
**Republic of Kenya**

**THE COUNTY GOVERNMENT OF SIAYA**

DEPARTMENT OF WATER, SANITATION, ENVIRONMENT, NATURAL RESOURCES AND CLIMATE CHANGE

# Siaya County Climate Change Action Plan (2023-2028)

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## Foreword

Siaya County is extremely susceptible to impacts of changing climate. Most livelihoods and economic activities in the County are reliant on climate sensitive sectors namely agriculture, fisheries, water, energy, trade and micro-processing. Dependence on these natural resources means that recurring droughts, floods and associated climate hazards a result of climate change will continue to negatively impact livelihoods in the county.

The Siaya County Climate Change Actions Plan (2023-2027) is a key milestone towards addressing the county's vulnerability to climate change. The Plan was guided by Participatory Climate Risk Assessment (PCRA) that was conducted by the Technical Working Group (TWG) bringing together representatives from the county government, national government, development partners and organized community groups intervening on climate changes. The adaptation priorities identified during the PCRA process helped in coming up with this Action Plan geared towards building community resilience climate shock. It is my hope that that all stakeholders in Siaya County will collectively implement the climate actions provided in this plan.

The County government of Siaya through the Department of Water, Environment and Natural Resources is committed to implement the plan guided by Siaya County Climate Change Policy (2020) and Siaya County Climate Change Act (2021). Through this plan, we call upon all stakeholders to join hands in addressing the climate crisis.

**H.E James Orengo, EGH**

**Governor,**
**County Government of Siaya**

## Acknowledgement

The Siaya County Climate Change Actions Plan (2023-2027) is the first of its kind by the county. The plan has been developed within the general framework of the Siaya County Climate Change Policy (2020), Siaya County Climate Change Act (2021) and national frameworks on climate change.

The plan was developed by the Technical Working Group comprising state and non-state actors in Siaya County. This plan was informed by a Participatory Climate Risk Assessment (PCRA) conducted across all wards in the county. Being a participatory, the PCRA process allowed the involvement of affected communities to identify climate risks, look into current and future trend of climate change and design collectively climate change adaptation strategies

This Action Plan is the result of contributions from representatives of relevant national and county government departments, development partners working in Siaya County, community groups, traditional institutions, opinion leaders and academia. I wish to thank all those who participated in the development of this plan. First and foremost, we wish to acknowledge H.E James Orengo, EGH (Governor, County Government of Siaya) for providing the overall leadership during the process. We also wish to acknowledge Hon. Angelina Oduor (Ag. CEC-Water, Sanitation, Environment, Natural Resources &Climate Change) for coordinating the technical teams during process, working with Walter Okelo (CO-Water, Sanitation, Environment, Natural Resources &Climate Change), Gabriel Oduong (Director- Environment &Natural Resources) and the entire Departmental staff who supported the process.

The department of Water Environment, Climate Change and Natural Resources is committed to facilitate and coordinate the implementation of Siaya CCAP and therefore would like to invite all partners and stakeholders to join hands in integrating proposed adaptation interventions into their planning and programs for the benefit of our county.

I look forward to seeing a prosperous and climate resilient Siaya County.

**Hon. Angeline Oduor**

**Ag. CEC- Water, Sanitation, Environment, Natural Resources &Climate change**
**County Government of Siaya**

## Acronyms

| | |
|---|---|
| AMCEN | African Ministerial Conference on the Environment |
| AIDS | Acquired Immunodeficiency Syndrome |
| CCA | Climate Change Adaptation |
| CBD | Convention on Biological Diversity |
| CoG | Council of Governors |
| COP | Conference of the Parties |
| CCCF | County Climate Change Fund |
| DTC | Drought Tolerant Crops |
| CIDP | County Integrated Development Plan |
| GESIP | Green Economy Strategy and Implementation Plan |
| GCP | Gross County Product |
| HIV | Human Immunodeficiency Virus |
| IPCC | Intergovernmental Panel on Climate Change |
| KCSAS | Kenya Climate Smart Agriculture Strategy |
| KMD | Kenya Meteorological Department |
| LM | Lower Midlands |
| MAM | March-April-May |
| M&E | Monitoring and Evaluation |
| MTP | Medium Term Plan |
| NAP | National Adaptation Plan |

| | |
|---|---|
| NCCAP | National Climate Change Action Plan |
| NCCRS | National Climate Change Response Strategy |
| NDC | Nationally Determined Contributions |
| OND | October-November-December |
| RCP | Representative Concentration Pathway |
| UNCCD | United Nations Convention to Combat Desertification |
| UNCED | United Nations Conference on Environment and Development |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WMO | World Meteorological Organization |

## Tables and Figures

 **Definition of Terms**

**Weather** refers to atmospheric conditions at a particular time in a particular location, including temperature, humidity, precipitation, cloudiness, wind, and

visibility. Weather conditions do not happen in isolation, they have a ripple effect. The weather in one region will eventually affect the weather hundreds or thousands of kilometers away.

**Climate** is the average of weather patterns in a specific area over a longer period of time, usually 30 or more years, which represents the overall state of the climate system.

**Climate change** refers to the long-term changes in the Earth's climate that are warming the atmosphere, ocean and land. Climate change is affecting the balance of ecosystems that support life and biodiversity, and impacting health. It also causes more extreme weather events, such as more intense and/or frequent hurricanes, floods, heat waves, and droughts, and leads to sea level rise and coastal erosion as a result of ocean warming, melting of glaciers, ad loss of ice sheets.

**Greenhouse gases** are gases that trap heat in the atmosphere, causing global warming and climate change. The main greenhouse gases released by human activity are carbon dioxide, methane, and nitrous oxide, as well as fluorinated gases used for cooling and refrigeration.

**Global warming** is an increase in the Earth's average surface temperature that occurs when the concentration of greenhouse gases in the atmosphere increases. These gases absorb more solar radiation and trap more heat, thus causing the planet to get hotter. Burning fossil fuels, cutting down forests, and farming livestock are some human activities that release greenhouse gases and contribute to global warming.

**Mitigation** refers to any action taken by governments, businesses, and people to reduce, sequester, or prevent greenhouse gas emissions. Examples of mitigation include transitioning to renewable energy like wind and solar, investing in carbonfree transportation, promoting sustainable agriculture and land use, planting forests to act as carbon sinks, and changing consumption practices and diet behaviors.

**Adaptation** refers to actions that help reduce vulnerability to the current or expected impacts of climate change. Examples of adaptation include planting crop varieties that are more resistant to drought or changing conditions, managing land to reduce wildfire risks, building stronger flood defences, relocating infrastructure from coastal areas affected by sea level rise, and developing insurance mechanisms specific to climate-related threats.

**Resilience** is the capacity of a community or environment to anticipate and manage dangerous climatic events and recover and transform after the ensuing shock, with minimal damage to societal wellbeing, economic activity, and the environment. Examples of increasing resilience in a community include long-term planning, early warning systems, training for new skills, diversifying the sources of household income, strengthening nature-based solutions, and building robust communal response and recovery capacities.

**Climate finance** refers to financial resources and instruments that are used to support action on climate change. Climate finance is critical to addressing climate change because of the large-scale investments that are needed to transition to a low-carbon global economy and to help societies build resilience and adapt to the impacts of climate change.

**Adaptive capacity** refers to the ability of systems, institutions, humans, and other organisms to adjust to potential damage, take advantage of opportunities, or respond to consequences.

**Vulnerability** is the predisposition to be adversely affected. It encompasses sensitivity or susceptibility to harm, and lack of capacity to cope and adapt.

**Risk** is the possibility of something bad happening. Risk involves uncertainty about the effects/implications of an activity with respect to something that a person values, often focusing on negative, undesirable consequences

**Disaster** is a serious problem occurring over a short or long period of time that causes widespread human, material, economic or environmental loss which exceeds the ability of the affected community or society to cope using its own resources

**Disaster Risk Reduction** is systematic approach to identifying, assessing and reducing the risks of disaster. Aims to reduce socio-economic vulnerabilities to disaster and the environmental and other hazards that trigger them

**Hazard** is a potential source of harm. Substances, events, or circumstances can constitute hazards when their nature would allow them, even just theoretically, to cause damage to health, life, property, or any other interest of value

## Executive Summary

Climate change is happening now and is projected to worsen in the future. Siaya County is extremely susceptible to impacts of a changing climate because most livelihoods are reliant on climate sensitive sectors including agriculture, fisheries and trade in agricultural products. Moreover, majority of county residents still rely on biomass to meet their energy needs. Social infrastructure is equally affected by floods, thereby affecting communities who are already underserved by health, water, schools, social halls and associated infrastructure.

In order to cushion key sectors against the impact of climate change, the stakeholders have come up with Siaya County Climate Change Action Plan (2023-2027). The plan has identified sectoral adaptation needs and also details specific sectoral actions plans, key implementing partners and indicative costs. This Action Plan is complementary and consistent with existing strategies at the county, national, regional and international levels as well as development and economic plans, principally the Siaya County Integrated Development Plan (CIDP; 2023-2027) that will resource its implementation. Some of the proposed actions include:

- Promotion of drought tolerant/early maturing crop varieties, promotion of climate smart agriculture, flood based irrigation, promotion of agroforestry, livelihood diversification and reducing effects of climate change on vulnerable communities through resilience building.
- Development of water infrastructure through improved water harvesting techniques and rehabilitation of existing ones, catchment protection, strengthening community governance of rural water schemes and improving access to clean water and sanitation facilities as a means of limiting outbreaks of water-borne diseases.
- Reforestation of degraded areas, promotion of energy efficient cook stoves to reduce household and institutional demand on biomass energy while also reducing greenhouse gas emissions
- Awareness creation on climate change adaptation and mitigation

**Walter Okelo**

**CO- Water, Sanitation, Environment, Natural Resources &Climate Change County Government of Siaya**

# 1.0 Background and Context

## 1.1 Siaya County

### 1.1.1 Administration and Demography

In 2019, the population of the county was 993,183 consisting of 471,669 (47.5%) males and 521,496 (52.5%) females. This was projected to increase to 1,040,616 consisting of 525,833 males and 514,782 females in 2022. It is further projected to rise to 1,097,141 comprising 552,387 males and 544,755 females and 1,136,553 comprising 571,351 males and 565,202 females in 2025 and 2027 respectively.

Administratively, Siaya is divided into six sub-counties including Rarieda, Bondo, Alego-Usonga, Gem, Ugunja and Ugenya.

### 1.1.2 Geography

With a combined surface area of 3,535 km² (land 2,530 km²; water 1,005 km2), Siaya County borders Busia County to the North West, Vihiga and Kakamega Counties to the North East, Kisumu County to the South East and Homa Bay County across the Winam Gulf to the South.

The county's surface water resources include Lake Victoria, Lake Kanyaboli, Lake Sare, River Yala, River Nzoia and Yala Swamp. Major rivers include Nzoia and Yala, both which of drain through Yala Swamp and finally into Lake Victoria. Several tributaries, among them, Huiro, Uludhi, Wuoroya, Ugege, Seme Awach, Ndate, and Rawuo, feed the two rivers. The county also hosts several swamps, wetlands, dams and water pans that serve both domestic and commercial users.

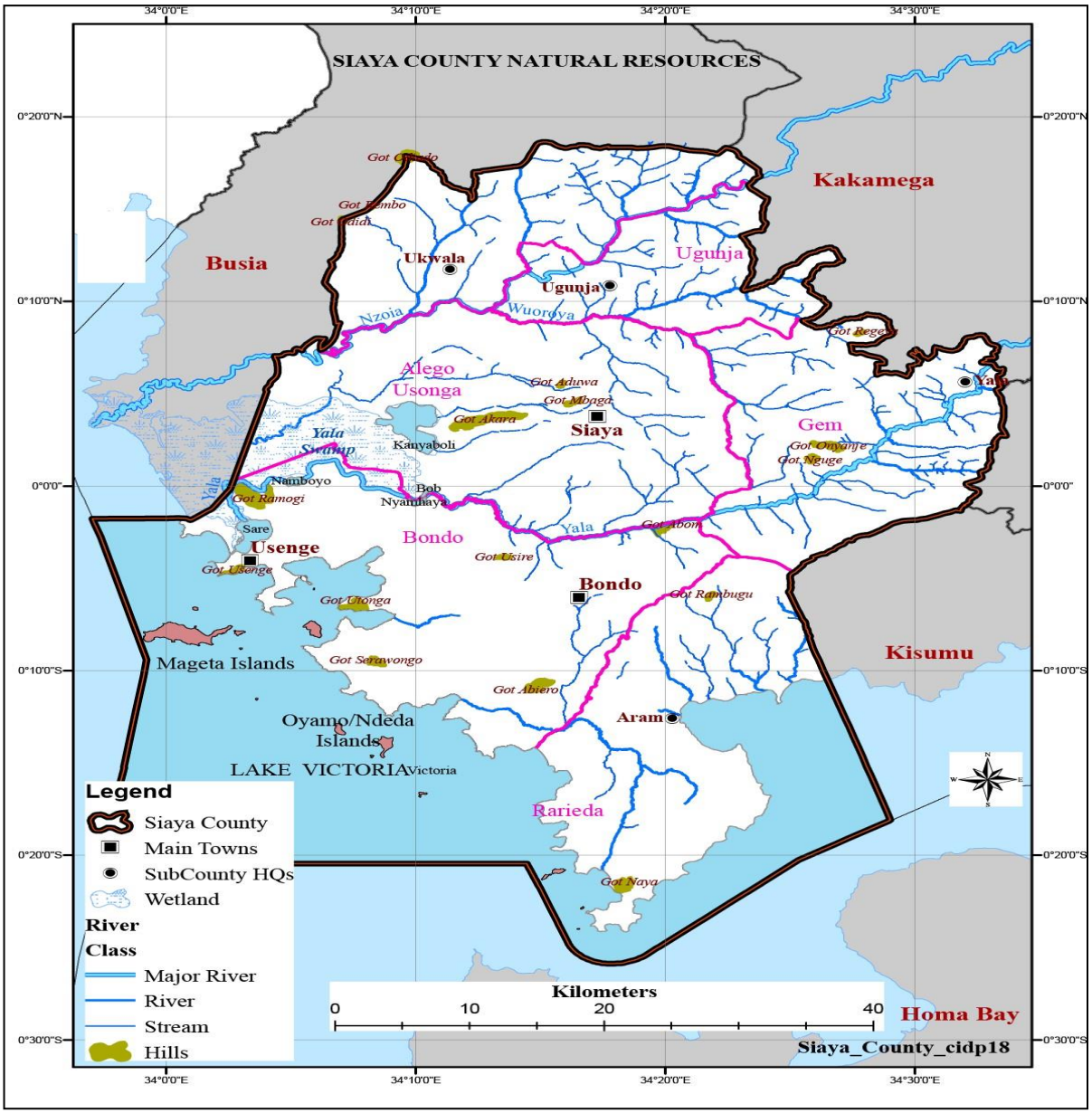
The county is divided into three major geographic areas namely: Dissected Uplands, Moderate Lowlands and Lowlands such as Yala Swamp. These areas have different ecological characteristics of reliefs and soils, which influence their inherent land use patterns. The County's altitude rises from 1,140m on the shores of Lake Victoria to 1,400m above sea level on the North (Ugunja, Ugenya and parts of Gem). Major hills include Mbaga and Akara (Alego Usonga), Odiado (Ugenya), Regea, Rawalo and Nguge (Gem), Usenge, Ramogi hills, Got Abiero, Sirafuongo (Bondo) and Rambugu and Naya hills (Rarieda).

These geographic features inform diverse socio-economic livelihood activities in the county and its development plans. For instance, high altitude areas of Ugenya and Ugunja sub-counties and Gem (particularly Gem North) experience high rainfall, hence are suitable for intensive agriculture. The low altitude areas of

Bondo, Rarieda, parts of Alego Usonga and Gem South experience low rainfall amounts and is thus suitable for drought resistant crops and fishing.

### 1.1.3 Natural resource map of Siaya County

*Figure 1: Siaya County Natural Resource Map*



### 1.1.4 Socio-economic characteristics

The County performs below the national average on most socio-economic indicators. It scores an HDI of 0.46 which is below the national average of 0.56. Poverty is prevalent in the county and manifests itself in other socio-economic outcomes such as poor nutrition, health, and education as well as a lack of access to basic services. Unemployment is a major challenge in the county, especially among the youth. The majority of the population is employed in fishing and agricultural activities, with limited opportunities in commercial ventures and public service. As more young people enter the workforce due to rapid population change, the pressure on available employment opportunities is expected to increase. High population density, HIV prevalence, water scarcity, falling food production combined with effects of climate change are increasing food insecurity, environmental degradation and poverty levels in the county.

The main economic activity is agriculture comprising of crop and livestock production as well as fishing. Crop and livestock production in the area is largely subsistence with a key focus on maize, beans, cassava, finger millet, sweet potatoes, bananas, tomatoes, sorghum, cattle, sheep, goats and chicken. The mean monthly food expenditure per adult accounted for 68.9 percent of household expenses, way above the national average of 54.3 percent. This is an indication of high poverty levels in the county because it is generally accepted that the poorer the household, the larger the share of its income spent on food.

Only 58 percent of county residents have access to improved water sources while the rest still rely on surface water sources. Open defecation is still common while waste management in the urban areas largely remains sub-optimal. The percentage of those who can read and write (basic literacy) is 79.75 percent while life expectancy is estimated to be 40 years—a staggering 16 years shorter than Kenya's average of 56.6 years. The major causes of morbidity and mortality include malaria (54 percent) respiratory tract infections (15 percent) and diarrheal diseases (4 percent). HIV/AIDS also contributes to morbidity and mortality.

### 1.1.5 Climate

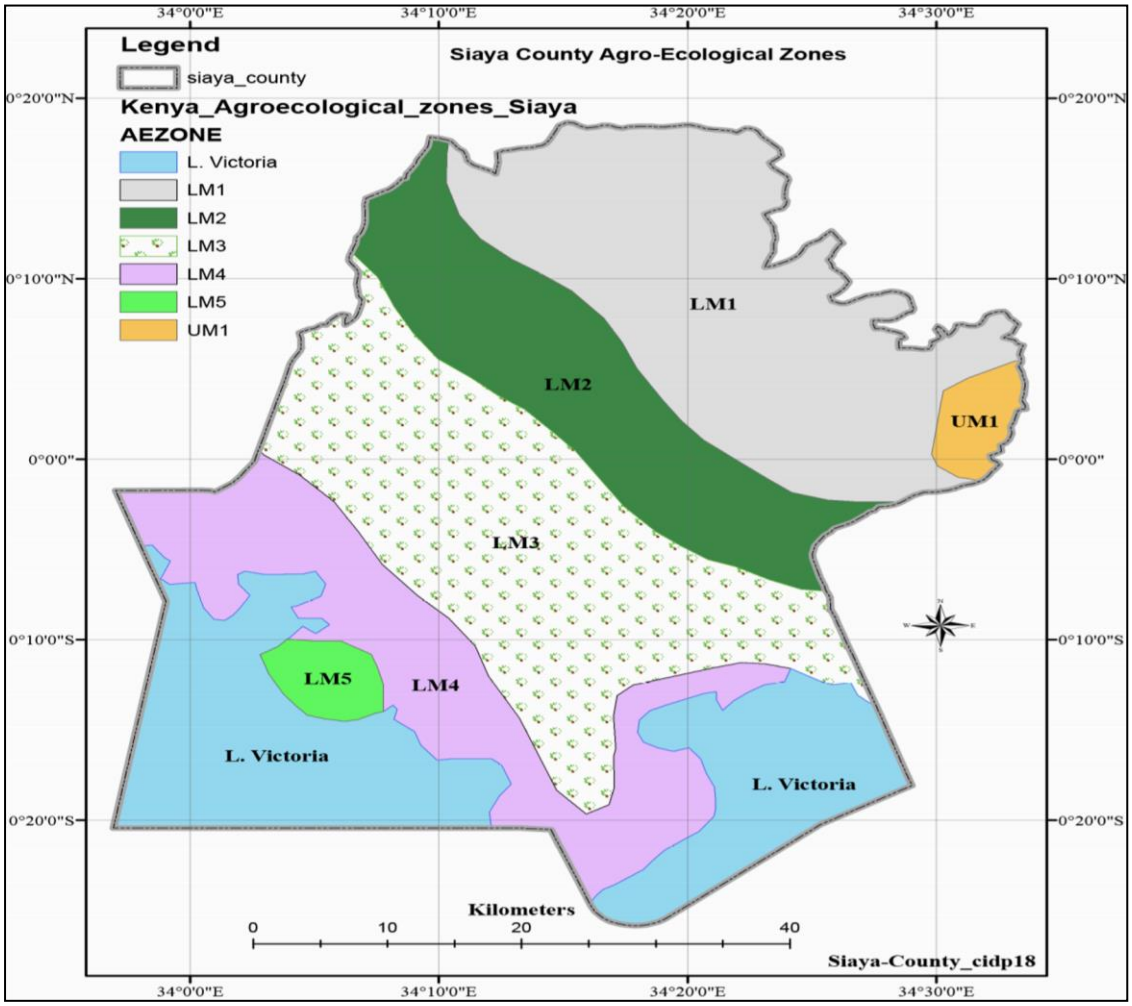
Like the rest of Kenya, annual rainfall patterns in Siaya County is bi-modal, with the long rains falling between March and May (MAM) and the short rains between October and December (OND). Over the western part of the country including Siaya County however, a third rainy season is experienced between the months of June and August. Annual rainfall amounts range from 1000 – 2000 mm, with the

southern parts of the county bordering Lake Victoria on the lower end of the spectrum with the northern parts on the upper end.

Consistent with other regions west of the Rift Valley, the county experiences high frequencies of thunderstorms, lightning and hailstorms. Strong winds are also experienced during, and often accompany, the rainy seasons. Temperatures range from a minimum of 15˚C to a maximum of 32˚C.

### 1.1.6 Agro-ecological zones

*Figure 2: Siaya County Agro-ecological zones*




Siaya County falls under the "Lower Midlands" agro-ecological zone. Here, annual mean temperature ranges from 21 to 240C, with night temperatures falling

as low as 140C. Siaya is further divided into 5 subzones based on weather patterns experienced.

**Lower midland zone 1 (sub-zone LM1):** This sub-zone is characterized by long cropping seasons due to cool temperatures, receiving 750-900 mm and 400-500 mm of rainfall in the first and second rainy seasons, respectively. Major crops grown during the long rains (March-April-May) include maize and beans intercrop, sorghum, cassava, groundnuts, cowpeas and sweet potatoes. During the short rains (October-November-December), however, maize and beans intercrop, cowpeas and sweet potatoes are prioritized. Fruit trees such as bananas, pawpaw, passion fruit, mangoes and avocadoes also do well in the subzone. Masiro Katsieno in Ugenya sub-county, Sigomere and Mudhiero in Ugunja sub-county, Yala in Gem Sub County, falls under this sub-zone.

**Lower midland zone 2 (sub-zone LM2):** This sub-zone is characterized by long cropping seasons only that it receives slightly lower amounts of rainfall of 700-800 mm and 400-500 mm in the first and second rainy seasons, respectively. Maize and beans intercrop, sorghum, cassava, sweet potatoes and sole maize are the main crops grown in both seasons. Similar to LM1, fruit trees such as cooking bananas, pawpaw, passion fruit, mangoes and avocadoes are also do well in the subzone. Sega and Ukwala in Ugenya sub-county, Ugunja centre and Sidindi in Ugunja sub-county, Mutumbu and Wagai in Gem sub-county falls under this subzone.

**Lower midland zone 3 (sub-zone LM3):** Characterized by a medium cropping season and weak short rains, this subzone receives 480-600 mm and 300-400 mm of rainfall in the first and second rainy seasons, respectively. Cotton is the most suitable crop for the subzone, although its cultivation at present is quite limited owing to the near collapse of the industry. Maize and beans intercrop, sorghum, cassava, sole maize, groundnuts, sole beans and sweet potatoes are mainly grown in both seasons, while mangoes are the most common fruit trees. Boro, Siaya town and Uranga in Alego Usonga Sub-County, Rera in Gem sub-county falls under this sub-zone.

**Lower midland zone 4 (sub-zone LM4):** Characterized by a medium cropping season and weak (short) to very short rains, this sub-zone receives 350-450 mm and 200-300 mm of rainfall in the first and second rainy seasons, respectively. Maize and beans intercrop, sorghum, sole maize and groundnuts are mostly cultivated during the long rains), with maize and beans intercrop and sole maize again being cultivated during the short rains. Similar to LM3, mangoes are

common in the subzone. An example of the subzone is Bondo Town, Mur Malanga and Nyangoma in Alego Usonga sub county, Asembo in Rarieda sub-county.

**Lower midland zone 5 (sub-zone LM5):** Characterized by a medium cropping season and weak (short) to very short rains, this sub-zone receives 300-400 mm and 200-300 mm of rainfall in the first and second rainy seasons, respectively. Maize and beans intercrop, sorghum, sole maize and groundnuts are mostly cultivated during the long rains), No maize is cultivated during the short rains. Similar to LM4, mangoes are common in the subzone. An example of the subzone is Usenge in Bondo Sub County, Mur Malanga and Madiany in Rarieda subcounty.

### 1.1.7 Climate trends and projections

Siaya County depends mainly on rain-fed agriculture to support its crop and livestock production. Smallholder farmers in Siaya are increasingly challenged by the uncertainty and variability of weather caused by climate change at seasonal scale. Since most crops are rain-fed, yields depend on water availability from rainfall. However, the length, intensity and distribution of rainfall over the rainy seasons are becoming increasingly unpredictable. Besides, the use of irrigation facilities remains limited due to poor extension services, mismanagement of irrigation schemes, inadequate financing and poor irrigation infrastructure.

Most of the wards in the county experience two rainfall maxima which is observed in March-April-May (MAM) and October-November-December (OND) as per the historical calendar developed during the county Participatory Climate Risk Assessment (PCRA) process. The PCRA process further developed the seasonal scale rainfall projections for the two RCPs 4.5 and 8.5 to determine the seasonal rainfall change. RCPs 4.5 refers to projections under business as usual emissions while RCPs 8.5 refers to projections under enhanced emissions. Generally, the northern and central parts are likely to experience reduction in rainfall amounts while the southern parts are projected to experience increase in rainfall amounts. Under the RCP8.5 the entire Siaya County is projected to experience reduction in rainfall amounts.

**ANNUAL MEAN RAINFALL PROJECTION**

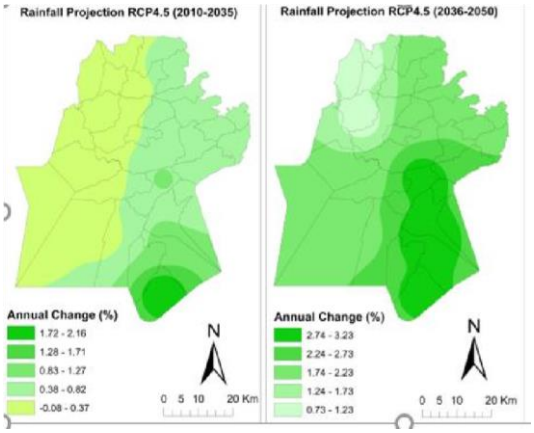



*Figure 3: Annual mean rainfall projection RCP4.5*

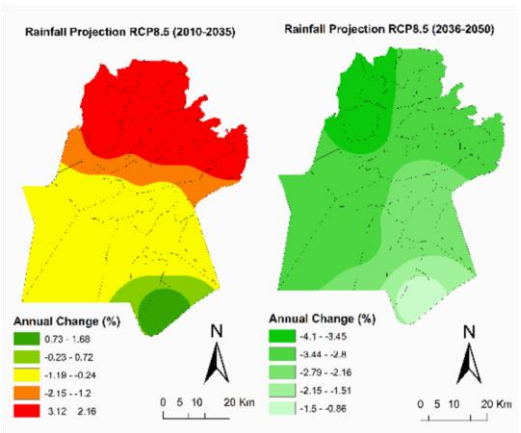



*Figure 4: Annual mean rainfall projection RCP8.5*

## MAM MEAN RAINFALL PROJECTION

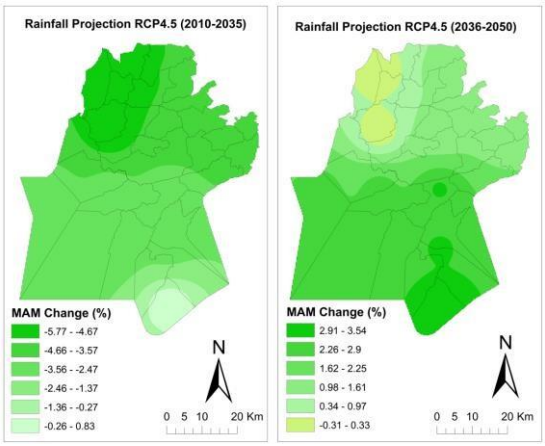



*Figure 5: MAM mean projection RCP4.5*

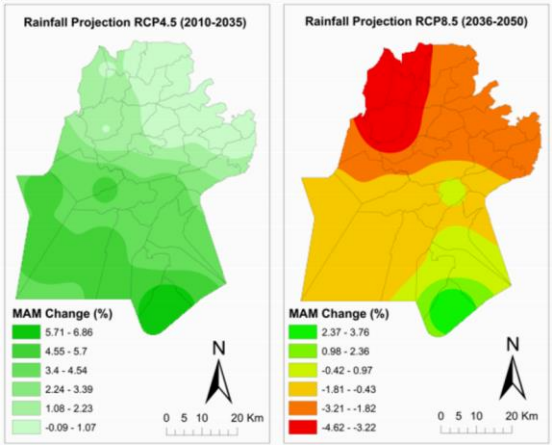



*Figure 6: MAM mean projection RCP8.5*

## OND MEAN RAINFALL PROJECTION

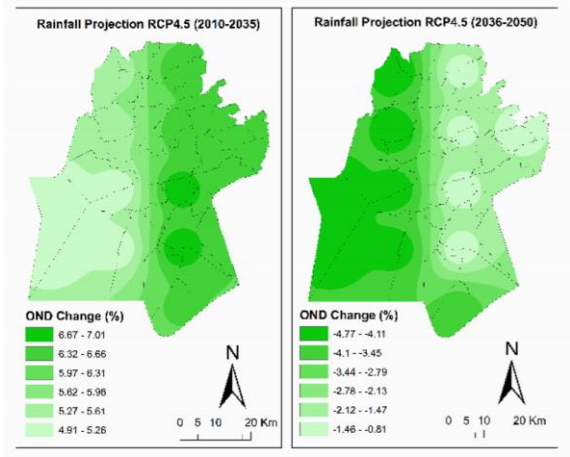



*Figure 7: OND mean projection RCP4.5*

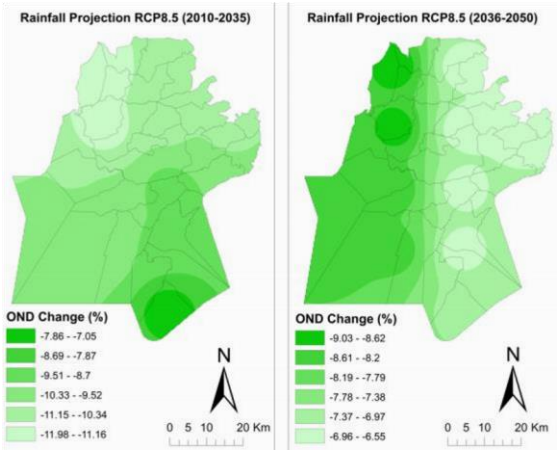



*Figure 8: MAM mean projection RCP8.5*

Both hot and cold temperature extremes can place many demands on vulnerable members of the society. While seasonal changes in temperature are normal and indeed important for a number of societal sectors (e.g. tourism and farming), extreme heat or cold can have serious negative impacts. Importantly, what is 'normal' for one ward in the county may be extreme for another ward that is less adapted to such conditions. The minimum and maximum projections depict warmer nights and hot day temperature Climate change is expected to have a significant influence on the ecology and distribution of tropical ecosystems, even though the magnitude, rate and direction of these changes are uncertain. With rising temperatures and increased frequency and intensity of droughts, wetlands and riverine systems are increasingly at risk of being converted to other ecosystems, with plant populations being succeeded and animals losing habitats. Increased temperatures and droughts also affect succession in forest

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systems while concurrently increasing the risk of invasive species all of which affect ecosystems. In addition to these climate drivers, low agricultural production and population growth might motivate further agricultural expansion resulting in increased deforestation, land degradation and forest fires, all of which will impact animal and plant biodiversity in Siaya County.

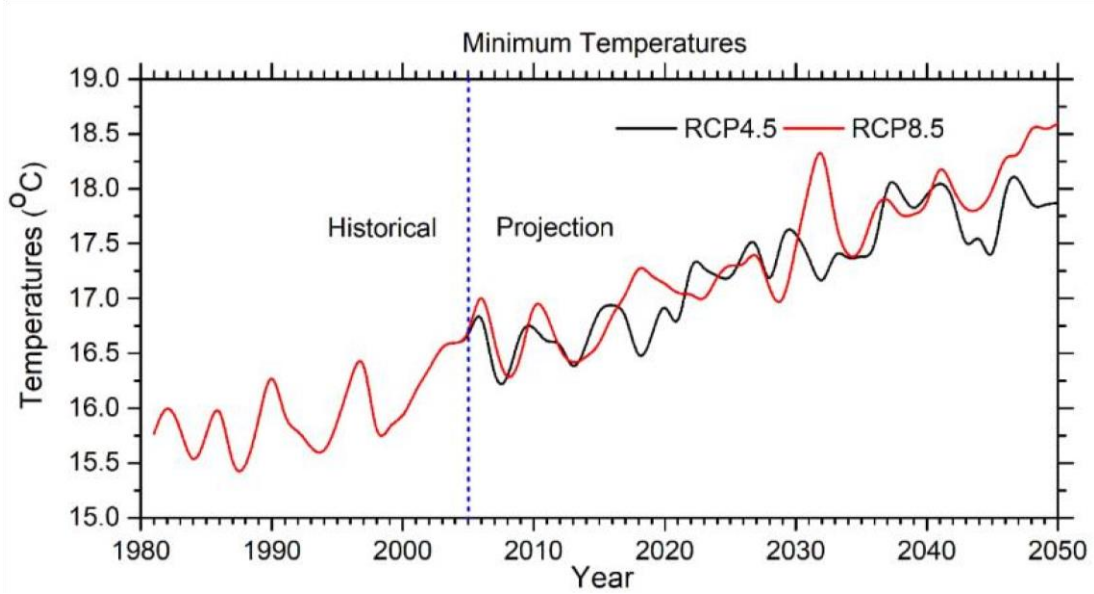



*Figure 9: Historical and projected minimum temperatures*

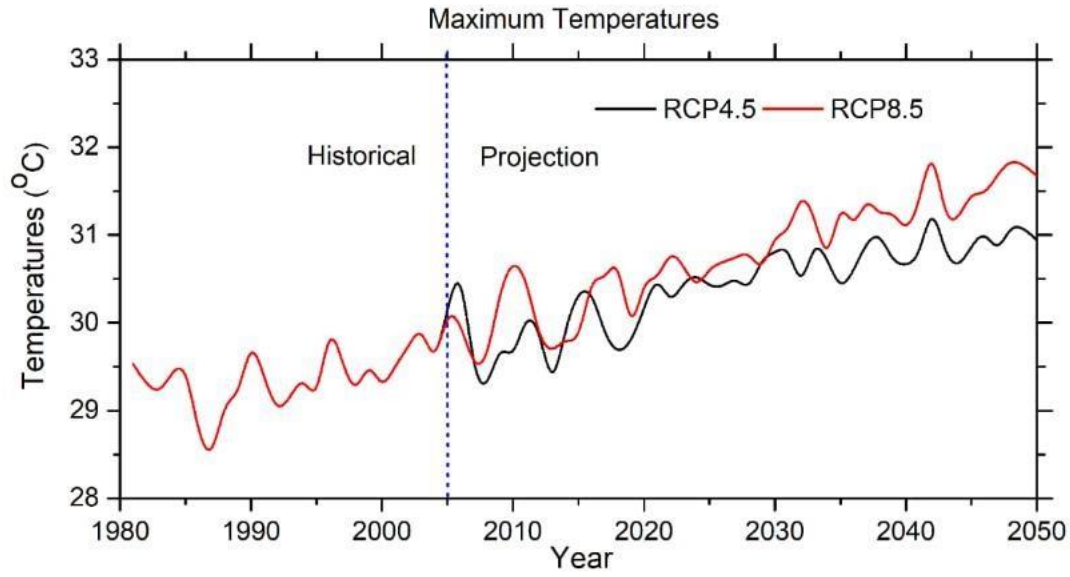



*Figure 10: Historical and projected maximum temperatures*

## 1.2 Underlying Climate Resilience Context

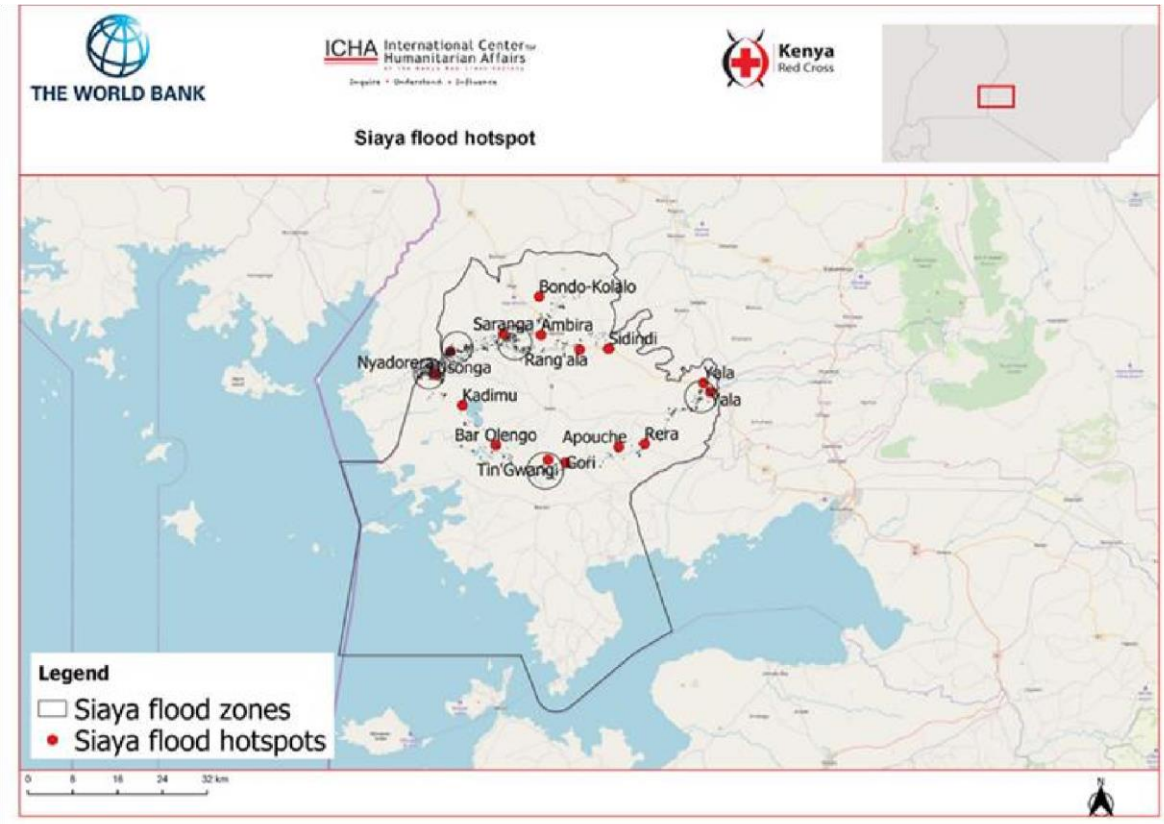
### 1.2.1 Spatial distribution of risks

**Disease outbreaks:** By far, HIV/AIDS is perceived to be the most dominant hazard in Siaya County. Indeed going by the results of the Kenya National Aids Indicator Survey of 2022, Siaya stands out as a county with the third highest rate of HIV/AIDS prevalence rate nationally at 15.3%. While focus remains on HIV/AIDS, malaria is the lead problem, being an endemic disease in the county. At 46% prevalence

rate, malaria is the most prevalent health problem in the county. Malaria spread is increasingly linked to frequent floods that provide conducive breeding grounds for mosquitoes. Disease outbreaks were reported across all the sub counties.

**Drought:** Recurrent droughts are a common phenomenon in sections of Siaya County, with the frequency of drought cycles varying in different parts of the county. In Bondo and Rarieda Sub-Counties, drought was regarded by respondents as the worst hazard. Apart from other factors related to climate change, the effects of droughts are becoming increasingly pronounced owing to population pressure, land use change and poor land management practices.

*Figure 11: Siaya Flood Hotspots*




**Floods:** Flood related losses along river Nzoia basin (mostly in the Budalangi plains and Siaya County's Nyadorera and Sifuyo areas) are estimated at US$ 4.8 million annually. Vulnerability is determined by poverty with the poor being forced to settle in risky floodplains to eke a living from agriculture, livestock rearing and fisheries. Flood impact is dependent on the nature of livelihood and wealth group in the community. For example agricultural production gets reduced to 50% every three years in Budalangi and the affected parts of Siaya County owing to floods.

**Severe winds/hail storms:** Due to global climate changes, recent climatic variations around the world have been highly unpredictable. Similarly Siaya County also experiences extreme variations in its climate and weather patterns. Although the county has not experienced large scale destructions due to windstorms or hailstorms, some pockets of the sub counties have been affected from time to time by both. All sub counties have reported damage from severe winds.

### 1.2.2 Impacts of Climate Hazards in the County

**Crop Farming:** Rain-fed agriculture is common in the county. Consequently, dry spells often impact agricultural productivity, livelihoods and incomes, and rendering the county a net food importer. Changes in temperature regimes and precipitation patterns have led to the shifting of agro-ecological zones thereby changing the geographical suitability of specific crops as well as changes in cropping seasons. This has resulted in reduced production per unit area and increased post-harvest losses. The changes have also contributed to an increase in the incidences of crop pests and diseases as well as emergence of new ones. Climate extremes, such as flooding, are expected to increase in frequency and intensity leading to anaerobic soil conditions, plant stress, and reduced yields or even total crop failure. Women are the most vulnerable and are hardest hit by these climate change impacts on agriculture given their disproportionately larger role in the sector across rural Kenya in general and Siaya County in particular.

**Fisheries:** Climate change is already impacting inland fisheries production. Increasing temperatures and reduced wind velocities have weakened lake mixing, with a subsequent reduction in nutrient availability for fish. Fishermen are already reporting reduced catch. Climate change is also predicted to lead to fluctuations of river volumes and lake levels by altering hydrological regimes. Such fluctuations affect the functionality of wetlands (such as the Yala Swamp and Lake Kanyaboli), altering the breeding ecology of both permanent and anadromous fish species. As populations grow and pressure to increase food supply increases, climate will reinforce existing challenges, among others, overexploitation of fisheries resources.

**Trade and Manufacturing:** Trade in agricultural products dominates the sector, taking place in more than 220 markets across the county. The trade and manufacturing sectors are often indirectly affected by climate change, as they depend on climate sensitive sectors such as agriculture, transportation and energy. Reduced agricultural productivity occasioned by climate change may leads to reduced supply of raw materials for agro-processing or even trade. On

the other hand, destruction of transport infrastructure by floods often limits movement of people, goods and services, thus hindering trade and manufacturing.

**Water and Sanitation:** Being a largely rural county, only 58 percent of county residents have access to improved water sources while the rest still rely on surface water sources. Access to water is generally a challenge as people have to walk long distances in search of it, with the southern part of the county (Rarieda and Bondo) being the most water scarce. Frequent droughts are making a bad situation worse. Floods, on the other hand, combined with siltation, often lead to pollution of surface water sources, thereby hindering availability of clean water and increasing the cost of water treatment. Over 82 percent of the population have access to pit latrines, while only 5 percent have access to sewerage system. The remaining 13 percent still use open defecation. The main impact of climate change on sanitation systems is damage to associated infrastructure by floods and contamination of potable water sources with human waste, with cascading impact on public health.

**Natural Resource Management:** Siaya County's forest cover stands at 0.42 percent against a national average of about 7 percent. The county's low forest cover means it cannot meet its demand (forest and non-forest products) through domestic production and, therefore, relies on imports. The main threat to the county's natural resources is the unsustainable extraction of forest products to meet the escalating energy demand of its growing population. For instance, firewood accounts for 82.5 percent of household energy demands followed by charcoal at 13.6 percent. Climate change is already exacerbating these challenges. Siaya is home to Yala Swamp, a critical ecosystem for various species of birds, fish and other mammals such as the Sitatunga (*Tragelaphus spekei*), which are unique to this wetland. Regrettably, the Yala Swamp ecosystem has undergone drastic ecological changes over the last decades. Most notable has been the decline in the populations of many endemic cichlid fishes. Climate change poses a new challenge as it is exacerbating existing pressures.

**Infrastructure:** Climate change is already impacting infrastructure development in the county. High temperatures lead to softening and expansion of tarmac roads and, in turn, create rutting and potholes. Climate change is also projected to increase the intensity of flooding, which could destroy critical infrastructure or even render most roads impassable. In Siaya County, low-lying and flood prone areas such as the Yala Swamp are particularly at greater risk. Taken together, these may increase the cost of developing and maintaining infrastructure in the county.

**Human Health:** Climate change is most likely contributing to an increase in vectorborne diseases. Changes in temperature and precipitation increases the geographic range of diseases spread by vectors. While malaria is endemic in lowlands such as the southern and central parts of Siaya County, it may pose greater challenges in the wetter and higher altitude parts of the county that border Kakamega and Vihiga counties. On the other hand, increased frequency of floods may result in environmentally-related diseases such as typhoid, amoeba, cholera, and bilharzia while also displacing populations or even causing deaths. Internal displacement owing to the heavy rains experienced in 2023 overburden public health systems and heighten the risk of disease outbreaks.

**Education:** Climate change's main impact on the education sector is as a result of the sector's linkages with agriculture, food security and household incomes in agriculturally dependent communities like Siaya. In such places, food insecure (hungry) children often miss school, as they and their families resort to seeking opportunities to get food. Further, reduced agricultural productivity and household incomes that is increasingly linked to climate change and climate variability implies that many rural households are increasingly unable to afford fees for their secondary school-going children.

### 1.2.3 Summary of Differentiated Climate exposure of key groups

Over the decades, Siaya County, like most other parts of Kenya has faced some measure of vulnerability to climate risks. Communities are predisposed to climate disasters by a combination of factors such as poverty, age, gender and settlement patterns especially in areas prone to perennial flooding. Vulnerable groups are mostly affected by climate change. These include:

**Women:** Climate change impacts affects women and men differently, and in Siaya, the disproportionate engagement of women to exploit agriculture and natural resources makes them highly susceptible to climate change and climate variability. Climate change is thus likely to worsen existing gender inequalities such as income disparities, labour engagement and market access between men and women. Women in Siaya seldom control land from which other livelihoods depend. Widows and women-headed households are particularly vulnerable to disenfranchisement for they own land through their spouses. Gender roles also ensure that the responsibility of fetching water, firewood, cooking and associated tasks rest on women. As climate change contributes to the scarcity of the said resources, it is women and girls who suffer the most.

**Youth:** Youth represent a crossover between the present and future generations, yet they are seldom involved in climate change response strategies. Climate change is already contributing to increased youth unemployment in sensitive sectors such as agriculture, manufacturing and tourism. Limited economic opportunities will likely result in youths dropping out of school, turning to crime, rural-urban migration and poor performance in school. Being a largely agriculture-based economy, Siaya County no longer generates adequate or even appropriate jobs of interest to the youth. Severe environmental degradation also threatens intergenerational equity.

**Elders:** Climate change risks such as droughts and floods tend to increase elder's vulnerabilities: appropriate foods may be unavailable, their mobility might be reduced and their dependence on others may increase. Droughts also negatively affect the traditional roles of older people, and perhaps more specifically their social position, as communities and power and support structures are dismantled, leaving older people with less influence and power. These challenges are already manifesting in Siaya County.

**Children:** Children are among the most vulnerable to the climate risk hazard such as drought and floods. Families have been driven to an increased reliance on negative coping mechanisms and strategies, which indirectly or directly affects children. When families are faced with difficult decisions in order to survive, they may be forced to leave their children, including at streets/relatives, so they can search for work or food, reduce the mouths they need to feed by engaging their children in forced marriage or labor. Negative coping mechanisms and strategies involving children have long-term repercussions, especially as children often do not have the same agency as adults, making them vulnerable to the decisions taken by their caregivers. Malnutrition has been also recorded among children in some pockets of the county especially during extended drought.

**Persons with Disability (PWDs):** Person living with disability and terminally sick people are affected by floods and drought owing to limitations regarding their mobility. People with terminal illness often exposed to lack of medication and this in long run might cause death.

### 1.3 Brief Overview of Climate Change Actions in Siaya CIDP (2023-2027)

Existing laws (County Government Act and Public Finance Management Act) allow county governments to spend only on priorities listed in the County Integrated Development Plan (CIDP), Annual Development Plan (ADP) and annual budget. The National Treasury has mandated counties to mainstream

climate change in the third generation CIDPs, including indicators to track implementation. Therefore, the Siaya County Integrated Development Plan (CIDP; 2023-2027) provides a framework to prioritize, resource and implement climate priorities in the next 5 years.

Adaptation actions remain a priority for Siaya County, consistent with the National Climate Change Action Plan for Kenya. Climate Smart Agriculture (CSA) priorities include, among others, expanding production of high value traditional crops, drought tolerant crops, improved livestock breeds, micro-irrigation schemes, conservation agriculture and livelihoods diversification. The CIDP also includes actions that promote climate change mitigation. Many of these actions, such as increasing forest cover and agroforestry, also generate climate resilience benefits and can be considered adaptation actions. These include, among others, using solar power at the various water points and promoting the use of energy saving cook. Some of these priorities will require adoption of new county policies and legislation for better implementation including the formulation of Siaya County Climate Change (Rules and Regulations).

## 2.0 Policy Environment

### 2.1 International Policy Context

**The United Nations Framework Convention on Climate Change (UNFCCC)** sets an overall framework for intergovernmental response to climate change, recognizing that the climate system can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The UNFCCC was adopted on May 9th, 1992 and opened for signatures at the United Nations Conference on Environment and Development (UNCED) the same year. Among others, the conference also adopted the Agenda 21, the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD). It is a non-binding agreement. Currently, there are 197 state parties to the Convention, including Kenya.

Through its Conference of the Parties (COP), the UNFCCC provides a platform for state parties and other key stakeholders to take stock of the status of implementation of climate change actions as well as recommendations necessary to promote the effective implementation of the Convention. Decisions made and agreed to by Parties at the COP are binding to all the UNFCCC Party States, and therefore to sub-national governments under the Party States. This is the relevance of the Convention to Siaya County for Kenya is a Party to the Convention.

**Intergovernmental Panel on Climate Change (IPCC):** The UN Environment Programme and the World Meteorological Organisation (WMO) jointly established the IPCC in 1989 to provide broad and balanced information about climate change. The IPCC fulfils this role by reviewing and assessing the most recent scientific, technical and socioeconomic information produced worldwide relevant to the understanding of climate change and translating this information into IPCC Assessment Reports and other periodic releases. IPCC's mandate to member states such as Kenya and its sub-national entities such as Siaya County Government enables provision of scientific, technical and other relevant information that informs climate change actions that entities should adopt. Such information includes projected temperature and rainfall changes and associated spatial and temporal socio-economic impacts.

**The Paris Agreement:** The Paris Agreement to the UNFCCC, just like the Kyoto Protocol is an instrument of the UNFCCC. The Convention is a consensual, nonbinding agreement that must be implemented by politically binding agreements such as the Kyoto Protocol, the Paris Agreement and others that will be agreed to, under the COPs. The Paris Agreement was adopted in Paris, France in 2015 in COP 21 and came into force on November 4th, 2016. To date, 187 Parties of the 197 Parties to the UNFCCC have ratified the Agreement. Kenya ratified it on December 28th, 2016.

The Paris Agreement mandates all Parties to the UNFCCC to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. This is achieved primarily through the Nationally Determined Contributions (NDCs), which are country-specific and owned action plans detailing mitigation, adaptation and other related actions individual countries intend to undertake in order to combat climate change. NDCs are implemented at both national and sub-national levels, and many actions in Kenya's first NDC relate to a number of devolved functions of interest to Siaya County.

## 2.2 Regional Policy Context

**African Ministerial Conference on Environment:** The African Ministerial Conference on Environment (AMCEN) was established in December 1985, following a conference of African ministers of environment held in Cairo, Egypt. AMCEN is a platform that brings together African ministers for environment to deliberate on common environmental and sustainable development issues of the continent. AMCEN has increasingly played a key role in advancing Africa's common positions on climate change, particularly with respect to the COPs and is therefore of relevance to sub-national governments like Siaya. For instance, issues that inform the common positions that AMCEN advances at the COPs are discussed at both national and county levels. Kenya has particularly been active as well as played a key role in AMCEN given its role as the host of the United Nations Environment Programme (UNEP) that provides secretariat services for the platform.

**The East African Community (EAC) Climate Change Policy (2010)** guides Partner States on the preparation and implementation of collective measures to address climate change in the region. The African Union's Agenda 2063 commits to climate change action that priorities adaptation and calls on member countries to implement the Programme on Climate Action in Africa including a climateresilient agricultural development program. Moreover, AU's Agenda 2063 commits to building climate-resilient economies and communities.

The Intergovernmental Authority on Development (IGAD) has also prepared the **IGAD Drought Disaster Resilience and Sustainability (IDDRS) Strategy**. IGAD Member States, Kenya included, developed Country Programming Papers (CPPs) for the Ending Drought Emergencies (EDE) interventions to be undertaken at the national level, from which the County Governments can now draw on for their drought resilience initiatives.

## 2.3 National Policy Context

**The Constitution of Kenya 2010** forms the foundation of the institutional and legal framework for climate change action. Article 10 sets out the National values such as sustainable development. Article 42 provides the right to a clean and healthy environment for every Kenyan. The constitution created 47 devolved County Governments which have a key delivery role in climate response. For instance, the Fourth Schedule to the Constitution mandates counties to intervene on climate-sensitive sectors such as water and sanitation, agriculture, forestry, public works, health, and tourism.

**Kenya Vision 2030 and its Medium Term Plans:** The Vision 2030 presents opportunities to identify climate-related actions and priorities through its implementation tools, the medium term plans (MTPs). The Fourth MTP (2023-2027) thus has a dedicated section on climate change, in addition to treating the same as a crosscutting theme in all sectors of the economy including governance and the rule of law. This is a key lesson for counties on how to mainstream climate change. The MTP IV identifies actions to address climate change, including implementation of the second National Climate Change Action Plan (NCCAP 2018-2022) and the Green Economy Strategy and Implementation Plan (GESIP 2016-2030) as well as mainstreaming of the Climate Change Act 2016 into sector policies, programs and projects formulation.

**Green Economy Strategy and Implementation Plan 2016-2030:** The Green Economy Strategy and Implementation Plan (GESIP) 2016-2030 aims at providing guidance to all development actors to adopt pathways with higher green growth, cleaner environment and higher productivity relative to the business as usual growth scenario. It will aid Kenya's transition to a low carbon development path through promotion of economic resilience and resource efficiency, sustainable management of natural resources, development of sustainable infrastructure and providing support for social inclusion. Similar to the other plans, policies and strategies for green growth/climate change response, GESIP recommends for mainstreaming of its proposed actions into development planning at both national and county levels, complemented by sound intergovernmental coordination for creating synergies.

**Climate Smart Agriculture Strategy 2017-2026:** The Climate Smart Agriculture Strategy (CSAS) 2017-2026 was developed to address the effects of climate change on the agricultural sector, taking cognizance of the importance of the sector to the country's economy. Agriculture being a devolved function, implementation of CSAS 2017-2026 largely rests with county governments. CSAS thus recommends that each county develops CSA policies, strategies and plans

to guide implementation or integrate County specific strategies into its County Integrated Development Plans (CIDPs) and other plans.

**Public Finance Management (Climate Change Fund) Regulations, 2018:** The Public Finance Management (Climate Change Fund) Regulations, 2018 aim at operationalizing the Climate Change Fund. The Regulations provide for the disbursement of the Fund's resources in the form of loans, grants or equity to eligible implementing agencies including county governments, as provided for in Section 25, for development of innovative actions that benefit climate change responses in Kenya.

**The Climate Change Act (2016)** provides the regulatory mechanisms to implement climate change resilience and low-carbon actions in both public and private sector development activities and has enshrined the National Climate Change Action Plan (NCCAP) – to be developed in 5-year cycles and aligned with the Medium Term Expenditure Plans (MTPs)—as its principal implementation instrument. It requires County governments to domesticate the Act. The National Adaptation Plan (2015-2030) aims to integrate climate change into national and county level development planning and budgeting, as well as enhance the resilience of vulnerable populations to climate shocks.

### 2.4 County Enabling Legal & Policy Framework

**Siaya County Climate Change Policy (2020)** is a major milestone in addressing county residents' vulnerability to climate change. The policy's overarching objective is to reduce vulnerability to the impacts of climate change by building adaptive capacity, enhancing climate change resilience and strengthening capacities for disaster risk reduction. The policy also provides a framework for mainstreaming climate change adaptation in county planning and budgeting cycle, promotes climate change awareness, mechanisms for mobilizing climate finance, and mainstreams gender in the county's climate change adaptation and mitigation efforts. The policy also creates a robust institutional framework for climate change response, recommends the adoption of specific legislation to better implement locally-led climate change response activities in Siaya County.

**Siaya County Climate Change Act (2021)** creates a Fund that will, among others, finance climate change programs in the county, mainstream climate response in the county planning and budgeting cycle, domesticate national climate change policies, support climate change awareness in the county, and create various institutions including community-level structures such as Ward Climate Change Planning Committees. The Act offers guidance on how to access additional

finance for climate change interventions, including but not limited to the National Climate Change Fund and mechanisms to leverage Public Private Partnerships (PPPs) as a vehicles for implementing low carbon climate resilient development activities in the county.

**Siaya County Disaster Risk Reduction (DRR) Policy Framework** is another instrument that demonstrates the county government's commitment towards addressing climate-related disasters. The goal of the DRR framework is to minimize the effects of potential disasters in the long run, thereby preserving lives, livelihoods and assets. Thus besides addressing the potential for immediate and accidental disasters, this policy focuses on DRR as the over-arching framework, for integration of risk reduction measures in the long term development plans of key sectors. It is intended to offer guidance by proposing relevant action points to be adopted in anchoring resilience in the long term development programming, besides responding to accidental disasters.

# 3.0 Priority Climate Change Actions

## 3.1 Strategic climate actions

### 3.1.1 Priority actions in the PCRA

*Table 1: Priority actions in the PCRA*

| Risk | Proposed Intervention |
|---|---|
| Eroded roadsides<br>Formation of Gulleys along the Roads e.g., Sidindi-Sikalame Tarmac Road | • Construction of Check Dams on the Roadsides for control of Run-Off<br>• Construction of On-farm Small-Holder pans to support mini-irrigation  Construction of Gabions |
| Strong winds causing destruction of public and private assets |  Boundary planting of trees in homesteads, Public Buildings, etc. |
| High temperatures leading to heat stress | • Establishment of Green Spaces in Public Facilities through woodlot Planting<br>• Greening roads through avenue planting of trees<br>• Promote on-farm forestry |
| Crop failures | • Promotion of Climate Smart Agricultural Technologies e.g., Drought Tolerant Crops.<br>• Promote public education on access to down-scaled weather information<br>• Promote rainwater harvesting &storage through water pans and installation of water tanks. |
| Air Pollution through emissions from vehicles, traditional cookstoves, factories, etc. | • Promote use of improved cook stoves<br>• Enact legislations to control vehicular emissions<br>• Public Education on air pollution |
| Biodiversity loss e.g., Weaver birds,<br>Butterflies, Hippos, Guinea Fowls, Porcupines, Gazelles, Grasshoppers and other tree species | • Establish Land Use Plans<br>• Establishment of Conservation areas by demarcation<br>• Establishment of arboreta<br>• Enhance public awareness on biodiversity conservation |
| Floods | • Demarcation of riparian lands & wetlands<br>• Development of Riparian Management Plans<br>• Mapping of Riparian zones and Wetlands<br>• Enhance Community awareness on riparian protection<br>• Promotion of Nature-Based Solutions for Riparian Management |

| | |
|---|---|
| Drying up of streams | • Water Catchment Protection through demarcation & planting of recommended tree species<br>• Promote Community Awareness on Water Resources Management<br>• Development of Sub-Catchment Management Plans<br>• Development of Solar-Powered Boreholes<br>• Construction of water pans and dams<br>• Construction of Rainwater Harvesting in Public Facilities |
| Land Degradation through erosion, brick-making in Ratado, Humwend & Nyaolo in West Ugenya Ward, Aluny, Anduro, etc.in Siaya Township Ward | • Public Awareness on erosion control<br>• Landscape Restoration through tree-planting<br>• Enactment of bylaws to control brick-making<br>• Promote environment friendly brick-making technologies e.g.interlocking blocks machines, etc. |
| Prolonged Dry Spells causing livestock deaths | • Establishment forage reserves<br>• Construction of Water Conservation Structures e.g., Dams |
| Lake Water Rises | Public Education on Riparian Distancing |

### 3.1.2 Purpose of the Siaya County Climate Change Action Plan

Siaya County is characterized by high poverty levels (47.56%) and food insecurity. Agriculture is the main source of livelihood in the county, contributing about 60% of the household income and providing almost 61% of all employment opportunities. Droughts and intense rainfall already constrain agricultural productivity in the county. Worse still, climate projections indicate increasing events of drought and intense rains. It is vital that policies and measures for adaptation to climate change are put in place across all the vulnerable sectors in order to minimize the impeding climate change disasters. Most importantly, proposed climate actions ought to address the different impacts faced by women, youth, children and other vulnerable groups.

The delivery of a participatory County Climate Change Adaptation Action Plan (2023-2027) is important if the County is to avoid the worst effects of climate change. Indeed, the county will need to put in place a conducive and enabling framework and a concerted program of action to combat impact of climate change. An informed public on climate change and its impact is the first step. A second step is the setting up of an institutional framework for strengthening partnership, planning and implementation of climate related sectors activities, working with all stakeholders including vulnerable groups.

The Action Plan's primary focus is ensuring that adaptation and mitigation measures are integrated in the Siaya CIDP (2023-2027). This calls for collaborative and joint action with all stakeholders in dealing with impacts of climate change. The emphasis is to prioritize the most vulnerable sectors of the economy namely

agriculture, fisheries, trade, water and sanitation, forestry, health social and infrastructure for meaningful impact.

### 3.1.3 Process of developing the Siaya County Climate Change Action Plan

The first step involved the development of Siaya County Participatory Climate Change Risk Assessment (PCRA) Report. The PCRA report identified and ranked the major hazards affecting the local residents of Siaya County and their livelihoods. The Report has also captured proposed climate adaptation actions that the communities felt, if implemented, would help them build their adaptive capacities to effects of climate change.

Relevant reviews of the previous Siaya County Climate Change Action Plan (20182022) was done and lessons on what worked well and what did not work well were captured. Thereafter, multi-stakeholder validation workshop took place and feedback incorporated into the revised plan. The second Draft Siaya County Climate Plan (2023-2027) was presented to the Cabinet for approval. Upon approval by the Cabinet, it was presented to the County Assembly for adoption. The adoption of the Siaya County Climate Change Actions (2023-2027) by the County Assembly now paves way for the implementation of priority actions.

The Siaya County Climate Change Action Plan (2023-2027) also feeds into the National Climate Change Action Plan (2023-2027), Vision 2030, Sustainable Development Goals (SDGs) and other national and international climate change priorities.

### 3.1.4 Vision, Mission and Objectives

Like all planning documents, the Siaya County Climate Change Action Plan (2023-2027) has certain key components embedded in it. These key components are the vision, mission, and the objectives that it seeks to achieve.

**Vision:** The vision of the Action Plan is for a prosperous and climate resilient County.

**Mission:** The mission of the Action Plan is to strengthen county actions towards adapting to and mitigation of climate change impacts by engaging all stakeholders while focusing on the vulnerable members in the county.

**Objectives:** The Action Plan responds to climate change by:

- Assessing the evidence and impact of climate change in Siaya County
- Recommending robust adaptation measures in all priority sectors

- Enhancing understanding of climate change and its impacts among relevant stakeholders
- Creating an enabling policy, legal and institutional framework to address climate change
- Mobilizing resources to implement, monitor and evaluate priority actions

## 3.2 Sectoral Climate Change Action Priorities

### 3.2.1 Water and Sanitation

- Protect and conserve (gazettement) water catchment areas/watersheds, rivers banks, spring/water ways and potential flood plains from degradation and contamination;

- Capacity build water resource user associations / WRUAs on water harvesting, storage, conservation measures, maintenance and operations;

- Increase access to safe water and sanitation facilities to limit outbreaks of water borne diseases;

- Construct water harvesting infrastructure
  Protection of water pans, dams and water springs

- Solarization of boreholes and water supply schemes

- Development support to SIBO and community water supply schemes

- Development of Siaya County Water Policy and master plan

- Develop child friendly ablution blocks in market centers

### 3.2.2 Agriculture and Food Security

- Promotion of community based adaptation strategies and knowledge, like indigenous seed bulking of drought tolerant traditional food crops like cassava, sorghum millet, African leafy vegetables with greater adaptations to extreme temperatures and rainfall events;

- Provision of technical assistance and increase access to finance to expand area under high value traditional drought tolerant crops (DTC) and drought escaping crops;

- Promoting Climate Smart Agriculture (CSA) to increase rainwater infiltration, reduced floods, reduced soil erosion, improve soil quality, fast growing perennial tree/food crops; sack gardens, shade nets, sustainable green houses, Zai Pits; and

- Supporting weather index-based crop insurance to cushion farmers against crop failure due to adverse weather conditions.

- Promotion of flood based farming systems e.g. use of water reservoirs for micro irrigation projects for crop production; on farm small water harvesting techniques

- Strengthening of agricultural extension services and mainstreaming climate change information and technologies into the farming system;

- Promote climate change resilience practices in the value chains

- Develop policies, strategies, bills regulations and plans (county livestock feed strategy; livestock subsector strategy; disease contingency plan; food safety policy; mechanization policy, fish cages policy, Lake Kanyaboli fisheries management plan)

- Control pests and diseases affecting crops, animal and fisheries

- Promote apiculture (beekeeping equipment,)
  Promote poultry development Strengthen legal and operational framework

### 3.2.3 Fisheries

- Strengthening of fish value chain to create formal and informal job creation.

- Supporting livelihood diversification strategies

- Strengthening capacity of Beach Management Units (BMUs) to carry out fisheries monitoring, control and surveillances in collaboration with the national government

- Identify and protect fish breeding sites to minimize unsustainable fishing practices and habitat destruction in collaboration with the national government;

- Strengthen community participation in fisheries resources management and value addition.

### 3.2.4 Forestry and Land Use

- Identify and assess pockets of degraded forest areas in county for rehabilitation;
- Draw and implement a comprehensive afforestation plan during wet seasons at all governance levels in the county, with an emphasis on indigenous tree species;
- Promote greening program in schools;
- Strengthen early warning systems in reduction of fire outbreaks (fire towers, fire drills).
- Support communities of interest to gazette fragile ecosystems like springs, forest buffer zones, riverine, watersheds etc.
- Support new enterprises suitable for the environment including bee keeping, domestication of plant medicinal plants, tree crops and forages of economic value
- Support alternative livelihood opportunities to charcoal/firewood as a source of income;
- Promote alternative building materials such as soil bricks.
  Tree nurseries establishment
- Establishment of woodlots &Hilltops Afforestation
- Creation of urban green spaces
- Gazettement of community forests
- Purchase and distribution of tree seedlings
- Awareness creation on environment and climate change.
- Surveillance and management of invasive species

- Development of Forestry Investment Strategy
- Establishment of community tree learning sites and Community Trainings on tree nursery establishment and management
- Development of Siaya County State of Environment Report
- Observation of environmental calendar days
- Planting of trees along major roads in urban areas within the County.
- Rehabilitate degraded areas
- Protecting environmental sensitive areas such as Yala swamp
- Mapping of available natural resources
- Develop Siaya County Spatial Plan

### 3.2.5 Social Infrastructure

- Strengthening disaster preparedness through improved public health systems (including personnel, infrastructure, medicine and equipment);
- Support spatial planning in urban centers and areas prone to disasters;
- Improve access to clean water and sanitary facilities to limit outbreaks of water borne dis-eases and awareness promotion on better hygiene;
- Formation and strengthening of resident / committees Units that can respond to emergencies and involving them in key decision making;
- Develop disaster response plans based periodic assessments and surveillance reports
  Formulate County Climate-Proofing Strategy to enhance compliance when designing and developing county infrastructure projects
- Climate proof projects through environment and social impacts assessment tools

### 3.2.6 Energy and climate change

- Implement installation of solar (hybrid systems), for water pumping – diesel generators;

- Enhance solar electrification program to meet public institutions and rural households' energy demand;

- Promotion of energy efficient cook stoves to reduce demand on biomass energy as well as to reduce greenhouse gas emission for households in rural areas and linkages to carbon financing/credit including awareness on improved cooking practices;

- Installation of improved institutional cook stoves to reduce GHG emissions to take advantage of carbon markets;

- Develop green energy (wind and solar) through public private partnership (PPPs);

- Investments in renewable biomass energy bio-fuels (briquettes, bio-gas);

- Lobby the national government to promote the use of Liquefied Petroleum Gas (LPG) for cooking, florescent light bulbs used by households through subsidies and or tax waivers;

- Support enactment policies/bills that support natural resources conservation measures.

- Formation of climate change planning committees' structures;

- Formulation regulations to support the Siaya County Climate Change Act, 2021

- Establishment of model Siaya County Climate Change Centres

- Climate change education and awareness creation materials

- Climate change education and awareness creation materials

### 3.2.7 Health

- Promotion of vaccination and immunization campaigns against diseases aggravated by climate change and climate variability.
- Periodic monitoring and evaluation of the quality of promotive and preventive, curative, palliative and rehabilitative services
- Construction and rehabilitation of climate-proofed health infrastructure
- Provide adequate commodities
- Formulate and implement policies, plans and laws that strengthen the link between climate change and halth
- Nutrition supplement and commodities procured
- Strengthen public health emergency response
- Proportion of targeted pregnant women provided with LLITNs

### 3.2.8 Education

- Formulate and implement policies/bills, regulations and guidelines
- Operationalize the existing child rescue centre to act as a safety net (child rescue centre)
- Provide bursary to needy to students
- Roll out school feeding programme
- Develop and operationalize VTCs
- Provide capitation to learners in ECDE and VTCs

## 4.0 Delivery Mechanisms for CCAP

## 4.1 Enabling Factors

### 4.1.1 Enabling Policy and Regulation

County Governments are the "first line of responders" to community challenges including negative impacts of climate change like droughts, floods, sea level rises and resource conflicts. In any case, climate-sensitive sectors such as, agriculture, health, disaster management and water services are now devolved. An enabling policy environment provides counties with an opportunity for effective response to climate change. Article 185 and 186 of the Constitution of Kenya (2010) empowers County Governments to develop policies for better implementation of devolved functions. The national Climate Change Act (2016) also mandates counties to mainstream climate change actions in their policies, plans, and budgets.

The County Government of Siaya has initiated measures aimed at strengthening its climate governance. These include, among others, mainstreaming climate change in the Siaya County Integrated Development Plan (CIDP; 2023-2027) and adoption of other climate governance frameworks including the Siaya County Climate Change Policy (2020), Siaya County Climate Change Act (2021) and Siaya County Climate Change (Rules and Regulations). The Act puts in place a framework for facilitating communities to respond effectively to effects of climate change through appropriate adaptation and mitigation measures. The Act also creates an elaborate institutional structure to drive implementation. Most importantly, the Act creates a county-level Climate Change Fund. Among other sources of finance, the Fund will benefit from moneys appropriated annually by the County Assembly, moneys received from the National Climate Change Fund, moneys from international climate finance mechanisms, and donations by development partners.

### 4.1.2 Mainstreaming in the CIDP

Climate change affects fundamental economic, social and environmental aspects of Siaya County's development. Climate change is multi-faceted and impacts all sectors of the County economy. To achieve scale and impact, climate change actions must be integrated in all county programs. For coordinated actions on climate change and to ensure that all sectors significantly contribute to climate change adaptation and mitigation, such actions must be included in all county planning and budgeting processes.

The Siaya County Integrated Development Plan (CIDP; 2023-2027) is the county's 5-year master plan for socio-economic development. The CIDP forms the basis for allocation of resources to County projects. It is one of the primary development

blue prints for Counties to engage the public and prioritize critical areas of development. Indeed, the County Government Act (2012) provides that no public funds shall be appropriated outside a planning framework developed by the county executive committee and approved by the county assembly. The county planning framework shall integrate economic, physical, social, environmental and spatial matters. The CIDP informs the county's budget which shall be based on the annual development priorities and performance targets. CIDP is also a critical entry point for the public engagement in the county's planning and development.

The Annual Development Plan (ADP) contains strategic priorities for the medium term and reflects the county government's plans for the specified year. It is usually derived from the 5-year CIDP and it informs the following: strategic priorities to which the program will contribute; services or goods to be provided; measurable indicators of performance; and allocated budget estimates to the program. The County Executive shall submit the ADP to the County Assembly for approval by 1 September in each year, with a copy to the Commission on Revenue Allocation (CRA) and National Treasury.

### 4.1.3 Multi-stakeholder participation processes

Public participation is a thread that runs throughout the Constitution of Kenya (2010) and other enabling legislation, among others, the County Government Act (2012) and the Public Finance Management Act (2013). The climate crisis cannot afford the loss of any allies. Therefore, there is need to involve relevant stakeholders in identifying climate risks, prioritizing climate response actions, implementation of climate change adaptation and mitigation programs, evaluation of program impacts and tweaking response strategies based on lessons learnt. It is particularly important to involve frontline communities affected by climate change for they also have ideas on how to better design and implement government response measures. The following agencies will play the role assigned to them as stated below:

**National Government**: The role of Government Ministries, Departments and Agencies will be to develop and establish standards and norms for ensuring mainstreaming, prevention and adaptation to climate change and further provide technical support in implementing adaptation and mitigation strategies.

**County Governments**: The role of the county will be to create a favorable environment for all stakeholders to thrive. County Government will establish, promote and implement set standards and norms, prepare and implement actions plans, facilitate public education on climate change. Within this policy

framework, Governments at the two levels will foster linkages with various development partners to provide financial, material and technical support as well as shape capacity for sustainability. The County government will facilitate research in collaboration with research institutions and academia

**Development Partners**: Development partners will play a complementary role towards realization of development of the goals and objectives of this policy. In particular, they will assist in leveraging resources and facilitating capacity support for climate change resilience, prevention and adaptation. The role of non-state actors will be to collaborate with Government to mobilize communities and resources, disseminate the policy and participate in capacity building for both for all stakeholders. This support will include awareness in the various aspects of climate change.

**Private sector:** The private sector has played an important role in helping communities such as small holder farmers adapt to climate change while simultaneously supporting market integration.. This policy prioritizes actions such as climate smart agricultural technologies, value addition, and extension that are of interest to the private sector.

**Communities:** Public policy is formulated for the protection of communities. Citizens are the main pillars of the policy and have to actively be involved in the implementation of this policy including being actively engaged in monitoring, evaluation and learning. They have a duty to be engaged and be allowed to contribute effectively. Communities are expected to exercise their sovereignty by holding duty bearers and all other agencies to account.

### 4.1.4 Resource mobilization strategy

Devolution of climate funds remains a major priority for climate financing in Kenya because it ensures that resources reach the neediest. County governments provide a good opportunity to create institutional linkages for devolving funds from the national to local level. Climate finance is also critical in enabling Siaya County to achieve goals set out in in the third generation County Integrated Development Plan (CIDP 2023-2027), Vision 2030 economic blueprint, Sustainable Development Goals (SDGs), the 2015 Paris Agreement, and the African Union Agenda 2063.

With the onset of climate change, Siaya and other counties have established local climate change fund through the Climate Change Fund Mechanisms (CCCF). CCCF is a mechanism through which counties can create, access and use climate finance from different sources to build communities resilience and reduce vulnerabilities to a changing climate in a more coordinated way. The

county climate finance mechanisms creates the county climate finance committees consisting of the ward planning committees to ensure the following principles are well inculcated in the administration of the funds.

Section 14 of Siaya County Climate Change Fund Act (2020) mandates the County Government to publish a County Climate Finance framework every three (3) years. Among other objectives, the **Siaya County Climate Finance Framework (2023-2025)** seeks to unlock financial resources necessary for the implementation of the County Climate Change Policy and County Climate Change Fund Act, establish an optimal mix of policy and financing tools thereby making climate change investments more attractive to private investors, coordinate the implementation and reporting mechanisms of climate finance in the county through a responsive monitoring and evaluation framework, provide assurances that the climate funds are used effectively and guarantee that climate change activities are undertaken as efficiently, mainstream climate change response into county planning and budgeting cycle and promote balanced and fair access to climate funds available so that vulnerable communities have equal access through affirmative action.

### 4.1.5 Climate Information Services & Climate Data Access

Kenya Meteorological Department (KMD) has been giving climate information for many years but the uptake has been limited due to a number of reasons including, among others, relevance of the climate information services and channels of communication. This Action Plan recommends the development of Siaya County Climate Information Services (CIS) Plan. The CIS Plan will collect, consolidate, analyze and disseminate down-scaled weather and climate information which can support ward, sub-county and county-level decision making processes. Most importantly, the CIS Plan will give priority to information that can enable farmers, fisher folks, traders and others make climate-smart decisions well advance of slow-onset disasters like floods and droughts.

This Action Plan is aware that timely communication of climate information helps prevent the economic setbacks and humanitarian disasters that can result from climate extremes and long-term climate change. The CIS Plan will also play a crucial role in development planning—both for managing development opportunities and risks and as well as mitigation and adaptation.

Operationalization of the CIS Plan is resource-intensive and requires financial and human resources that are mobilized well beyond the government provisions. This is where collaboration between state and non-state actors in Siaya comes in.

### 4.1.6 Resilience Planning Tools

Resilience is a multidimensional issue that is based on human, social, natural, productive, financial and political capital – yet the institutions involved in implementing resilience interventions have their own sector- specific views on which one of these building blocks counts more than others. In such a situation, a shared understanding of the multi- pronged nature of resilience can help county governments to position different projects as different building blocks of resilience and understand how they fit into the overall picture. There are several resilience planning tools in use by both state and non-state actors. Therefore, this Action Plan will use a mix of these planning tools, albeit within the county planning and budgeting cycle.

**Planning and budgeting tools:** The CIDP forms the basis for allocation of resources to County projects. It is one of the primary development blue prints for Counties to engage the public and prioritize critical areas of development. The CIDP integrates economic, physical, social, environmental and spatial matters. The CIDP informs the county's budget which shall be based on the annual development priorities and performance targets. The CIDP is also a critical entry point for the public engagement in the county's planning and development. Conversely, the Annual Development Plan (ADP) contains strategic priorities for the medium term and reflects the county government's plans for the specified year. Once the ADP priorities are subjected to budget ceilings, the next step is development of annual budget to resource the implementation of priority actions, including climate change adaptation and mitigation.

**The Integrated Food Security Phase Classification (IPC)** is an innovative multistakeholder initiative to improve analysis and decision-making on food security and nutrition. Using the IPC classification and analytical approach, governments, UN agencies, NGOs, and other stakeholders work together to determine the severity and extent of acute and chronic food insecurity and acute malnutrition situations within countries, according to internationally recognized standards.

**Early Warning Bulletins:** The National Drought Management Authority Act (2016) mandates the Authority to exercise overall coordination over all matters relating to drought risk management and to establish mechanisms, either on its own or with stakeholders that will end drought emergencies in Kenya. The Government, together with development partners under the Kenya Food Security Steering Group (KFSSG) in collaboration with the respective County Steering Groups (CSGs) routinely carry out the seasonal Long /Short Rains Food and Nutritional Security Assessment. NDMA also publishes Drought Early Warning Bulletin especially focusing on the counties at risk. It is this information that informs the

decision to declare "drought a national disaster" by the President following which certain drastic response measures are initiated. NDMA also relies on the IPC data.

**Community Managed Disaster Risk reduction (CMDRR)** is an empowering process where a community systematically manages its disaster risks for increased resilience. It places community at the center of participatory disaster risk assessment, planning and implementation. It emphasizes the importance of communities being empowered to prepare and respond to micro level hazards and link their efforts to government processes for sustainability. Contingency plans and development plans generated from the CMDRR process often inform wardlevel priorities by the county government or even development partners.
**Participatory Climate Risk Assessment (PCRA) Tool:** Siaya County PCRA report informed the priorities in this Action Plan. Climate risk assessment is essential in identifying climate risks, impacts and priority resilience options to build local capacities through locally-led action. The participatory climate risk assessment (PCRA) results in the development of a county climate risk assessment report, which identifies the key climate risks for the county as well as strategic investment areas for climate resilience. Other resilience planning tools include Sustainable Livelihoods Framework, the Coping Strategy Index (CSI), vulnerability assessment and Multidimensional Poverty Assessment Tool.

**Siaya County Climate Finance Framework:** The Siaya County Climate Change Act (2021) mandates the County Government to publish a County Climate Finance framework every three (3) years. Among other objectives, the framework will address the status of climate change awareness in the county, impact of climate change in the county, human activities in the county that impact climate change, and climate change adaptation and mitigation activities relevant to the county. Therefore, the Climate Finance Framework compliments both the CIDP and Action Plan in coming up with priority actions on climate response.

### 4.1.7 Measurement, Reporting and Verification

Monitoring and Evaluation System (NIMES) as a mechanism for tracking climate finance implementation under the Medium-Term Plan (MTP IV) of Kenya's Vision 2030. At the county level, results management is undertaken through the County Integrated Monitoring and Evaluation System (CIMES) that is linked to NIMES. However, incomplete policy reform has meant that majority of counties lack dedicated M&E departments and, where they exist, they seldom have adequate capacity to effectively discharge their mandate.

This Action Plan reinforces Kenya's global commitments regarding climate change reporting. Kenya is part of the transparency framework under the Paris

Agreement and is expected to provide frequent information (at least biennially) on the support required and needed under Articles 9 (Finance for mitigation and adaptation) and technology development (10) and transfer (11) capacity building. The Public Finance Management Act, 2012 also provides a framework for tracking and reporting on climate finance. Besides, the CIDP allows counties to develop SMART indicators on climate change to help track climate response.

The Financing Locally-Led Climate Actions (FLLoCA) Monitoring and Evaluation Manual also helps program implementers (like Siaya County), to understand M&E procedures and processes for the program, decide how progress will be monitored to enable any adjustments where necessary and gather the necessary information to be used during various evaluation studies. Taken together, this Action Plan seeks to support a robust monitoring and evaluation system that is linked to CIMES to track the impacts of climate investments in the county. The M&E System twill also track the effectiveness of climate actions being implemented, lessons learnt and necessary tweaks based on what is working and what is not working.

## 4.2 Implementation and Coordination Mechanisms

### 4.2.1 Coordination structures

Climate risk management strategies in Siaya County are implemented mainly through the collaboration between various actors, both state and non-state. Government departments mainly provide technical support and policy direction in collaboration with non-state actors provide the research, funding, and implementation for the adaptations. Even though there is a good deal of collaboration among the various stakeholders mentioned, there is lack of an institutionalized framework for structuring and organizing the collaborations between actors. This lack of structured interaction contributes to a lack of accountability on the part of the actors.

Institutional arrangements are critical in implementation and coordination of climate change actions. The cross-cutting nature of climate change requires that all sectors are involved at different levels in implementation. It is drawing from the partners' knowledge, expertise and financial contributions that will make it possible for the county to realize its climate change goals. The implementation of the policy, and the roles assigned to each implementing agency will respect the functional distribution of roles between the two levels of government as provided for in the Fourth Schedule to the Constitution (2010).

As per the Siaya County Climate Change Act (2021), climate change actions are being spearheaded by climate change directorate which works closely with County Climate Change Steering committee (CCCSC), County Climate Change Planning Committee (CCCPC) and Ward Climate Change Planning Committees (WCCPC). The structure has embraced locally led actions where climate intervention prioritized and are implemented at the ward level.

*4.2.1.1 County Climate Change Steering Committee*

This is higher level structure that provides leadership and support to county climate change actions. Some of their functions as per the act are

- Approve and oversee implementation of the Climate Finance framework in the County;

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  Approve the Fund Eligibility Criteria developed by the County Planning Committee;

- Approve the Climate Change Awareness Strategy developed by the County Planning Committee;

- Approve the climate change projects and programs list compiled by the Fund Administrator;

- Ensure that projects approved for funding conform to the Climate Finance Framework;

- Approve and oversee execution of the County Climate Finance Budget in compliance with the Public Finance Management principles under article 201 of the Constitution of Kenya;

- Oversee the coordination of research and development for climate finance in the County;

- Approve the list of pre-qualified research consultants for Climate Finance research in the County;

- Approve the curriculum for capacity building and climate change awareness in the County;

- Mobilize additional funding for projects, programs and activities listed in the Climate Finance Framework;

- Provide the essential linkages between the County Executive Committee and the County Assembly with regard to management of the Fund;

- Approve a Strategic Plan and Service Charter for the Fund developed by the County Planning Committee;

Approve the ward and county-wide disbursement proposals by the Fund Administrator

*4.2.1.2 County Climate Change Planning Committee*

This comprise of sectoral County and National Directors to provide technical support. Some of their functions as per the Act are

- Develop a Climate Finance Framework for the County;
  Develop, consultatively, Eligibility Criteria for selecting and prioritizing climate change projects and programs for approval by the Steering Committee;

- Evaluate, validate and recommend climate change proposals developed by the Ward Planning Committee and submit to the Steering Committee for approval;

- Oversight to the project evaluation process by the Ward Planning Committee and prepare appropriate reports to the Climate Change Fund Steering Committee;

- Facilitate and monitor the implementation of projects and programs financed by the Fund in the County;

- Develop a Climate Finance research priority needs for the county;

- Develop a Climate Awareness Strategy for the County;

- Develop a Strategic Plan and Service Charter for the Fund;

- Assign and coordinate technical assistance from County departments to projects funded under this Act;

- Facilitate the coordination of Climate Finance projects and programs with other programs in the County

*4.2.1.3 Ward Climate Change Planning Committee*

This is locally led structure to spear head locally led climate actions at ward level. The Act has given more provision for ward participation in sustainable climate change adaptation and mitigation by participating in climate risk/hazard assessment, look into historical timeline, trend and future climate projection and from well informed perspective prioritize climate change adaptation to build local adaptive capacity. Some of their functions as per the act are

- Consult with the community on the relevant Climate Finance activities at the Ward level;

- Facilitate public participation at the Ward level to develop and prioritise proposals for investments in public goods that promote climate change mitigation and adaptation;

- Receive project proposals from the community at the Ward level and develop technical components of the project proposals;
  Monitor project implementation at the Ward level;

- Prepare the Climate Finance Budget at the ward level;

- Ensure compliance with the provisions in this Act and regulations made hereunder;

- Prepare ward level project report

## 4.3 Implementation Matrix

*Table 2: Implementation Matrix*

| Sector | Action priority by sector | Responsible | Source of Funds | Timeframe | | | | | Annual budget KES in Millions) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | FY 2023/24 | FY 2024/25 | FY 2025/26 | FY 2026/27 | FY 2027/28 | |
| **Water and sanitation** | Water harvesting, retention and recharge technologies | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 11 |
| | Conduct regular water quality testing & monitoring based on WRA / NEMA guidelines ;In-stall hydrometric network to monitor river flows and flood warning; and | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 15 |
| | Purchase of plastic water tanks for each ward in the county | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 35 |

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|---|---|---|---|---|---|---|---|---|---|
| | Promotion of water harvesting, retention to ensure availability of water during drought season; | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 40 |
| | Protect and conserve water catchment areas/watersheds, rivers banks, spring / water ways | County Government National Government | CCCF NCCF FLLoCA | | | | | | 17 |

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| | and flood plains from degradation and contamination; | | Development partners Private sector | | | | | | |
| | Strengthen capacity building of water resource user associations / WUAs on water harvesting, storage, conservation measures and maintenance and operations; | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 17 |
| | Review and update water & sanitation training manuals to strengthen WUAs/WRUAs; | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 7 |
| | Mainstream Climate Change into all water resource management plans and actions. | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 3 |
| | Increasing urban & rural domestic water supplies & urban sewage services to help combating water borne diseases, their social & economic impacts; | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 50 |

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| | Community awareness for promotion of better hygiene; | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 11 |
| | Solarization of boreholes and water supply schemes | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 100 |
| | Development support to SIBO and community water supply schemes | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 150 |
| | Development of Siaya County Water Policy and master plan Child friendly ablution blocks in market centers | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 85 |

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|---|---|---|---|---|---|---|---|---|---|
| **Agriculture and food Security** | Promotion of community based adaptation strategies, like seed bulking of drought tolerant traditional food crops with greater adaptations to extreme temperatures and rainfall events; | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 14 |
| | Provision of financial and technical assistance to expand area under high value traditional drought tolerant crops (DTC) and drought escaping crops; and | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 20 |
| | Support to demonstration and onfarm trials on pest and disease resistant varieties. | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 4 |
| | Assessment of the status agroforestry and water harvesting structures and make recommendations for up-scaling | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 7 |
| | Promotion of agro-forestry to increase rainwater infiltration, reduced floods, reduced soil | County Government National Government | CCCF NCCF FLLoCA | | | | | | 20 |

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|---|---|---|---|---|---|---|---|---|---|
| | erosion, improve soil quality, fast growing perennial tree crops. | | Development partners Private sector | | | | | | |
| | Promotion of flood based farming systems e.g. use of mega dams for micro irrigation projects for crop production; on farm small water harvesting structures | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 30 |
| | Promotion of conservation measures like soil bunds, stone bunds, grass strips, contour leveling terracing, tie ridges for increased water infiltrations; | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | 5 years | | | | | 15 |
| | Promotion of appropriate water harvesting technology for household level crop production; sack gardens, shade nets, sustainable green houses, Zai Pits; and | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 45 |
| | Livelihood diversification through value addition to agriculture products and provision of credit facilities. | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 40 |

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|---|---|---|---|---|---|---|---|---|---|
| | Promote improved post-harvest storage and management of crops. | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 3 |
| | Strengthening of agricultural extension services to mainstream climate change information and technologies into the farming system | County Government National Government | CCCF NCCF FLLoCA Development partners | | | | | | 4 |

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|---|---|---|---|---|---|---|---|---|---|
| | | | Private sector | | | | | | |
| | Community capacity building on climate change adaptation; provision of climate information to farmers, through altering timing of planting dates to adapt to changing situations | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 10 |
| | Establish four climate proof technology development and transfer centers. | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 30 |
| | Support value addition to agricultural products and financial support for investment in agroprocessing; | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 12 |
| | Promote climate change resilience practices in the value chains | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 11 |

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|---|---|---|---|---|---|---|---|---|---|
| | Develop policies, strategies, bills regulations and plans (county livestock feed strategy; livestock subsector strategy; disease contingency plan; food safety policy; mechanization policy, fish cages policy, Lake Kanyaboli fisheries management plan) | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 12 |
| | Promote apiculture (beekeeping equipment,) | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 15 |
| | Control pests and diseases affecting crops, animal and fisheries | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 13 |
| | Promote poultry development Strengthen legal and operational framework | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | |

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| **Fisheries** | supporting livelihood diversification strategies which add value within the fisheries sector, | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 10 |
| | Strengthening capacity of Beach Management Units (BMUs) to carry out fisheries monitoring, control and surveillances; | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 5 |
| | Identifying and protecting fish breeding sites to minimize unsustainable fisheries practices and habitat destruction; and | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 2 |
| | promotion of formal and informal job creation, self-employment and entrepreneurship relevant to the need of both women and men; | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 3 |
| **Forestry and Land Use** | Reforestation of Degraded Forests Identify and assess pockets of degraded forest areas in county for rehabilitation; | County Government National Government | CCCF NCCF FLLoCA | | | | | | 10 |

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|---|---|---|---|---|---|---|---|---|---|
| | Promote greening program in schools; | | Development partners Private sector | | | | | | |
| | Strengthening capacity of community-based forest management committee/associations (CFAs, EMCs) | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | 4 | | | | | 10 |
| | Support new enterprises suitable for the environment including bee keeping, domestication of plant medicinal plants, tree crops and forages of economic value | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | 4 | | | | | 10 |
| | Support alternative livelihood opportunities to charcoal/firewood as a source of income; | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 7 |
| | Promote alternative building materials such as soil bricks. | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 6 |

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|---|---|---|---|---|---|---|---|---|---|
| | Creation of urban green spaces | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 25 |
| | Gazettement of community forests | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 15 |
| | Awareness creation climate change. | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 11 |
| | Surveillance and management of invasive species | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 13 |

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|---|---|---|---|---|---|---|---|---|
| | Development of Forestry Investment Strategy | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | 7 |
| | Establishment of community tree learning sites and Community | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | 50 |
| | Development of Siaya County State of Environment Report | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | 12 |
| | Observation of environmental calendar days | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | 24 |
| | Planting of trees along major roads in urban areas within the County. | County Government National Government | CCCF NCCF FLLoCA | | | | | 13 |

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| | | | Development partners Private sector | | | | | | |
| | Protecting environmental sensitive areas such as Yala swamp | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 25 |
| | Mapping of available natural resources | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 11 |
| | Develop Siaya County Spatial Plan | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 20 |
| **Energy** | Promotion of energy efficient cook stoves to reduce demand on biomass energy as well as to reduce greenhouse gas emission; | County Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 15 |

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|---|---|---|---|---|---|---|---|---|---|
| | Installation of improved institutional cook stoves to reduce GHG emissions to take advantage of carbon markets; | County Government | CCCF<br>NCCF<br>FLLoCA<br>Development partners<br>Private sector | | | | | | 12 |
| | Develop green energy (wind and solar) through private public sector investment; | County Government | CCCF<br>NCCF<br>FLLoCA<br>Development partners<br>Private sector | | | | | | 35 |
| | Investments in renewable biomass energy bio-fuels (briquettes, biogas); | County Government | CCCF<br>NCCF<br>FLLoCA<br>Development partners<br>Private sector | | | | | | 13 |
| | Investments in efficient and sustainable charcoal production from invasive tree species | County Government | CCCF<br>NCCF<br>FLLoCA<br>Development partners<br>Private sector | | | | | | 11 |

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|---|---|---|---|---|---|---|---|---|---|
| | Formation of climate change planning committees' structures; | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 30 |
| | Formulation regulations to support the Siaya County Climate Change Act, 2021 | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 11 |
| | Establishment of 6 model Siaya County Climate Change Centres | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 50 |
| **Social Infrastructure** | Support spatial planning in urban centers and areas prone to disasters; | County Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 85 |
| | Establishment of disaster management response committee in towns and municipalities; | National Government | CCCF NCCF FLLoCA | | | | | | 16 |

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| | | | Development partners Private sector | | | | | | |
| | Develop disaster response plans based periodic assessments and surveillance reports | County Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 11 |
| | Promotion of vaccination and immunization campaigns against diseases aggravated by climate change and climate variability. | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 13 |
| **Health** | Periodic monitoring and evaluation of the quality of promotive and preventive, curative, palliative and rehabilitative services | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 11 |
| | Provide adequate commodities | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 50 |

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| | Proportion of targeted pregnant women provided with LLITNs | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 5 |
| | Strengthen public health emergency response | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 6 |
| | Construction and rehabilitation of climate-proofed health infrastructure | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 60 |
| | Formulate and implement policies, plans and laws that strengthen the link between climate change and health | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 11 |

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|---|---|---|---|---|---|---|---|---|---|
| | Nutrition supplement and commodities procured | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 45 |
| | Promotion of vaccination and immunization campaigns against diseases aggravated by climate change and climate variability | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 21 |
| **Education** | Formulate and implement policies/bills, regulations and guidelines | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 11 |
| | Operationalize the existing child rescue centre to act as a safety net (child rescue centre) | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 7 |
| | Roll out school feeding programme | County Government National Government | CCCF NCCF FLLoCA | | | | | | 45 |

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| | | | Development partners Private sector | | | | | | |
| | Develop and operationalize ECDEs and VTCs | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 59 |
| | Provide capitation to learners in ECDE and VTCs | County Government National Government | CCCF NCCF FLLoCA Development partners Private sector | | | | | | 70 |

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## Annexures

### Annex 1: List of Participants (Ward Meetings)

| Ward Participatory Climate Risk Analysis |
|---|

| Work Area Allocation | | | | |
|---|---|---|---|---|
| **Alego Usonga** | | | | |
| 1 | Siaya Township | Dominic Arodi | 713817279 | KMD |
| 2 | North Alego | Hillary Omondi | 791694302 | Siaya Muungano |
| 3 | Central Alego | Immaculate Ochieng' | 720990182 | Gender |
| 4 | West Alego | Joseph Abuje | 722108600 | Public Health |
| 5 | South-East Alego | Eric Omuombo | 727716098 | Communications |
| 6 | Usonga | Diana Awuor | 726714513 | Environment |
| **Ug unja** | | | | |
| 7 | Sidindi | Rodgers Otieno | 0710 204 014 | Tourism |
| 8 | Sigomre | George Okello | 0722 492 099 | Governance |
| 9 | Ugunja | Kelly Wafula | 725772133 | Agriculture |
| **Ug enya** | | | | |
| 10 | North Ugenya | Maurice Otieno | 729422149 | Agriculture |
| 11 | East Ugenya | George Saitoti | 717303509 | Agriculture |
| 12 | West Ugenya | Pascal Omondi | 0708 767 070 | Public Health |
| 13 | Ukwala | Ben Ouma | 0720 972 776 | Agriculture |
| **Gem** | | | | |
| 14 | Yala Township | Jared Abayo | 0722 717 657 | Governance |
| 15 | Central Gem | Kevin Owira | 707440227 | Finance |
| 16 | North Gem | Marylin Otwoma | 0795 206 350 | Public Health |
| 17 | West Gem | Charles Ngige | 790287575 | Agriculture |
| 18 | South Gem | Kevin Otieno | 0797 623 941 | Public Health |
| 19 | East Gem | Collins Ouko | 0791 571 844 | Public Health |
| **B ondo** | | | | |
| 20 | North Sakwa | Moses Otieno | 721651058 | Finance |
| 21 | West Sakwa | Sophie Odhiambo | 720925025 | Agriculture |
| 22 | Central Sakwa | Jackson Achuti | 742334761 | Agriculture |
| 23 | South Sakwa | Millicent Otieno | 717703551 | Agriculture |
| 24 | East Yimbo | Evans Onyango | 707776144 | Public Health |

| | | | | |
|---|---|---|---|---|
| 25 | West Yimbo | Mercelline Amuga | 723941108 | Environment |
| **Ra rieda** | | | | |
| 26 | East Asembo | Henry Dundo | 0714 279 820 | Livestock |
| 27 | West Asembo | Abraham Oluoch | 0708 713 330 | Finance |
| 28 | West Uyoma | Walter Aol | 0719 563 641 | Public Health |
| 29 | North Uyoma | John Awalo | 0720 342 035 | Agriculture |
| 30 | South Uyoma | Bernhard Ogetta | 0729 644 364 | Finance |

| **SAMPLE LIST OF PCRA PARTICIPANTS FROM EAST GEM WARD** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **S/No.** | **Name** | **ID** | **Mobile number** | **Gender** | | **People living with disability** | | **Age** |
| | | | | Male | Female | yes | No | |
| 1. | ESTHER AMOLO | 20606137 | | | ✓ | | ✓ | 45 |
| 2. | COLLINS OUKO | 29343893 | | ✓ | | | ✓ | 31 |
| 3. | MICHAEL ATIENO | | | ✓ | | | ✓ | 52 |
| 4. | COLLINS OKELO | 7814350 | | ✓ | | ✓ | | 55 |
| 5. | ZJULIA ARWA ODHIAMBO | 0642818 | | | ✓ | ✓ | | 70 |
| 6. | WASHINGTONE ONYANGO | 25272983 | | ✓ | | | ✓ | 35 |
| 7. | ISAAC ONJALA | 24632287 | | ✓ | | | ✓ | 35 |
| 8. I | KEVIN OKOTH<br>S<br>A<br>A<br>C | 24845731 | | ✓ | | | ✓ | 35 |
| 9. | DANIEL ONYANGO | 6480943 | | ✓ | | | ✓ | 70 |
| 10. | JOAN AMIMO | 8135610 | | ✓ | | | ✓ | 66 |
| 11. | CHRISTINE OTIENO | 41778649 | | | ✓ | | ✓ | 18 |
| 12. | ROSEMAY ACHIENG | 30852254 | | | ✓ | | ✓ | 32 |
| 13. | CHRISTINE AKINYI | 24914971 | | | ✓ | | ✓ | 35 |
| 14. | J JANE ANYANGO ODHIER | 8254469 | | | ✓ | ✓ | | 55 |
| 15. | DORINE ADHIAMBO OKUMU | 26970339 | | | ✓ | | ✓ | 39 |
| 16. | GEORGE OMONDI | 26252736 | | ✓ | | | ✓ | 35 |
| 17. | MAWINDA ATIENO LENCER | 36827531 | | | ✓ | | ✓ | 24 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 18. | JOSEPH OTIENO OBONYO | 24843774 | | ✓ | | | ✓ | 39 |
| 19. | SSTEPHEN ODHIAMBO TOGENGA | 29592482 | | ✓ | | | ✓ | 31 |
| 20. | JACOB ADEDE | 13664770 | | ✓ | | | ✓ | 52 |
| 21. | ARANGA EMMANUEL | 40505341 | | ✓ | | | ✓ | 21 |
| 22. | OCHIENG' VICTOR ONYANGO | 39439671 | | ✓ | | | ✓ | 20 |
| 23. | POLYCARP OMONDI | 29366192 | | ✓ | | | ✓ | 31 |
| 24. | YROBERT OTIENO Y | 31241615 | | ✓ | | | ✓ | 28 |
| 25. | BENARD ODONGO | 25780224 | | ✓ | | | ✓ | 31 |
| 26. | GABRIEL OTIENO | 29078566 | | ✓ | | | ✓ | 31 |
| 27. | BARACK OCEAGO | 21791089 | | ✓ | | | ✓ | 49 |
| 28. | HESBON NYAKOMBO | 26103262 | | ✓ | | | ✓ | 35 |
| 29. | EDWIN OGINGA | 32945605 | | ✓ | | | ✓ | 29 |
| 30. | SELINE OKELLO | 22283735 | | | ✓ | | ✓ | 44 |
| 31. | HORACE SEDA | 24702741 | | ✓ | | | ✓ | 37 |
| 32. | JOEL BIWOTT | 27774698 | | ✓ | | | ✓ | 36 |
| 33. | EMMANUEL OMOLLO | 25807216 | | ✓ | | | ✓ | 39 |
| 34. | CONSLATA ORIEDI | 4823440 | | | ✓ | | ✓ | 60 |
| 35. | CCHARLES OCHIENG | 27893668 | | ✓ | | | ✓ | 35 |
| 36. | PELSCAH OGENYO | 26431136 | | | ✓ | | ✓ | 37 |
| 37. | BRIAN OMBODO | 33380943 | | ✓ | | | ✓ | 28 |
| 38. | JOSEPH OTIENO | 3586710 | | ✓ | | | ✓ | 29 |
| 39. | DELSON NYABERA | 27893688 | | ✓ | | | ✓ | 33 |
| 40. | EMMANUEL OTIENO | 40632438 | | ✓ | | | ✓ | 24 |
| 41. | FESTUS ABUODHA | 4879685 | | ✓ | | | ✓ | 68 |
| 42. | JEZACA OMOUMA | 33229783 | | | ✓ | | ✓ | 26 |
| 43. | AATIENO ONYANGO | 32534934 | | | ✓ | | ✓ | 28 |
| 44. | PETER MINANI | 2703166 | | ✓ | | | ✓ | 65 |
| 45. | JOSEPH OCHIENG | 1421176 | | ✓ | | | ✓ | 63 |
| 46. | NICHOLAS SOGO | 8210057 | | ✓ | | | ✓ | 61 |
| 47. | ABEL OMONDI OTIENG' | 24617568 | | ✓ | | | ✓ | 35 |
| 48. | HENRY OBONYO ONANJE | 16081840 | | ✓ | | | ✓ | |
| 49. | SAMSON ODINGA | 29450560 | | ✓ | | | ✓ | |
| 50. | CONSLATA OKUMU | 29543848 | | | ✓ | ✓ | | 30 |
| 51. | EDWIN OGINGA | | | ✓ | | | ✓ | 28 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 52. | PAMELA ADHIAMBO | 13039210 | [redacted] | | ✓ | | ✓ | 40 |
| 53. | PETER OKETCH | 4251714 | [redacted] | ✓ | | | ✓ | 64 |
| 54. | DANIEL AGUTU SEWE | 0647467 | [redacted] | ✓ | | | ✓ | 70 |
| 55. | MILLICENT ANYANGO | 25553840 | [redacted] | | ✓ | | ✓ | 46 |
| 56. | CALEB NGULI | 25582955 | [redacted] | ✓ | | | ✓ | 36 |
| 57. | JOAN AKINYI | 32832265 | [redacted] | | ✓ | | ✓ | 30 |
| 58. | MAURICE OMONDI | 11670683 | [redacted] | ✓ | | | ✓ | 44 |
| 59. | JANE ADHIAMBO | 3337123 | [redacted] | | ✓ | | ✓ | 28 |
| 60. | AMOS ODHIER | 1218153 | [redacted] | ✓ | | | ✓ | 65 |

## Annex 2: Ward Adaptation Priorities

| No. | Risk | Proposed Intervention | Affected Wards |
|---|---|---|---|
| 1 | Eroded Roadsides - Formation of Gulleys along the Roads e.g., Sidindi-Sikalame Tarmac Road | Construction of Check Dams on the Roadsides for control of Run-Off Construction of On-farm Small-Holder pans to support mini-irrigation Construction of Gabions | Yala Township, North Gem, Central Gem, West Gem, East Gem, parts of South Gem, Sidindi, Sigomre, Ugunja, West Ugenya, East Ugenya, North Ugenya, Ukwala, North Alego, parts of Central Alego, parts of South-East Alego and parts of North Sakwa Ward |
| 2 | Strong Winds Causing destruction of Human Settlements, Public Buildings in schools, dispensaries, etc. | Boundary Planting of trees in homesteads, Public Buildings, etc. | All Wards |
| 3 | High Temperatures leading to High Heat Stresses | Establishment of Green Spaces in Public Facilities through woodlot Planting -Greening roads through Avenue planting of trees -Promote On-farm forestry | All Wards |
| 4 | Crop failures | -Promotion of Climate Smart Agricultural Technologies e.g., Drought tolerant crops, zero tillage, cover cropping, on-farm terracing. -Promote Public Education on access to weather information -Promote Rainwater Harvesting & Storage through water pans, installation of Water Tanks. | Quite Severe in All Wards but less severe moderate in Yala Township, North Gem, Sidindi and Sigomre Wards |
| 5 | Air Pollution through emissions from vehicles, | -Promote use of improved cookstoves -Enact legislations to control vehicular emissions - Public Education on | All Wards |

| | | | |
|---|---|---|---|
| | traditional cookstoves, factories, etc. | | |
| 6 | Loss of Biodiversity e.g., Weaver birds, Butterflies, Hippos, Guinea | -Establish Land Use Plans<br>-Establishment of Conservation areas by demarcation | All Wards |
| | Fowls, Porcupines, Gazelles, Grasshoppers, *Oripa, Ochol*, Tree Species such as *Siala, Ober, Ochuoga, Oduogo,* | -Establishment of arboreta<br>-Enhance public awareness on biodiversity conservation | |
| 7 | Floods | -Demarcation of riparian lands & wetlands<br>-Development of Riparian Management Plans<br>-Mapping of Riparian zones and Wetlands<br>-Enhance Community awareness on riparian protection<br>-Promotion of Nature-Based Solutions for Riparian Management | West Ugenya,East Ugenya,Usonga,East Yimbo,and sections of West Uyoma |
| 8 | Drying up of streams | -Water Catchment Protection through demarcation<br>& planting of recommended tree species<br>-Promote Community Awareness on Water Resources Management<br>-Development of Sub-Catchment Management<br>Plans<br>-Development of Solar-Powered Boreholes<br>-Construction of water pans and dams<br>-Construction of Rainwater Harvesting in Public Facilities | Common in All Wards but rare in Yala<br>Township, Central Gem, North Gem,<br>Sidindi & Sigomre Wards |
| 9 | Land Degradation through erosion, brick-making in Ratado, Humwend & Nyaolo in West Ugenya Ward, Aluny, Anduro, etc.in Siaya Township Ward | -Public Awareness on erosion control<br>-Landscape Restoration through tree-planting<br>-Enactment of bylaws to control brick-making -Promote environment friendly brick-making technologies e.g.inter-locking blocks machines, etc. | High in most Wards but low in South<br>Uyoma, North Uyoma, West Uyoma,<br>East Asembo, West Asembo, South<br>Sakwa, Central Sakwa & West Sakwa Wards |
| 10. | Prolonged Dry Spells causing livestock deaths | -Establishment forage reserves<br>-Construction of Water Conservation Structures e.g., Dams | All Wards but livestock deaths is more common in West Uyoma, North Uyoma, and South Uyoma Wards |
| 11 | Artisanal Mining Accidents | -Public Education on Mining Safety | -South Sakwa, Central Sakwa, North Sakwa, East Gem, and South East Alego Wards. |
| 12 | Lake Water Rises | Public Education on Riparian Distancing | East Yimbo, West Yimbo, North Uyoma, |

| | | | |
|---|---|---|---|
| | | | South-East Alego, West Alego & Central Alego Wards |