THE COUNTY GOVERNMENT OF ISIOLO

PARTICIPATORY CLIMATE RISK ASSESSMENT REPORT

Financing Locally-Led Climate Action (FLLoCA) Program

May, 2023

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Definition of Terms

Term	Definition
Adaptation	Changes made in response to the likely threats and opportunities arising from climate variability and climate change.
Climate	Average weather based on the statistical description in terms of the mean and variability of relevant quantities, such as temperature, precipitation and wind, over an extended period of time.
Climate change	A statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer).
GHG	Greenhouse gas
Impact	A threat or an opportunity that may arise as a result of either the weather or climate change both in the short and long term, and represents the fact that the issue is one that is constantly evolving.
Infrastructure	Assets and systems of assets that support our society. NOTE: This includes buildings, open space systems, public domain areas and associated infrastructure, and transport, water, power and communications assets.
Level of risk	Magnitude of a risk or combination of risks, expressed in terms of the combination of consequences and their likelihood.
Mitigation	Reducing causes of climate change.
Monitoring/Tracking	Continual checking, supervising, critically observing or determining the status in order to identify change from the performance level required or expected.
Resilience	Adaptive capacity of an organisation to a complex and changing environment.
Risk	Effect of uncertainty on objectives.
Risk assessment	Overall process of risk identification, risk analysis and risk evaluation.
Risk management	Coordinated activities to direct and control an organization with regard to risk.
Vulnerability	Degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes.

Acronyms

ASALs	Arid and Semi-Arid Lands
CBO	Community Based Organisation
CCAPs	Climate Change Action Plan
CIDP	County Integrated Development Plan
CIS	Climate Information Services
CoK	Constitution of Kenya
CRS	Catholic Relief Services
CSOs	Civil Society Organisations
DPPs	Drought Preparedness Programs
EMCA	Environment Management and Coordination Act
FAO	Food and Agriculture Organization
FLLOCA	Financing Locally-Led Climate Action
GBV	Gender Based Violence
GoK	Government of Kenya
ICCF	Isiolo County Climate Change Fund
IDPs	Internally Displaced Persons
IPC	Integrated Food Security Phase Classification
IPCC	Inter-Governmental Panel on Climate Change
KFS	Kenya Forest Services
KP	Kyoto Protocol
KWS	Kenya Wildlife Services
LMS	Livestock Market Support
MSMEs	Micro and Small Enterprises
NAWIRI	USAID Thrive program
NCCAP	National Climate Change Action Plan
NCCRS	National Climate Change Response Strategy
NDMA	National Drought Management Authority
NEMA	National Environmental Management Authority
PA	Paris Agreement
PCRA	Participatory Climate Risk Assessment
PwDs	Persons with Disabilities
SDDA	State Department for Development of the ASALs
SDG	Sustainable Development Goal
TWG	Technical Working Group on Climate Change
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
WFP	World Food Programme
WPCs	Ward Planning Committees

Forward

The Participatory Climate Resilience Assessment (PCRA) for Isiolo County represents a significant milestone in our collective efforts to address the challenges posed by climate change and build resilience within vulnerable communities. As esteemed researchers and experts, in collaboration with the Isiolo County Government and stakeholders, we have successfully conducted field consultations and synthesized the invaluable reports from the field to develop this comprehensive assessment.

The purpose of the PCRA is to strategically evaluate the vulnerabilities and adaptive capacity of different groups within Isiolo County in the face of climate change. Our objective is to identify key interventions and strategies that will enhance resilience and promote sustainable development in the county. Through the engagement of diverse stakeholders, including community members, local organizations, and governmental agencies, we have sought to foster a participatory approach that ensures the voices and perspectives of those most affected by climate change are heard and considered in the assessment process.

To achieve this, a rigorous methodology was employed. Field consultations were undertaken to gather first-hand information and insights from the communities of Isiolo County. These consultations involved in-depth interviews, focus group discussions, and participatory exercises, allowing us to capture a comprehensive understanding of the unique challenges faced by different groups, such as women, pastoralists, agro-pastoralists, and sedentary farmers.

The reports generated from these consultations served as a foundation for the development of the PCRA, ensuring that the assessment is grounded in the realities and experiences of the people of Isiolo County. Throughout the assessment process, we have engaged closely with stakeholders at various levels. The Isiolo County Government has been an invaluable partner, providing guidance and support, and facilitating access to relevant data and information. We have also collaborated closely with local organizations, academic institutions, and civil society groups, who have contributed their expertise and insights to enrich the assessment process. Additionally, community members have actively participated, sharing their knowledge and experiences, thereby strengthening the validity and relevance of the PCRA.

This collaborative approach ensures that the PCRA reflects a broad range of perspectives and insights, enabling us to develop targeted strategies that address the differentiated impacts of climate change on gender and livelihood practices. By recognizing the distinct vulnerabilities and adaptive capacities of women, pastoralists, agro-pastoralists, and sedentary farmers, we aim to design context-specific interventions that promote gender equality, safeguard traditional livelihoods, and enhance overall resilience in Isiolo County.

In conclusion, the Proactive Climate Resilience Assessment (PCRA) for Isiolo County stands as a testament to the power of collaboration and community engagement. By leveraging the field reports and insights generated through consultations, we have developed an assessment that is firmly rooted in the realities of Isiolo County's communities. We express our sincere gratitude to all the stakeholders who have contributed their time, knowledge, and support to this endeavor. It is our hope that the findings and recommendations of the PCRA will serve as a valuable resource to inform policy-making and foster climate resilience in Isiolo County and beyond.

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The Isiolo County Government's Department of Environment and Climate Change Resilience wishes to thank the following organizations that have continuously collaborated with other national agencies and county departments in community consultations, research, implementation of adaptation actions and financial support to ensure that the Isiolo Climate Change Action Plan is developed in a participatory way involving all stakeholders. Special mention is due to the following organisations: Merti Integrated Development Program (MidP), Action Aid, LISTEN Program, Catholic Relief Services (KRAPID+), Feed the Future LMS, and the USAID-Nawiri Program.

Executive Summary

A novel and innovative 7-step Participatory Climate Risk Assessment Framework has been adopted to assess current and future climate change hazards in Isiolo County and specifically at the ward levels. This is in addition to identifying climate risk adaptation and mitigation options that are appropriate for each ward-level climate outlook. Following an intensive planning process by the Isiolo County Government in Coordination with key stakeholders including a spectrum of relevant county government departments, ActionAid and the Catholic Relief Services (CRS) a comprehensive PCRA was undertaken, considering underlying components of hazard, exposure, and vulnerability.

The assessment also entailed an assessment of existing resources including among others; water sources, grazing lands, arable lands, conservancies, and infrastructure in the form of roads, health facilities, and education facilities within each of the wards. This was in addition to examining their vulnerabilities to the impacts of climate change through a ranking approach that identifies the most climate-fragile resources. Separate climate-related parameters were observed in their uniqueness for instance in light of livelihoods as related to agriculture (both livestock and crop production). The assessment also considered both slow-onset events such as drought, extreme heat, and water stress, and rapid onset events including heavy rains and floods.

The risk assessment has shown that there has been a remarkable variation in the climatic conditions in Isiolo County over the years. The most common changes identified include warmer temperatures, erratic rainfall, water scarcity, and prolonged drought periods that occur after every two years. In terms of perceptions of long-term change in climate, an overwhelming majority of the community in the county observed an increase in average temperatures and a decrease in average precipitation.

These findings are in line with community perceptions that have highlighted significant and increasing impacts relating to long drought periods where the water sources such as. shallow wells, boreholes, water pans, and rivers become totally depleted and high temperatures generate heat stress that destroys crops and pastures. The likely effects of climate change in the County manifest themselves in significant increases in year-round temperatures, increased intensity of rainfall during rainfall seasons, shifts in rainfall onset and cessation dates, increases in the frequency of extreme weather events from year-to-year weather variation.

While representing an idealized approach, the analyses could demonstrate that in the absence of suitable adaptation measures communities will be periodically prone to unpredictable climate changes and their related impacts. Considering damages to infrastructure, tolerance levels for communities will be seasonably variable, for example, damage to critical transportation roads is more critical during the high market season, and hence the inaccessibility to markets. The seasonality of resource-based conflicts is also triggered by increased competition for the scarce resource especially during the dry season.

Core challenges remain in assessing future changes in vulnerability and exposure, including how the outcomes from existing and future development programmes and adaptation strategies can be accounted for in the risk assessment. However, despite these uncertainties, it is clear that timely implementation of well-conceived adaptation strategies has the potential to significantly reduce future losses, and thereby increase risk tolerance levels, especially for rural communities in the County. It is

anticipated that the learnings and experiences from this assessment will help inform local decision-making, and further guide the climate action planning process.

1. Context of the Participatory Climate Risk Assessment (PCRA)

1.1 Background

Established within the devolved system of governance given precedence by the Constitution of Kenya 2010, Isiolo County covers an estimated 25,700 km^2. The county is centrally located bordering Marsabit County to the north, Samburu and Laikipia Counties to the west, Garissa County to the southeast, Wajir County to the northeast, Tana River and Kitui Counties to the south and Meru and Tharaka Nithi Counties to the south-west. Classified as one of the Arid and Semi-Arid Lands (ASALs), the county lies in two ecological zones which are predominately arid and semi-arid, with an estimated annual rainfall estimated at between 400 – 650 mm[1]. Economically, agriculture is the county's economic stronghold with over 80% of the inhabitants relying on livestock for their livelihoods and less than a third (26%) practicing agro-pastoralism[2].

Similar to other ASAL counties, Isiolo County remains susceptible to the impacts of climate change. The impacts are already being felt across a wide economic, social and environmental spectrum exacerbating existing pressure on the already scarce natural resources and reinforcing factors that increase the local community's vulnerability to extreme climate-related shocks. Projections indicate that climate impacts will continue to affect the county in the future, especially in the very arid parts which constitute about 65% of the land area[3].

Notably, the County Government of Isiolo has made significant steps towards addressing the impacts of climate change manifested by among others, *the Isiolo County Climate Change Fund Act*, 2018 and the *Isiolo County Climate Change Fund (ICCCF) Inventory of Adaptation Investments.* This has been with the support of non-state state actors including development partners, Civil Society Organizations (CSOs) and private sector actors. Notwithstanding, the county remains one of the most vulnerable to the effects of climate change including drought and unpredictable rainfall, floods, and spread of water and vector-borne diseases, loss of forests and wetland ecosystems, land degradation and desertification and scarcity of portable water. These impacts continue to result in severe social and economic effects especially considering the high dependency on rainfall especially for livestock farming.

To address these challenges, it is critical to emphasize the need to engage communities as key stakeholders in tackling climate change vulnerabilities. Members of the community hub a chronology of climate variabilities as well as the diverse impacts on their social and economic wellness. Similarly, communities have evolved in response to climate change hazards. These adaptation and mitigation measures provide a starting point in addressing climate related issues, and even more effective if they were adopted at scale.

The effects of climate change are compound and multidisciplinary. Intent on sustainably addressing the climate-related challenges in Isiolo county, among other counties, the Government of Kenya (GoK) launched the World Bank funded Financing Locally-Led Climate Action (FLLOCA) programme. The overarching goal of the programme is to strengthen local resilience to the impact of climate change,

[1] Isiolo County Integrated Plan 2018-2022
[2] MoALF. 2017. Climate Risk Profile for Isiolo County. Kenya County Climate Risk Profile Series. The Ministry of Agriculture, Livestock and Fisheries (MoALF), Nairobi, Kenya
[3] https://www.iucn.org/restoration-initiative/projects/kenya-arid-and-semi-arid-lands

natural hazards, and other shocks/stressors by building local capacity to plan, budget, implement and monitor resilience investments in a way that promotes collaborative partnerships between communities, and national and county governments. Implemented collaboratively by the national and county governments the programme seeks to build county-level capacity for planning, budgeting, reporting and implementation of local climate actions in partnership with communities, and to strengthen national-level capacity for coordination, monitoring and reporting.

Structured within the FLOCCA programme, Counties are required to develop Climate Change Action Plans (CCAPs). Development of these action plans requires a multistakeholder and participatory process that emphasizes locally-steered adaptation and mitigation measures. It is against this backdrop that the Participatory Climate Risk Assessment (PCRA) was launched and undertaken. The process and outcomes give prominence to climate change effects and solutions that are unique and locally adapted to each of the ten wards in Isiolo County.

1.2 Policy Context

Kenya is a signatory to the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol (KP) and Paris Agreement (PA). Anchored within the Constitution of Kenya (CoK), these commitments are furthered through an elaborate policy and legislative framework as underscored by among others, the Climate Change Act (2016), the National Climate Finance Policy (2018), the Environment Management and Coordination Act (EMCA) 1999, and the Public Finance Management (Climate Change Fund) Regulations (2016) under the Public Finance Management Act (2012). Key provisions within the policy framework are implemented through a labyrinth of plans and strategies including the National Climate Change Action Plan (NCCAP) and the National Climate Change Response Strategy (NCCRS)[4].

With continued support from development partners, national government agencies, CSOs and the private sector, Isiolo County Government has made significant efforts towards domestication of the national climate change national policy framework. This is manifested through the Climate Change Bill, the establishment of the ICCCF, the development of Climate Information Services (CIS) and the creation of critical bodies to champion adaptation and mitigation measures including the County Climate Change Planning Committee (CCCPC) and the Ward Planning Committees (WPCs).

1.3 Purpose of the PCRA Report

To sustainably address the evolving causes and impacts of climate change in Isiolo County commissioned a Participatory Climate Risk Assessment (PCRA). This was in line with the constitutional provision mandating county governments to ensure safe, healthy and clean environments, as well as the commitments of the county government, manifested through the existing policy and legislative framework. The PCRA report provides critical information on the existing climate risks in the county including mapping of their prevalence and effects at the ward level. Additionally, the assessment provides practical recommendations on adaptation and mitigation measures, which inform the climate change action planning process.

[4] https://www.devolutionhub.or.ke/file/73f6a4e5-turkana-county-strategic-environment.pdf

The PCRA provides a much-needed platform for understanding the climate change trends and historical interactions between the community and climate hazards in Isiolo County. Further, the assessment identifies adaptations that have evolved to cope with these hazards, which is a fundamental step in developing practical adaptation and mitigation measures to manage future climate risks (*see figure 1*). The characterization of current climate hazards is also critical towards building setups for future climate-related interventions. It is envisioned that this risk assessments report will enable decision-makers to allocate appropriate resources, within finite budgets, to address the various challenges communities in Isiolo County continue to face. Notably, climate change risks have increased over time, and what might be a small risk in the near term could exemplify devastating impacts in the medium to long term.

Figure 1: Risk Mapping by Community Members in Sericho Ward

The PCRA report is organised into six main sections. The first section provides a discourse on the PCRA context including a background on the county climate dynamics including the policy framework. It also provides a summary of the purpose of the PCRA as well as the methodology and approach. Section provides an analysis of the county climate risk profile including key trends, exposure, differentiated impacts and spatial distribution of risks per ward. Section thee provides a brief overview of future climate scenarios at the national and county level. Section four examines existing adaptation strategies employed by communities and their effectiveness, in addition to areas for improvement. Section five objectively describes key climate strategic action areas for each of the words. Finally, section six provides a brief conclusion on the PCRA process as well as key observations, critical to informing action planning

1.4 Key Steps in the County's PCRA Process

1.4.1 Study Area

The PCRA was conducted in all the 10 wards of Wabera Bulla Pesa Burat Ngaremara Oldonyiro in Isiolo sub-county, Chari and Cherab in Meerti sub-county, and, Garbatulla, Kinna and Sericho in Garbatulla sub-county, Isiolo County. The process commenced with a PCRA stakeholder engagement meeting with the TWG held on the 16th and 17th of May 2023 geared towards appreciation of the process, understanding of the tools and the intended outcomes. The rationale for engaging each of the wards separately is premised on the fact that each of the wards present unique climate change characteristics. This is in reference to the differentiated challenges presented by climate change. Additionally, managing climate risks requires an understanding of historical interactions between society and climate hazards. These include awareness of the local coping mechanisms, community level of vulnerabilities, local attitudes to innovations, and developing community capacity to adopt them.

For this reason, it is fundamental to elaborately understand what is happening at the community level because adaptation is largely site-specific taking into consideration where the greatest vulnerabilities are. The PCRA was therefore critical in providing satisfactory evidence from local communities in Isiolo County to inform climate change planning and identification of adaptation options for ward-level implementation. Among other interrogation areas, the assessment sought to establish how climate variability and change are perceived in each of the wards, the events that have resulted as a result of climate change, the most at-risk groups, and local adaptation and mitigation measures that can be adopted or upscaled

The PCRA process adopted an inclusive and participatory approach. This was with the intent of objectively engaging key stakeholders at the county to the wards. Key stakeholders engaged in the process include cunty government officials drawn from relevant departments, Civil Society Organizations including ActionAid and the Catholic Relief Services (CRS), representatives from national government agencies including the Kenya Meteorological Department (KMD) and the National Drought Management Authority (NDMA).

1.4.2 Data Collection

At the ward level, the PCRA process was carried from the 22nd of May 2023 in each of the wards. It was structured to ensure inclusivity including the identification of key climate change hazards as well as required action areas (*see figure 2*). Key informants were drawn from representatives of Ward Planning Committee (WPCs), village elders, women group representatives, church leaders, grazing committees, county representatives, and the representatives of the provisional administration. In summary the PCRA process was executed in 7 subsequent phases. These include;

Figure 2: Ward-level PCRA Process in Garbatulla Ward

1. ***Literature review.*** Based on the objectives outlined above, a comprehensive desk-based review was undertaken focusing on scientific literature and studies, existing scientific data, and policy documents to establish the context for the PCRA and to determine further information needs. The review cut across various climate change components including global commitments and good practices, the policy and legislative framework at the national and county level and key agendas of the county in light of climate change adaptation and mitigation.
2. ***Stakeholder mapping***. This ensured the deliberate inclusivity of critical stakeholders and informed the formulation of a Technical Working Group (TWG) to undertake the PCRA.

3. ***Formulation of the TWG.*** Membership of the TWG constituted of relevant actors critical towards guiding the process including ensuring ownership of the PCRA, coordinating the reporting process, and providing an anchor for quality control.
4. ***Stakeholder workshop***. The stakeholder workshop was held with the TWG. This was with the intent of ensuring a common understanding of the PCRA context including the climate change outlook nationally and in Isiolo County. It also provided grounds for training of the TWG on the PCRA data collection and analysis process including familiarization with the data collection tools. The workshop also provided suitable grounds for learning in addition to the clarification of key issues such as logistics and anticipated challenges.
5. ***Data collection.*** The descriptive research design was used for the study and purposive sampling was used to select community representatives through the WPCs in each of the 10 wards. The TWG worked hand in hand with the WPCs to purposefully identify key participants of the PCRA disaggregated by age, and gender while mainstreaming key cross-cutting issues including the inclusion of PWDs. A sample of 40 participants was drawn from each ward. Data was collected using a community climate change adaptation assessment toolkit that encompasses; a resource map/ hazard map, historical timeline, seasonal calendar, vulnerability assessment and problem ranking tool, Venn diagram, and resource matrix analysis.
6. ***Data analysis and reporting***. Data analysis was undertaken at three significant levels. The first was at the community level which entailed joint hazard mapping including identifying key vulnerabilities as well as feasible local solutions. In the second stage, the TWG members were tasked with analyzing of data emerging from each of the wards and generating ward-level PCRA reports. In the third stage, the consultants reviewed the PCRA reports to determine the reflection of community climate change concerns, needs and priorities. These reports have been reviewed and consolidated to form the Isiolo County PCRA report.
7. ***Stakeholder validation workshop.*** The validation workshop was held on the 30th of May 2023 with the purpose of authenticating the PCRA findings, conclusions, and recommendations. More critically, the validation process provided needed space for interrogating proposed action areas and determining their fit in light of the climate change context at each of the wards. The list of participants is annexed herein.

2. Isiolo County Climate Hazard Profile

2.1 Current and Historical Climate Hazards and Trends

Isiolo County is one of the most vulnerable counties to climate change in Kenya. The county has a generally hot and dry climate throughout the year. Most of the county has mean annual temperatures greater than 25°C. The mean annual temperatures in the western extremities do fall to as low as 21°C with variations in some places as a result of altitude. to altitude. The southeastern parts of the county receive a mean annual rainfall of below 250mm per year, and the central areas between 250mm and 500mm per year[5].

The key climate hazards encompass drought and unpredictable rainfall, floods, the spread of water-borne diseases, conflict among the agro-pastoralists and the pastoralists, wildlife-farmers conflict, loss of forests and wetland ecosystems, land degradation, desertification and scarcity of portable water. The resulting effects of these hazards have significantly affected the social and economic wellness of the communities in the county. Some of these negative effects include reduced crop yield, low livestock productivity, high livestock mortality, loss of income for farmers, famine and malnutrition.

2.2 Exposure and Vulnerability Profiles of the County

Figure 3: Community Members Mapping Resources in Kinna Ward

Vulnerabilities to climate change in the county vary from one ward to another. The assessment however established that there are vulnerabilities that cut across the entire county. The tipping point however points to drought and resource-based competition over already scarce resources. It was also observed that each ward has some unique characteristics defined in terms of available and vulnerable resources (*see figure 3)*, the periodic transitions linked to climate change, and hence the variance in adaptation and mitigation measures.

Generally, the impacts of climate change have affected all the communities in Isiolo County. The degree of exposure however varies in relation to gender, available resources in each world, and economic factors which influence access to water sources and other key resources such as pasture. Women, children, and the elderly were identified to be the most at-risk group to the effects of climate change. Women were more exposed since they travel long distances in search of water for domestic use making them vulnerable to various forms of abuse including Gender Based Violence and rape.

[5] MoALF. 2017. Climate Risk Profile for Isiolo County. Kenya County Climate Risk Profile Series. The Ministry of Agriculture, Livestock and Fisheries (MoALF), Nairobi, Kenya

They also spent time attending to any sick members of their families further exposing them to diseases in case of contagious diseases such as cholera.

Children are more exposed to malnutrition as a result of food insecurity in most parts of the county. School-going children are also greatly affected with notable cases of high school dropouts during the dry season as they are compelled to accompany women in the search for water. The elderly were found to be significantly affected by climate change effects due to low immunity levels and hence prone to climate change-induced diseases as well as their inability to fend for themselves.

2.2.1 Ward Exposure and Vulnerability Profiles

Acknowledging the variance in the hazard contexts for each ward, it is important to understand the climate change dynamics towards informing ward-specific interventions. This is because different communities have diverse understanding of the climate change context including local solutions that have been adopted over time and their effectiveness.

1. **Cherab Ward**

> "The long droughts have caused the depletion of pastures leading to loss of livestock and drying up of

Community members in the Ward identified that climate transitions have been observed over the last 30 years. Significantly, the frequency and intensity of drought has increased. The occurrence of drought after four years has now increased to an annual concern. Additionally, invasive plant species and majorly, *Prosopis Juliflora* has become increasingly prevalent invading homesteads and reducing grazing areas. The thick bushes of the plant species also provide breeding grounds for sand flies which transmit livestock diseases.

The most devastating impact of climate hazards has been the loss of livestock due to drought. This has emaciated the socioeconomic status of the community considering that they are predominantly pastoralists. In addition to this, the scarcity of water and pasture has exacerbated resource-based conflicts which often lead to injuries and at times, death of members of the community. In addition, the scarcity of water and pasture greatly trivializes already existing differences between communities which rapidly escalates into resource-based conflict.

2. **Chari Ward**

> The main climate hazards affecting our community include, drought and famine, resource-based conflict leading to loss of lives and livelihood, prevalence of diseases both human and animal, water

Chari ward has an immense concentration of resources including but not limited to the vast land, health facilities, schools, ward offices, rangeland, water points, rivers, natural forest coverage, conservancy area, wildlife, hills and plateaus, and minerals including gold and other precious stones.

In spite of the resource richness, the community has in the last three decades witnessed increasing impacts of climate change. These are characterized by the persistent and perennial occurrence of drought, reduced rains and

variation in rainfall patterns, reduction in the number of livestock, shrinking forest cover, the prevalence of animal and human diseases, the reduced water level in the rivers, drying up of wells and reduced pasture.

There is a clear trend of climate change based on the community's historical timeline. In particular, community members identified that the rainfall patterns have been completely interfered with hence the increased frequency of drought and other related hazards. Using the seasonal calendar, community members were able to describe key hazards over time as illustrated in Figure 4 below.

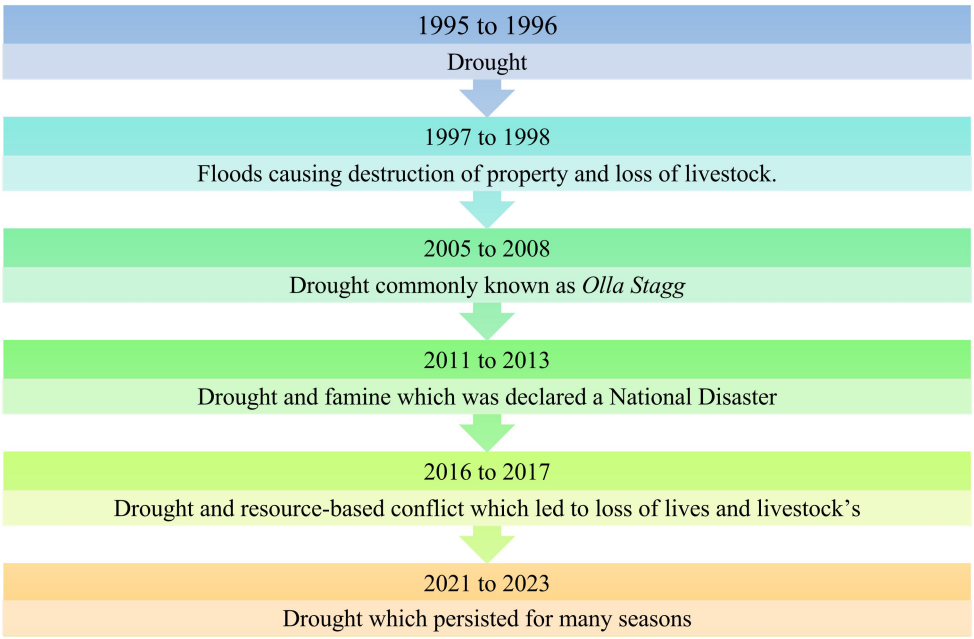

Figure 4: Chari Ward Climate Risk Historical Timeline

The challenges faced by the community have proportionately morphed with the increasing frequency of the effects of the impacts of climate change. Community members in the ward decried increased vulnerabilities in the form of high malnutrition rates for children under the age of 5 years, diminished immunity, increased susceptibility to diseases, loss of livelihoods, low economic productivity, heightened cases of resource-based conflict which greatly affects women, children, the elderly and PwDs, low access to water, increased time spent in search of water and pasture other than other economic activities, high school dropout rates, in turn, contributing to high illiteracy levels, and continued overdependence on relief aid

3. Oldonyiro

The ward has an assembly of fundamental resources that define the socioeconomic wellness of the community. These include rivers, health facilities, roads, hills, water kiosks, sand dams, bushlands, livestock, dams, GSU Camp, police posts, and churches. Similar to other wards, Oldonyiro is constantly prone to the effect of climate change in the form of protracted drought periods, an increase of invasive plant species, and in particular, *Acacia reficiens,* water scarcity, malnutrition, land degradation, soil erosion, loss of biodiversity, resource-based conflict, poor infrastructure, and human-wildlife conflict in significant elephant corridors and shrublands. Out of these, members of the community ranked drought, land degradation, poverty, invasive species, and poor roads to be the major challenges in that order.

Communities are cognisant of the climate change trends in the ward over the last twenty years. Of significance, there are now protracted drought periods, rains have become increasingly unpredictable and hence the occurrence of flash floods and gulley erosion, communities have witnessed the infestation of locusts, the once prominent wild fruits and medicinal plants are scarcely available, the rich vegetation has now been replaced by invasive plant species, the Ewaso Ng'iro River is becoming seasonal with greatly reduced volumes of water in River Looseket and Lobur, there has been an influx of pets and diseases affecting both crops and livestock and resource-based conflicts are more pronounced.

To further spotlight the climate change transitions, the community members identified climate change-triggered occurrences in the ward as summarised in Table 1 below.

Table 1: Oldonyiro Ward Climate Risk Historical Timeline

Duration	Event	Negative Effects
1984-1986	Drought	• High school dropout rates • Limited access to livelihoods and increased poverty • Migration • Desertification • Water scarcity • Resource-based conflict
1986-1989	Disease outbreak - E.C. F	• Loss of livestock • Poverty • Urban migration
1989-1990	The rain season, Circumcision of Moran (Lmooli age-set)	• Increased school dropout rates by Morans to perform their cultural ritual
1986-2000	Elnino	• Outbreak of diseases • High school dropout rates • Loss of livestock attributable to subsequent floods
1990-1992	Prolonged drought (*riai e ngano*) Resource-based Conflicts	• Loss of lives by community members • Community displacement • Death of livestock • Livestock disease outbreak spreading to Samburu/Laikipia highlands
1996 - 1997	Drought The resource-based conflict between Samburu and Somali communities	• Death of animals • Prevalence of invasive plant species • Loss of lives in masses • Destruction of property • Proliferation of illegal firearms
1997-1998	Elnino	• Flash floods • Increased prevalence of livestock diseases, specifically, the Rift Valley fever and pests such as the narrow bee fly. • Outbreak of water-borne diseases and especially cholera • Death of livestock
2000-2002	Famine	• Poor health among community members and malnutrition • Loss of lives

		• Death of livestock • Resource-based conflict • Migration • Diseases
2006-2009	The resource-based conflict between Samburu and Pokot communities Drought	• Loss of lives • Destruction of property • Loss of livestock • Migration
2005-2013	Creation of more locations (Oldonyiro,Kipsing, Longopito, and Lenguruma)	• Reduced incidences of resource-based conflicts owing to the use of arbitration for dispute resolution by chiefs
2010-2013	Introduction of title deeds (individual lands) to the communal land	• Land grabbing by individuals • Land degradation due to uncontrolled human activities/development
2020-2023	Forests cleared for cultivation of agricultural crops Covid 19 pandemic Locust invasion	• Reduced grazing land • Human-wildlife conflict • Loss of lives owing to Covid 19 and accelerated by poor WASH practices and water scarcity • Loss of pasture due to the locust invasion • Loss of livestock

4. Burat Ward

The communities in Burat Ward are mainly nomadic pastoralists coupled with subsistence crop farming, and to some extent, mining, particularly sand harvesting. This is in addition to traces of charcoal burning. Notably, communities in the ward predominantly source water from the seasonal rivers and streams. Given this context, community members identified that the most vulnerable resources in the ward include water, livestock, minerals (specifically, sand), rangelands, livestock pasture, and the livestock market.

Drought was found to have the most significant impact on all the critical resources in the ward. Key effects of drought were established to encompass; the drying of water sources and livestock pasture resulting in the death of livestock. Prolonged periods of drought are a major driver of resource-based conflict in the ward. In addition, water scarcity has impaired the communities' capacity to engage in subsistence farming as they can barely meet the domestic water[6] supply needs. As a result, members of the community have been left with limited options to meet their daily needs. This has occasioned engagement in the unstainable economic practices of sand mining and charcoal burning which has greatly affected the ecosystem in the ward.

The community in Burat indicated they had witnessed significant changes in weather patterns over the last 30 years. These changes have had a significant bearing on the environment in addition to critical socioeconomic dynamics in the ward. In the 1980s drought was experienced after four years, and yet its severity then cannot be matched to the current situation. The frequency of drought gradually increased to 2-3 times in the 1990s,

[6] Domestic water in this case refers to water used for cooking, cleaning, and drinking

approximately twice between 2000-2010 and by 2020, drought had become a yearly occurrence. An analysis of these trends is illustrated Table 2 below.

Table 2: Burat Ward Climate Risk Historical Timeline

Duration	Event	Effects
1980 - 1985	Severe drought	• Death of livestock • Loss of human life • Food scarcity and malnutrition especially among infants • Increased cases of GBV and family breakups • High mortality rates • Outbreak of both livestock and human diseases, specifically, cholera
1997 1998	El Nino	• Death of livestock • Loss of human life • Destruction of property and farm crops as a result of the floods • Disease outbreak
2000 - 2002	The Famous Mlango War	• Loss of human life • Loss of livestock • Destruction of properties characterized by the burning of houses • Economic disruptions and especially trade • Forced closure of schools which affected learning
2004 - 2005	Severe drought (commonly referred to as (*olla stagg*)	• Death of livestock • Loss of livelihoods • Food and water scarcity • Resource-based conflict
2010 -2011	Drought Outbreak of cholera	• Loss of lives both owing to the drought and cholera • Death of livestock • Distorted livelihoods
2017	Drought Resource-based conflict	• Displacement of members of the community • Destruction of property • Loss of livestock
2019 - 2021	Locust infestation Corona Drought	• Closure of schools • Loss of employment and income sources • Immobility owing to the curfew • Loss of lives • Resource-based conflict
2022	Resource-based conflict	• Loss of livestock • Destruction of property • Loss of lives

5. Bulapesa Ward

The Ward is home to immense vital resources including the Isiolo River, boreholes, medical facilities, primary and secondary schools, religious institutions (churches and mosques), livestock, minerals, road networks, security lights, markets, and significantly, the Red Cross office which is critical in responding to emergency situations in the ward.

Similar to other wards, Bulapesa is buffeted by several effects of climate change. Communities identified the loss of lives and livestock due to floods, drought, and resource-based conflict as the key impacts of climate change. The occurrence of floods in the wards is mainly accelerated by the poor drainage systems, and deforestation with the latter resulting in soil erosion and destruction of settlements, roads, and bridges. The loss of livestock continues to be a major challenge that results from both floods and drought. Floods are also associated with the prevalent spread of water-borne diseases, in particular, cholera. Drought remains to be the major cause of resource-based conflicts as communities compete for the hardly available resources including grazing lands. The assessment also determines that prolonged drought periods were a major contributor to malnutrition especially among children below the age of 5 years. the distribution of resources and climate hazards is illustrated in Figure 5 below.

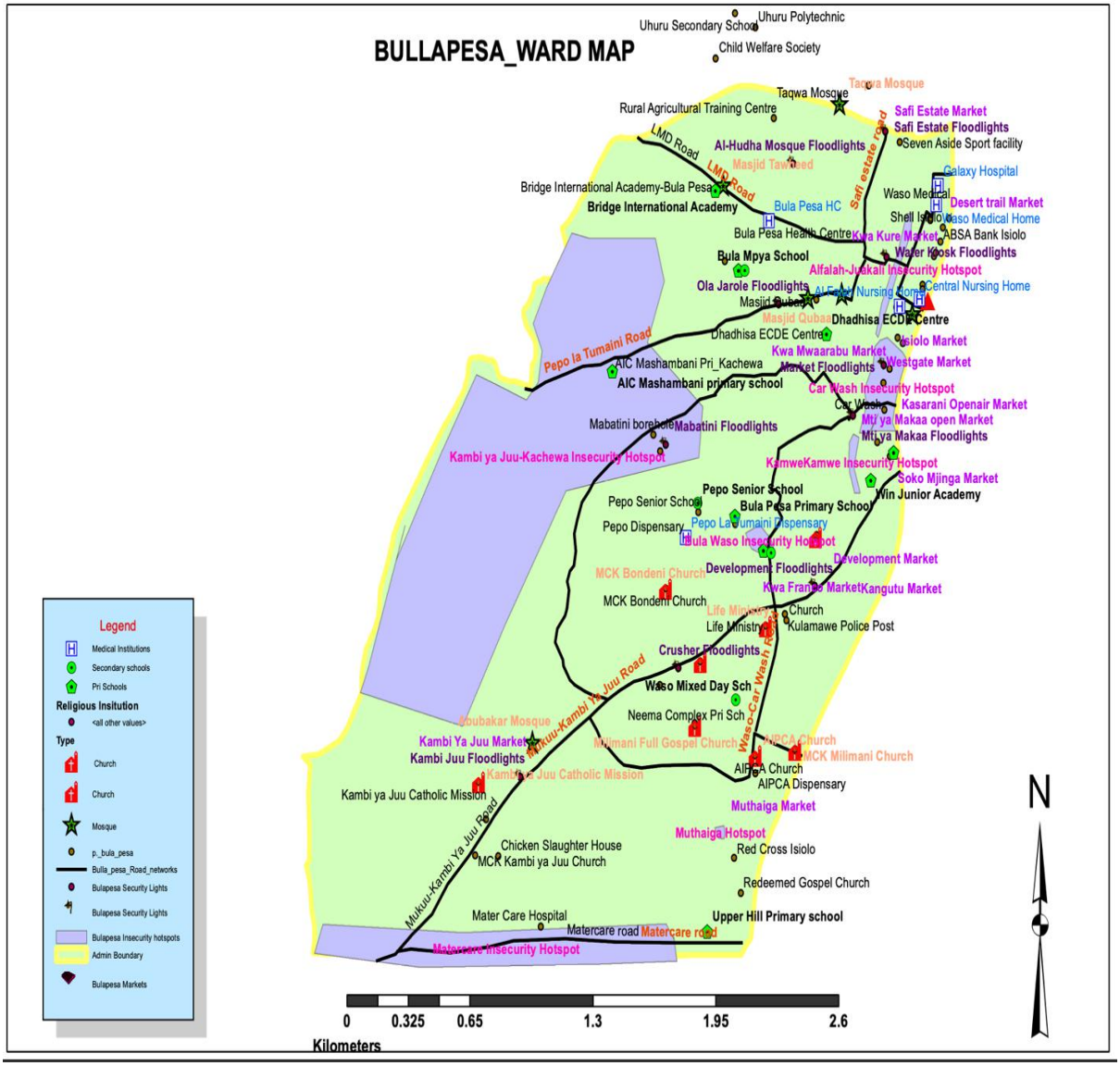

Figure 5: Map of Bulapesa Ward showing resources and hazards

The Bulapesa Seasonal Calendar reveals several key patterns and activities that occur throughout the year. For instance, from January to March, multiple events take place including formulating a grazing plan, livestock vaccination, and preparation of bee hives. Business activities during this time are not vibrant. From June to September, communities focus on the close care of young livestock, livestock breeding, and vaccination. It was noted that there is a decline in livestock populations attributable to the conducive climate for livestock trade. To avert the adverse effects of climate change, communities indicated that livestock trade is prevalent in the months of January, May, September, and December. Bee hives preparation is also common in January and February, with installation taking place in May during the flowering season. Communities also exemplified an elaborate understanding of the climate change history over the last three decades. This is presented in Table 3 below.

Table 3: Bulapesa Ward Climate Risk Historical Timeline

Duration	Event	Effects
1980 - 1984	Drought	• Food scarcity and malnutrition especially among children below the age of 5 years

		• Death of livestock • Loss of lives • Human-Wildlife conflict • Resource-based conflict • Loss of livelihood
1997 1998	El Nino	• Destruction of property including settlements and farm crops • Outbreak of waterborne diseases • Loss of lives • Soil erosion including the formation of deep gullies • Death of livestock
1997	The Shifa War	• Massive loss of human lives • Loss of property including livestock • Disruption of socio-economic activities • Violation of women rights including GBV and cases of rape
2010 - 2011	Post-Election Violence	• Displacement of some members of the community • Increased cases of insecurity, further escalating existing tension between communities
2019	Corona Virus	• Loss of lives • Limited livelihoods sources • High cost of living • Interruption of economic activities • Closure of schools

6. Kinna Ward

The Ward is well endowed with various resources that are critical for the social and economic development of communities. It is expansive and has various water sources including rivers, water pans, and boreholes. Other critical resources include game reserves, wildlife minerals including precious stones and gum resin, construction sand, livestock, infrastructure including roads, schools and hospitals, farmland, and rangelands. The ward is also strategically located within the Lapset corridor.

Communities in the ward continue to bear the burden of climate change. Some of the key impacts that members of the community identified include drought which has been frequent, leading to the death of livestock, resource-based conflict, migration of community members, increased school dropout rates, and in severe cases, closure of schools. Malnutrition of children under five and health complications among pregnant and lactating mothers due to food scarcity was also identified to be key challenges. Out of the assets identified, land, livestock, infrastructure, water sources, and the environment were found to be the most climate-fragile. Justifiably, there has been an increase in overgrazing and deforestation leading to land degradation and loss of vegetation cover. The loss of livestock has been recurrent and greatly pronounced, especially during the dry seasons. The road infrastructure is now in a dilapidated state owing to floods and poor drainage systems. Sources of water and especially wells and rivers dry up during drought and most water pans have been destroyed by

the floods. Crop production has become an expensive affair owing to the periodic destruction of crops by floods and drought, erosion of fertile soils and the high cost of farm inputs.

The assessment also unearthed that there have been changes in the seasonal weather patterns leading to unpredictable rainfall patterns, and this impairs the decision-making capacity of communities practicing crop farming. Additionally, the sporadic heavy rainfalls have from time to time caused floods which in turn have detrimental physical, psychosocial, and economic impacts including the destruction of property. Notably, there has been significant interference with the ecosystem through deforestation and the burning of charcoal. The PCRA also identified that communities have a wealth of knowledge concerning climate patterns over time and the implications they have had. These are illustrated in Figure 6 below.

1980	•Drought (*Ola Dhadi*)
1983	•Short rains
1984	•Severe Drought
1984	•Heavy rains (*Hagay*)
1994	•Livestock Disease outbreak (*Tite Gurach*)
1996	•Floods (O*la Bisan Dhimo*)
1997	•Elnino
2007-2018	•Drought
2019	•Heavy rains •Covid 19
2020	•Drought
2021	•Locust invasion
2022	•Drought

Figure 6: Kinna Ward Climate Risk Historical Timeline

7. Wabera Ward

Wabera ward constitutes of both urban and peri-urban areas. It hubs a range of resources including water sources such as boreholes and the Ewaso Ng'iro River, community grazing land, livestock, agricultural productive land, infrastructure including health facilities schools, and roads, religious institutions including mosques and churches, fuel stations, government offices including the Isiolo County Government headquarter offices and the Isiolo International Airport.

In spite of its positioning communities felt that the ward is prone to disquieting climate change effects that exacerbate already existing challenges such as pollution and drug abuse. The assessment established that drought and floods were serious impacts that result in the loss of livestock as well as the livelihoods of communities. In particular, floods are a major contributor to the destruction of property. Additionally, the ward is greatly affected by land

degradation and desertification due to unsustainable land use practices attributable to the increasing urban population and uncontrolled development.

In a similar case to wards within the rural setting, Wabera has been a victim of invasive plant species such as *Prosopis Julliflora* which renders the limited arable land unusable. Again, the ward is prone to resource-based conflicts arising from unresolved boundary disputes between Isiolo County and other neighbouring counties. These disputes greatly escalate during the dry seasons as competition for limited resources heightens. The road infrastructure in the ward is in a wanting state and movement is further curtailed by the sporadic occurrence of floods.

It was noted that as a result of the loss of livelihoods, a rural-to-urban exodus has ensued, especially among the youth in the pursuit of jobs. However, these has had very retrogressive effects including rampant drug abuse, the prevalence of infectious diseases such as HIV/AIDS, and increased rates of crime including the surge of rape cases. In the peri-urban areas, communities reported cases of cattle rustling and resource-based conflicts.

The community in Wabera is very much aware of the climatic variations that have occurred over the last 30 years. Summatively, some of these changes include increased temperatures, irregular rainfall patterns, increased frequency of drought and prolonged dry spells, declining water levels in the rivers that traverse the wards including the Isiolo River, increased prevalence of pests and diseases affecting crops and livestock, and even wildlife. This is better illustrated by the climate change historical timeline of the ward as illustrated in Table 4 below.

Table 4: Wabera Ward Climate Risk Historical Timeline

Duration	Activity	Effects
1983-1984	Severe drought (commonly referred to as *ola-elas* in borana)	• Death of livestock and humans • Shortage of food leading to poor health and increased cases of acute malnutrition • Resource-based conflicts especially at the border of Isiolo and other counties
1997-1998	El-Nino	• Destruction of key infrastructure including roads and property. • Outbreak of diseases, specifically cholera • Soil erosion • Loss of lives • Diseases • Distorted livelihoods and interruption of key economic activities such as trade
1999-2000	Tribal conflict (*hadi-mlango)*	• Loss of lives • Destruction and loss of property • Displacement of people • Dissolution of families as a result of mistrust and displacement • Proliferation of illegal firearms
2005	Isiolo land balloting	• Displacement of the poor, indigenous

	system	communities
2006	Urban sprawl especially among the youth leading to HIV/ADS prevalence	• Loss of lives • Affected livelihoods
2014	Resettlement of Internally Displaced Persons (IDPs)	• Management of resource-based conflicts through arbitration
2019-2021	Covid -19	• Loss of lives • Distortion of the economy thus affecting livelihoods • Closure of schools
2021	Locust invasion	• Loss of pasture • Destruction of farm crops • Increased food insecurity • Low agricultural productivity
2022	Severe drought	• Death of livestock • Insecurity including cases of resource-based conflict • Influx of both human and animal diseases • High food insecurity

8. Garbatulla ward

Garbatulla is majorly inhabited by pastoral communities estimated at 70% of the population, and the rest are small-scale farmers inhabiting the area along the Ewaso Ng'iro River. The Ward is vast and consisting of an array of resources including grazing land, raisin and Gum Arabic, minerals, livestock, construction sand, water sources consisting of rivers and boreholes, edible wild fruits, a hill terrain with a spread of flora and fauna that provide aesthetic value, medicinal plants, conservancies and natural honey. The main economic activity is pastoralism, agro-pastoralism to a small and extent and traces of sand harvesting which is mostly undertaken by the youth.

Like other wards in Isiolo County, Grabatulla faces immense climate-related challenges. Communities indicated that there have been significant changes in the last three decades characterised by the persistent and perennial occurrence of drought, reduced rains and extreme variations in rainfall patterns, reduced livestock population as a result of drought, diminished forest cover attributable to rampant charcoal burning, outbreak of both human and livestock diseases, reduced water levels at the rivers and boreholes, and in some cases drying up of wells, and of greatest detriment, scarcity of pasture. In addition to these, members of the community decried other challenges including the lack of organized livestock marketing system, recurrent resource- driven conflict incidences, poor management of rangelands, spread of invasive plant species, poor infrastructure and migration communities to the ward, and high poverty levels.

These climate change impacts have had overwhelming effects on the social and economic wellness of the community. These are manifested through the loss of human lives as a result of conflict, loss of livelihoods, accelerated poverty, malnutrition especially amongst infants

and at times infant mortality, food scarcity, acute shortage of pasture, closure of schools as a result of drought, and outbreak of both human and livestock diseases. The assessment also established while some of these effects have been recurrent the intensity has increased over time. An illustration of historical climate trends is provide in Table 5 below.

Table 5: Garbatulla Ward Climate Risk Historical Timeline

c	Climatic Events	Effects
1957	Severe Drought	• Unprecedented loss of livestock • Loss of lives • Prevalent cases of malnutrition among infants
1984	Drought and Famine commonly known as *Olla Yellow maize*	• Resource-based conflicts due to heightened competition for water and pasture • Loss of livestock • Prevalence of livestock diseases • Increase in malnutrition cases among under 5 years children
1997	Floods	• Destruction of community property including settlements • Displacement as community members sought safer grounds • Emergence of livestock diseases such as ECF which caused widespread loss of livestock • Distortion of livelihoods • Outbreak of cholera and widespread cases of malaria
2005	Drought	• Resource-based conflict resulting from scarcity of water and pasture • Death of livestock • Cases of malnutrition especially among children under the age of 5 • Poor health particularly among women and the elderly
2011 to 2013	Drought and Famine which was declared a National Disaster	• Infant mortality owing to food scarcity and inability of households to access relief food in time • Death of animals • Widespread cases of malnutrition • Loss of livelihoods as a result of overdependence on livestock production
2016 to 2017	Drought and Insecurity	• Resource-based conflict especially within the ward borderlines. • Proliferation of illegal firearms • Loss of livestock both as a result of death and cattle rustling • Loss of lives due to the intense conflict • Displacement of community members as a result of the conflicts

2021 to 2023	Drought which persisted for many seasons	• Acute malnutrition majorly affecting young children • Loss of livestock • Migration of communities in pursuit of pasture and water • Closure of schools due to food scarcity. Food acts as a major incentive for improved attendance and retention rates

9. Sericho Ward

Sericho ward houses an array of resources which are critical for their development. Key among these include rivers, health facilities, roads, water sources, sand dams, grazing lands, livestock, dams, and minerals. The assessment observed that management of productive resources is largely aligned disaggregated with women having limited ownership of significant resources such as land.

Communities identified that there have been significant climate related changes over the last 30 years. Key climate related impacts in the ward include drought, which has had devastating effects on the livelihoods of communities, land degradation due to unsustainable land use practices such as overgrazing, sand harvesting and charcoal burning, uncontrolled spread of invasive species such as *prosopis juliflora* which compete with useful natural cover, resource-based conflicts, increased temperature, irregular rainfall patterns, declining water levels in rivers and the drying up of wells, increased prevalence of pests and diseases affecting crop and livestock production. Beyond these, communities evidenced an ingrained understanding of the key trends attributable to climate change effects over time. These are summarized in Table 6 below

Table 6: Sericho Ward Climate Risk Historical Timeline

Year	Activity	Effects
1984	• Drought	• Death of livestock • Migration • Water scarcity • Distorted livestock market • poor market for • Prevalence of livestock diseases
1985	• Livestock skin disease outbreak (Locally known as *kurtu bale*)	• Death of livestock • Distorted livelihoods
1986	• Heavy rains	• Prevalence of livestock diseases
1988	• Resource-based conflict	• Loss of lives • Destruction of property • Loss of livestock • Distorted livelihoods

1991	• Drought	• Outbreak of livestock diseases • Distorted livestock market • Death of livestock • Migration • Acute malnutrition
1993	• Resource-based conflict	• Loss of lives • Destruction of property • Loss of livestock
1994	• Resource-based conflict between Somalis and Borana	• Loss of lives • Loss of livestock • Migration to safe areas • Wide-scale destruction of property
1996	• Drought (locally referred to as olla • bisan dimo)	• Death of animals • Distorted livelihoods and increased poverty • Malnutrition
1997	• Elnino • Rift valley fever	• Death of livestock especially goats and sheep • Human-wildlife conflict • Damage of infrastructure including roads • Destruction of property including settlements • Uncontrolled spread of invasive plant species • Loss of lives
2001-2022	• Prolonged drought • Cholera outbreak • Covid 19 pandemic • Locust Invasion	• Unprecedented death of livestock • Forced migration • Loss of lives • Resource-based conflict as a result of high completion for resources due to drought • Forced migration • Outbreak of livestock diseases • Infant mortality as a result of chorea • Loss of pasture-

10. Ngaremara Ward

Ngaremara is strategically located along the Ewaso Ng'iro River and is home to various resources that contribute to the socioeconomic development of the community as well as preservation of the ecosystem. Some of the key resources found in the ward include grazing lands, livestock, various forms of infrastructure including roads, religious institutions, health

centers and houses, water sources including rivers and boreholes, schools, farm crops, hilly terrains with a plethora of flora and fauna, parks and dams. According to the community, the most critical resources constitute of grazing lands, water sources, livestock and crop farms including kitchen gardens.

These immense resources are however continuously threatened by the impacts of climate change. The assessment established that communities are particular about the climate transitions that have manifested over the last three decades. Some of the notable changes include increased temperature, irregular rainfall patterns, frequent droughts and prolonged dry spells, declining water levels in the rivers, and increased prevalence of diseases and pests such as locusts that affect crop, livestock and wildlifee.

In addition to these community members an escalation of land degradation due to unsustainable land use practices such as as overgrazing, sand harvesting and charcoal burning, prevalence of invasive species such as *prosopis juliflora* which compete with native plants species and harms environment and resource-based conflicts caused by cattle rustling and scarce resources such as pasture and water. The community was also able to trace the evolving nature of climate impacts. These are illustrated in Table 7 below.

Table 7: Ngaremara Ward Climate Risk Historical Timeline

c	Climatic Events	Effects
2009	Severe Drought	• Migration in search of pasture • Resource-based conflicts • Loss and death of livestock • Loss of lives • Human-Wildlife conflict • Poaching • Prevalent cases of malnutrition among infants
2011	Severe drought and livestock diseases	• Loss of livestock • Resource-based conflicts due to heightened competition for water and pasture • Acute malnutrition cases among under 5 years children
2015	Drought	• Resource-based conflict • Loss of lives • Destruction and loss of property including livestock • Death of livestock • Cases of malnutrition • Poor health particularly among pregnant and lactating women • Inreased rates of school dropout
2017	Drought	• Resource-based conflict specifically between the Samburu and Turkan communities • Loss of livestock • Increased human-wildlife conflict • Displacement of community members

2018	Floods	• Loss of livestock • Destruction of property including homesteads and crop farms • Prevalence of waterborne diseases, notable cholera • Increased livestock diseases
2019 to 2022	Drought Covid 19	• Food scarcity leading to poor health and malnutrition • Massive loss of livestock • Migration of communities in pursuit of pasture and water • Closure of schools due to food scarcity. • Limited movement which curtailed the pursuit of alternative source of income

2.3 Differentiated Impacts of Climate Trends and Risks

Generally, the impacts of climate change bear heavily on women and children. This is because they are the most reliant on water for domestic use as well as the concerns of health and hygiene. In particular, the assessment identified that women are more exposed to floods. This is because in most cases, they are first to experience the effects of the natural catastrophe in addition to the responsibility of managing the crisis by ensuring food access and taking care of the vulnerable including children and the elderly. The same roles apply in times of drought. In spite of this overview of the differentiated impacts, each ward in the county presents unique features in relation to at-risk groups. These have been discussed in Table 6 below

Table 8: Differentiated Impact of Climate Trends and Risks

Ward		Most At-Risk Groups
1	**Cherab**	The elderly, women, and children are the most affected by the effects of climate change as men move to look for pasture for their livestock. Women carry the major burden of taking care of their households including fetching water and promoting good hygiene practices. They have to walk at time for over 5km in search of water which makes them vulnerable to both physical and emotional abuse. Children especially infants are prone to various vulnerabilities including waterborne diseases and malaria during the rainy seasons. The elderly are at great risk of malnutrition and other illnesses as a result of reduced immunity levels.
2	**Chari**	The effects of the impacts of climate change including drought have contributed to several significant challenges that the community believes should be given key priority. These include; the loss of livelihood and hence increased poverty, loss of human life due to resource-based conflict resources, food scarcity and malnutrition, human and animal disease outbreaks, and reduced pasture for grazing animals. These challenges affect community members disproportionately with the most affected groups constituting of children under the age of 5, pregnant

		and lactating mothers, the elderly, and PwDS. These groups are most at-risk because of their proclivity to contract diseases as well as their high dependence on livestock products such as milk for health and nutrition.
3	**Oldonyiro**	Generally, the effects of climate change are felt by all members of the community irrespective of whether they are pastoralists in entirety or agro-pastoralists. This is because of the high dependence on rain-fed economic practices. Communities face challenges accessing water, pasture, and veterinary services due to limited infrastructure and resources. While this is the case, the communities identified that women, girls, children, and the elderly are most susceptible to the effects of climate change either directly or indirectly. Women and girls, bear the burden of running their households including fetching water. Navigating over long distances makes them vulnerable to various forms of abuse including rape, Gender Based Violence (GBV), and discrimination. This is common during the dry seasons. Pregnant and lactating mothers even face greater challenges given the limited ability to attend to their daily chores and the need for eased access to water and nutrition. Infants are particularly vulnerable to malnutrition and diseases that are catalysed by climate variations. The elderly are also highly vulnerable to the risk of flash floods as well as disease outbreaks. This is in addition to emaciation, especially during the dry seasons.
4	**Burat**	The occurrence of drought has disproportionately affected members of the community in the ward leading to distracted livelihoods, loss of lives, death of livestock, increased cost of production both for farm crops and livestock, the outbreak of diseases, and heightened resource-based conflicts as a result of communities competing for meager resources. Notwithstanding, these climate change effects have to a greater extent affected the elderly, children, and women. The assessment determined that culturally, men leave their homesteads under the care of their spouses as they migrate to look for pasture. Subsequently, women are expected to take care of their homesteads regardless of their vulnerability to various forms of abuse. Further, it was observed that the absence of men creates ground for promiscuity, which often leads to GBV and shuttering of relationships.
5	**Bulapesa**	Bulapesa ward is occupied by both pastoralists and agro-pastoralists who are equally affected given reliance on rain-fed agricultural practices. As such they are highly vulnerable to drought, floods, and other climate hazards. They also face challenges accessing water, pasture, and veterinary services due to limited infrastructure and resources. The most at-risk groups however constitute of women, children and the elderly. Women and girls are often responsible for fetching water and

		firewood which increases the risk of abuse including GBV and discrimination, common during drought. Discrimination in light of access to education and health services heightens their vulnerability to climate change impacts. Children are greatly susceptible to malnutrition, especially during the dry season. This is in addition to waterborne diseases, and other climate-related illnesses. The elderly are highly vulnerable to the effects of drought and floods, again owing to their fragility and low immunity to waterborne and climate hazards.
6	**Kinna**	Exposure and vulnerability to climate hazards cuts across the ward. However, children, women, the elderly, and PWDs suffer most from the effects of climate change. Members of the community expressed that children under the age of 5 years are vulnerable to various ailments that occur during the dry and rainy seasons. In particular, they are vulnerable to communicable diseases in addition to malnutrition. The elderly and especially those above the age of 60 years hardly get sufficient food during drought. This is in addition to the fact that their immunity is low and they largely depend on members of their households to take care of them. Pregnant and lactating women are in constant need of food, and in particular, balanced diets. Climate variations have however made it difficult to sustain their nutritional needs which often leads to health complications and at times loss of life. Widowed mothers as well find it difficult to meet the needs of their families during the dry seasons as they have split responsibilities. The assessment also established that PwDs are also vulnerable because they can barely meet their own needs let alone handle climate change-related challenges such as drought, floods, and conflicts.
7	**Wabera**	Wabera ward presents unique characteristics considering its socioeconomic bearing. The effects of climate change however were observed to have a ripple effect on various groups within the community and thus affect them differently, both in the urban and peri-urban areas. In the peri-urban areas, these impacts have mainly affected pastoralists and agro-pastoralists since they are highly dependent on rainfall for their livelihoods. As such climate hazards such as drought and floods have devastating effects. Out of these groups, children, women, girls, the elderly, and the youth were identified as the most vulnerable groups. Women and girls have limited ownership and control of significant resources. In urban areas for instance, the majority of women and girls are economically handicapped and can barely access basic services such as water. As a result, they fall prey to various forms of abuse including GBV and prostitution. In the peri-urban areas, women and girls bear the burden of taking care of their families including fetching water. This also makes them vulnerable to abuse including reported cases of rape, dissolution of families as a result of

		infidelity and discrimination especially in times of drought and other climate-induced hazards. Children both in urban and peri-urban areas are particularly vulnerable to malnutrition, especially those under the age of 5 years. Generally, the effects of climate change including floods also make children vulnerable to both waterborne and communicable diseases. The elderly are also prone to climate hazards such as drought, floods, disease outbreaks, and resource-driven conflicts. This is because they are too fragile to either fend for themselves or defend themselves in times of conflict. Another category of the community that is at risk from the secondary effects of climate change is the youth. The effects of drought leading to increased cases of school dropout rates coupled with the increasing urban sprawl has left the youth vulnerable to the adoption of social ills such as drug abuse and commercial sex. This is very rampant in the urban setting of the ward.
8	**Garbatulla**	Climate change has indiscriminately contributed to severe socioeconomic shocks among the residents in the ward. The most impactful include the loss of sources of livelihoods and livestock, the loss of lives including high infant mortality, forced displacement of community members, and distorted markets especially for livestock trade. The greatest bearers of these effects however have been children, women, the elderly and PwDs. The occurrence of drought and especially over long periods of time has contributed to cases of acute malnutrition among children below 5 years, as well as increased infant mortality. The elderly are highly susceptible to an array of climate-related ailments due to low immunity levels as well the inability to take care of themselves. Girls are married of at very tender age in exchange for livestock which are of great value to the communities. On the same note, women are responsible for taking care of their families including fetching water and firewood as well as keeping their homesteads clean. Resultantly, the have to trek for long distances in search of water especially during the dry season making them prone to abuse in the form of rape, GBV and discriminating. The context of conflict is pervasive. Conflict affects all at-risk groups. However, women are mostly affected as most fall victim to sexual abuse.
9	**Sericho**	Community members in the county identified that drought, insecurity, poverty, poor roads and livestock diseases were the primary climate impacts that affected all members of the community leading to devastating socioeconomic impacts. Notably, the impacts of climate change are felt differently by the various categories of groups in the community. The assessment observed that

		women, children, the youth and the elderly were the most vulnerable groups to the effects of climate change. The gender roles culturally allocated to women including those of fetching water and firewood conveniently position them to various vulnerabilities including rape. "Men have unrealistic expectations of their wives including fetching of water after dark in addition to taking care of the homesteads. At times we have to trek long distances especially during the dry season" Children are particularly vulnerable to malnutrition, waterborne and communicable diseases, and other health risks associated with climate hazards such as malaria. The elderly are highly vulnerable to diseases owing to reduced immunity to climate-induced illnesses. Loss of livelihoods has made the youth vulnerable to crime, engagement in resource-based conflicts and drug abuse.
10	**Ngaremara**	The ward is largely composed of pastoralists and agro-pastoralists inhabitants who are equally affected by the impacts of climate change. This is because they are both dependent on rainfall for their livelihoods and are highly vulnerable to impacts such as drought, floods, conflict and the outbreak of diseases. The impacts are nonetheless segregated with women, children, the elderly and the youth emerging as the most vulnerable groups. Similar to other wards in the county, women carry the responsibility of collecting water and firewood. Climate change impacts and particularly drought heightens the risks prone to women as they have to travel for long distances in search of water. This makes them vulnerable to abuse in the form of rape as well as GBV owing to their long absence as they look for water. Drought also presents the challenge of food scarcity majorly contributing to magnetron which often affects children under the age of 5. Floods also bring in new dynamics such as the spread of cholera again placing children at risk of infection. The elderly are friable and easily fall victim to ailments associated with climate change effects. This is in addition to the fact that they are not able to delink themselves from the support required especially in times of emergencies like floods. The youth as well are vulnerable to the effects of climate change and especially the fact that drought is a main driver to engagement in resource-based conflict and other forms of crime including theft.

2.4 Spatial Distribution of Risks

The variance of climate risks implies that they have affected livelihoods and economic sectors differently. Each ward in the county has its own inimitable sets of livelihood sources that are critical

and hence the need for sustainable actions to address the effects of climate change. These are summarized in Table 9 below.

Table 9: Spatial Distribution of Risks

Ward	Hazard	Impact
Cherab	Drought	• Loss of livelihoods • Malnutrition especially among children under the age of 5 and the elderly • Death of livestock • Water scarcity
	Resource-based Conflict	• Loss of lives • Death of livestock • Destruction of property
	Invasive Plant Species	• Reduced pasture area • Death of livestock • Migration in search of pasture
Chari	Drought	• Malnutrition of children under the age of 5 years • Water and pasture scarcity • Emaciation and death of livestock • High school dropout rates • Heavy winds
	Floods	• Destruction of property and crops • Outbreak of waterborne diseases such as cholera
	Resource-based Conflict	• Loss of human life • Loss of livelihood • Increased levels of intolerance between communities • Inaccessibility of grazing zones due to insecurity • Closure of schools • Displacement of people • Interruption of economic activities such as trade
Oldonyiro	Land Degradation	• Soil erosion and hence loss of fertile soil. • Poverty • Loss of pasture • Loss of biodiversity including the migration of wildlife
	Drought	• Resource-based conflict often which leads to loss of lives and destruction of property • Human-wildlife conflict • High cost of production for agro-pastoralists • Prevalence of both human and livestock diseases
	Invasive Plant Species	• Loss of pasture. • Poisoning of livestock as they result to eating the poisonous invasive plant species • Displacement of households in search of pasture and water
	Poverty	• Malnutrition due to limited access to balanced diets especially during drought • Migration • Increased school dropout rates given the frequency of migration patterns • Insecurity resulting from resource-based conflicts
	Poor infrastructure	• Limited access to markets

		• Disruption of trade vis-à-vis livestock and farm products • High cases of resource-based conflict as security agencies are not able to arrive on time • Breakdown of vehicles ferrying commodities to the market
Burat	Drought	• Migration in search of pasture and water • Loss of livestock • Distortion of livelihoods • Malnutrition especially among children under the age of 5 • Low returns on investment due to the sale of livestock at throw-away prices because they are emaciated
	Resource-based conflict	• Loss of lives and severe injuries • Destruction of property • Interruption of economic activities and more so, livestock trade • Loss of livestock • Increased tension and mistrust between communities
	Outbreak of diseases	• Loss of lives especially among children and the elderly • Death of livestock • Increased financial burden on households
Bulapesa	Drought	• Loss of lives • Malnutrition of children under the age of 5 years • Death of livestock • High school dropout rates given food shortage at the schools • Resource-based conflict • High cost of production • Human-wildlife conflict • Prevalence of livestock diseases
	Floods	• Destruction of property including settlements • Soil erosion leading to loss of fertile soils • Outbreak of waterborne diseases such as cholera
	Resource-based Conflict	• Loss of lives • Loss of livelihood • Increased levels of intolerance between communities • Displacement of people as they seek refuge elsewhere • Interruption of economic activities such as trade
Kinna	Drought	• Loss of livestock • Increased cases of malnutrition • Poor health especially among pregnant women, lactating mothers, and the elderly • Low farm yields and at times none at all • Resources-driven conflict with neighbouring communities • Loss of lives
	Floods	• Destruction of settlements and farms • Land degradation • Displacement of community members • Loss of lives and property • Loss of livestock

	Disease outbreaks	• Death of livestock as a result of ECF • Low livestock production • Distortion of the livestock trade market
	Human-Wildlife Conflict	• Destruction of crop farms • Death of wild animals
Wabera	Drought	• Resource-based conflict especially in peri-urban areas • Outbreak of diseases • Poor health of the community and malnutrition especially among children under the age of • Increased school dropout rates • Reduced socio-economic development including trade • Forced early marriages in exchange for material resources • Water scarcity • Increased rates of crime especially in urban areas • Death of livestock
	Floods	• Destruction of infrastructure including roads as well as community property such as houses • Soil erosion and land degradation • Displacement of community members • Loss of livestock
	Invasive Plant Species	• Loss of pasture. • Low agricultural productivity in the limited arable area
	Poverty	• Outbreak of various categories of diseases • Pollution due to poor waste management and carbon emissions in the urban area. • Increased school dropout rates • Insecurity resulting from resource-based conflicts and the drive to access livelihoods, especially among the youth
	Poor infrastructure	• Slow development of the urban areas • Disruption of trade as a result of slow and at times interrupted movement of goods and services • Increasing levels of insecurity • Prevalence of accidents, which has also contributed to the increasing number of PwDs in the ward
Garbatulla	Drought	• Heighted cases of severe and acute malnutrition among children under the age of 5 years • Scarcity of water and pasture • Emaciated livestock which distorts market prices • Death of livestock during severe drought • Increased cases of school dropout rates due to lack/shortage of food at the schools • Frequent dust storms often leading to land degradation as a result of loss of vegetable cover and accelerated soil erosion
	Floods	• Destruction of property including homesteads and crop farms • Increased prevalence of waterborne diseases including cholera • Loss of lives especially as a result of flash floods • Death of livestock

	Resource-based Conflict	• Loss of lives • Widespread destruction of property • Heightened inter-community rivalry and lack of peace owing to the tendency to retaliate • Inaccessible grazing zones owing to fear of conflict • Closure of school and displacement of settlement • Interruption of key economic activities including the livestock trade market and micro and small enterprises
	Invasive Plant Species	• Reduced pasture area as the • Migration of communities to more productive areas. This is however not sustainable sine the *Prosopis Julliflora* is extremely resistant to drought and curtails the growth of other forms of productive vegetation
	Disease outbreaks	• High infant mortality rates as a result of communicable ailments, drought and waterborne diseases • Services at the health facility are overstretched and hence limited access to urgent health services
Sericho	Drought	• Resource-based conflict as other communities pursue the limited pasture in the ward • Deforestation as a result of charcoal burning • Death of livestock • Bush fires triggered by the dry terrain • Desertification and increased frequency and intensity of dust storms • Prevalence of invasive drought—resistant plant species • Poor health among community members in addition to severe and acute malnutrition among children under the age of 5 years • High school dropout rates owing to shortage/lack of food at schools
	Poverty	• Malnutrition due to limited access on the account of prolonged drought • Increased school dropout rates • Involuntary migration in the pursuit of access to livelihoods • Increased conflict levels in the form of cattle rustling • Increased crime rates mainly perpetrated by the youth
	Poor infrastructure	• High cost of transporting farm and livestock produce to the market • Shortage of food in addition to increased prices especially during drought • High cases of insecurity • Limited development • Several accident cases which have contributed to the increased number of PwDs • Slow rate to respond to climate induced emergencies
	Insecurity in the form of resource-based conflicts and banditry	• Loss of lives • Distorted livelihoods • Loss of property including livestock • Forced migration to safer areas • Displacement of communities

	Livestock diseases	• Death of livestock • Loss of livelihoods
Ngaremara	Drought	• Domestic violence sparked by shortage of resources • Loss of lives • Death of livestock • Low crop productivity • Malnutrition of children under the age of 5 years • Increased school dropout rates • Resource-based conflict • Prevalence of livestock diseases
	Floods	• Destruction of property including crop farms and homesteads • Land degradation and soil erosion leading to loss of fertile soils as well as low yields • Outbreak of waterborne diseases such as cholera • Distortion of economic activities including the closure of markets
	Resource-based Conflict	• Forced migration of communities • Loss of lives • Loss of livelihood • Displacement of people as they seek refuge elsewhere • Interruption of economic activities such as trade and farming
	Poverty	• Migration • Malnutrition due to limited access to balanced diets especially during drought • Increased school dropout rates given the frequency of migration patterns • Insecurity resulting from resource-based conflicts and engagement in crime especially among the youth

3. Future Climate Scenarios for the County

3.1 Kenya Overview

The ASALs occupy over 80% of the country's landmass. It is home to about 36% of the population, 70% of the national livestock, and 90% of wildlife. The annual rainfall in arid areas ranges between 150 mm and 550 mm and in semi-arid areas between 550 mm and 850 mm per year. Temperatures are high throughout the year, with high rates of evapotranspiration. ASALs in Kenya are spread across 29 counties including Isiolo, with varying degrees of aridity. These extreme climatic conditions have had devastating effects on the environment and livelihoods of communities with spiralling vulnerabilities, warranting the establishment of the State Department for Development of the ASALS (SDDA) in June 2018, to coordinate overall planning and development of policies for ASALs

Approximately 17 million people, residing in the ASALs in Kenya earn their living principally through a mix of pastoralism and small-scale agriculture. Often marginalised, and with high rates of poverty, residents of ASALs are particularly susceptible to droughts and flooding. With increasing impacts from climate change, these areas are considered to be at risk of desertification. Moreover, a large percentage of ASALs have been degraded from deforestation and overgrazing, which further reduces the productivity of these lands, threatening food security, livelihoods, and biodiversity.

ASALs in Kenya are increasingly becoming key livelihood and economic zones that drive the country's development in line with the Kenya Vision 2030. According to the Kenya Climate-Smart Agriculture Strategy, 2017–2026, the livestock sector, which is a predominant activity through pastoralism, employs 50% of the agricultural workforce, providing a substantial source of income and livelihood to over 10 million Kenyans living in the ASALs, and contributing 12% of the national GDP and 43% of the agricultural GDP. Additionally, crop production is also practiced in arable parts of the ASAL areas.

ASALs in Kenya face multiple challenges from the effects of climate change, a problem further complicated by various other factors such as population expansion and competition for available resources such as land. Recent research indicates that there has been a general decline in rainfall in 15 out of the 29[7] ASAL counties of Kenya (except Narok, Baringo, Laikipia, Turkana, West Pokot, and Elgeyo Marakwet). Similarly, the average temperature in all 21 ASAL counties has increased during the 1960 to 2014 period. Five counties that have surpassed the 1.50C increase are: Laikipia (1.590C), Narok (1.750C), Turkana and Baringo (1.80C), and West Pokot and Elgeyo Marakwet (1.910C).

It is estimated that 16 counties in ASAL will have maximum temperatures increases greater than 10C. By 2050, in 17 counties, the temperature would have increased by more than 1.50C and by 2070, in all counties, temperature increases are expected to exceed 1.50C. Consultations with residents of the ten wards reveal that most pastoralists experience severe decline and more unpredictable rains alongside changing temperatures. Figure 7 provides an illustration of the drought situation in Kenya as of January 2023.

[7] No. of ASAL counties as per State Department for Development of ASALs, Ministry of Public Service, Gender, Senior Citizen Affairs and Special Programmes, 2019.

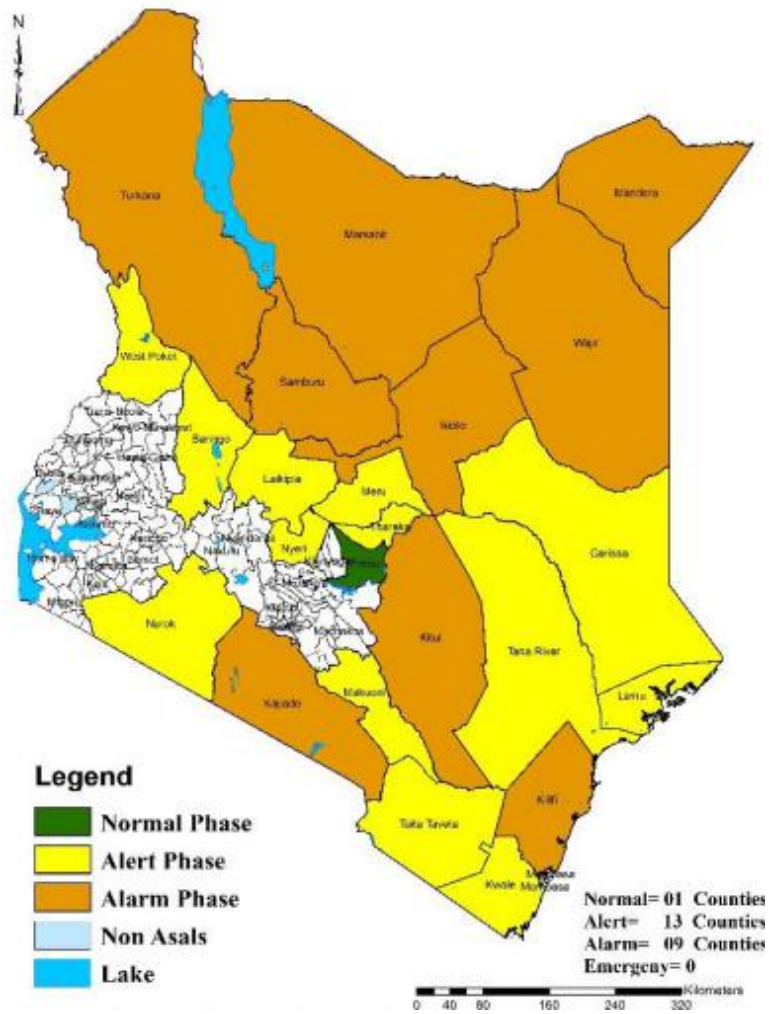

Figure 7: ASAL counties drought January 2023 (Source: NDMA)

The decline in rainfall and changes in temperature has led to a decrease in the number of livestock in the last few years. More frequent droughts continue to affect available livestock feeds, whilst increases in temperature limit livestock productivity, feed intake, reproduction and performance across the range of livestock species. An increase in animal pests and diseases and the emergence of invasive species have also been reported. In Isiolo County, invasive species *Prosopis juliflora* was specifically reported to outgrow the common (adapted) pasture, affecting the availability, quantity, and quality of available feeds

3.1 Isiolo County Overview

The county is classified into three ecological zones namely; semi-arid, arid and severe arid, as shown in figure 8. The semi-arid zone covers part of Wabera Ward, Bulla Pesa Ward, and some parts of Burat Ward in Isiolo North Constituency, and southern parts of Kinna Ward in Isiolo South Constituency. This zone receives between 400 and 650 mm of rainfall annually. The vegetation in this zone mostly consists of thorny bush with short grass. The relatively high amount of rainfall is influenced by Mount Kenya and Nyambene hills

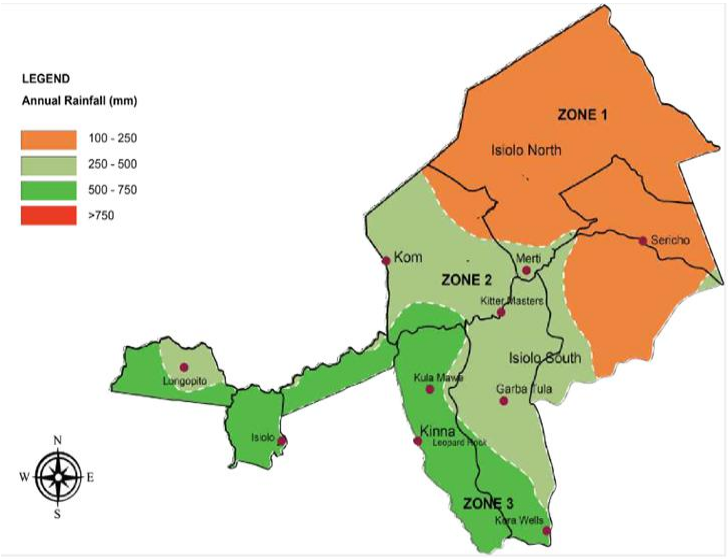

Figure 8: Map of Isiolo climatic zones. Source: KMD Isiolo County

in the neighboring Meru County. The Arid zone covers a portion of Chari and Garbatulla wards. Rainfall received here ranges between 250 mm and 350 mm annually and supports grassland and few shrubs. The severe arid zone covers Chari, Cherab, parts of Oldonyiro Ward in Isiolo North Constituency and Sericho Ward in Isiolo South Constituency. The area is barren, very hot, and dry most of the year. Annual rainfall received in this zone is less than 250 mm. Such harsh climatic conditions do not favour crop growth in this zone.

Isiolo County has two main rainfall seasons, namely the long rains season, which occurs between March and May with the peak in April. The short rains season, which is the most significant, occurs from October to December with the peak in November. The World Bank (WB) analysis of temperature trends Isiolo County over 25 years (1980 to 2005), showed an increase of about 0.5°C in the mean temperatures of both seasons. On the other hand, climate projections based on two representative concentration pathways (RCPs4.5) indicate that rainfall amounts in both seasons are expected to continue increasing only moderately (≤25mm) with the rise being greater under the high emissions scenario. However, the period 2036-2070, climate projections based on concentration pathways (RCPs4.5) indicate that rainfall amounts in both seasons are expected to continue decreasing as the emissions scenario continues to rise. The heat and drought stress will continue to be the main hazards for Isiolo. the number of heat stress days, compared to the historical average, are expected to increase as the maximum number of consecutive dry days are expected to increase for both seasons. This is illustrated in Figure 9 below.

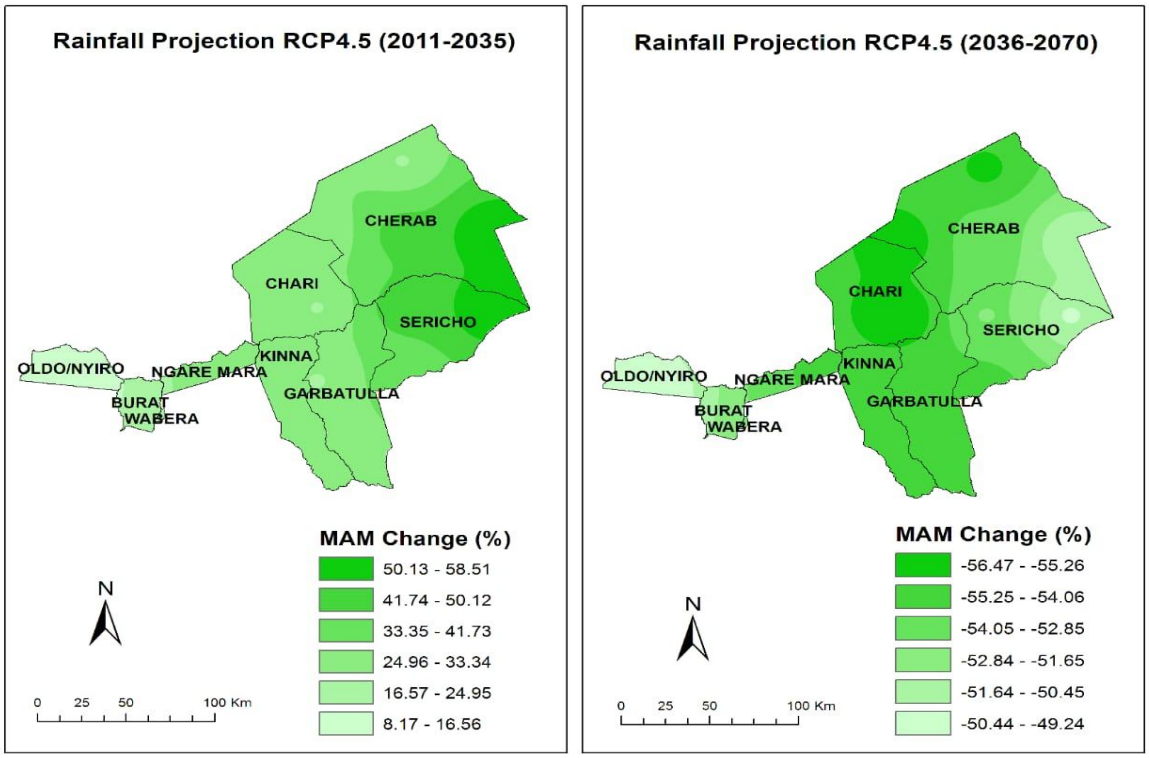

Figure 9: Isiolo County Rainfall Projections for the period 2011-2035 and 2036-2070. Source:: KMD Isiolo County

Looking ahead to the period 2021-2065, climate projections based on two representative concentration pathways (RCP2.6 and RCP8.5) indicate that temperatures in both seasons are expected to continue to increase, increasing under the high emissions scenario. While heat and drought stress has been indicated as the main hazards for Isiolo, under both scenarios, the number of heat stress days, compared to the historical average, are expected to reduce, while the maximum number of

consecutive dry days are expected to remain reasonably constant for both seasons. Under the high emissions scenario, rainfall is expected to reduce and moisture stress expected to increase, particularly in the second season.

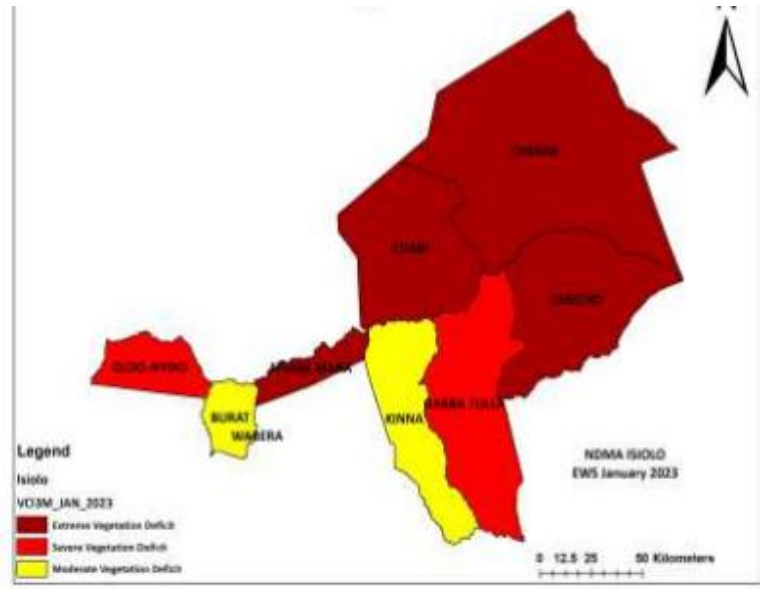

Figure 10: Isiolo Vegetation Cover Index January 2023. Source: NDMA Bulletin

As of January 2023, almost half of the County's accessible grazing lands had very poor pasture condition, attributed to poor regeneration of natural vegetation as an impact of the poor performance of the short rains season as illustrated in Figure 10. The condition has however improved in the month of April 2023, characterised by improve pasture availability in many parts of the county and the same is expected to regenerate further due to ongoing rains. The improving availability of pasture in all parts of the county will enable pastoral communities to migrate back to their traditional grazing areas and thus minimize competition that was experienced in the beginning of 2023.

There are however few cases of livestock mortality reported in the month of April 2023 associated with floods and cold in some sections of the pastoral livelihood zone. In addition, more livestock diseases are expected to arise as an influence of the ongoing rains with a higher likelihood along the Ewaso Ng'iro flood basin which has been flooded following the ongoing heavy rains in the country.

The prevailing food security situation is dismal but improving with the ongoing livelihoods recovery after a prolonged drought episode that led to massive losses of productive assets. Food crop production under rainfed conditions is expected to improve considerably with the ongoing rains expected to support crop development up to maturity in agro-pastoral livelihood zones. The overall food security situation is gradually improving with a likelihood of getting into alert phase (Integrated Food Security Phase Classification (IPC) phase 2). This is however possible with ongoing well performance of the rains spatially and temporarily. The proportion of households with poor and borderline food consumption is expected to decrease considerably as food availability and access improves. Currently, there are no cases of resource-based conflicts with the improved availability of forage and water resources. The peaceful situation is expected to prevail in the Months of June to September 2023.

4. Adaptation Strategies to Current and Future Climate Risks

4.1 Overview of Existing Adaptation Strategies and Their Effectiveness to Current Climate Risks

In the course of time and driven by the need to have local solutions to the challenges presented by climate change, communities in Isiolo County have developed an understanding of climate variability in order to manage climate risk. Members of the community have learned to modify their behaviour and their environment to reduce the harmful impacts of climate hazards and to take advantage of their local climatic conditions. This has also entailed the observation of environmental and socioeconomic systems responding to climate change, and have tried to understand and manage these responses. Important to note is that the degree of application of these responses and the methods used vary from ward to ward.

Existing resilience strategies for each ward have been analysed in Table 10 below. This is in addition to the interrogation of their effectiveness as well as areas that require improvement

Table 10: Existing Adaptation Strategies and Their Effectiveness to Current Climate Risks

Ward	Hazard	Local Response	Most Effective Local Responses	What can make them effective
Cherab	• Drought • Resource Conflict • Invasive Plant Species	• Structuring of grazing patterns • Water Tracking • Surveillance and monitoring • Clearing of areas with invasive plant species	• Structuring of grazing patterns	• Awareness creation and sensitization of communities on the suitable adaptation and mitigation measures and their applicability to the local context • Provision of animal feeds • Construction of boreholes • Construction of a police post to manage resource-based conflicts • Increased engagement of NPR towards enhancing early warning systems and early dispute resolution • Provision of tools to aid in clearing invaded areas • Support with mechanized removal of invasive plant species

Chari	• Drought • Floods • Resource-based Conflict	• Migration • Preservation of livestock products including milk and meat • Rangeland management • Community lending of livestock to those adversely affected (commonly known as Dabare)	• Rangeland management • Management of water points to prevent conflict escalation	• Increase access to relief food as an emergency action • Enhance the effectiveness of the cash transfer program, especially for at-risk groups • Support women and youth-owned micro enterprises • Improve the livestock feeding programme • Improve the livestock vaccination programme • Enhance collaboration with development partners and CSOs to build the capacity of the local community on suitable resilience strategies • Enhance the effectiveness of the early warning systems communication to communities
Oldonyiro	• Land Degradation • Drought • Invasive Plant Species • Poverty • Poor infrastructure • Poor health and malnutrition	• Regenerative farming • Migration in search of pasture. • Establishing good relations with neighbours to get food assistance. • Livestock offtake • Discouraging charcoal burning and tree cutting • Awareness creation on the need for family planning to limit overburdening the already scarce resources • Planned settlement • Destocking: selling of animals during drought • Clearing of evasive species • Supplementary feeding programmes through the distribution of RUTFs and RUSFs to curb malnutrition. This is done by NGOs such as ACF • Capacity building on the	• Prioritizing the dietary needs of children, pregnant and lactating women, and the elderly by feeding them with high-protein foods • Uptake of alternative IGAs including beekeeping • Migration	• Building of gabions to prevent soil erosion during all seasons • Increased awareness creation on climate change including rangeland management targeting various groups • Enhancing the cash transfer programme, especially during climate-triggered emergencies • Catalysing uptake of alternative IGAs through capacity building and supply of inputs to agro-pastoralists • Sensitizing community to avoid operating within wildlife corridors • Creating employment opportunities for the youth and women geared at exterminating the invasive plant species • Manure decomposition using invasive species to increase soil fertility and

		uptake of alternative IGAs such as phone repair, hairdressing, machine operation, etc. • Enhancing security through community scouts • Use of locally available materials to repair the derelict roads • Diverting streams/rivers to reduce road degradation • Mobilization of community resources to repair roads		controls soil erosion. • Increased engagement of community scouts by NRT towards the reduction of resource-based conflicts • Enhancing the animal feeding programme especially during the dry season to reduce the loss of livestock • Building bridges and culverts to manage overflows • Grading and leveling up of roads
Burat	• Drought • Resource-based conflict • Disease outbreaks	• Migration in search of pasture • Sale of livestock albeit at a throw-away price • Engaging in subsistence farming to complement income generated from livestock production. • Convening conflict resolution meetings through local leaders • Use of herbal medicine to treat both human and livestock diseases	• Community-led peace-building meetings • Migration	• Making the offtake programme more effective through government coordination with other stakeholders • Effective implementation of a livestock feeding programme especially during drought • Improved engagement of the NPR in the management of resource-based conflict • Effective early warning systems and timely communication to the community • Availing of free vaccines to manage livestock and human diseases
Bulapesa	• Drought • Floods • Resource-based conflict	• Migration in search of water and pasture during the dry season, as well as during floods • Reliance on community leaders and seers to predict the occurrence of floods • Promoting cohesion among communities as a preparatory measure for outbreak of conflicts • Engaging community leaders to broker peace with neighbouring communities	• Use of seers has been effective since they have extensive knowledge of the changing weather patterns in the ward • Migration is an effective way of responding to drought and floods to prevent the loss of lives and livestock	• Effective restocking of livestock to cushion farmers from losses • Effective early warning systems and timely communication to the community • Implementation of cash transfer programmes for the most at-risk groups • Promoting uptake of sustainable climate-smart agricultural practices

Kinna	• Drought • Floods • Disease outbreak • Human-Wildlife conflict	• Destocking • Buying and storing fodder to feed animals during the dry season • Migration in search of water and pasture during the dry season, as well as during floods • Creation of self-help groups (SHGs)for fodder farming to cushion members against the adverse effects of drought • Development of a grazing strategy plan locally known as *dedha* • Building of gabions to control floods and soil erosion • Community sensitization on disease outbreaks • Reporting to KWS cases of human-wildlife conflict	• Migration is an effective way of responding to drought and floods to prevent the loss of lives and livestock • SHGs have proven to be effective but not during protracted periods of drought. • Building of gabions has helped divert water flow from the villages	• Introduction and effective implementation of Drought Preparedness Programs (DPPs) • Capacity building of communities on water harvesting and storage in addition to supply of water storage facilities • Land relocation programme to enable communities shift from flood-prone areas • Introduction of a periodic livestock vaccination programme • Revival of the compensation committee to ensure communities are compensated for livestock killed or crops destroyed by wild animals
Wabera	• Drought • Floods • Invasive Plant Species • Poverty • Poor infrastructure	• Adoption of table banking by women towards poverty alleviation • Youth empowerment to reduce their vulnerability • Uptake of alternative IGAs including micro enterprises to augment income during the dry seasons • Planting of trees through community-driven approaches • Adoption of food preservation mechanisms • Building of terraces to aid in minimizing the effects of floods • Adoption of rainwater harvesting • Community policing towards enhancing security • Clearing of invasive plant species	• Tree planting initiatives • Building of terraces which has reduced soil erosion • Rainwater harvesting has helped communities preserve water for use during the dry season • Food preservation has gone a long way in enhancing food security but mostly in the urban areas	• Enhancing existing and developing new youth empowerment programmes towards increased transfer of knowledge and skills • Promoting the cash transfer programme especially during the dry season • Advocating for the uptake of alternative IGAs including community capacity building initiatives and the support of Micro and Small Enterprises (MSMEs) • Promoting dispute resolution and cohesion creation programmes t • Advocating for flood control mechanisms including increased construction of terraces, gabions and good drainage systems
Garbatulla	• Drought • Floods	• Water tracking by seers based on community	• Developing and adhering to	• Provision of relief food o the most at-risk groups in

	• Resource-based Conflict • Invasive Plant Species • Disease outbreaks	knowledge that has been passed on over the years • Developing and adhering to grazing patterns • Retreating from conflict to prevent huge losses especially in terms of human s • Meat preservation using traditional methods including sun drying to feed families during drought. • Feeding the most at-risk groups with a high protein meal, locally referred to as *Sangah* to cushion them against drought induced death • Management of rangelands and water points by community leaders, in addition to coordination of grazing patterns • Community lending of livestock to those adversely affected by drought and floods • Use of community scouts as sentries including reporting on any incidences that may trigger conflict • Clearing of lands covered by the invasive plant species	grazing patterns • Use of community scouts as sentries including reporting on any incidences that may trigger conflict	the ward • Enhancing the effectiveness of the cash transfer programme with a focus on the most vulnerable households • Increased support to MSMEs especially those run by women and youth • Provision of animal feeds during extremely dry seasons • Implementation of a livestock vaccination programme to curb the spread of diseases and death of livestock • Development of an effective early warning system including prompt communication to the community for adequate adaptation measures
Sericho	• Drought • Poverty • Poor infrastructure • Insecurity in the form of resource-based conflicts and banditry • Livestock diseases • Floods	• Migration in search of pasture. • Feeding livestock with human food • Livestock offtake • Kitchen gardening to augment food sources • Family planning to reduce strain on households to provide food • Selling of livestock during drought through at throw-away prices • Use of traditional means of transport such as use of donkeys	• Migration in search of • pasture • Livestock offtake • Adoption of grazing patterns • Establishment of committees in charge of the management of grazing lands and coordination with neighbouring communities	• Improving the effectiveness of social safety nets including the cash transfer programme to target the most at-risk groups • Creating awareness on suitable adaptation measures • Promoting the uptake of alternative IGAs through capacity building and support of MSMEs operated by women and the youth • Fostering effective management of

		• Diverting streams and rivers leading to roads to prevent destruction of infrastructure • Community mobilizing their own resources to repair roads • Adoption of grazing patterns • Lending of animals to neighbouring communities that have been adversely affected by climate impacts *(dedha)* • Establishment of committees in charge of the management of grazing lands and coordination with neighbouring communities • Killing and burying of sick/infected livestock to stop the spread of some livestock diseases		rangelands through awareness creation and reseeding • Providing most affected communities with relief food • Provision of livestock pellets and feeds during the extreme dry seasons
Ngaremara	• Drought • Floods • Resource-based Conflict • Poverty	• Migration in search of water and pasture during the dry season, as well as during floods • Reliance on crop produce from agro-pastoralists along the Ewaso Ng'iro River • Engagement of community leaders who act as arbitrators • Selling of livestock to avert total losses • Effective management of rangelands	• Rangeland management with guidance from community leaders • Migration is an effective way of responding to drought and floods to prevent the loss of lives and livestock	• Effective offtake programme to cushion farmers from drought-induced losses • Provision of extension services including periodic vaccination for effective livestock disease control • Effective early warning systems and timely communication to the community • Encourage uptake of IGAs through skills transfer especially among the youth • Strengthen grazing committee to ensure good grazing pattern • Continuned and effective implementation of the cash transfer programme target the most at-risk groups

5. County Climate Strategic Action Priorities

Climate change has been recognized as one of the key challenges in Isiolo County. This is together with other socioeconomic sectors linked to climate change such as water and food. The economy of Isiolo County especially the livelihoods of the rural population is dependent on climate-sensitive sectors like agriculture, forest, and pastoralism which are highly vulnerable to the impacts of climate change. Severe droughts and heat waves as well as land and forest degradation and salinization of groundwater resources are already prevalent and often viewed as an indication of climate change.

For this reason, members of the community and the climate TWG identified local solutions to prepare for and adapt to the current and potential impact of climate change. From a sectoral perspective, agriculture has been highlighted as particularly threatened by climate change and related impacts. Resultantly, many interventions are focusing on strengthening the rural economy and reducing vulnerabilities in this sector.

Efficient livestock offtake, restocking, increased water sources, and alternative IGAs were proposed by the community in Isiolo as the most ideal adaptation options for managing the adverse effects of climate change including drought. The NPRs and community elders stood out as key dispute resolution avenues that are critical in the management of resource-based conflict. for HWC. Although water harvesting and storage were identified as suitable adaptation approaches, there was consensus that their applicability is in the mid to long term. Respective wards ranked the adaptation strategies differently. Communities in each ward had different opinions on the best adaptation and mitigation options for climate hazards based on their locality and prior experience with the hazards. In some instances, however, there was similarity in the issues and their solutions given that some wards share the same ecological zone. These have been summarized in Table 11 below.

Table 11: County Climate Strategic Action Priorities

Ward	Risk/Hazard	Livelihood/Economic	Proposed Climate Resilience	Stakeholder

		System Affected	Strategies	Group to Apply the Strategy
Cherab	• Drought • Resource-based conflict • Invasive species	• Agriculture – Livestock production • Water	**Short-Term** • Awareness creation on rangeland management with respect to the grazing patterns to sustainably manage the available forage • Training on water management and conservation techniques including water harvesting and storage • Providing feeds on time and supporting the communities in restocking • Timely livestock offtakes to reduce the temptation of cattle rusting **Mid-Term** • Construction of boreholes • Construction of dams build harvest stormwater during the rainy season. **Long-Term** • Engaging NPR and building more police posts • Operationalization of the national *propis* management strategy including allowing members of the communities to harvest the invasive species for can charcoal production to improve their livelihoods	• National government agencies including NMDA • County Government • CSOs • Private sector actors • Development partners including USAID and WFP • NPR

Chari	Drought Floods Resource-based conflict	Agriculture – Farming and Livestock production Trade Water	**Short-Term** • Enhancing offtake and restocking of livestock • Fodder farming and preservation of local grass • Enhancing the effectiveness of rangeland management **Mid-Term** • Increasing the number of water sources in strategic community grazing areas • Enhancing security including coordinating with the local community structure • Commercialization of the livestock industry through local investments in a tannery, etc. • Enhance conflict management and peace initiatives **Lon-Term** • Behavioural transformation to catalyse uptake of alternative Income Generating Activities (IGAs). These could include, poultry farming, fish farming, kitchen gardening, beekeeping fodder farming, and organic manure harvesting. • Introduction of irrigation schemes along the river • Investing in water harvesting and storage including the construction of water pans and dams	• National government through the various agencies • County government • Development partners including WFP and USAID through its Nawiri programme • CSOs including World Vision and Mercy Corps, Kenya Red Cross, and Impact Kenya
Oldonyiro	• Land Degradation • Drought • Invasive Plant Species • Poverty • Poor infrastructure • Poor health and malnutrition	Agriculture – Farming and Livestock production Trade Water	**Short-Term** • Awareness creation about the risks of climate change and hazards. • Providing social safety nets, such as cash transfers and food assistance, to most at-risk households • Developing and implementing effective early warning systems to help communities to better prepare for and respond to climate change hazards. • Developing community-based emergency preparedness and	• National Government agencies including NDMA • County Government • Development Partners including WFP, FAO and USAID through its NAWIRI programme • CSOs including Action Aid, World Vision, ACF, CESVI, • Local CBOs including MID P and NRT

			response plans • Improving water management systems to help communities cope with the impacts of droughts and floods. **Mid-Term** • Diversifying livelihoods sources to include crop cultivation, fish farming, poultry keeping, beekeeping and other climate-resilient agricultural practices • Promoting sustainable land use practices, such as conservation agriculture and agroforestry to help increase soil moisture, reduce erosion and enhance soil fertility • Adoption of Disaster Risk Reduction (DRR) measures, such as evacuation plans during emergencies such as floods • Strengthening community capacity training. This should focus on among others, climate change adaptation, disaster risk reduction, and sustainable resource management. **Long-Term** • Afforestation and reafforestation to increase forest coverage • Investing in improved infrastructure, such as climate smart irrigation schemes and roads to improve livelihoods and enhance market access respectively. •	
Burat	Drought Resource-based conflict Disease Outbreak	Agriculture – Farming and Livestock production Trade Water	**Short-Term** • Effective and sustainable offtake of livestock to reduce losses • Supply of livestock feeds during the dry season • Mapping of rangelands and ensuring their effective management • Capacity building of communities on the effects of climate change including climate-friendly and sustainable economic practices	• National government through the various agencies • County government • Development partners including WFP and USAID through its Nawiri programme • CSOs including World Vision and Mercy Corps, Kenya Red Cross, and Impact Kenya

			Mid-Term • Effective engagement of the NPR to mitigate the occurrence of resource-based conflicts • Effective management of water points to avert resource-based conflict **Lon-Term** • Increasing the number of water sources in the ward including boreholes and dams • Enhancing community uptake of alternative IGAs such as climate-smart farming • Supporting the community in water harvesting and storage for the purpose of meeting domestic water needs and crop production	
Bulapesa	Drought Floods Resource-based conflict	Agriculture – Farming and Livestock production Water Trade Infrastructure	**Short-Term** • Enhancing restocking of livestock • Easing access to livestock feeds during the dry seasons • Awareness creation of the effects of climate change and adaptation and mitigation solutions • Adaptation of interventions to the local knowledge and practices **Mid-Term** • Construction of gabions to prevent soil erosion • Coordinating with the local community security structures to prevent conflict • Enhancing the effectiveness of existing and new conflict management initiatives **Long-Term** • Investing in water harvesting and storage including the construction of dams. These will be essential in the harvesting of surface runoff	• National government through the various agencies • County government • Development partners including WFP and USAID through its Livestock Market Support (LMS) programme • CSOs including the Red Cross Society, Peace Link, Mid-P, Seed, Mercy Corps, CREW, Call for Change, World Vision, Action Aid, and BOMA

			• Behavioural transformation to catalyze uptake of alternative IGAs	
Kinna	Drought Floods Disease outbreaks Human-Wildlife conflict	Agriculture – Farming and Livestock production Water Trade Infrastructure Health Tourism	**Short-Term** • Distribution of treated mosquito nets • Continuation and enhancement of the cash transfer programme with a focus on most at-risk groups • Providing livestock feeds to community members during the dry seasons • Awareness creation of the effects of climate change including the need for efficient water management • Rehabilitation of the *giro dima* drainage systems • Prohibition of charcoal burning • Strategic engagement of the NPR to manage resource-based conflicts • Penalization of negligent contractors vis-à-vis road, bridge and drainage construction **Mid-Term** • Establishing and strengthening community inter-county peace forums • Creation of an afforestation programme • Restoration of old and construction of more gabions to control floods • Promoting the uptake of alternative IGAs by communities through awareness creation and capacity building • Introduction of a livestock vaccination programme • Development of a compensation plan for community members who are victims of human-wildlife conflict	• National government through the various agencies including KWS, KERRA and NDMA • County government • Development partners including WFP and USAID • CSOs including World Vision,

			Long-Term • Investing in water sources through the construction of boreholes especially in Duse, Kulamawe, Kina Abarseti, Kina North, and Qurquchi • Construction of drainage systems in flood-prone areas •	
Wabera	Drought Floods Disease outbreaks Human-Wildlife conflict	Agriculture – Farming and Livestock production Water Trade Infrastructure Education	**Short-Term** • Awareness creation and education communities on the climate change context including suitable adaptation and mitigation mechanisms that they can contribute to. • Promote climate-smart agriculture practices that are sustainable, adaptive and resilient, such as conservation agriculture, agroforestry, and mixed farming systems • Create social safety nets, such as cash transfers and food assistance for most at-risk groups in the community • Community capacity building on effective water management including harvesting and storage of water, to cope with the impacts of drought **Mid-Term** • Developing and implementing effective early warning systems for extreme weather events to help communities better prepare for and respond to climate change hazards. • Developing participatory community-based emergency preparedness and response plans • Implementation of a tree planting programme to curb desertification and enhance carbon sequestration. **Long-Term**	• National government through the various agencies including KENHA, KURA, KFS and NDMA • County government • Development partners including WFP and USAID • CSOs including VSF Kenya, Helping Hand International, Hope International, Community Empowerment Environmental Development (CEED), and Isiolo Conservationists Trust (ICT) • Private sector actors including the Kenya Climate Innovation Center (KCIC)

			• Investing in improved infrastructure including terraces, gabions and drainage systems to mitigate the adverse effects of floods • Supporting the uptake or urban agriculture that will contribute to increased access to food • Implementation of DRR measures that will enable the anticipation of and quick response to climate hazards	
Garbatulla	• Drought • Floods • Resource-based Conflict • Invasive Plant Species • Disease outbreaks	Agriculture – Farming and Livestock production Water Trade Health Education	**Short-Term** • Destocking and effective restocking of livestock • Fodder farming and preservation to cushion the community against the effects of extreme drought • Coordinated and effective rangeland management in consultation with community leaders **Mid-Term** • Increasing the number of boreholes in the common grazing areas especially where conflict is common • Enhancing security including coordinating with the local community leaders • Commercialization of the livestock industry through local investments in a tannery, etc. • Reseeding of rangelands to ensure their sustainability **Lon-Term** • Behavioural transformation to catalyse uptake of alternative Income Generating Activities (IGAs). These could include, poultry farming, fish farming, kitchen gardening, beekeeping fodder farming, and organic manure harvesting. • Introduction of irrigation schemes along River Ewaso	• National government through the various agencies • County government • Development partners including WFP and USAID through its Nawiri programme • CSOs including World Vision and Mercy Corps, Kenya Red Cross, and Impact Kenya

			Ng'iro. • Investing in water harvesting and storage including the construction of water pans and dams • Increased implementation and follow up on peace-building initiatives to ensure community cohesion in the long-term	
Sericho	• Drought • Poverty • Poor infrastructure • Insecurity in the form of resource-based conflicts and banditry • Livestock diseases • Floods	Water Agriculture – Farming and Livestock production Health Infrastructure Trade	**Short-Term** • Formation and support of Dedha committee in charge of grazing land management and dispute resolution • Effective and sustainable offtake of livestock to reduce losses • Supply of livestock feeds during the dry season • Establishment and effective implementation of rangeland management plans • Capacity building of communities on the effects of climate change including climate-friendly and sustainable economic practices **Mid-Term** • Effective engagement of the NPR to mitigate the occurrence of resource-based conflicts • Effective management of water points to avert resource-based conflict **Lon-Term** • Construction of bridges, gabions and drainage systems to minimis the effect of flood water • Increasing the number of water sources in the ward including boreholes and dams • Enhancing community uptake of alternative IGAs such as climate-smart farming • Supporting the community in water harvesting and storage for	• National government through the various agencies • County government • Development partners including WFP and USAID through its Nawiri programme • CSOs including World Vision and Mercy Corps, VSO Kenya, Star of Hope, Kenya Red Cross, and Sericho Community Conservancy

			the purpose of meeting domestic water needs and crop production	
Ngaremara	• Drought • Floods • Resource-based Conflict • Poverty	Agriculture – Farming and Livestock production Education Health Trade Water	**Short-Term** • Awareness creation about the risks of climate change and hazards. • Providing social safety nets, such as cash transfers and food assistance, to most at-risk groups • Effective implementation of the early warning systems to help communities to better prepare for and respond to climate change hazards. • Promote good water management practices such as rain water harvesting and storage. • Enhancing the effectiveness of community dispute resolution mechanisms **Mid-Term** • Diversifying livelihoods sources including supporting MSMEs owned by woemn and the youth • Promoting sustainable land use practices, such as conservation agriculture and agroforestry • Strengthening community capacity training. This should focus on among others, climate change adaptation, disaster risk reduction, and sustainable resource management. **Long-Term** • Afforestation and reafforestation to increase forest coverage • Promoting adoption of climate smart agriculture to improve livelihoods and enhance conservation of natural resources including rivers and the soil	• National Government agencies including NDMA • County Government • Development Partners including WFP, FAO and USAID through its NAWIRI programme • CSOs including Action Aid, World Vision, ACF, CESVI, • Local CBOs including MID P and NRT

6. Conclusion

The PCRA process has tested the implementation of a practical community-focused approach to assess climate risks through a combination of participatory approaches. The process has examined climate change impacts and has identified appropriate response actions to manage current and future risks associated with a spectrum of extreme weather in Isiolo County at the ward levels. Experiences, challenges, and new perspectives of communities arising from the assessment provide important guidance to the climate change action planning process. The benefit of using a risk lens is that it has allowed a more nuanced analyses of the ward-specific hazards and their impacts on communities. This is in addition to unearthing practical short to long term adaptation and mitigation measures that will subsequently inform targeted planning and programming by various stakeholders including the Isiolo County Government, national government agencies, development partners, CSOs and private sector actors. Under typical climate vulnerability assessments (such as those undertaken at a regional and national level), it is difficult to disentangle the role of climate and its influence on physical events, from the underlying social, economic, institutional, and cultural factors that determine a communities' ability to prepare, respond and recover from climate hazards.

The PCRA process has made its easy to determine the factors driving climate vulnerability, and therefore, how resources can be best utilized to reduce the potential environmental and socioeconomic impacts. Under the PCRA, ward-specific hazard, exposure, and vulnerability catalogues have been presented, providing the full spectrum of information needed to inform decision-making. For example, in Wabera ward, where vulnerabilities cut across urban to peri-urban areas, risk reduction efforts could be approached from a joint programming approach that integrates social programmes that build local capacities and enhance resilience, with infrastructure developments that reduce susceptibility to climate hazards such as floods and their resulting impacts. In the rural wards where communities are scarcely populated, efforts could rather focus on the effective management of rangelands including zoning, awareness creation to inform transition to alternative IGAs, and adoption of early warning systems that build on existing local capacities and knowledge.

A major challenge observed by the PCRA is that future changes in vulnerability and exposure are characterized by high levels of uncertainty. While general trends in population and economic growth can provide some insight, projecting future economic development at the ward level, and what this means for levels of exposure and vulnerability can be speculative. Again, considering the real damages to critical infrastructure such as roads, bridges, and gabions, it is clear that an event comparable in magnitude to the floods caused by the El-Nino rains in the county in 1997-1998, would clearly overwhelm local communities' capacities to cope with the effects of such high-level impacts and subsequent socioeconomic effects.

Key findings from the PCRA process provide a required entry point into the climate change action planning process including prioritization of emergent key actions in each of the wards. It further augments climate change issues highlighted in the Isiolo CIDP including providing emphasis on ward-specific issues that should be considered in the planning and budgeting process from the period 2023 into the ensuing timeline of five years. These include *inter alia* access to water, environmental conservation practices and climate-smart agriculture. These can be stratified from the short to long term with priority given to the most urgent action areas identified in each of the wards. Ultimately, the PCRA provides critical benchmarks against which progress in the implementation can be tracked.

Annexes

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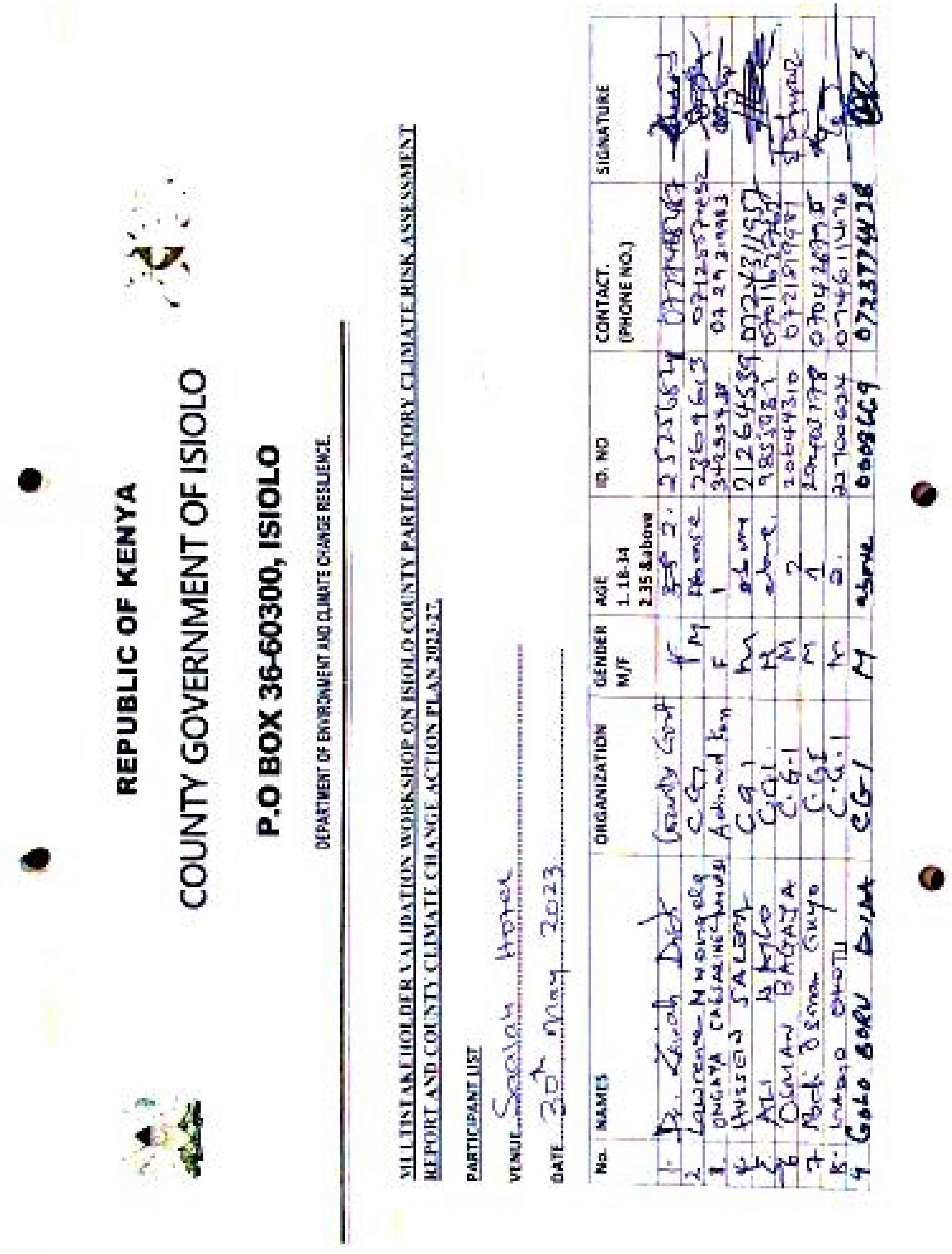
List of PCRA Report Validation Workshop Participants



REPUBLIC OF KENYA

COUNTY GOVERNMENT OF ISIOLO

P.O BOX 36-60300, ISIOLO

DEPARTMENT OF ENVIRONMENT AND CLIMATE CHANGE RESILIENCE.

MULTISTAKEHOLDER VALIDATION WORKSHOP ON ISIOLO COUNTY PARTICIPATORY CLIMATE RISK ASSESSMENT REPORT AND COUNTY CLIMATE CHANGE ACTION PLAN 2023-27.

PARTICIPANT LIST

VENUE: Saaiah Hotel

DATE: 30th May 2023

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