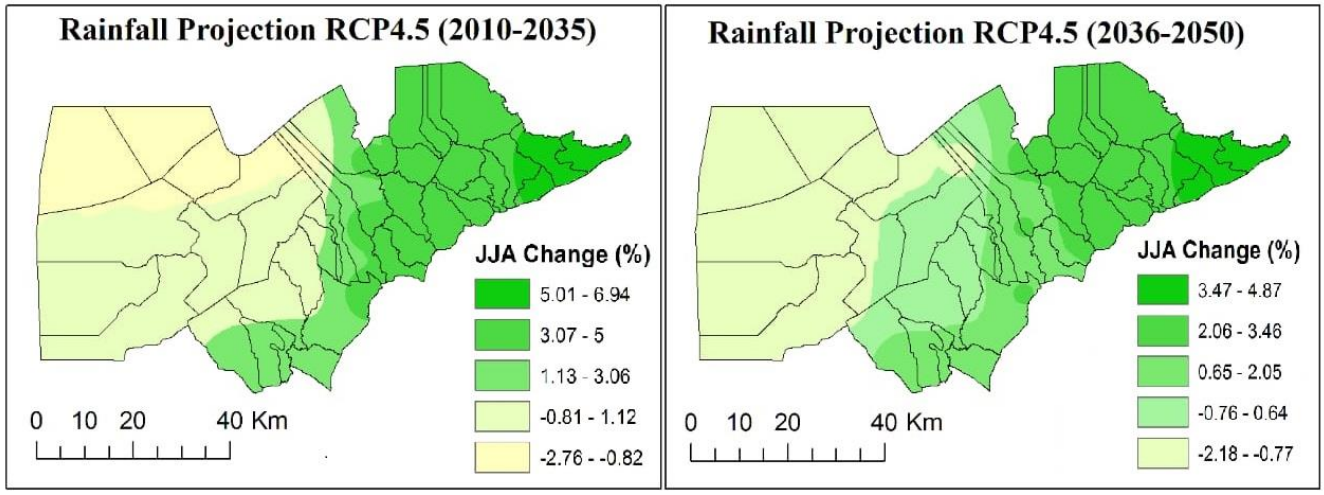


Source: Kenya Metrological Department

The County will expect marginal average increase in JJAS rainfall of -0.1 – 5.5mm by 2035 and reduction/increase of -5.5 – 3.0mm by 2050. The highest projected percentage increase in June to August (JJA) rainfall will occur over Karachuonyo, Kasipul and Kabondo Kasipul Sub-Counties of 3.1 – 6.9% by 2035, and smaller rise of 2.1 – 4.9% by the year 2050 based on RCP4.5 scenario. However, based on RCP8.5 scenario these sub-counties will experience

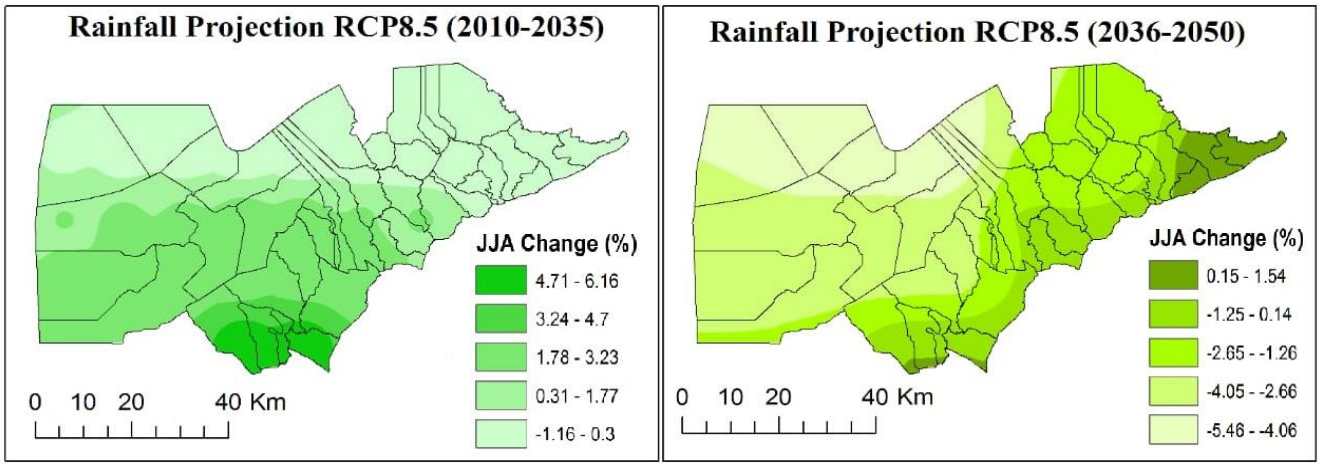
no significant change in JJA rainfall of -1.2 – 0.3% by 2035, and slight reduction/rise of -2.7 – 1.5% by the year 2050. The JJA rainfall over Suba South and North (Mbita) Sub-Counties are projected by percentage to reduce with -2.8 – 1.1% by 2035 and decrease of 0.8 – 2.2% by the year 2050 based on RCP4.5 scenario. However, based on RCP8.5 scenario these sub-counties, will expect no significant percentage change in annual rainfall of -1.2 – 3.2% by 2035, and a percent reduction of 2.7 – 5.5 % by the year 2050. Figure 22 and Figure 23 below gives the projected percentage change in June to August rainfall for the periods 2010-2035 and 2036-2050 over Homa Bay County using RCP4.5 and RCP8.5 emission scenarios respectively.

Figure 22: Projected percentage change in June to August rainfall for the periods 2010-2035 (left) and 2036-2050 (right) over Homa Bay County using RCP4.5 emission scenario.



Source: Kenya Metrological Department (KMD)

Figure 23: Projected percentage change in June to August rainfall for the periods 2010-2035 (left) and 2036-2050 (right) over Homa Bay County using RCP8.5 emission scenario.



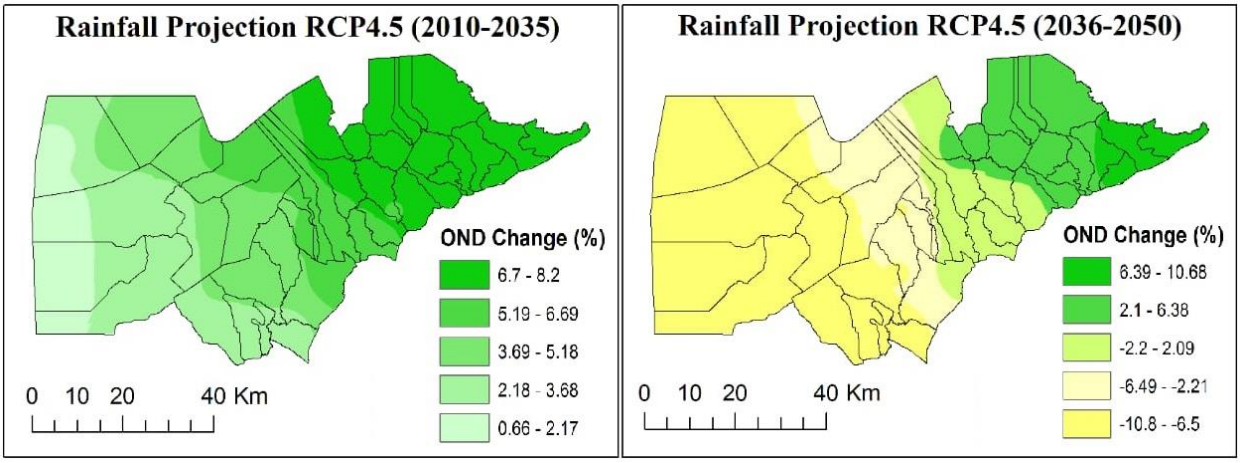
Source: Kenya Metrological Department (KMD)

The County OND rainfall is projected on average to increase with 6.7 – 9.6mm by 2035 and with about 25.7 – 49.9mm by 2050. However, the projections based on RCP4.5 are indicating

percentage increase in OND rainfall, but the projections based on RCP8.5 are anticipating reduction in OND rainfall.

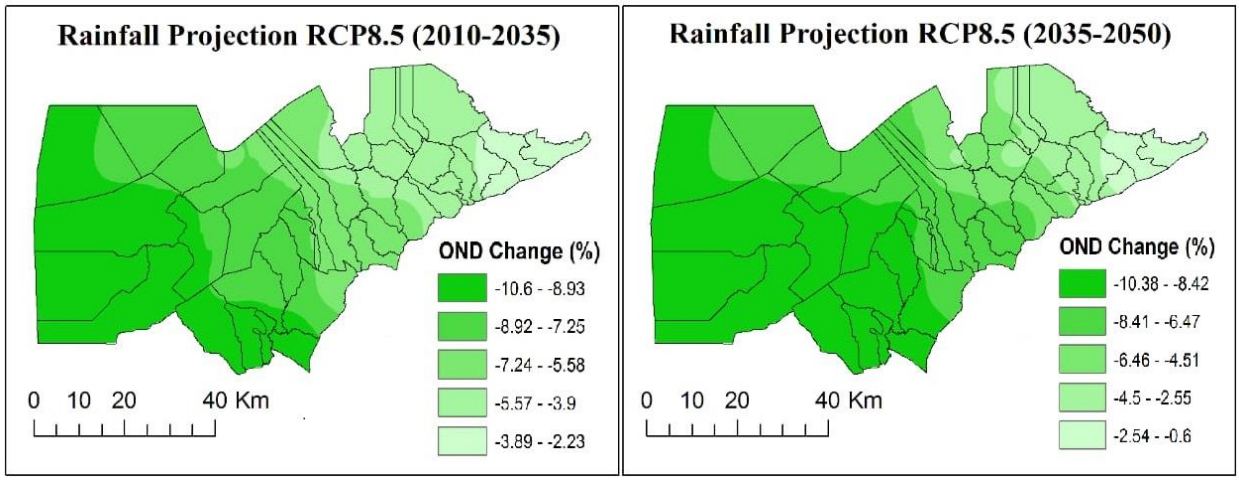
The highest projected percentage increase in OND rainfall will occur over Kabondo Kasipul Sub-County of 6.7 – 8.2% by 2035, and higher rise of 6.4 – 10.7% by the year 2050 based on RCP4.5 scenario. However, based on RCP8.5 scenario the sub-county will experience a marginal reduction in OND rainfall of 2.3 – 3.9% by 2035, and still lower reduction of 0.6 – 2.6% by the year 2050. The OND rainfall in Homa Bay Town and Rangwe Sub-Counties is projected to increase with 3.7 – 8.2% by 2035, and reduction/increase of -6.5 – 2.1% by the year 2050 based on RCP4.5 scenario. However, based on RCP8.5 scenario these sub-counties will expect a reduction in OND rainfall of 3.9 – 8.9% by 2035, and a reduction of 4.5 – 8.4% by the year 2050. Figure 24 and Figure 25 below gives the projected percentage change in October to December rainfall for the periods 2010-2035 and 2036-2050 over Homa Bay County using RCP4.5 and RCP8.5 emission scenarios respectively.

Figure 24: Projected percentage change in October to December rainfall for the periods 2010-2035 (left) and 2036-2050 (right) over Homa Bay County using RCP4.5 emission scenario.



Source: Kenya Metrological Department (KMD)

Figure 25: Projected percentage change in October to December rainfall for the periods 2010-2035 (left) and by 2036-2050 (right) over Homa Bay County using RCP4.5 emission scenario.



Source: Kenya Metrological Department (KMD)

There is a high increased duration (+9–30 days) of heat waves expected. Heat stress is also expected to increase significantly under both scenarios, the number of days with a mean temperature above 35°C in the second season being particularly affected and expected to rise from an historical average of just under 10 days to over 15 days under the conservative emissions scenario and 20 days under the high emissions scenario. These changes represent an increase in the number of heat stressed days by approximately 50% and 100% respectively.

There is likely to be increased inter-seasonal rainfall variability. There will be increase in frequency and intensity of heavy rainfall events. There will also be likely decrease in duration of dry spells but increase in severity (-2 to +27 percent). Under both RCP4.5 and RCP8.5 emissions scenarios rainfall quantity and intensity are expected to increase along with an increase in flood risk during JF, MAM and OND seasons, with minimal or reduction during JJAS period. Although the projections of future climate change under the two GHG emissions scenarios show some differences, both indicate the likelihood of significant changes in the weather and climate over the county.

4.0 Analysis of Existing Adaptation/Resilience Strategies and Their Effectiveness to Current Climate Risks

4.1 Overview of Existing Adaptation/Resilience Strategies

The communities identified a number of climatic hazards and risks that affected and threatened their way of life and livelihoods, similarly, the communities had a number of adaptation strategies to cope with these climate hazards and risks.

4.1.1 Floods: Adaptation/Resillience Strategies

Floods were identified as a major climate hazard affecting communities in the County with diverstating consequences on the livelihoods of these communities. The affected communities have been coping with the effects of floods through various means with varying degrees of effectiveness. However most of the coping/adaptation strategies are short term and are only suitable for the duration of the floods without any meaningful capacity to cushion the communities from similar impacts in the future. The adaptation strategies communities have been deploying against floods include: Moving to higher grounds in the event of floods; migration from flood prone areas when the flood risk levels are raised; building temporary gabions and terraces around homes to keep flood water away; and, planting trees in and around the homesteads.

The communities observed that these resillience strategies are mostly short term and serve them well only as long as the flood season lasts. They suggested a number of better and long-term flood adaptation strategies that included: Construction of dykes along the river banks prone to flooding; construction of holding dams along the rivers prone to flooding; installation of effective flood early warning systems; permanent migration and relocation from the flood prone areas; and, construction of canals in the low lying flood prone areas to channel flood waters either back to the main river course of the lake or a constructed water holding facility like a dam or a reservoir.

4.1.2 Droughts: Adaptation/Resillience Strategies

Decreased precipitation combined with prolonged dry periods have resulted in increased incidences of drought in the county. communities in almost all parts of the county identified drought as a major climate hazard they have had to cope with in the last two decades. Since drought arises from prolonged periods of low or no precipitation and results in acute water shortages, most of the community adaptation options ae fashioned around water preservation during the droughts. As such, communities identified water harvesting and storage as a major coping strategy for droughts. They further identified the planting of

drought resistant crops to guard against massive crop failures in the event of droughts. They also mentioned also mentioned income diversification away from agriculture; destocking during droughts; rotational grazing; food preservation; and, rearing of drought resistant crops as some of the adaptation strategies against droughts.

For long term adaptation options, the communities identified: Agroforestry; irrigation; adoption of efficient water harvesting and storage technologies; tree planting; constructions of dams and pans; drilling of boreholes; and, planting of early maturing crops as adaptation options for drought hazards and risks.

4.2 Effectiveness of Adaptation/Resilience Strategies to Future Climate Risks

The communities identified historical climate hazards and risks together with means and ways of adapting to the associated impacts. The adaptation strategies identified by the communities revolved around protection of livelihoods and lives from the ravages of climate hazards and risks. The community identified options were then synthesized into the options presented in Table 8 below. Most of the exiting community adaptation options were short term and designed to cope with active situations of the occurrence of climate hazards. However there were options identified that aligned with the sustainability principles of climate change adaptation actions and were further identified as priority investment areas for the county.

Table 8: Effectiveness of adaptation strategies

Risk/Hazard	Livelihood/Economic System	Climate Resilience Strategies	Stakeholder Group Applying Strategy	Gender & Social Inclusion Information
(Precipitation) Flooding Rise in lake water levels Changing Rainfall Patterns	Agriculture (Crops)	▪ Cultivation of early maturing crop varieties ▪ Building of dykes along river banks ▪ Community education on dealing with flood emergencies ▪ Funding of emergency and disaster response services by the county government	▪ Farmers ▪ County Government ▪ NGOs ▪ Communities ▪ Households ▪ National Government	Prioritizing sensitization of women, PWDs and youth in implementation of the adaptation options
	Livestock	▪ Farmer sensitization opportunities on building durable and safer livestock shelters ▪ Capacity building opportunities on optimal stock levels ▪ Capacity building opportunities on the benefits of keeping improved livestock breeds	▪ Farmers ▪ County Government ▪ NGOs ▪ Communities ▪ Households ▪ National Government	Prioritizing sensitization of women, PWDs and youth in implementation of the adaptation options
	Fisheries	▪ Capacity building opportunities on fish farming ▪ Fish landing grounds moved to higher grounds ▪ Implementation of fishing holidays	▪ Fisherfolks ▪ County Government ▪ NGOs ▪ Communities ▪ Households	Prioritizing sensitization of women, PWDs and youth in implementation of the adaptation options

			▪ National Government	
	Water	▪ Expansion of existing water production capacity ▪ Replacement of old water pipes ▪ Construction of more water pans and boreholes	▪ County Government ▪ NGOs ▪ Communities ▪ Households ▪ National Government	Prioritizing sensitization of women, PWDs and youth in implementation of the adaptation options
	Health	▪ Establishment of flood emergency rescue centers ▪ Construction of health facilities on higher grounds ▪ Increased investment in the Health sector	▪ County Government ▪ NGOs ▪ Communities ▪ National Government	Prioritizing sensitization of women, PWDs and youth in implementation of the adaptation options
(Temperature) Droughts Pests and Diseases	Agriculture (Crops)	▪ Cultivation of drought resistant crops ▪ Multi-cropping ▪ Capacity building opportunities for smart agriculture	▪ Farmers ▪ County Government ▪ NGOs ▪ Communities ▪ Households ▪ National Government	Prioritizing sensitization of women, PWDs and youth in implementation of the adaptation options
	Livestock	▪ Use of alternative livestock feeds e.g. crop residues ▪ Agroforestry-planting of trees and fodder crops ▪ Exploring means of finding alternative water sources for livestock	▪ Farmers ▪ County Government ▪ NGOs ▪ Communities ▪ Households ▪ National Government	Prioritizing sensitization of women, PWDs and youth in implementation of the adaptation options
	Fisheries	▪ Introduction of fish ponds ▪ Sensitization opportunities for alternative livelihoods away from capture fisheries	▪ Fisherfolks ▪ County Government ▪ NGOs ▪ Communities ▪ Households ▪ National Government	Prioritizing sensitization of women, PWDs and youth in implementation of the adaptation options
	Water	▪ Construction of boreholes ▪ Expansion water pans ▪ Capacity building opportunities for rain water harvesting ▪ Irrigation	▪ Farmers ▪ County Government ▪ NGOs ▪ Communities ▪ Households ▪ National Government	Prioritizing sensitization of women, PWDs and youth in implementation of the adaptation options
	Health	▪ Establishment of more health facilities ▪ Maintenance and improvement of existing health facilities	▪ County Government ▪ NGOs ▪ Communities ▪ Households	Prioritizing sensitization of women, PWDs and youth in implementation of the adaptation options

5.0 County Climate Strategic Adaptation Investment/Action Priorities

The strategic adaptation investment/action priorities are based on the adaptation options identified in section 4. These options address the diverse array of livelihoods/economic activities identified earlier in section 4. The options here are presented to respond to the two major climate hazards in the County (flooding and droughts). The investment options are to be implemented across the sectors of: Agriculture; water; environment & forestry; health; infrastructure; urban development; fisheries; and, disaster response and management.

Table 9: County priority investment actions

Risk/Hazard	Sector	Priority Area of Investment
(Precipitation) Flooding Rise in lake water levels Changing Rainfall Patterns	Agriculture (Crops)	▪ Promotion of early maturing crop varieties ▪ Building of dykes along river banks ▪ Community education on dealing with flood emergencies ▪ Funding of emergency and disaster response services by the county government
	Livestock	▪ Farmer sensitization on building durable and safer livestock shelters ▪ Capacity building on optimal stock levels ▪ Capacity building on the benefits of keeping improved livestock breeds
	Fisheries	▪ Capacity building on fish farming ▪ Investments in sheltered fish landing grounds ▪ Implementation of fishing holidays
	Water	▪ Expansion of existing water production capacity ▪ Replacement of old water pipes ▪ Construction of more water pans and boreholes
	Health	▪ Establishment of flood emergency rescue centers ▪ Construction of health facilities on higher grounds ▪ Increased investment in the Health sector
	Environmental Protection	▪ Protection of riparian land from encroachment ▪ Construction of bioengineering infrastructure on river banks ▪ Invest in sustainable waste management systems in the county
	Disaster Management	▪ Investment in flood disaster early warning systems ▪ Investment in disaster risk management services
(Temperature) Droughts Pests and Diseases	Agriculture (Crops)	▪ Cultivation of drought resistant crops ▪ Multi-cropping ▪ Capacity building on smart agriculture ▪ Development of bulk grain storage facilities ▪ Investment in integrated pest management systems
	Livestock	▪ Promotion of alternative livestock feeds e.g. crop residues ▪ Agroforestry-planting of trees and fodder crops ▪ Exploring means of finding alternative water sources for livestock ▪ Building of livestock auction centers
	Fisheries	▪ Introduction of fish ponds ▪ Sensitization opportunities for alternative livelihoods away from capture fisheries
	Water	▪ Construction of boreholes ▪ Expansion water pans ▪ Capacity building opportunities for rain water harvesting ▪ Irrigation ▪ Upstream water and landscape conservation
	Health	▪ Establishment of more health facilities ▪ Maintenance and improvement of existing health facilities

6.0 Conclusion

The impacts of climate hazards and risks affects key productive sectors of Homa Bay County including: Agriculture; livestock production; fisheries; trade and enterprise activities; forestry; water; infrastructure; and, health systems. These productive sectors are crucial for the sustenance of the livelihoods of the people and communities in the County. The dominant climate hazards in the county are droughts and floods which together result into impacts such as: Decreased agricultural productivity; emergence of livestock and crop pests and diseases; disruption of economic and livelihood activities; destruction of critical infrastructure such as road and bridges; water scarcity; outbreak of diseases and epidemics; destruction of health facilities; and, disruption of social and cultural systems.

The impacts of the climate hazards and risks disproportionately affect the vulnerable and marginalized groups of people and communities in the county such as: Women; children; the elderly; people living with disabilities; the youth; and marginalized and minority communities in the county. Communities in the county have been implementing adaptation actions to the impacts of climate hazards and risks such as: Migration to safer areas during disasters; planting drought resistant crop varieties; rearing improved breeds of livestock and poultry; and, diversifying their income sources away from agriculture. these existing community adaptation options have some elements of sustainability however they are still vulnerable to increased frequency and magnitudes of climate hazards. It is necessary to invest in actions that enhance the resillience of the communities while building on their efforts to adapt.

The future climate projections for the county presents a picture of increased intensity and frequency of climate hazards which calls for forward planning and mobilization of financial resources to increase the resillience of the people and communities to the anticipated future impacts. The Communities identified strategic investment areas that will build the resillience of the key productive sectors to the impacts of climate change. investments options have been prioritized for: The agriculture (crops); livestock; fisheries; water; disaster management; infrastructure; and health sectors. The investment option in these sectors range include: Promotion of early maturing crops; farmer sensitization on optimal stocking levels; capacity building on fish farming; expansion of existing water production capacity; increased investments in the health sector; investment in sustainable waste management systems; investment in disaster risk management services; and capacity building on smart agricultural practices.

The identified climate investment priorities in this report have been used to inform the prioritization of climate actions in the Homa Bay County Climate Change Action Plan (HCCCAP) 2023-2027. The community adaption priorities have also been used to inform the overall strategic formation of priorities I the HCCCAP 2023-2027.

References

Care International. (2009). *Climate Vulnerability and Capacity Analysis: Handbook.* Atlanta: CARE International.

CGHB. (2018). *Homa Bay County Intergrated Development Plan 2018-2022.* Homa Bay, Kenya: Department of Finance, Economic Planning & Service Delivery; County Government of Homa Bay (CGHB).

CGHB. (2021). *Homa Bay County Climate Change Policy.* County Government of Homa Bay (CGHB), Department of Water, Sanitation, Environment, Forestry & Climate Change. Homa Bay: Government Printer.

Government of Kenya (GoK). (2010). *The Constitution of Kenya.* State Law Office. Nairobi: The Government Printer.

Government of Kenya (GoK). (2013). *National Climate Change Action Plan 2013-2017.* Ministry of Environment & Natural Resources, The Climate Change Directorate. Nairobi: The Government Printer.

Government of Kenya (GoK). (2016). *Sessional Paper No.5 of 2016 on National Climate Change Framework Policy.* State Department of Environment. Nairobi: MInisitry of Environment & Natural Resources.

Government of Kenya (GoK). (2018). *National Climate Change Action Plan 2018-2022.* Minsitry of Environment & Natural Resources. Nairobi: The Government Printer.

Government of Kenya. (2010). *The National Climate Change Response Strategy (NCCRS).* State Department of Environment. Nairobi: Ministry of Environment and Natural Resources.

Government of Kenya. (2016). *Kenya National Adaptation Plan, 2015-2030.* State Department of Environment. Nairobi: Ministry of Environment & Natural Resources.

Government of Kenya. (2020). *Kenya's Updated Nationally Determined Contribution (NDC), Submitted to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat on the 24th December 2020.* State Department of Environment. Nairobi: Ministry of Environment & Natural Resources.

IPCC. (2014). *Climate Change 2014: Impacts, Adaptations, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge, United Kingdom and New York, NY, USA, 1132 pp: Cambridge University Press.

Kenya National Bureau of Statistics (KNBS). (2018). *2015/16 Kenya Integrated Household Budget Survey (KIHBS).* Nairobi, Kenya: Government of Kenya.

Micah B, Hahn., Anne M. Rieder., Stanley O. Foster. (2009). The Livelihood Vulnerability Index: A pragmatic approach to assessing risks from climate variability and change - A case study of Mozambique. *Global Environmental Change, 19*, 74-88.

Ministry of Agriculture, Livestock & Fisheries. (2016). *Climate Risk Profile for Homa Bay County: Kenya County Climate Risk Profile Series.* Nairobi, Kenya: Government of Kenya (GOK).

Ministry of Environment & Natural Resources. (2010). *National Climate Change Response Strategy.* Nairobi: Government of Kenya.

MoALF. (2016). *Climate Risk Profile for Homa Bay County. Kenya County Climate Risk Profile Series.* Nairobi, Kenya: The Ministry of Agriculture, Livestock and Fisheries (MoALF).

Sharma J, Indu K, Esteves,T., Negi P., Shushma S, Dasgupta S., Barua A., Bala G and Ravindranath NH.,. (2018). *Vulnerability and Risk Assessment: Framework and Guideline.* India: Indian Institute of Science.

United Nations. (1992). *United Nations Framework Convention on Climate Change.* New York: United Nations.

United Nations. (1997). *The Kyoto Protocol to the United Nations Framework Convention on Climate Change adopted at COP3 in Kyoto, Japan on 11th December 1997.* New York: United Nations .

United Nations. (2015). *The Paris Agreement to the United Nations Framework Convention on Climate Change adopted at COP21 in Paris, France on 12th December 2015.* New York: United Nations.

World Bank Group. (2021). *Climate Risk Profile: Kenya.* Washington DC: World Bank Publications. Retrieved from https://climateknowledgeportalworldbank.org/country/kenya/climate-data-historical

Annexes

Annex 1: The PCRA-CCCAP Technical Working Group Members

	Name	Department	Role
1.	Dr. Joash Aloo	Water, Sanitation, Irrigation, Environment, Energy, Forestry & Climate Change	CECM
2.	Prof. Donald Ogweno	Environment, Energy, Forestry & Climate Change	Chairperson
3.	Otieno Roy Odongo	Director Climate Change	Secretary
4.	Stacy A. Virginia	Environment & Forestry	Member
5.	Francis Obwanga	Environment	Member
6.	Flora M. Akinyi	Environmental & Social Safeguards focal point	Member
7.	Charles Acholla	Water & Irrigation	Member
8.	Paul Agwanda	Public Health	Member
9.	Maximillia Malongo	Agriculture & Livestock	Member
10.	George Oduma	Energy	Member
11.	Albert Otieno	Finance (Accountant)	Member
12.	Kennedy Oyier	Finance (Budget)	Member
13.	George Okoth	Blue Economy & Fisheries	Member
14.	Gilbert Odhiambo	Physical Planning & Urban Development	Member
15.	Peter Obarah	GIS Expert	Member
16.	Joseph Ayieko	County M & E Officer	Member
17.	Ruth M Oteng	Infrastructure & Public Works	Member
18.	Evelyne Ododa	Youth, Sports, Talent Development, Gender Inclusivity, Cultural Heritage & Social Services	Member
19.	Lucy Odwar	Youth, Sports, Talent Development, Gender Inclusivity, Cultural Heritage & Social Services	Member
20.	Silas Raba	Youth, Sports, Talent Development, Gender Inclusivity, Cultural Heritage & Social Services	Member
21.	Victor Juma	Climate Change Unit	Secretariat
22.	Linda Nyambok	Climate Change Unit	Secretariat
23.	Reuben Leso	Climate Change Unit	Secretariat
24.	Isiah Alaka	Climate Change Unit	Secretariat
25.	Kennedy Okello	Climate Change Unit	Secretariat
26.	Cosmas Ouma	Climate Change Unit	Secretariat
27.	Vera Omollo	Climate Change Unit	Secretariat
28.	Paul Odhiambo	Climate Change Unit	Secretariat
29.	Martin Omondi	Climate Change Unit	Secretariat
30.	Winnie Beryl	Climate Change Unit	Secretariat

Annex 2: List of Participants at the Multi-Stakeholders Participatory County Climate Risk Assessment Workshop

1

REPUBLIC OF KENYA

COUNTY GOVERNMENT OF HOMA BAY

THE CLIMATE CHANGE TECHNICAL COMMITTEE

HOMA BAY COUNTY

Homa Bay County Participatory Climate Risk Assessment Multistakeholder Workshop

ATTENDANCE LIST

No.	Name	Ward/Title/Organisation	Age		Gender		PWD	Phone No.	Email	Signature
			Below 35	Above 35	F	M				
	MAURINE ODIA	HBCG	✓		✓			0708245253	lydiaogodo	
1.	HENRY OGINGA	NORTH KARACHUONYO WARD ADMIN		✓		✓	SHORT SIGHTED	0725206078	hongjinga2015@	
2.	TONY WASONGA	WANG'CHIENG WARD ADMIN	✓			✓		0727410161	tonywasonga@	
3.	JAMES MYANDIEKA	ADMIN KAMAGWO		✓		✓		0723608473	jmyandieka@	
4.	BENARD RIMBA	KENDU-BAY TOWN ADMIN		✓				0715624455	benardrimba	
5.	Christopher Gobby	Sub County Admin Rachuonyo North		✓		✓		0724466804	cymadigabby20@	
6.	JUSTO MAGUU	KARACHUONYO CONSTITUENCY YL	✓			✓		0790131638	justomaguu1994@	
7.	PHILIP OKEYO	KIBIRI WARD ADMIN		✓		✓		0727595601	okeyophilip2015@gmail.com	
8.	Cosmas Duma	HBCG- Environment	✓			✓		712022946	Coumae80@gmail.com	
9.	WERE FRED O.	Central Kanyamwa Ward Admin		✓		✓		0722976714	werefredy2015@gmail.com	
10.	Winnie B. Nirambo	HBCG + EEACC	✓		✓			0721872879	lazylwinnie@yahoo.com	

2

REPUBLIC OF KENYA

COUNTY GOVERNMENT OF HOMA BAY

THE CLIMATE CHANGE TECHNICAL COMMITTEE

HOMA BAY COUNTY

Homa Bay County Participatory Climate Risk Assessment Multistakeholder Workshop

ATTENDANCE LIST

No.	Name	Ward/Title/Organisation	Age		Gender		PWD	Phone No.	Email	Signature
			Below 35	Above 35	F	M				
1.	DAVID OBUYA	KWABWAI WARD ADMIN		✓		✓		0715719375	thegardenwid4423@gmail	
2.	AMOS K. NDEGE	KOSOWE WARD ADMIN		✓		✓		0720246852	kamosndege@gmail.com	
3.	MOSES OMUGA	KANYIKELA WARD ADMIN		✓		✓		0710727421	mosesomuga@	
4.	JARED ORECH	WARD ADMIN KANYIDOTO		✓		✓		0727649266	oseekjaredgmail	
5.	KENNEDY OKELLO	HBCG-CC		✓		✓		0720977296	Kenokello99@gmail	
6.	MOSES OWUOTH	SOUTH KABUOCH WARD ADMIN		✓		✓		0704782619	mosesowuoth@gmail.	
7.	Everlyne Odadya	Director Gender - County		✓	✓			0703985460	evoodaya81@gmail.com	
8.	Harrison Ochollа	Wa-Wa Kenya	✓			M		0799986363	ochollakamiza	
9.	RICHARD EBUDO	DIRECTOR ROADS		✓		✓		0713413731	richardebudo@yahoo.com	
10.	CAROL ACHIENG	WARD ADMIN KOLOGI	✓		✓			0727952861	phelistouracwol@gmail.com	

3

REPUBLIC OF KENYA

COUNTY GOVERNMENT OF HOMA BAY

THE CLIMATE CHANGE TECHNICAL COMMITTEE

HOMA BAY COUNTY

Homa Bay County Participatory Climate Risk Assessment Multistakeholder Workshop

ATTENDANCE LIST

No.	Name	Ward/Title/Organisation	Age		Gender		PWD	Phone No.	Email	Signature
			Below 35	Above 35	F	M				
	Japhleth Ojiyo	CO Kabula						0700886824	jaojiyo@yahoo.com	
1.	DANIEL O-SIMBA	SCA		✓		M		0727494906	SIMBATEK2010@GMAIL.COM	
2.	OBILLO DANIEL	KOJWACH	✓			✓		0729010764	danielobillo6376@yahoo.com	
3.	SUSAN KAMYOKOH	KABONDO WEST		✓	✓		✓	0717130525	Kamyokoh12@gmail.com	
4.	HELEN OWA	KABONDO EAST		✓	✓		✓	0721233228	helenowaseguna@yahoo.com	
5.	JACOB NYADIA	WARD ADMIN		✓		✓		0724580526	jngadia@gmail.com	
6.	GORDON ODHIAMBO	Kanyanya/Kadelo Ag/Ward Admin		✓		✓		0724051366	gordon824@gmail.com	
7.	JANET OKUMU	KABONDO WEST WARD ADMIN		✓	✓			0728350872	youthjunet@gmail.com	
8.	OKELLO CYNTHIA	KOJWACH WARD ADMIN		✓	✓			0727080000	cynthiaokello@gmail.com	
9.	SILAS RABAH	DIRECTOR KARAN WARD		✓		M		0724 310877	silasisrael1982@gmail.com	
10.	LUCY ODWAR		✓				✓	0714317300	odwharlucie@gmail.com	

4

REPUBLIC OF KENYA

COUNTY GOVERNMENT OF HOMA BAY

THE CLIMATE CHANGE TECHNICAL COMMITTEE

HOMA BAY COUNTY

Homa Bay County Participatory Climate Risk Assessment Multistakeholder Workshop

ATTENDANCE LIST

No.	Name	Ward/Title/Organisation	Age		Gender		PWD	Phone No.	Email	Signature
			Below 35	Above 35	F	M				
1.	NICHOLAS OBINGO	WARD ADMIN		✓		✓		0727160146	nicholasochieng100@yahoo.com	
2.	MICHAEL OGOLA	YOUTH LEADER	✓			✓		0704427033	mikeogola@gmail.com	
3.	ANTHONY OSANO	CSO		✓		✓		0720082425	isaacleon@gmail.com	
4.	David Ambogo	Ward Admin		✓		✓		0712 733 406	davidambogo@gmail.com	
5.	MOSES ODERO	SCA		✓		✓		0725789589	moderos4@gmail.com	
6.	Sam Collins Owiyo	Trade		✓		✓		0721499539	slowiyo28@gmail.com	
7.	Michael Tidy Ochiel	Ward Admin		✓		✓		0724112450	m.tidy1982@gmail.com	
8.	CARBEN OTIE	Ward Adm		✓				0715354648	Carben@gmail.com	
9.	LINDA NYAMBOK.	HBC - CC	✓					0701619924	Lynnnyambok@gmail.com	
10.	CS-WILLIAM-O-LUGANO	HCC - ADMIN - TRADE		✓		✓		0723735513	Onyiluballo@gmail.com	

5

REPUBLIC OF KENYA

COUNTY GOVERNMENT OF HOMA BAY

THE CLIMATE CHANGE TECHNICAL COMMITTEE

HOMA BAY COUNTY

Homa Bay County Participatory Climate Risk Assessment Multistakeholder Workshop

ATTENDANCE LIST

No.	Name	Ward/Title/Organisation	Age		Gender		PWD	Phone No.	Email	Signature
			Below 35	Above 35	F	M				
	WILLIAM OSANO	HB EAST		✓		✓		0723975630	osanowilliam@...	
1.	GEORGE MBORIA	ARUJO		✓		✓		0725722043	mboyage...@gmail.com	
2.	DAVID OCHOLA	HCDF				✓		0720622247	...@gmail.com	
3.	NANCY ADUMA	HB WEST		✓	✓			0714081519	...@gmail.com	NA
4.	PHILIP ONYANGO	HB WEST		✓		✓		0726205263	...@gmail.com	
5.	NICHOLAS AYIETA	SUB COUNTY ADMIN		✓		✓		0711490017	Nichodawo@gmail.com	
6.	VICTOR WERE	HBAY	✓			✓		0725279372	...@gmail.com	
7.	Lawnida Achieng	HBCSOM - S.G	✓		✓			0700127498	homabaycsonet@gmail.com	
8.	Reuben Lasso	HBCG - CC	✓			✓		0726572449	...@gmail.com	
9.	Sally olga Agola	HBCG - CC	✓			✓		0715880192	...@gmail.com	
10.	Varch Omolo	HBCG - CC		✓	✓			0726585580	...@gmail.com	

6

REPUBLIC OF KENYA

COUNTY GOVERNMENT OF HOMA BAY

THE CLIMATE CHANGE TECHNICAL COMMITTEE

HOMA BAY COUNTY

Homa Bay County Participatory Climate Risk Assessment Multistakeholder Workshop

ATTENDANCE LIST

No.	Name	Ward/Title/Organisation	Age		Gender		PWD	Phone No.	Email	Signature
			Below 35	Above 35	F	M				
1.	VICTOR JUMA	HBCG - CC	✓			✓		0711195718	jumavictor95	
2.	Alice Odhiambo	Sub-County Adm		✓	✓			0723619572	waethalice@gmail.com	
3.	St.Simon OTIATO	WARD ADMIN		✓		✓		0719460074	kambona123@yahoo.com	
4.	JARED ONDICHO	WARD ADMIN	✓			✓		0713530900	jerrejared@gmail.com	
5.	DAVID O. ODERO	WARD ADMIN		✓		✓		0724290444	jumadavidodero...	
6.	JOANES NYAKWANA	WARD ADMIN		✓		✓		0729090944	joanesnyakwana95@gmail.com	
7.	NORSEA BATER	LANDS - PLANNING	✓		✓			0718536243	norsea2111@gmail.com	
8.	DAVID OYUGI	KWS		✓		✓		0714311716	david...@kwsg...	
9.	JOSEPH OBANYA	HBC - TRADE		✓		✓		0726836507	...@gmail.com	
10.	OLIVER OMOLLO	WARD ADMIN	✓					0713155538	...@gmail.com	

7

REPUBLIC OF KENYA

COUNTY GOVERNMENT OF HOMA BAY

THE CLIMATE CHANGE TECHNICAL COMMITTEE

HOMA BAY COUNTY

Homa Bay County Participatory Climate Risk Assessment Multistakeholder Workshop

ATTENDANCE LIST

No.	Name	Ward/Title/Organisation	Age		Gender		PWD	Phone No.	Email	Signature
			Below 35	Above 35	F	M				
1.	Dennis Sirah	Ward Administrator		✓		✓		0720820971	dennissirah2013@gmail.com	
2.	Paul Odyo Joshua	Ward Admin Kwasi South		✓		✓		0725146401	paulodyo@gmail.com	
3.	MARTIN OTIENO OPIYO	ADMIN RUMAKIKWENGI		✓		✓		0721731528	OKOTOSBACK@GMAIL.COM	
4.	SAMMY OKOTH	ENFORCEMENT		✓				0746779588 0746779585		
5.	SYNOD OKEYO	SUB-CONTY REVENUE ENFORCEMENT OFFICER		✓				0729-953-585	Okelosynod1988@gmail.com	
6.	Robert Owiso	YOUTH Liason Officer	✓			✓		0714769149	Robertdellakcafe.com	
7.	PAUL O. MUGA	Environment officer HBCG		✓		✓		0726862964	muga@gmail.com	
8.	Joseph A Otenyo	SCA		✓		✓		0707886630		
9.	Washington Omondi	Ward Kwasi Home		✓		✓		0726273142		
10.	Aking Hora Mitchel	Environment officer	✓		✓			01013935729		

8

REPUBLIC OF KENYA

COUNTY GOVERNMENT OF HOMA BAY

THE CLIMATE CHANGE TECHNICAL COMMITTEE

HOMA BAY COUNTY

Homa Bay County Participatory Climate Risk Assessment Multistakeholder Workshop

ATTENDANCE LIST

No.	Name	Ward/Title/Organisation	Age		Gender		PWD	Phone No.	Email	Signature
			Below 35	Above 35	F	M				
1.	Martin Ojala	HBG-CC TWG		✓		✓		0711560896	Omondjmartin@gmail.com	
2.	CHARLES ACHOLA	WENR		✓		✓		0728704677	Acholacharles21@gmail	
3.	MAURICE O. OMONDI	EAST KAMAGAK		✓		✓		0724777037	mauriceomondi1@gmail.com	
4.	ROBINSON NYAGAR	SCA RACHUONYO SOUTH		✓		✓		0725630794	robin.nyagar@yahoo.com	
5.	Felix O. Adyo	CENTRAL KASIPUL		✓		✓		0729568429	adyofelix@yahoo.com	
6.	REYNOLDS NDEGE	WEST KAMAGAK	✓			✓		0712884556	reynoldsgeorge@gmail.com	
7.	EDWARD OKOTH	WEST-KAMAGAK	✓			✓		0708796273	Edwardotho@gmail.com	
8.	WEHS MANGLA	SOUTH KASIPUL		✓		✓		0729329171		
9.	JOSPHINE A. OBINGO	PRACTICAL ACTION		✓	✓			0121989121		
10.	Matthews A Ayuka	MOH		✓		✓		0726742133		

9

COUNTY GOVERNMENT OF HOMA BAY

THE CLIMATE CHANGE TECHNICAL COMMITTEE

REPUBLIC OF KENYA

HOMA BAY COUNTY

Homa Bay County Participatory Climate Risk Assessment Multistakeholder Workshop

ATTENDANCE LIST

No.	Name	Ward/Title/Organisation	Age Below 35	Age Above 35	Gender F	Gender M	PWD	Phone No.	Email	Signature
1.	Sally Olga	HBC	✓			✓		0715880172	Sallyolga@g...	[illegible]
2.	Verah Omolo	HBC		✓		✓		0726568580	[illegible]	[illegible]
3.	TRACY AWUOR	HBC	✓			✓		0112387889	[illegible]	[illegible]
4.	REAGAN ANGI	HBC		✓				0728675439 / 2021309	[illegible]@gmail.com	[illegible]
5.	Barrack O Otieno	HBC Trade	✓			✓		0717094370	otienobarrack@gmai...	[illegible]
6.	Everlyne Ododa	HBC - DIR GENDER		✓	✓			0703985460	eveododa8@gmail	[illegible]
7.	SINOD OKELO	ENFORCEMENT		✓		✓		0729953585	[illegible]	[illegible]
8.	SAMMY OKOTH	INSPECTORATE		✓		✓		0746779582	[illegible]	[illegible]
9.	SILAS [illegible] RABMI	DIRECTOR -HBC		✓		✓		0724 810 877	[illegible]	[illegible]
10.	OLIVER OKOLLO	Ward Admin	✓		✓			0713155538	[illegible]@gmail	[illegible]

10

COUNTY GOVERNMENT OF HOMA BAY

THE CLIMATE CHANGE TECHNICAL COMMITTEE

REPUBLIC OF KENYA

HOMA BAY COUNTY

Homa Bay County Participatory Climate Risk Assessment Multistakeholder Workshop

ATTENDANCE LIST

No.	Name	Ward/Title/Organisation	Age Below 35	Age Above 35	Gender F	Gender M	PWD	Phone No.	Email	Signature
	MARJORIE LYDIA	HBC	✓		✓			0708285558	lydia@gmail	[illegible]
1.	Felix O. Adoyo	CENTRAL KASIPUL WARD ADMIN		✓		✓		0729568429	adoyofelix@gm...	[illegible]
2.	Reynolds Ndege	West Kamagak Ward Admin	✓			✓		0712884156	[illegible]	[illegible]
3.	Robinson Magak	S.C. Admin		✓		✓		0725630794		R.M.
4.	Maurice O. Omondi	Ward Admin East Kamagak		✓		✓		0724777037	mauriceomondi@gmail	[illegible]
5.	WENS O. MANGLA	WARD ADMIN SOUTH KASIPUL		✓		✓		0729329171	[illegible]@g	[illegible]
6.	CHARLES ACHOLA	WENR		✓		✓		0728704677	[illegible]	[illegible]
7.	Paul A. Rautta	Ward Administrator		✓		✓		0715807760	prauttaa@gmail	AR
8.	EDWARD OKOTH	W/KAMAGAK YL KASIPUL	✓			✓		0708796275	Edwardotien@gmail	[illegible]
9.	Martin Ojala	HBC CC TWG		✓		✓		071156896	omondimartins@gmail.com	[illegible]
10.	JOSPHINE A. OBINGO	PRACTICAL ACTION		✓	✓			0721989121	josephineobingo@gmail.com	[illegible]