

VOICES FOR JUST CLIMATE ACTION

NAIVASHA

NAIVASHA SUB-COUNTY CLIMATE CHANGE VULNERABILITY
REPORT
SEPTEMBER 2022



www.muungano.net/

Executive Summary

INTRODUCTION

Climate change, ecosystem degradation, and social inequality can threaten community development and well-being across Kenya. Climate change in Kenya is already increasingly the vulnerability of Kenya's residents living in precarious situations, such as those living in slums, in poverty and in risky environmental settings. Current climate change governance and strategies are not prioritizing these environmental injustices, and more inclusive and integrated planning can help ensure Kenya pursues climate justice.

Urban climate injustice is, in part, about disproportionate burdens from new environmental, social, and human health risks but also about how existing vulnerabilities, from exposure to urban air pollution, to frequent flooding, to insecure housing, to precarious employment, are being made worse by a rapidly changing climate. Urban climate justice includes calls for changing both the processes and outcomes of science and policy, such as ensuring previously ignored groups and places are included and that human rights concerns are given more weight in decision making than abstracted models of decontextualized, one-size-fits-all risk assessments.

In this report, we report on the knowledge shared by residents in Naivasha about climate vulnerabilities and their suggestions for policy and planning proposals to achieve greater climate justice. The data collection described here was led by Muungano wa Wanavijiji (Muungano) and SDI-Kenya (SDI-K), as part of the Voices of Just Climate Action programme. This program aims to lift-up the voices of civil society, particularly women and youth in Kenya, in order to co-creates locally relevant, inclusive, and climate justice solutions.

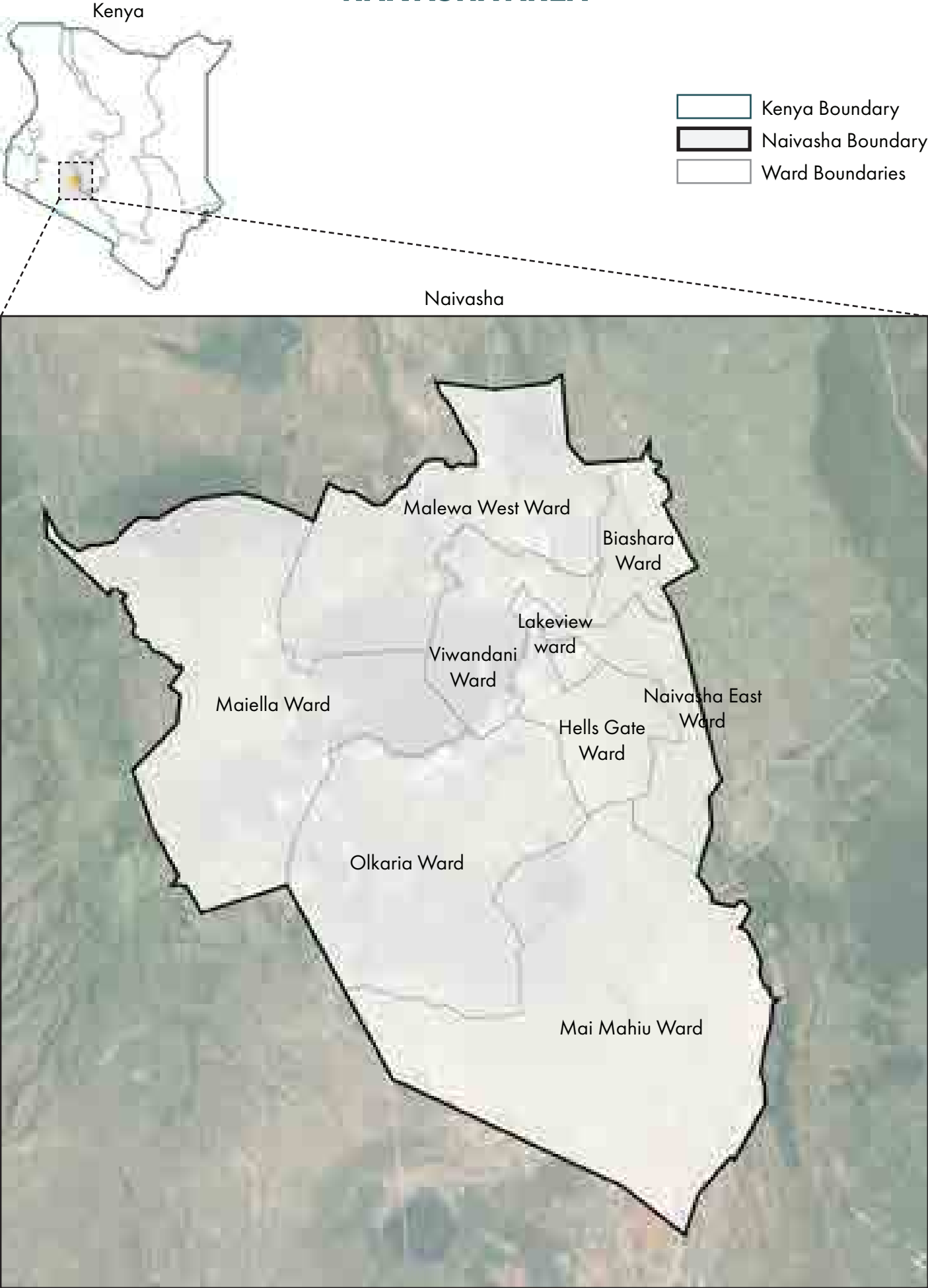
METHODS

This report highlights ward findings from the a household survey and Focus Group Discussions (FGDs) conducted in Naivasha. Vulnerability mapping was also conducted by SDI-K at the Ward level in Naivasha which includes Naivasha East Ward, Maiela Ward, Lake View Ward, Mai Mahiu Ward, Viwandani Ward, Ndabibi Ward, and Olkaria Ward. Community members were mobilized to help collect data from their settlement. The actual data collection started on the 20th to 25th of April 2022 and the FGD's forums and Household data collection were done concurrently.

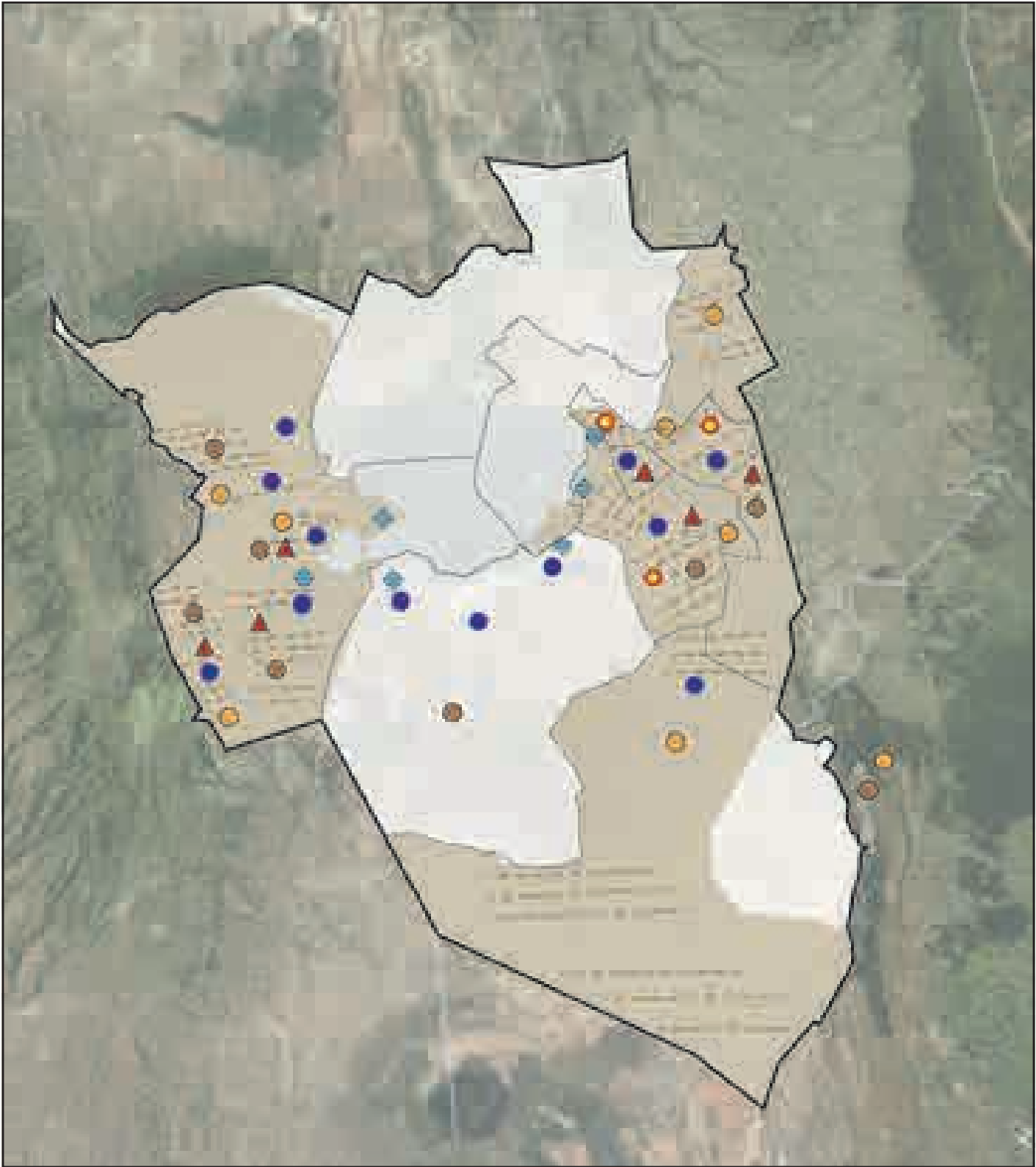
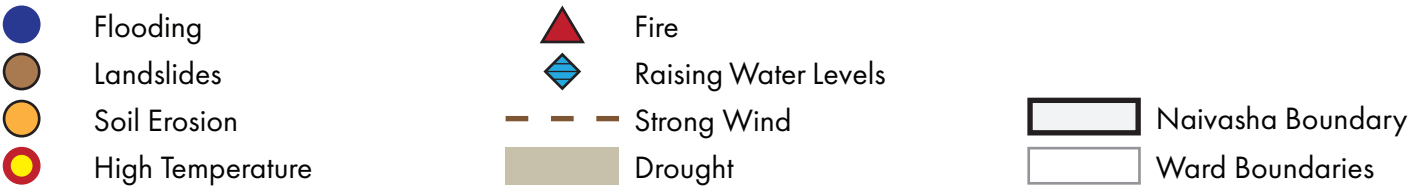
Spatial data were analyzed with the help of Google Earth which enabled the identification of settlement locations within Nakuru County, specifically Naivasha Sub-County. ArcGIS analysis enabled the presentation of the areas majorly affected by the climate-related hazards/disasters as well as the scope. Microsoft Excel and SPSS were used to analyze the statistical data collected from the respective households within the settlements. The FGD's findings were synchronized using a template enough to present all the key components in the FGD guide.

The UC Berkeley, Center for Global Healthy Cities (www.healthycities.berkeley.edu) summarized the findings shared by Muungano and SDI-K and generated this report.

NAIVASHA AREA



NAIVASHA CLIMATE RISK MAP



Key Climate Vulnerability Issues

MOST FREQUENT COMMUNITY IDENTIFIED CLIMATE CHANGE-RELATED RISKS IN NAIVASHA



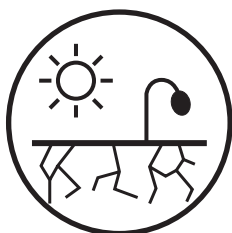
Winds

Strong winds have caused property destruction by carrying away roofing sheets from structures, making repairs costly. Wind damage has reduced working/business opportunities and incomes. Strong winds are also suspected of contributing to health issues by increasing exposure to dust particulate matter and air pollution.



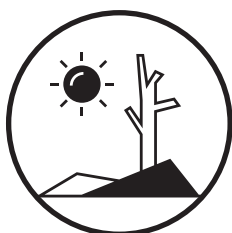
Floods

Floods have caused displacement, destruction of property, loss of jobs, and wildlife threats. Floods can kill, destroy infrastructure, contaminate water and food. Floods have deadly impacts because many poor communities receive runoff from the top of plains. Floods also contribute to food insecurity as crops are destroyed, food prices increase and the quantity of food decreases.



Droughts

Droughts have led to water scarcity, livestock starvation, and reduced produce, all of which contributes to food insecurity. Drought also increases poverty due to the increases in the price of food and how drought can limit livelihoods and reduce income, such as for street vendors.



High Urban Temperature

Rising temperatures have caused lower crop yields and increased the presence of mosquito-vector-transmitted diseases such as malaria and dengue fever. Heat-related diseases include stroke, heart attacks & asthma, and is a leading cause of hospitalization. Excessive, prolonged heat can contribute to adverse outcomes at birth and stunt infant growth.

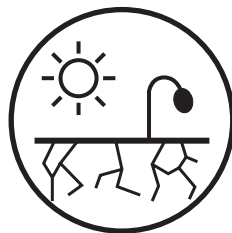
MOST FREQUENT COMMUNITY IDENTIFIED CLIMATE CHANGE-RELATED RISKS IN NAIVASHA



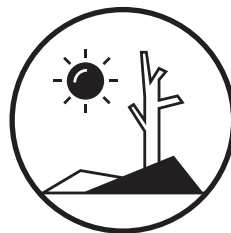
Winds



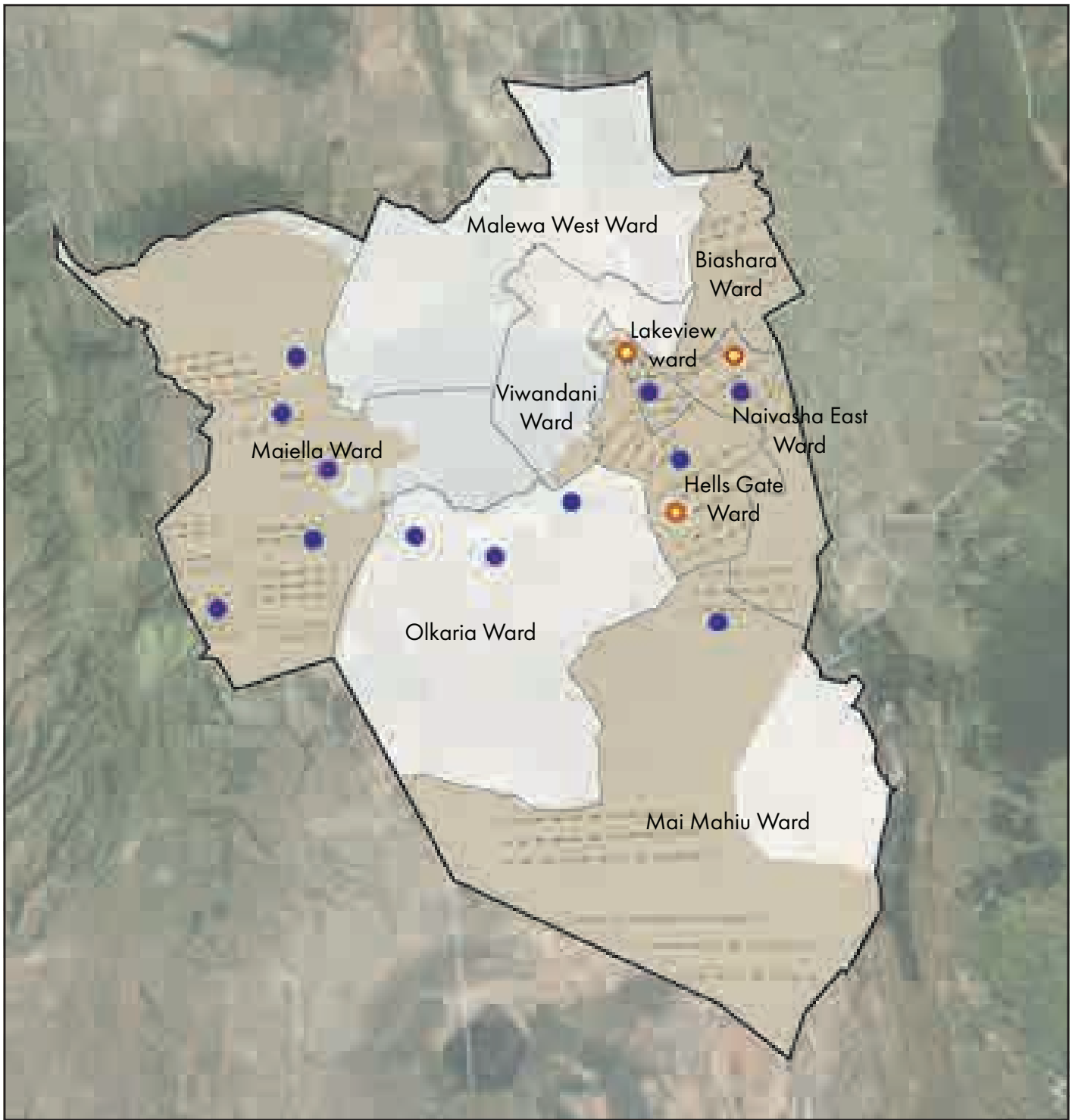
Floods



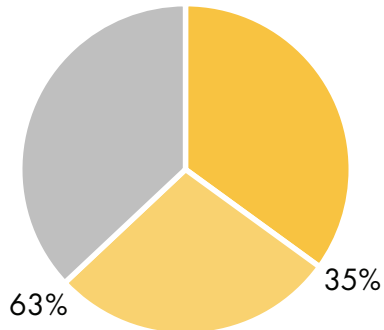
Droughts



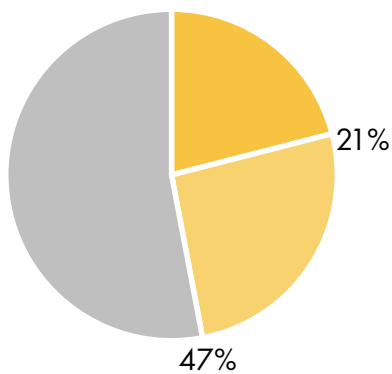
High Urban Temperature



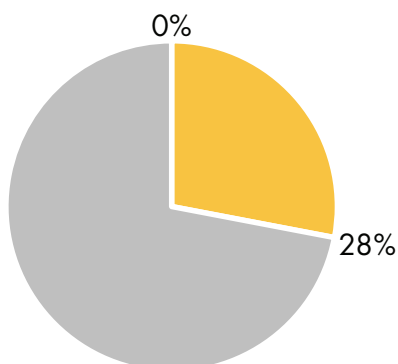
COMMUNITY PERCEPTIONS OF PREPAREDNESS FOR A CLIMATE CHANGE RELATED DISASTER IN EIGHT NAIVASHA WARDS



35% to 63%
FEEL UNPREPARED



21% to 47%
**FEEL PARTIALLY
PREPARED**



0% to 28%
FEEL FULLY PREPARED

** According to the question in Household Analysis Tool (Appendix 2): How prepared is your family to handle natural disasters? (Fully prepared, somehow prepared, and not prepared.)*

MAJOR IMPACTS ON VULNERABILITY & CLIMATE INJUSTICE IN NAIVASHA



Loss of Income

At least in 7 Wards

Strong winds and flooding have contributed to reducing working/business hours and family/individual income. A low crop yield due to drought or flooding also lead to a decrease in income as farmers have little or no agricultural produce to market.



Property Destruction

At least in 7 Wards

Floods and strong winds lead to property destruction by carrying away components or roofing sheets from structures and destroying infrastructure such as roads and toilets.



Water and Air Pollution

At least in 7 Wards

Residents are overly reliant on firewood and charcoal for energy. These also contribute to local air pollution. Floods destroy local water infrastructure, such as wells, taps & toilets, and one result is water contamination as from the pread of sewage. Women bear the greatest burden from damaged toilets and being forced to travel farther for water collection.



High Food Prices

At least in 7 Wards

Climate change related foods & drought destroy crops, lead to low farm productivity and increase food prices. Strong winds tend to blow farm crops away, resulting in crop destruction. High food prices limit opportunities for street food vending and other livelihood possibilities.



Water and Food Shortage

At least in 7 Wards

Drought has caused a water shortage resulting in some boreholes and dams drying up due to the reduced rainfall. Families are forced to skip meals and children often suffer the most from food shortages. Malnutrition and low nutrient absorption can result from prolonged food insecurity.

** The number of wards facing an vulnerability issue is calculated based on household analysis.*



Health Problems

At least in 6 Wards

Climate change related weather has increased eye problems due to dust and asthma. High urban temperatures cause headaches, stroke and heart disease. Lack of access to healthy foods, clean water and safe sanitation can increase susceptibility to infectious diseases, such as cholera. People exposed to prolonged food insecurity and displacement also experience serious mental health issues, such as anxiety, that can contribute to disease and death.



Displacement

At least in 6 Wards

Property damage often leads to displacement. Residents are forced to relocate to available cheap land after disasters. In some areas, house rents have increased after a disaster. This has forced people to relocate to less expensive areas that are often further from employment and social connections.



Environmental Deterioration

At least in 6 Wards

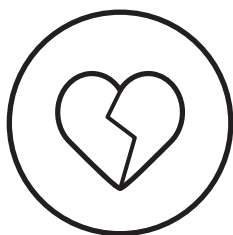
Flooding has caused soil erosion and degraded the environment by carrying and depositing waste. Water sources are depleted and damaged by drought and floods. Energy sources such as firewood and charcoal also have an environmental impact since they cause deforestation.



Reduced Accessibility

At least in 3 Wards

Floods cause road damage and closure, reducing accessibility to business and work. Besides, roads may get too muddy to travel from one location to the next, limiting residents to stay at home.



Loss of Life

At least in 2 Wards

In some cases, people were swept away by floods. The longer-term damage to health and potential early death are still unknown. The mental illness from chronic climate change vulnerabilities and displacement can contribute to fatal stress-induced events, such as stroke and heart attack.

** The number of wards facing an vulnerability issue is calculated based on household analysis.*

COMMUNITY IDENTIFIED PRIORITIES FOR REDUCING CLIMATE INJUSTICE IN NAIVASHA WARDS

	Number of Wards
1. Water and sanitation-related projects	++ ++ ++ ++
2. Food security-related projects	++ ++ ++ +
3. Disaster management	++ ++ ++ +
4. Education-related projects	++ ++ ++
5. Health-related projects	++ ++ +
6. Environmental conservation-related projects	++ ++
7. Infrastructure related projects	++ +
8. Afforestation	++ +

TABLE OF CONTENTS

Executive Summary	1
Key Climate Vulnerability Issues	4
Background & Methods	11
Findings by Ward Name	13
Viwandani Ward	13
Biashara Ward	17
Olkaria Ward	20
Lakeview Ward	24
Hell's Gate Ward	28
Maiella Ward	31
Mai Mahui Ward	36
Naivasha East Ward	40
Way Forward & Recommendations	44
Appendix	48

BACKGROUND & METHODS

BACKGROUND

Climate change, ecosystem degradation, and social inequality trends threaten significant progress made on human well-being. Climate change in Kenya is increasingly impacting the lives of Kenya's citizens and the environment. Kenya has experienced a general warming trend since 1960, and the trend of rising temperature is expected to continue. This change has affected both social and economic activities.

Vulnerability to climate change is the degree to which a system is not capable of and unable to cope with adverse effects of climate change, including climate variability and extremes. Vulnerability mapping of climate change entails the mapping exposure, sensitivity, and coping strategies of human beings to climate change threats. A climate change vulnerability map is vital to assist the government and other stakeholders during the environmental assessment, spatial planning, infrastructural development, and regulation of activities that lead to environmental degradation.

A just transition will require increased recognition of how society is reliant on ecological systems and recognition of already unequal rights. However, current climate change governance models are yet to fully support inclusive and integrated planning. The systems of economic development and governance that brought us the climate crisis continue to persist as the same group of individuals in power continue to make the decisions. In this regard, Muungano wa Wanavijiji, SDI-Kenya in partnership with six organizations is implementing a five-year program on Climate action - Voices of Just Climate Action.

This program aims to unite and inspire civil society coalitions for a positive and innovative just transition agenda. Together we believe this needs a new level of civil society leadership by women and youth in Kenya hence our vision: A world where civil society is heard and respected as it influences and co-creates locally relevant, inclusive, and fundable climate solutions that deliver real benefits to people and nature as part of local and global responses to the climate crisis.

Governor Lee Kinyanjui signed the Nakuru County Climate Change Bill 2020 in May 2020, making it the Nakuru County Climate Change Act, 2020. The Nakuru climate change act will help the assembly to establish a framework and mechanisms for mobilizing and facilitating county governments, communities, and other stakeholders to respond to climate change effectively through appropriate adaptation and mitigation measures, as well as for related purposes.

Muungano wa Wanavijiji is supporting the county government of Nakuru to form ward-level committees by collecting data in the community to help the committees make the right decisions on projects to be prioritized and ensure the climate change funds get to the community level. In Naivasha, climate change vulnerability mapping was conducted to assess the impacts of natural disasters on livelihood, social infrastructure, physical infrastructure, and the level of governance and preparedness in response to these natural disasters. The process created awareness of climate change in different wards in Naivasha.

METHODS

Preparation of Data Collection Tools

1. Phones installed with ODK application and the VCA vulnerability mapping questionnaire.
2. SDI vulnerability mapping questionnaire.
3. Maps to guide data collection on ArcGIS software.

Identification of Informal Settlements

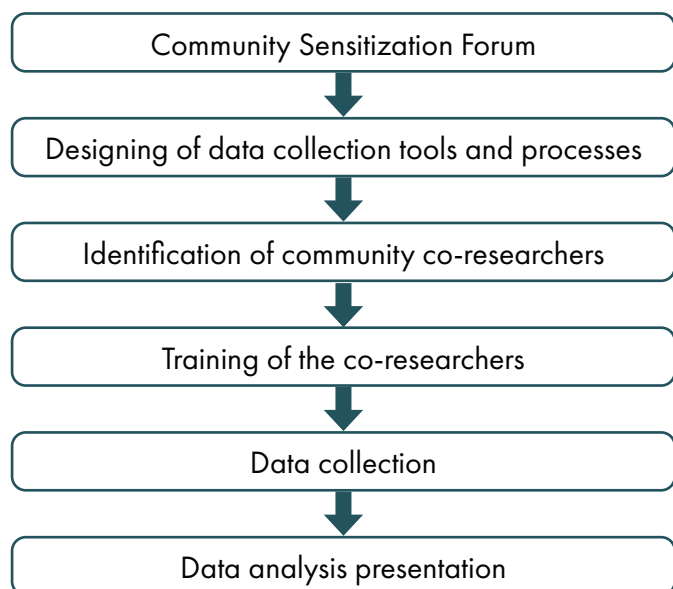
Vulnerability mapping data collection was conducted at the Ward level in Naivasha which includes Naivasha East Ward, Maiela Ward, Lake View Ward, Mai Mahiu Ward, Viwandani Ward, Ndabibi Ward, and Olkaria Ward.

Training of Data Collection Team

Community members were mobilized to help collect

data from their settlement. This team was first trained on the vulnerability mapping tool used in data collection. The training forum helped the data collection team to understand the vulnerability mapping and climate change-related issues under the VCA program and some of the expectations at the end of the data collection process. Community members from respective settlements were entitled to data collection in their settlements to enhance accuracy and reliability.

Summary of Methodology



Data Collection

The actual data collection started on the 20th to 25th of April 2022 and the FGD's forums and Household data collection were done concurrently.

Data Analysis

Spatial data were analyzed with the help of Google Earth which enabled the identification of settlement locations within Nakuru County, specifically Naivasha Sub-County. ArcGIS analysis enabled the presentation of the areas majorly affected by the climate-related hazards/disasters as well as the scope. Microsoft Excel and SPSS were used to analyze the statistical data collected from the respective households within the settlements. The FGD's findings were synchronized using a template enough to present all the key components in the FGD guide.

Data Description

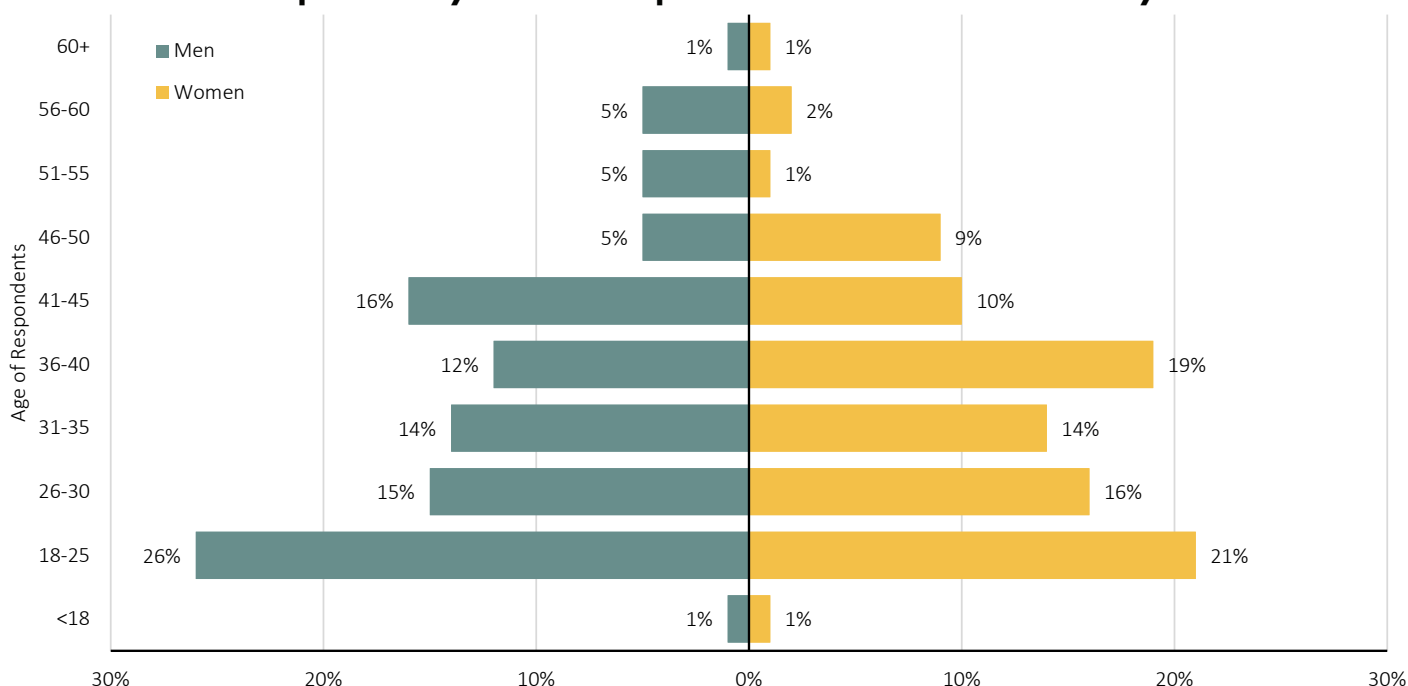
The household data collection was conducted in eight wards in the Naivasha sub-county in Nakuru County. In total, 541 household questionnaires were administered using the ODK tool. The total questionnaires administered per ward were as follows:

- 99 in Viwandani ward
- 39 in Biashara ward
- 73 in Olkaria ward
- 43 in Lakeview ward
- 89 in Hell's gate ward
- 71 in Maiella ward
- 73 in Mai Mahiu ward
- 55 in Naivasha East ward

From the survey conducted in Naivasha, an estimated 53% of the respondents were females, and 47% were males. The majority of respondents were middle-aged adults aged between 35-60 years (43%).

The elderly i.e., above 60 years, contribute to 1% of respondents recorded from the survey.

Population Pyramid of Respondents in Naivasha Sub-county



FINDINGS BY WARD NAME

VIWANDANI WARD

Most Frequent Reported Risks



Winds

29%



Floods

28%

** Percentages show the percentage of households reporting a disaster in the Household Analysis.*

Community Preparedness

48%

Feel Unprepared

35%

Feel Partially Prepared

17%

Feel Fully Prepared

** According to the question in Household Analysis Tool (Appendix 2): How prepared is your family to handle natural disasters? (Fully prepared, somehow prepared, and not prepared.)*

Major Impacts on Vulnerability



Property Destruction



High Food Prices



Reduced Accessibility



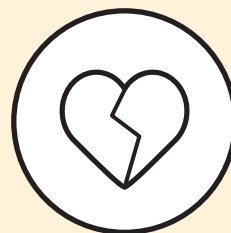
Loss of Income



Displacement



Environmental Deterioration



Loss of Life



Health Problems

Overview

In Viwandani ward, a total of 99 household questionnaires were administered from different settlements such as Genesis, Godfirst, Kabati, Guest inn, Hopewell, Kabati, Kaburi, Kanjo, Site, Viwandani, and Wambari. A total of 60% of the respondents were females, while 40% were males. The most common household typology is the regular household typology (45%) which means it is male-headed but lives with the wife and children. On the other hand, 29% of households interviewed are female headed-single parents, widowed or divorced.

Climate Trends and Impacts of Natural Disasters on Livelihoods

The most common natural disasters reported in the ward are strong winds (29%) and flooding (28%). From the sample household survey conducted in this ward, there is low farm productivity due to floods that continuously destroy crops, leading to high food prices. Flooding events have rendered some road infrastructure impassable, thus reduced accessibility in the area. This has further led to property destruction, causing some enterprises to discontinue their activities, resulting in a decline in income. It has contributed to displacement, as some individuals were forced to relocate to safer places.

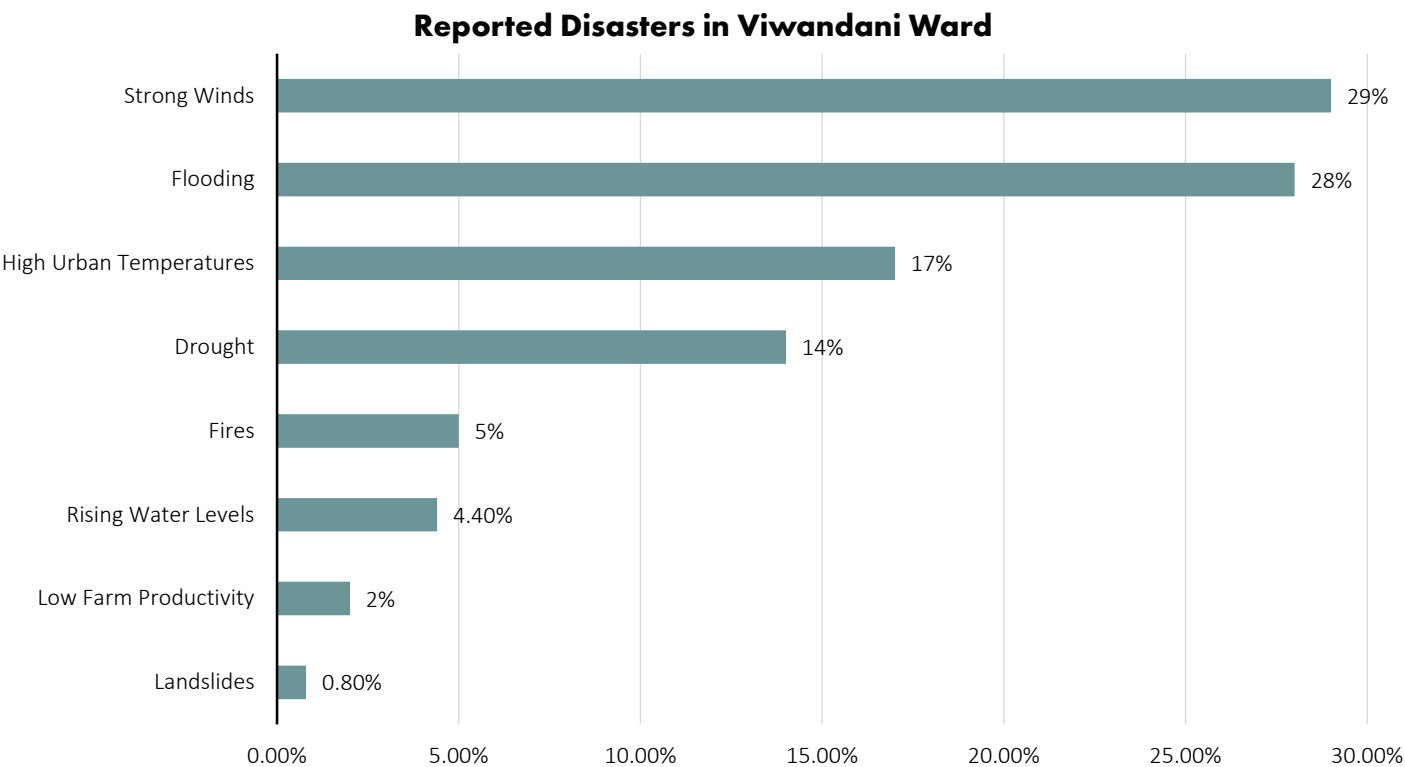
In some cases, house rent doubled due to the high cost of living, forcing some to relocate to less expensive areas. Because most people stay indoors during floods, there has been little engagement within the community. In addition, the survey has revealed that

flooding has caused soil erosion and degraded the environment in Viwandani Ward by carrying and depositing waste in various places. In some cases, these events have resulted in deaths, as people were swept away by floods. In Viwandani Ward, Kabati, Kanjo, Site, Hopewell, and Guest inn are among the areas that have been flooded.

Further, strong winds have caused property destruction by carrying away roofing sheets from structures, making repairs costly. Collectively, disasters e.g. strong winds and flooding reported in this ward, have contributed in reducing working/business hours thus reducing family/individual income. Strong winds have increased respiratory diseases such as chest complications and asthma. The entire Viwandani ward is experiencing strong winds. Approximately 17% of the residents interviewed reported experiencing high urban temperatures. Additionally, strong winds reported in the ward have also increased the amount of dust in the area, causing eye problems. The chart below depicts the other natural calamities that have affected the ward.

Natural Disaster Response

The majority of Viwandani residents responded to natural disasters by relocating, purchasing gumboots and other protective gear for school-aged children, and actively practicing afforestation. Some residents did nothing to help in the aftermath of the disasters. The community responded by working together to construct drainage systems, terraces, dams, and bridges, as well as tree planting. Finances, construction materials, and



drainage systems were provided by community-based organizations and the government.

Impacts of Natural Disasters/Environmental Hazards on Energy

Electricity is the most prevalent form of cooking energy, with 45% of residents using it and 29% using LPG gas. They use electricity since it is readily available and accessible to nearly everyone in the settlement. The 11% of residents who use charcoal, on the other hand, believe it has a negative influence on the environment. Charcoal also causes respiratory ailments, with most people developing chest problems and asthma. Other sources of energy are; Biofuels (7%), Kerosene (5%), and Firewood (3%).

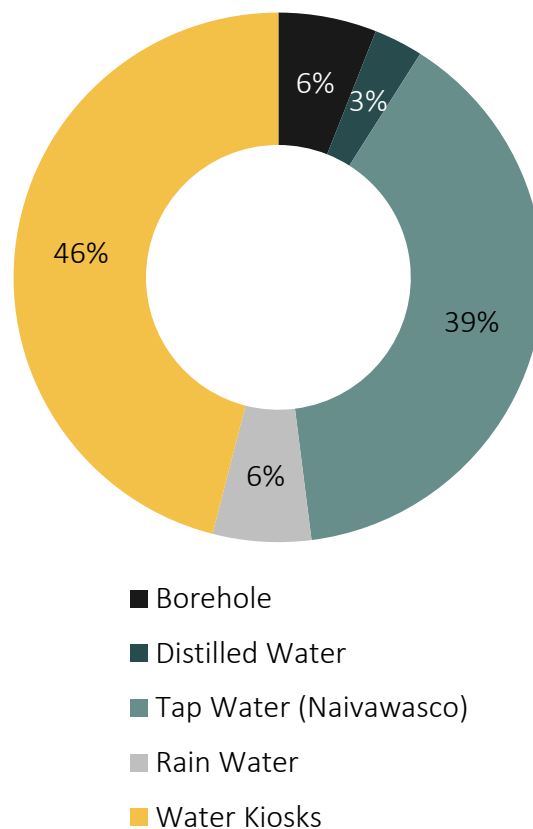
Impacts of Natural Disasters/Environmental Hazards on Physical Infrastructure

Water kiosks (46%) and tap water (39%) are the most common sources of water. Tap water is primarily provided and distributed by Naivawasco. Other water sources are listed in the chart on the right. However, they pointed out that sewage mixes with borehole water when it floods, resulting in contamination owing to water pollution. Borehole water also contains fluoride, which is toxic to humans and causes fluorosis. Water scarcity occurs during the drought season, resulting in crop drying and reduced farm yields.

Household Disaster Preparedness and Governance

In Viwandani ward, an estimated 48% of the community is unprepared in the event of a disaster, 35% are partially prepared, and only 17% are fully prepared. Lack of preparedness in the event of a disaster is contributed to a lack of funds, training, and instruments

Sources of Water in Viwandani Ward



to equip themselves with the knowledge, information, and processes to help them deal with any calamities that may come. Collectively, 23% of the community have attended a disaster preparedness meeting, 18% have attended a first aid training session, 7% have engaged in a disaster drill, and 42% have participated in volunteer-related activities. There is a need for disaster management training and sensitization forums. On the other hand, households aim to mitigate natural disasters and environmental hazards by planting trees, raising awareness, and assuring the safety of each individual through proper waste disposal.

Kabati Sub-Location

In the last few years, there has been a change in rainfall patterns and increased drought that has led to the community sourcing its food from Kinangop. As a result, deforestation and rural-urban migration have increased. The area has experienced a rise in water levels of L. Naivasha, which causes recurrent flooding. This causes a scarcity of fish, causing some community members to change their occupations, i.e., from a fisher to a hustler. Kabati also experiences strong winds

that have resulted in eye problems among the residents and destruction of property by blowing away the roofing sheets. The community identified hotspots prone to strong winds namely; behind Kabati Primary, Makaburi, and Level 4 hospital District hospital in Naivasha. Men, children, and people living with disabilities are the most affected by drought and rising sea levels. They are more prone to respiratory diseases, eye problems, and waterborne diseases.

The community has access to CHVs who provide civic education on disease prevention only when there is an outbreak. However, they recommended increasing the number of CHVs to reach the whole population and pharmaceutical products/medicines in the health facilities. They also proposed using other alternative sources of cooking energy such as briquettes instead of charcoal and firewood since they produce carbon fumes that affect the health of individuals and cause air pollution resulting in respiratory diseases. They recommended subsidization of the cost of alternative energy sources so that every individual can afford to use them. Kabati has waste management private groups that collect wastes from households once per week and transport the

waste to Mdakii dumpsite in Kayole, Lakeview ward. However, the area has no formal collection point whereby they can place the wastes as they await transportation to the dumpsite.

The community has an inventory of hazards stored at the chief's office. They also have a disaster response plan by the CBOs in the sub-location. However, they are not fully prepared to handle a disaster due to the lack of proper knowledge and mechanisms for disaster response and management. However, they mobilize the community members to address the disasters and inform the local administration, i.e. the chief, to organize aid and relief. The community has been engaged in climate change forums that Naivasha Climate Change Network convened.

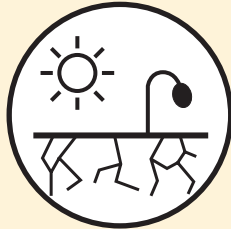


Key Priority Areas of Viwandani Ward

- 1. Infrastructure related projects**
- 2. Water and sanitation-related projects**
- 3. Food security-related projects**
- 4. Health-related projects**
- 5. Environmental conservation-related projects**
- 6. Education-related projects**
- 7. Disaster management**

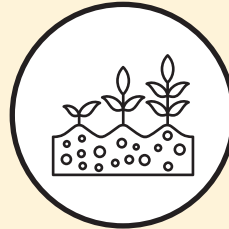
BIASHARA WARD

Most Frequent Reported Risks



Droughts

48%



Low Farm Productivity

24%

** Percentages show the percentage of households reporting a disaster in the Household Analysis.*

Community Preparedness

62%

Feel Unprepared

30%

Feel Partially Prepared

8%

Feel Fully Prepared

** According to the question in Household Analysis Tool (Appendix 2): How prepared is your family to handle natural disasters? (Fully prepared, somehow prepared, and not prepared.)*

Major Impacts on Vulnerability



High Food Prices



Loss of Income



Water and Food Shortage



Water and Air Pollution



Health Problems



Environmental Deterioration

Overview

In Biashara ward, 39 household surveys were administered from different settlements such as Kinamba, Kahuruko, Muteithia, Gachagi, Line Moja, Muthithi, Kambi Ndogo, White, Highland, Mununga, NYS, Karati, and Ndoroto. A total of 51% of the respondents were females, while 49% were males. The most common household typology is the regular household (64%) which means it is male-headed but lives with the wife and children.

Climate Trends and Impacts of Natural Disasters on Livelihoods

The most prevalent natural disasters reported in the ward are drought (48%) and low farm productivity due to pests and diseases (24%). From the sample household survey conducted in this ward, there is a low crop yield due to drying up of crops leading to high food prices and a decrease in income as farmers have little or no agricultural produce to market. Collectively, disasters such as drought and low farm productivity have contributed to water scarcity and livestock starvation. The entire Biashara ward is experiencing drought while areas such as Mununga, Kinamba, NYS, Ndoroto, and Karati settlements face low farm productivity. The chart below depicts the other natural disasters that have affected the ward.

Natural Disaster Response

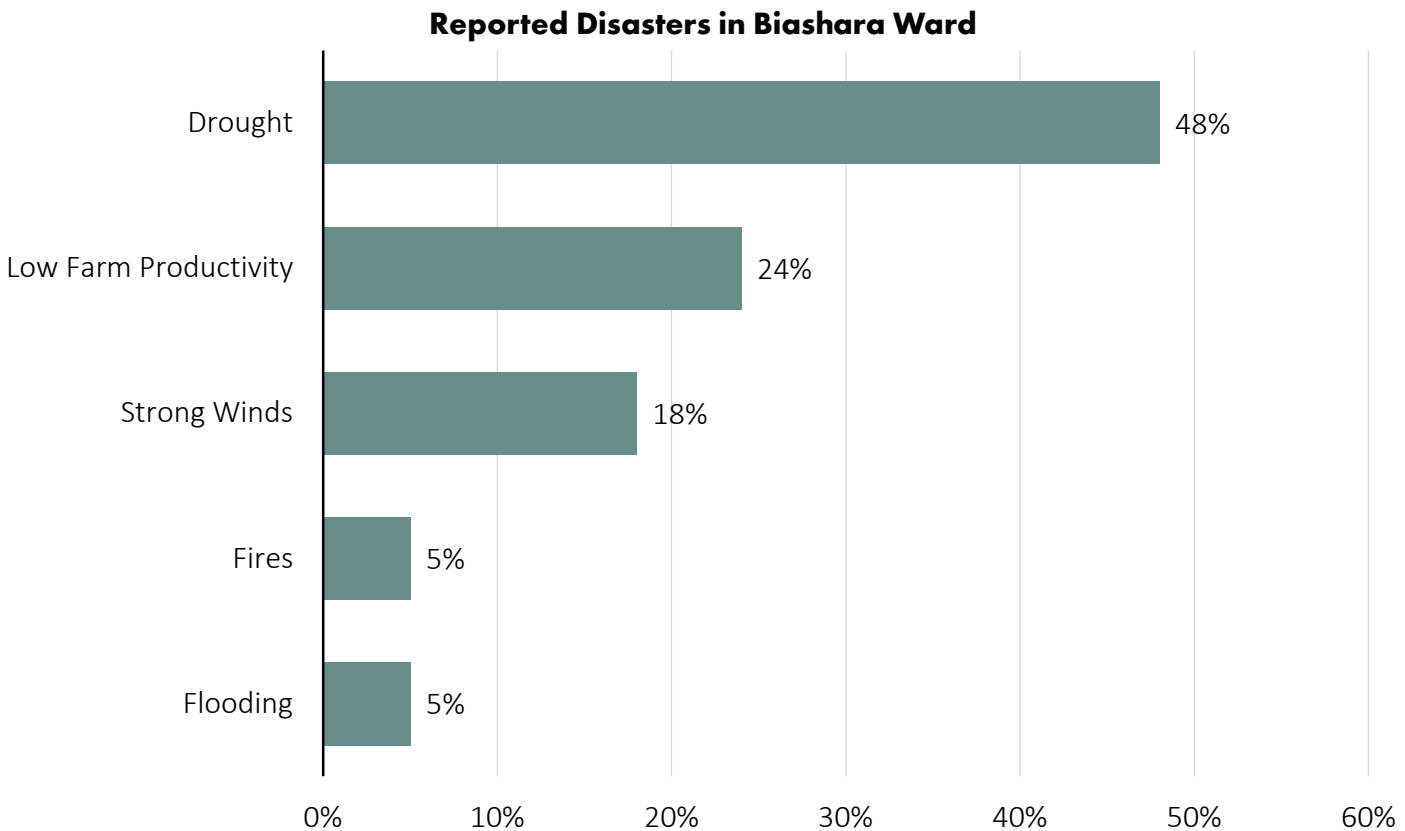
The majority of Biashara residents responded to natural disasters by planting trees and looking for more food. Some residents did nothing to help in the aftermath of the disasters. The community responded by working together to reconstruct damaged roads and planting trees in the community. It was reported by the majority that community-based organizations and the government were said to have done nothing.

Impacts of Natural Disasters/Environmental Hazards on Energy

Firewood (41%) and charcoal (22%) are the most common sources of cooking energy. They stated that they employ these energy sources because it is inexpensive for everyone to use. However, they have an environmental impact since they cause deforestation, which reduces forest cover and causes air pollution, contributing to respiratory disorders such as chest problems and asthma. Other sources of energy include; Electricity (13%), Biogas (9%), Kerosene (9%), and LPG (6%).

Impacts of Natural Disasters/Environmental Hazards on Physical Infrastructure

Rainwater is the most prevalent source of water (72%). Drought has caused a water shortage resulting in some boreholes and dams drying up due to the reduced rainfall. Boreholes (21%), tap water (5%), and water kiosks (2%) are some of the other sources of water.



Household Disaster Preparedness and Governance

In Biashara ward, 62% of the community said they are unprepared in case of a disaster owing to a lack of funds, training, and tools to equip themselves with the knowledge, information, and processes to help them deal with any calamities that may come. Only 8% said they are fully prepared in the event of a calamity, while 30% said they are prepared in some way. As a result,

disaster management training and sensitization forums are required. No one has managed to attend a disaster preparedness meeting, 10% have attended a first aid training session, none have engaged in a catastrophe drill, and 8% have participated in volunteer-related activities. On the other hand, households try to mitigate natural disasters and environmental hazards by planting trees to reduce the severity of the drought in the area.



Key Priority Areas of Biashara Ward

- 1. Water-related projects**
- 2. Afforestation**
- 3. Health-related projects**
- 4. Food Security**
- 5. Education-related projects**

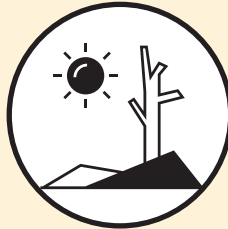
OLKARIA WARD

Most Frequent Reported Risks



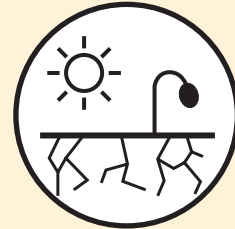
Floods

32%



High Urban Temperature

25%



Droughts

23%

** Percentages show the percentage of households reporting a disaster in the Household Analysis.*

Community Preparedness

57%

Feel Unprepared

32%

Feel Partially Prepared

11%

Feel Fully Prepared

** According to the question in Household Analysis Tool (Appendix 2): How prepared is your family to handle natural disasters? (Fully prepared, somehow prepared, and not prepared.)*

Major Impacts on Vulnerability



Property Destruction



Loss of Income



Environmental Deterioration



Displacement



High Food Prices



Water and Food Shortage



Water and Air Pollution

Overview

In Olkaria ward, 73 household surveys were administered from different settlements such as Arimi arimuru, DCK, Hell’s gate, Kamere, Kasarani, Kimwatu, Kwa Muhia, Olkaria, Rift, and Sher. A total of 45% of the respondents were females, while 55% were males. The most common household typology is a regular household (53%) which means it is male-headed but lives with the wife and children.

Climate Trends and Impacts of Natural Disasters on Livelihoods

Flooding (32%), high urban temperatures (25%), and drought (23%) are the most common natural calamities reported in the ward. Flooding events have caused destruction of properties and farm produce, resulting in a drop in business activities. As a result, the residents have a low income. It has also resulted in land degradation due to increased soil erosion, making farming more challenging. Property destruction has resulted in the death of animals and the displacement of people. Drought has increased food prices due to reduced agricultural yields induced by water scarcity. Drought has also widened the scope of bare land, which increases the amount of dust particles released into the atmosphere when soil erosion occurs. Other disasters experienced in the ward are strong winds (11%), earthquakes (2%), landslides (2%), low farm productivity, and fires (2%)

Natural Disaster Response

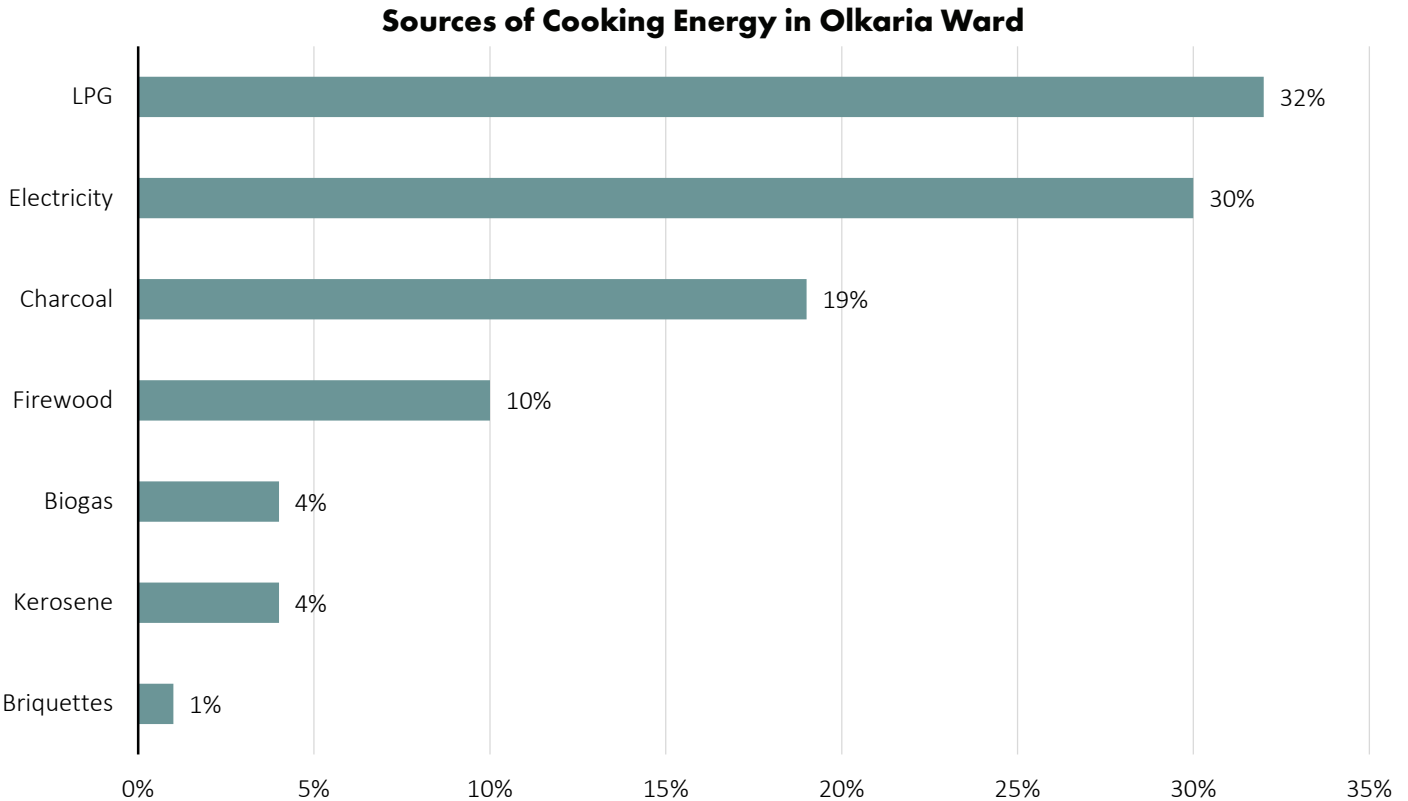
The majority of Olkaria residents chose not to send their children to school in response to natural disasters. In the aftermath of the disasters, some residents did nothing to help themselves. The community's response was to do nothing. The majority of respondents reported that community-based organizations and the government provided funds and held fundraising campaigns.

Impacts of Natural Disasters/Environmental Hazards on Energy

Electricity (30%) and LPG gas (32%) are the most prevalent sources of cooking energy. They stated that they employ these energy sources because they are accessible and efficient in cooking. However, 10% and 19% of people use firewood and charcoal, respectively, which have an environmental impact since they release carbon emissions, causing air pollution. They also contribute to deforestation. 1% of the respondents use briquettes, which are more environmentally friendly and energy-efficient, reducing the impact on trees and lowering pollution levels in urban areas. Other sources of cooking energy are shown in the chart below.

Impacts of Natural Disasters/Environmental Hazards on Physical Infrastructure

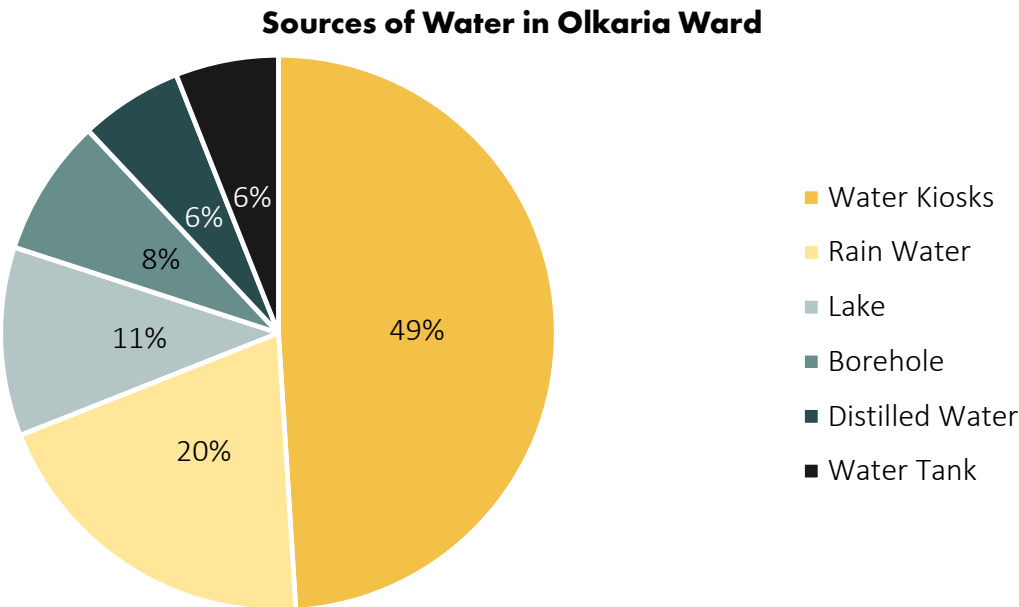
The most common water sources are water kiosks (49%) and rainwater (20%). Based on the analysis, the ward does not have piped water. However, when floods occur, it leads to the destruction of water infrastructure and water contamination as the water is mixed with sewage.



Household Disaster Preparedness and Governance

In Olkaria ward, 57% of the community stated that they are not prepared in case of a disaster due to the lack of finances, training, and tools to help them in disaster management. 32% stated they are somehow prepared, and only 11 % are prepared in case of an occurrence of a disaster. As a result, disaster management training and

sensitization forums should be necessary, as 34% have managed to attend a disaster preparedness meeting, 19% have attended a first aid training session, 7% have engaged in a disaster drill, and 15% have participated in volunteering related activities. Households attempt to mitigate natural disasters and environmental hazards by planting trees and educating one another through involvement in environmental programs that raise awareness about natural catastrophes.



Kwa Muhia Sub-Location

Over the last five years, the area has experienced landslides, drought, flooding, rising water levels in the lake, and low production of fish in the lake. Floods have been very rampant in 2020-2022 and occur mainly during the rainy season. Floods affect the majority of the community since it leads to displacement, destruction of property, loss of jobs as well as wildlife threats. Landslides have also been experienced between 2021-and 2022 and affect most of the residents living in Kamere by causing displacement and destruction of property. Drought mostly occurs once a year and affects most of the crops grown by reducing productivity and increasing the wildlife threats as well as starvation across all the area residents. Rising water levels result in floods and displacement of the people living close to the lake.

Fishing, casual jobs, motorbike riding (Boda-boda), flower farms, and selling of sand used

for construction are the major economic activities undertaken in Olkaria Ward for women, men, and children. The chemicals used in the flower farms have major negative effects on the environment since they are hazardous, especially to the air and water. They also have serious health implications for the people working on the flower farms. Overfishing in the lake has led to the extinction of some fish species. The disasters experienced majorly affect the economic activities since during drought there is less supply of food products which causes their prices to go up. Motorbike riding (Boda-boda) work is also affected by the rising water levels since it risks the life of the riders. Heavy rainfall destroys property and in turn, results in displacement and loss of jobs.

Amoeba, Malaria, Flu, Cold, Asthma, Diarrhea, Cholera, and Typhoid are the prevalent diseases in the area. Asthma is majorly caused by the air

pollution from flower farms. Typhoid and cholera are experienced during the rainy season due to contamination of the water consumed by human waste and chemical components from the flower farms. During the onset of drought, diarrhea is witnessed since there is a water shortage and the community majorly depends on stagnant untreated water which is rendered unsafe for human consumption. The FGD participants highlighted that there is no proper sensitization on disease prevention mechanisms by the MOH and CHVs. They, therefore, suggested that awareness should be capitalized on to prevent malaria, training on health issues should also be held occasionally, a public health facility should be developed and necessary policies against emissions from the flower farms should be reinforced by the government.

FGD participants stated that their waste is disposed of in the dumpsite and is usually collected by the Kwa Muiya Environmental Group (KMEG). The group picks up the waste every Wednesday from the households and takes the waste to the dumpsite. The groups are not fully able to ensure

all the waste is collected hence some areas experience bad smell and untidiness due to the uncollected waste in their neighborhoods. Liquid waste is majorly disposed of along the road and open fields which in turn causes the outbreak of water-borne diseases. Kwa Muiya Environmental Group also recycles plastics and glass which has created employment and enhanced cleanliness by recycling and reusing the non-biodegradable waste in the environment.

The community has no inventory and response plan/strategy for the disasters which have occurred. The community contacts the village elders and the Nyumba Kumi initiative to inform other government officials during the onset of the disaster. The community is less prepared since it does not have a mechanism put in place to handle the disasters/hazards which occasionally affect the area residents. The community, therefore, suggests that the government should prioritize the hazard response strategy and improve the disaster response know-how among the community members.



Key Priority Areas of Olkaria Ward

- 1. Water-related projects**
- 2. Disaster management**
- 3. Health-related projects**
- 4. Food security**
- 5. Environmental conservation**

LAKEVIEW WARD

Most Frequent Reported Risks



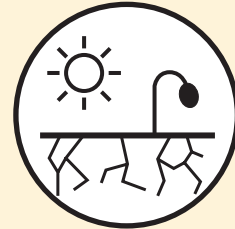
Floods

26%



Winds

25%



Droughts

16%

** Percentages show the percentage of households reporting a disaster in the Household Analysis.*

Community Preparedness

35%

Feel Unprepared

44%

Feel Partially Prepared

21%

Feel Fully Prepared

** According to the question in Household Analysis Tool (Appendix 2): How prepared is your family to handle natural disasters? (Fully prepared, somehow prepared, and not prepared.)*

Major Impacts on Vulnerability



Property Destruction



Reduced Accessibility



Displacement



Water and Air Pollution



Water and Food Shortage



Loss of Income



High Food Prices

Overview

In Lakeview ward, 43 household questionnaires were administered from different settlements such as Kasokoo, Kayole, Kihoto, Lakeview, and Third drive. 58% of the respondents were females, while 42% were males. The most common household typology is the regular household (50%) which means it is male-headed but lives with the wife and children.

Climate Trends and Impacts of Natural Disasters on Livelihoods

The most prevalent types of natural disasters that occur in the ward are flooding (26%), strong winds (25%), and drought (16%). Flooding has led to low levels of business activities due to property destruction. It has also resulted in road closures due to the floods. As a result, getting to work becomes difficult, resulting in job losses as some roads get too muddy to travel from one location to the next. It has led to some people relocating from one area to another, displacing them from their houses. Dust particles in the atmosphere have increased due to strong winds, causing eye and chest complications. Strong winds tend to blow farm crops away, resulting in crop destruction. As a result, farm production decreases, and farmers have less produce to market, resulting in lower-income. It also causes soil erosion, exposing the ground and affecting agricultural production. Drought causes a rise in food prices due to reduced crop yields, resulting in higher living standards.

Natural Disaster Response

The majority of residents in Lakeview did not react to natural disasters. The response of the community was to do nothing. Community-based organizations and the government, according to the majority of respondents,

did not respond to the calamities.

Impacts of Natural Disasters/Environmental Hazards on Energy

Electricity (58%) is the most common source of energy used. It is environmentally friendly and conveniently accessible to all residents. However, the 13% who use charcoal emphasized that it leads to deforestation and produces air pollution due to carbon emissions. Other sources of energy are LPG (28%) and biofuel (2%).

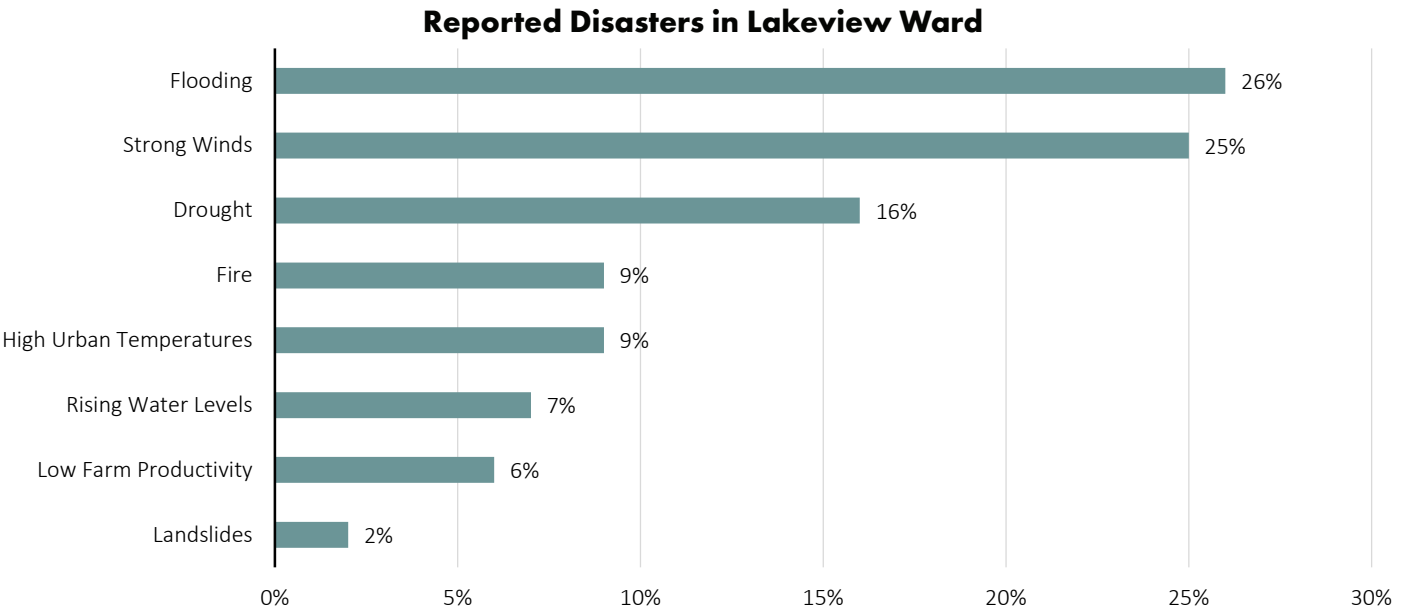
Impacts of Natural Disasters/Environmental Hazards on Physical Infrastructure

Rainwater (49%) and piped water (26%) are the most popular water sources. The other water sources include water kiosks (16%), distilled water (12%), and boreholes (7%). However, due to the drought, the ward is experiencing water scarcity.

Household Disaster Preparedness and Governance

In Lakeview ward, 35% of the community stated that they are not prepared in case of any disaster due to the lack of information that can help them tackle any disasters. About 44% stated they are somehow prepared due to savings. However, they need proper disaster management training. Only 21% said they are adequately prepared to face a disaster, although they need proper disaster management training. They claimed that, in comparison to past disasters, households are more prepared to deal with disasters.

As a result, disaster management training and sensitization forums should be necessary, as 16% have managed to attend a disaster preparedness meeting, 21% have attended a first aid training session, 7% have engaged in a disaster drill, and 12% have participated



in volunteering related activities. On the other hand, households attempt to mitigate natural disasters and environmental hazards by planting trees, cleaning

drainage systems, and creating awareness of natural disasters and environmental hazards.

Kayole Sub-Location

Over the last five years, the area has experienced strong winds, drought, flooding, hailstones, invasion of insects, and a rise in temperatures. Flood has been prevalent from 2019 to current, especially during the rainy season affecting the entire community by causing displacement and destruction of bridges. Strong winds occur often and have majorly affected children by causing eye problems. Drought has been experienced over the last 4 years and has affected the community by causing starvation and depression due to a rise in social problems in families. Hailstone's cause of the destruction of property, death of animals, and destruction of crops. Hailstones have been experienced for the last four years and affect the entire community as well as the surrounding biodiversity.

Farming, construction, and business are the major economic activities for men. Women majorly engage in flower farming, waste picking, and other casual works. Children work in construction, flower farms, and sometimes 'Kazi mtaani' government initiatives. Flower farms cause both air and water pollution due to their harmful gaseous and liquid emissions which are discharged into the water sources. Waste picking activity affects the health of the residents since they lack the necessary PPEs when handling the waste in the dumpsites. Burning of waste which sometimes happens in the dumpsites causes air pollution since the smoke emitted is hazardous. Heavy rains which trigger the floods, destroy flower greenhouses leading to loss of employment. Drought on the other hand also lowers the agricultural produce causing starvation and loss of a job to the people working on the farms. This has in turn led to the rise in poverty levels and a high rate of school dropouts.

Flu, Tuberculosis, Depression, Typhoid, Cholera, and Malaria are some of the diseases caused by natural disasters. Cholera is caused by floods as a result of the contamination of drinking water. Strong winds cause eye problems and flu due to coldness and the dust blown by the wind when

passing through the area. Drought is the main cause of depression since starvation and a rise in poverty levels result in depression. Other hazards which threaten human health are strong winds which cause houses to collapse causing injuries, high levels of fluoride in water which leads to tooth coloration, and wildlife attacks which cause injuries, destruction of property, destruction of crops, accidents, and spread of zoonotic diseases. The FGD participants highlighted that they have been trained on any disease prevention measures/mechanisms by the MOH but the know-how is not satisfactory hence they suggested civic education to be one of the priorities in their community. They also suggested there should be sensitization of the area's residents during chief Barazas, immunization against Malaria, supply of mosquito nets, and actions to be taken by KWS against straying animals.

FGD participants stated that they dispose of their waste in pits but some of the waste is collected in gates. There is one collection point in the area where the private garbage collectors pick up the waste once a week. Land pollution and loss of land productivity were attributed to the waste being disposed of in the area. The waste also causes the outbreak of some diseases such as Typhoid, Cholera, and Diarrhea. Liquid waste is also disposed of in open drains and open fields which also aggravates the rate of waterborne diseases outbreak. Sometimes the wastewater ends up in their water sources (boreholes) which in turn results in serious health issues due to contamination. The situation of water never gets better since they do not even have recycling and water treatment plants in the area.

The community usually keeps an inventory of the disasters experienced. They usually inform the ward administrator, MCA, and Chiefs to take action or rather inform the necessary officials in charge of disasters at the county or national level. The community has planted trees to act as wind-breakers and has as well changed the

roof styles to counter the effects of hailstones. The government has aided in disaster response by the construction of bridges destroyed by floods, supply of avocado seedlings, and fencing of game parks to reduce human-wildlife conflict

even though the fencing is not sustainable. They suggested that the government should prioritize the disaster response since it affects the majority of society.

Kihoto Sub-Location

In the past five years, the area has experienced increased rainfall, a rise in water levels in L. Naivasha, and low temperatures that have caused diseases such as flu, arthritis, and tuberculosis. Typhoid, malaria, diarrhea, and amoeba are some of the ailments caused by flooding and rising water levels. The sub-location experienced flooding in March 2020, which affected over 10,000 people. The county government provided food and funds to those affected by the flooding. However, there was corruption in that money was allocated to those not affected, and the affected were left stranded. Ksh.4000 was given to 500 people, which was insufficient for the residents to sustain themselves. Also, the government was charging those affected Ksh.3000 to evacuate them to safer zones, but most could not afford to pay the money required. The county governments have an inventory of hazards that are not easily accessible by the community.

The common income-generating activity in this sub-location is fishing, which women, men, and youth do. They stated that fishing harms the

environment and the community in that it has led to the death of fishers, unemployment, it has posed a risk to the aquatic life, has led to a dirty environment, and has led to school dropouts, as most would opt to do fishing to generate some income instead of going to school. Fishing has been affected by the rise in water levels in L. Naivasha, resulting in a decline in fishing activity as fish move closer to/into the settlement. The floods and rising water levels have the greatest impact on landowners.

Lakeview ward has Mdakii dumpsite, whereby the plot owners pay Ksh.200 to dispose of their waste. Households pay Ksh.50 for waste collection services. The community members proposed that the county government help transport the waste from the households to the dumpsite. There are also waste management groups in Kihoto that collect garbage from the community twice a month. The community stated that they lack proper drainage systems as sewage is diverted to L. Naivasha, leading to the destruction of wildlife and its habitats.

Key Priority Areas of Lakeview Ward

- 1. Education-related projects**
- 2. Disaster management**
- 3. Water-related projects**
- 4. Health-related projects**
- 5. Food security**
- 6. Afforestation**

HELL'S GATE WARD

Most Frequent Reported Risks



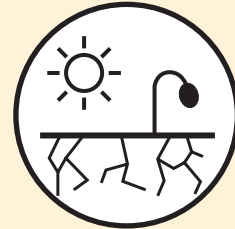
Floods

32%



Winds

23%



Droughts

20%

** Percentages show the percentage of households reporting a disaster in the Household Analysis.*

Community Preparedness

51%

Feel Unprepared

21%

Feel Partially Prepared

28%

Feel Fully Prepared

** According to the question in Household Analysis Tool (Appendix 2): How prepared is your family to handle natural disasters? (Fully prepared, somehow prepared, and not prepared.)*

Major Impacts on Vulnerability



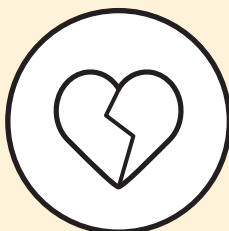
Property Destruction



Loss of Income



Reduced Accessibility



Loss of Life



Health Problems



Water and Food Shortage



Water and Air Pollution

Overview

In Hell’s Gate ward, 89 household questionnaires were administered from different settlements such as Acacia, Chechinia, Githuuri, Karagita, Kiandege, Kichinjio, Kosovo, Kwa Njuki,Makutano, Maranantha, Maruti, Matangi nne, Metameta, Mirera, Mitimingi, Munyu Reli, Musaka, Muthaiga, Rubiri, Sanctuary, Suncity, and Villas. 49% of the respondents were females, while 51% were males. The most common household typology is the regular household (38%) which means it is male-headed but lives with the wife and children.

Climate Trends and Impacts of Natural Disasters on Livelihoods

The most prevalent types of natural disasters that occur in the ward are flooding (32%), strong winds (23%), and drought (20%). Flooding has led to the destruction of properties and crops, resulting in decreased crop yields. This has caused low levels of business activities and job loss, leading to a low income generated by the residents. It has also led to the destruction of roads, and thus many people are unable to go about their day-to-day activities, including going to work. It has resulted in death and stress, thus causing separation among the residents. Strong winds have caused an increase in respiratory and eye complications, increasing residents' medical expenses. Strong winds

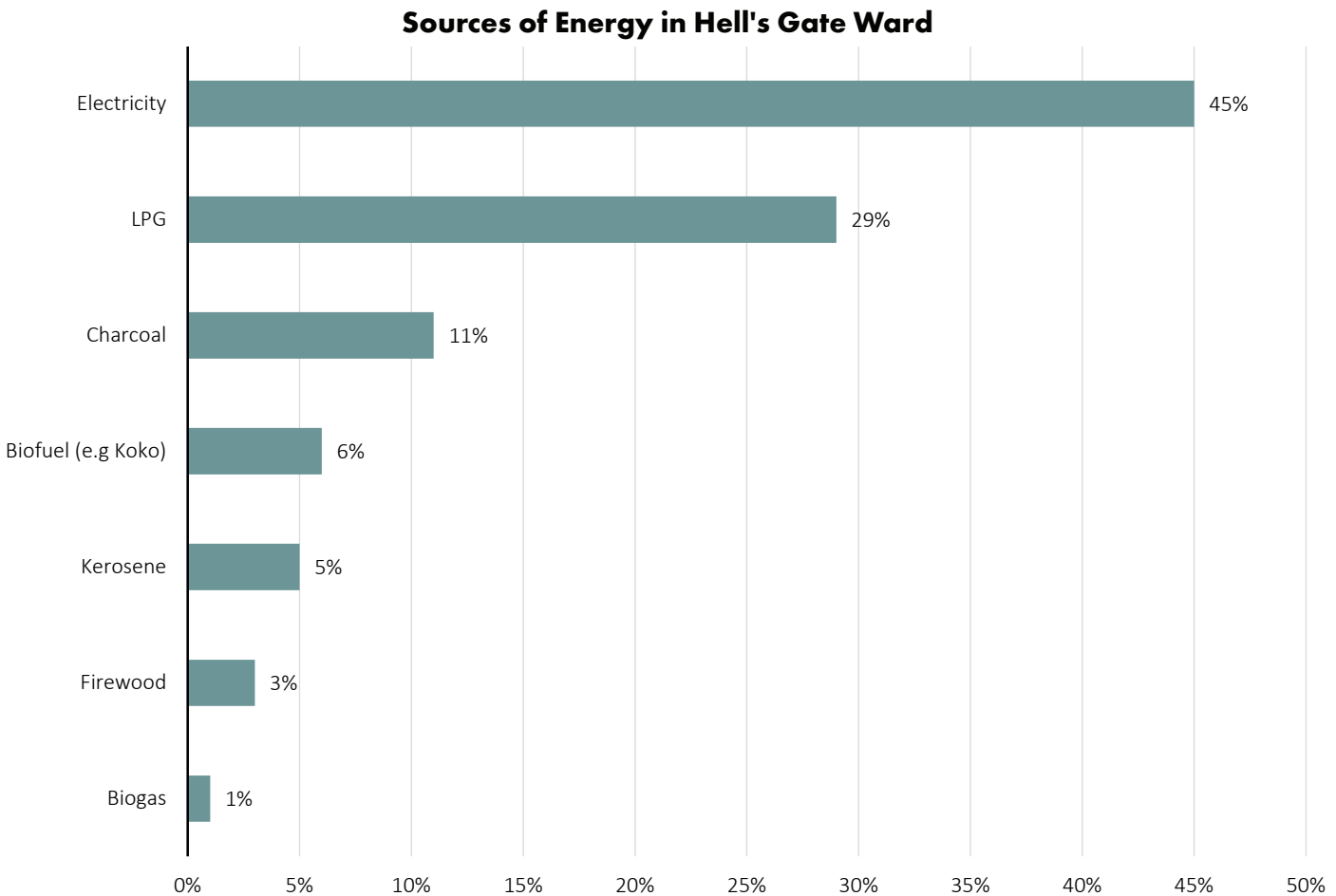
blow away the structures and roofing sheets increasing the expense of rehabilitating these structures.

Drought has led to starvation and the death of animals due to water and food shortage. It has also resulted in a decrease in farm produce due to the drying up of crop yields. Strong winds are experienced in the following areas; Chechinia, Githuuri, Karagita, Maruti, Matangi nne, Mirera, Reli, Sanctuary, and Suncity. Flooding is experienced in the whole ward, while drought is experienced in Karagita, Kiandege, Makutano, Maruti, Matangi nne, Mirera, Muthaiga, and Reli. Other natural disasters experienced in the ward include rising water levels (9%), low farm productivity (7%), high urban temperatures (6%) and fires (3%).

Natural Disaster Response.

The majority of Hells gate residents responded to natural disasters by doing nothing to help in the aftermath of the disasters. The community responded by working together to reconstruct damaged roads and planting trees in the community. It was reported by the majority that community-based organizations and the government were said to have done nothing, while a few noted that they created awareness.

Impacts of Natural Disasters/Environmental Hazards on Energy



The most common source of cooking energy used is electricity (45%) as it is easily affordable and accessible by all residents. However, those that use charcoal (11%), Kerosene (5%), and Firewood (3%) stated that they cause air pollution due to the fumes produced, thus causing respiratory illnesses.

Impacts of Natural Disasters/Environmental Hazards on Physical Infrastructure

The most common source of water is borehole (76%). Other sources are piped water (21%), rainwater %, and wells (2%). However, they are experiencing water scarcity during drought and water contamination during flooding.

Household Disaster Preparedness and Governance

In Hell's gate ward, 51% of the community stated that they are unprepared in case of a disaster due to the lack of information and disaster preparedness training that can help them tackle any disasters. 21% are somehow prepared as they have savings. Only 28% are fully prepared in case of an occurrence of a disaster as they have been sensitized to such. They stated that the households are less likely to handle a disaster compared to the last occurrence. Thus, disaster preparedness training and sensitization forums should be necessary, as 8% have managed to attend a disaster preparedness meeting, 15% have attended a first aid training session, 7% have engaged in a disaster drill, and 3% have participated in volunteering related activities. However, the households try to mitigate natural disasters and environmental hazards by taking care of the environment and creating awareness.

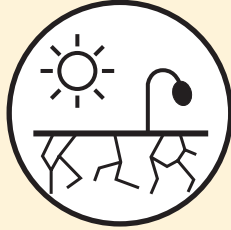


Key Priority Areas of Hell's Gate Ward

- 1. Education-related projects**
- 2. Environmental conservation**
- 3. Disaster management**
- 4. Water-related projects**
- 5. Food security projects**

MAIELLA WARD

Most Frequent Reported Risks



Droughts

40%



Floods

25%

** Percentages show the percentage of households reporting a disaster in the Household Analysis.*

Community Preparedness

62%

Feel Unprepared

37%

Feel Partially Prepared

1%

Feel Fully Prepared

** According to the question in Household Analysis Tool (Appendix 2): How prepared is your family to handle natural disasters? (Fully prepared, somehow prepared, and not prepared.)*

Major Impacts on Vulnerability



High Food Prices



Water and Food Shortage



Water and Air Pollution



Health Problems



Loss of Income



Displacement



Property Destruction



Environmental Deterioration

Overview

In Maiella ward, 71 household surveys were administered from different settlements such as Moi Ndabi, Kinja, Ndabibi, Snakie, Kipkonyo, Kongoni, Kinja, Kianugu, Ngondi, Sero, Elera, Oloika and Ndabibi central. 59% of the respondents were females, while 41% were males. The most common household typology is a regular household (61%) which means it is male-headed but lives with the wife and children.

Climate Trends and Impacts of Natural Disasters on Livelihoods

The most prevalent natural disasters experienced are drought (40%) and flooding (25%). Other natural disasters reported in this ward include; strong winds, landslides, low farm productivity due to pests and diseases, fires, high urban temperatures, and earthquakes. Drought has negatively affected this area. Some of the effects are; a reduction in farm produce, which leads to increment in the prices of food, water shortage, increase in dust particles in the atmosphere, respiratory complications in human beings, and migration of people. Also, flooding has affected people significantly in that it has led to the destruction of properties, displacement of people, and loss of livelihood.

Natural Disaster Response

The majority of Maiella residents responded to natural disasters by storing more food. The community responded by doing nothing. It was reported by the majority that community-based organizations and the

government were said to have done nothing while a few noted that they provided excavators.

Impacts of Natural Disasters/Environmental Hazards on Energy

Charcoal (30%) and firewood (25%) are the most prevalent sources of cooking energy. They stated that they employ these energy sources because they are affordable for all. However, these energy sources have an environmental impact since they release carbon emissions into the atmosphere, causing air pollution. They also contribute to deforestation in the area. Other sources include LPG (20%), electricity (14%), kerosene (7%), and biogas (4%),

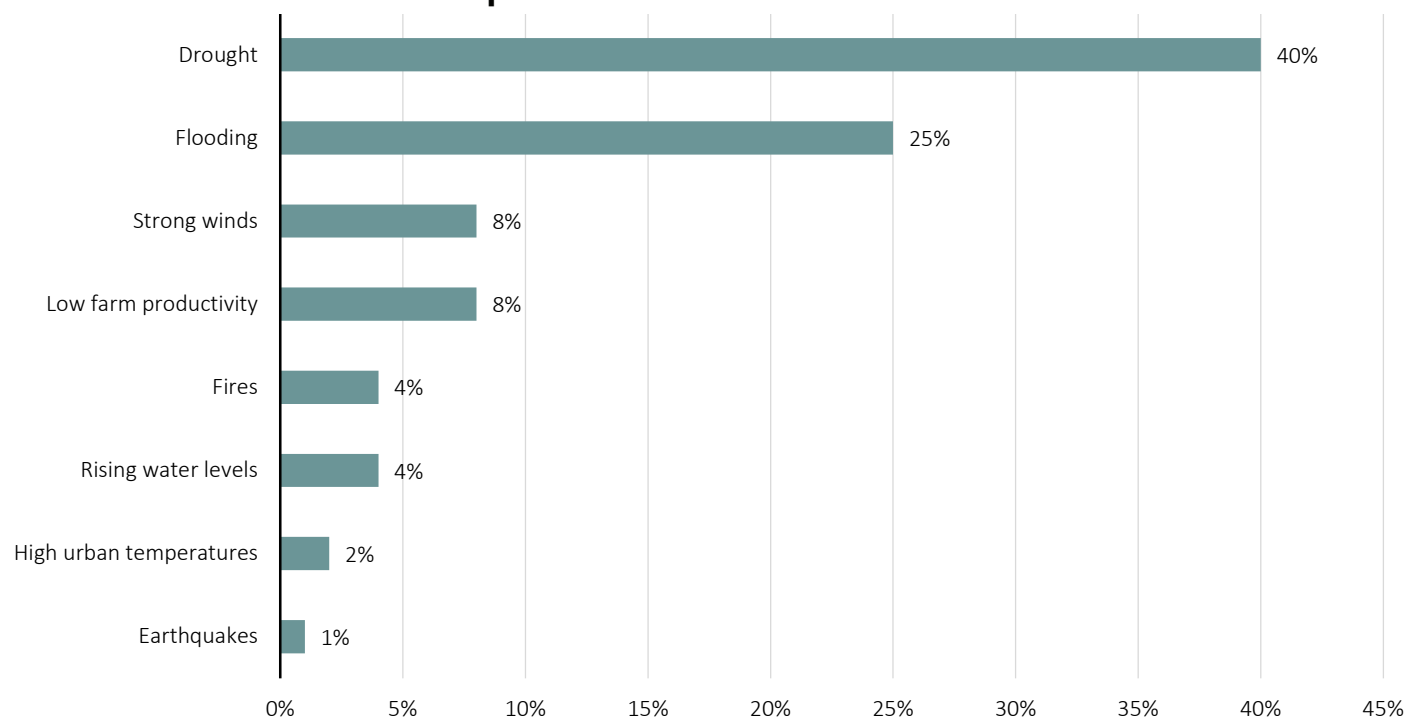
Impacts of Natural Disasters/Environmental Hazards on Physical Infrastructure

A majority (74%) of people in this ward source water from boreholes, 20% use rainwater, and 3% source water from the water kiosks. Other sources of water are dam, lake water, and piped water from Naivawasco. However, drought has led to a shortage of water in the area.

Household Disaster Preparedness and Governance

In Maiella ward, 62% are unprepared in case of a disaster due to the lack of finances. 37% stated they are somehow prepared, and only 1% are fully prepared in case of an occurrence of a disaster. As a result, disaster preparedness training and sensitization forums should be necessary, as 10% have attended disaster preparedness meetings, 18% have attended a

Reported Disasters in Maiella Ward



first aid training session, 8% have engaged in a disaster drill, and 4% have taken part in volunteering related activities. Households attempt to mitigate natural

disasters and environmental hazards by planting trees and creating awareness of natural disasters.

Ngondi Sub-Location

Over the last five years, the area has experienced floods, landslides, strong winds, levels of fluoride in water, soil erosion, and drought. Floods happen as soon as it rains since the area lies close to the mount Longonot plain where the water run-off from the top of the plains downwards to the Ngondi area causing a lot of soil erosion and destruction of property. Floods are the major cause of displacement from areas of residence as well as schools. It has therefore resulted in school access challenges for the school-going children and sometimes they miss going to school or even look for alternative routes and centers to progress with their learning programs. This has had a tremendous financial implication for the parents and has also aggravated the rate of school dropouts in the area. The floods hindered the data collection process. Strong winds are usually experienced from January to March and the FGD participants stated it last happened in March 2022. Landslides are also frequently experienced due to the fault lines along the rift valley majorly caused by the volcanic processes.

Farming and livestock keeping are the major economic activities for men, women, and children. The major crops grown in the area are maize and beans which do not perform as expected due to the tremendous effects of floods and drought which highly affects the level of production. Lack of crop rotation, deforestation, and overgrazing has also affected the produce due to the reduction of soil fertility. This has resulted in the rise in poverty levels and famine in the area which in turn causes starvation of a high percentage of the residents. There are also other secondary economic activities, especially for youths and women which are; small and medium enterprises and motorbike riding (Boda-boda) as an alternative way of earning a living even

though the motorbike transportation sector was affected by the shortage in agricultural produce which they relied on to earn income.

Typhoid, flu, and respiratory diseases are some of the diseases experienced in the area which are attributed to natural disasters. The participants said that there is no health-related education offered hence the government should focus on improving the health sector by promoting civic education among the area residents. The health facilities in the area also do not have necessary services hence proper furnishing of the facilities should be prioritized. The government should also institute policies against harmful gases emission from the Olkaria Geothermal Plant which is causing major respiratory problems in the area.

The community has no proper waste disposal mechanisms since there are no formal designated collection points. The waste is therefore disposed of in the neighborhoods which cause the outbreak of diseases like cholera and typhoid. The water consumed is mainly obtained from the boreholes since there are no rivers. The water used has high levels of fluorine which affects their teeth and causes arthritis in some people. Fluorine also leads to spine problems. Water harvesting also happens during the rainy seasons though it contains a lot of dust since the iron sheets are coated with dust blown by the strong winds.

The community has no disaster management group in their area that responds to disasters. The group informs the village elders via phone during the onset of a disaster. They usually form a committee during the onset of a disaster to help in the recovery of the impacts of the hazards. Some of the major challenges are a lack of finances and proper mechanisms to deal with the disasters/hazards.

Moi Ndabi Sub-Location

Over the last five years, the area has experienced rising temperatures and low rainfall, resulting in

more pests preying on the plants and causing lower crop yields. Floods and landslides have

affected over 315 people. During the FGD session, those in attendance stated that the presence of fault lines in the area was the cause of landslides. The most recent natural disaster to strike the sub-location occurred in February 2022, when strong winds ignited wildfires that destroyed a large portion of the forest cover and a few schools. This led to congestion in schools, and the community sought alternatives for school-going children to learn in churches.

Farming is the most prevalent source of income for men, women, and youth in the Moi Ndabi sub-location. However, it has a detrimental impact on the environment and community because it leads to the loss of lives. Some fish farmers, for example, drown in L. Naivasha, and others are eaten alive by aquatic animals. Crop farming has been affected by natural disasters that have led to decreased rainfall, thus leading to unemployment among the farmers due to decreased crop yields. Also, decreased farm produce has led to decreased income among Boda-boda riders as they were used to transporting the produce from the farm to the market for sale.

Cholera, typhoid, flu, and amoeba are some of the diseases caused by natural disasters in the community. Those in attendance recommended

that there should be mechanisms to support CHVs, such as increasing the number of community health volunteers since the scope of the sub-location is large. This would ensure that every community has access to community health volunteers. It would also ensure that the health volunteers are not overburdened while offering civic education on disease prevention.

The community has no proper waste disposal mechanisms, which has led to diseases in children as all types of waste are thrown in the surrounding. They use boreholes, rainfall, and the Lake as their water sources. However, the water is salty, making it unfit for drinking water. The fluoride in the water has led to arthritis and teeth problems in the residents living there. They stated that the population has increased, leading to a decrease in the water levels as most are now using the Lake water for their activities.

The community has a disaster management group in their area that responds to disasters. The group informs the village elders, who subsequently inform the chief of the calamities. However, they face a dilemma because they lack information on disaster management, leaving them unprepared to deal with environmental hazards.

Kongoni Sub-Location

Over the last five years, there has been a change in rainfall patterns as now it is unreliable and unpredictable. Initially, rainfall would occur between March and April, but that is not the case. This has led to a decrease in crop yields and increased soil erosion. Flooding occurred in the area in 2020, between April and May, that affected 220 households. The area also experienced fires in 2021 and 2022 and strong winds in 2013 and 2014. The prevalent income generating in the area is fishing though fishers overfish harming the community. Also, increased water hyacinth affects fishing, leading to a reduction in fish in the Lake.

Respiratory diseases such as asthma and typhoid are the most common diseases caused by the natural disasters the area has experienced. Also, waste incineration and composting have led to increased health hazards. The community

has access to civic education offered by CHVs. However, the community does not have access to frequent civic education. To improve the health sector in the community, they proposed to have health facilities that are easily accessible by all and to have sufficient medicine in those facilities. They also proposed maternal health care for pregnant mothers.

The community mainly sources its food from outside because not many are farm producers. However, flooding has affected food production in that it leads to a shortage of fish in the Lake. Some of the community members have been employed in flower farms to help them earn an income to purchase food so that they can be able to cope with the negative impacts of the natural calamities.

The area chief has photos and documents that act as an inventory of hazards in the community.

Through the gatekeepers and local leaders, the community has access to information during an occurrence of a disaster. The community is not fully prepared to handle a disaster due to the lack of disaster management mechanisms that the community can adapt. As a result, capacity

building should be carried out to train people to deal with calamities appropriately. They advocated forming a disaster management committee to oversee the capacity building and the distribution of disaster relief funds to the grassroots levels.

Ndabithi sub-location

The area has experienced strong winds, drought, flooding, and soil erosion over the last five years, occurring annually. The flooding occurred in 2019, and drought and strong winds occurred in 2022. These natural disasters have affected the whole community, leading to the displacement of people, destruction of crops, low productivity, and spoiled roads. The county government, however, purchased food for those affected by drought. The action taken was not sufficient because the drought was still more prevalent. Sand harvesting is the most common income-generating activity, even though they negatively impact the environment. The quarry holes are a hazard to children and animals and can cause mild tremors.

Chest complications are the most common illnesses caused by natural disasters. This leads to people being less productive in their day-to-day activities. The community does not have access to civic education offered by CHVs. To improve the health sector in the community, they proposed to have dispensaries that are easily accessible by all and have community training to sensitize the community on health matters. The community

mainly sources its food from outside due to low food productivity and land infertility within the sub-location.

The residents use charcoal and firewood as their sources of cooking energy due to their easy accessibility. However, these energy sources cause pneumonia. The area has a Karima dumping site where they dispose of their garbage. Garbage collection is done twice per week, i.e., on Mondays and Fridays. The community has constructed cases to handle their wastewater. Solid waste disposal has impacted the community as animals eat plastics that are not good for their health. Also, waste incineration causes air pollution. Solid waste disposal has encouraged many to drop out and be waste pickers to earn income.

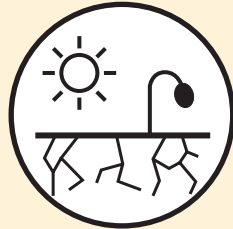
The community does not have an inventory of hazards in the community. It is not fully prepared to handle a disaster due to the lack of disaster management resources. However, the county government has been involved in repairing roads to reduce the risk in case of a disaster. During an occurrence of a disaster, the community is communicated via phone calls and whistle blows.

Key Priority Areas of Maiella Ward

- 1. Water-related projects**
- 2. Disaster management**
- 3. Sanitation-related projects**
- 4. Food security**
- 5. Infrastructure-related project**

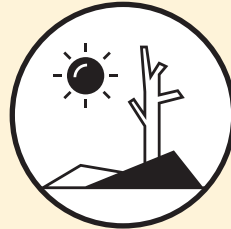
MAI MAHUI WARD

Most Frequent Reported Risks



Droughts

43%



High Urban Temperature

32%

** Percentages show the percentage of households reporting a disaster in the Household Analysis.*

Community Preparedness

63%

Feel Unprepared

36%

Feel Partially Prepared

1%

Feel Fully Prepared

** According to the question in Household Analysis Tool (Appendix 2): How prepared is your family to handle natural disasters? (Fully prepared, somehow prepared, and not prepared.)*

Major Impacts on Vulnerability



High Food Prices



Water and Food Shortage



Loss of Income



Water and Air Pollution



Health Problems



Displacement



Environmental Deterioration

Overview

In Mai Mahiu ward, 73 household surveys were administered from different settlements such as Backstreet, Dam area, Gathima, Gicugu, Kamore, Karesheni, Kariadusi, Karima, Kigesha, Kwel, Longonot, Mafuta taa, Mai Mahiu, Mosque, Mucherere, Muthaiga, Nyakinyua, PCEA, Quarry, Rare, Satellite, Sipemba, Sylvester, Zambezi. 41% of the respondents were females, while 59% were males. The most common household typology is a regular household (51%) which means it is male-headed but lives with the wife and children.

Climate Trends and Impacts of Natural Disasters on Livelihoods

The most prevalent natural disasters reported in Mai Mahiu ward are drought (43%) and high urban temperatures (32%). Other natural disasters reported in this ward include strong winds, landslides, low farm productivity due to pests and diseases, fires, flooding, and earthquakes. Drought has negatively affected this area. Some of the effects are; a reduction in farm produce, which leads to an increase in the prices of food resulting in food insecurity, water shortage, death of animals, poverty due to low income generated as there is insufficient farm produce to market, an increase in dust particles in the atmosphere which causes respiratory complications in human beings, and migration of people to urban centers. Also, high urban temperatures cause adverse headaches due to the extreme heat and make food go bad easily as they cannot withstand the high temperatures.

Natural Disaster Response

The majority of Mai Mahiu residents responded to natural disasters by stocking more food. The community responded by constructing roads and bridges. It was reported by the majority that community-based organizations and the government were said to have done nothing while a few noted that they provided tree seedlings and aid and relief.

Impacts of Natural Disasters/Environmental Hazards on Energy

The most common sources of energy are LPG (24%), electricity (22%), and Firewood (19%). They stated that they employ these energy sources because they are affordable and accessible. However, firewood has an environmental impact since it contributes to deforestation. Also, 17% use biofuels such as biogas and Koko, a renewable energy source that has little or no impact on the environment. Other sources used include charcoal (16%) and Kerosene (12%).

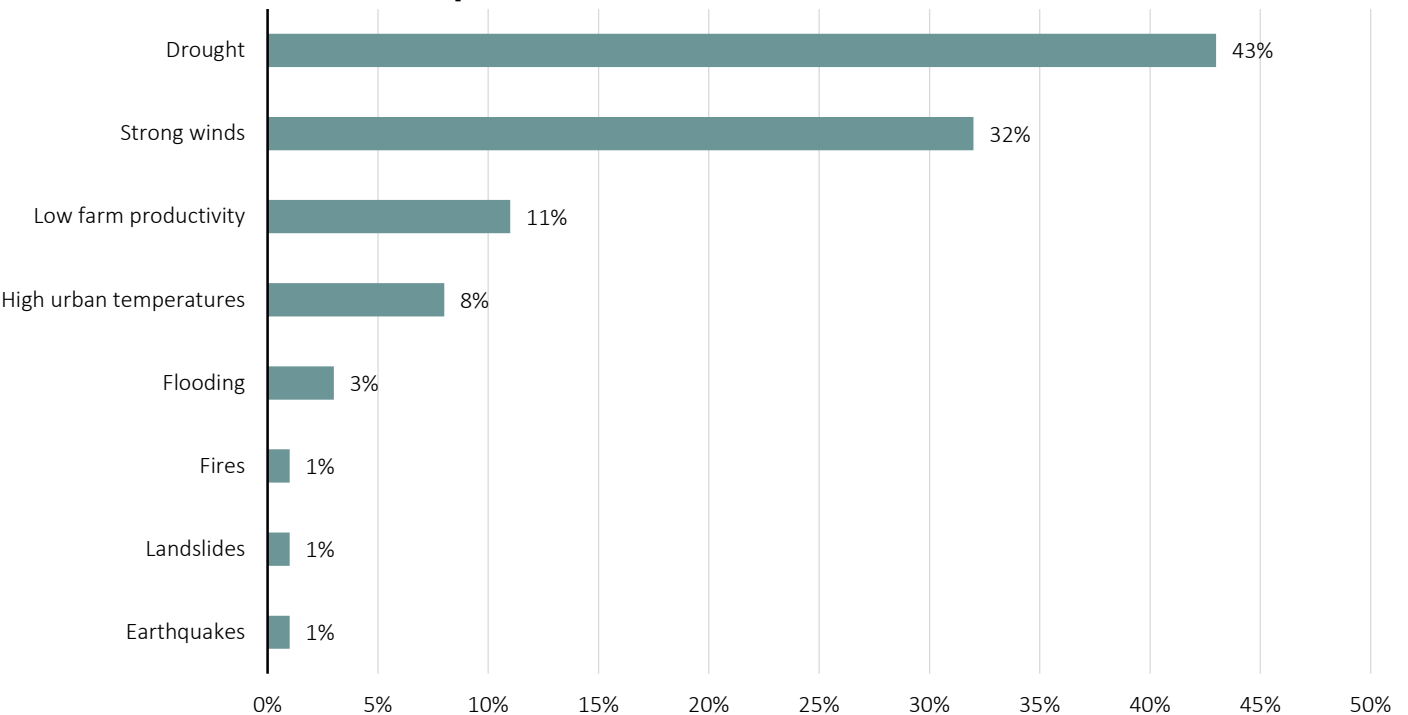
Impacts of Natural Disasters/Environmental Hazards on Physical Infrastructure

The majority (36%) of people in this ward source water from water kiosks, 32% use rainwater, 15% use boreholes, and 12% use piped water. Other sources of water are dams (4%) and distilled water (1%). The area, however, experiences a water scarcity that leads to an increase in the cost of water.

Household Disaster Preparedness and Governance

In Mai Mahiu ward, 63% of the community stated

Reported Disasters in Mai Mahiu Ward



that they are unprepared in case of a disaster due to the lack of finances and information on disaster preparedness. In case of an occurrence of a disaster, 36% of the respondents stated they are somehow prepared, and only 1% are fully prepared. As a result, disaster preparedness training and sensitization forums should be necessary, as 34% have attended a disaster preparedness meeting, 15% have attended a first

aid training session, 3% have engaged in a disaster drill, and 16% have taken part in volunteering related activities. Households attempt to mitigate natural disasters and environmental hazards by planting trees, engaging in more environmentally friendly activities, undertaking soil tests, and creating awareness of disasters.

Longonot Sub-Location

The area has experienced decreased rainfall and increased temperatures due to deforestation and overgrazing. In the past five years, soil erosion and strong winds have affected 600 people, and drought has affected 39,000 people. The community stated they should have a leadership representative who will advocate for their services. Drought has led to absenteeism in school-going children, especially those in primary schools. The children are then forced to carry water and firewood to school, three kilometers away from home, in exchange for food. Luckily, a feeding Programme was introduced to the schools as a relief from a volunteer that increased the number of children going to school because they are sure of having one meal a day.

Sand harvesting is the most common economic activity done by men, women, and youth. Due to the presence of strong winds, some of the most prevalent diseases are typhoid, eye complications, chest pains, and asthma. The community members suggested that CHVs be provided as incentives to offer civic education on disease prevention. There should be a proper health facility in the area that offers various services such as maternity and VCT services.

The residents in the area mostly use firewood, charcoal, and cow feces as a source of cooking energy because of their affordability and availability. However, the use of firewood and charcoal increases the frequency of strong winds

and causes respiratory problems among people. Therefore, they recommended that the government electrify the whole community and install solar panels due to the increased sunrays witnessed in the area.

The community sources its food items from outside the sub-location. This is due to a drop in farm yields as a result of the drought. There is also a human-wildlife conflict, in which buffaloes trespass on human settlements and consume the crops cultivated, forcing residents to obtain farm produce from other sources. They suggested that Kenya Wildlife Services (KWS) fence Mt. Longonot to prevent wild animals from intruding on areas where residents have settled. Some of the coping mechanisms used by the community to deal with the decreased crop production are residents surviving on one meal a day, going on days without eating, taking advantage of the school feeding programs where they offer Githeri, and searching for scrap metals to sell to get the money that can be used to buy food.

The community members recommended having collection points and community dustbins to avoid waste disposal in drainages and trenches that cause pollution. They also recommended having accessible roads to respond fast in case of natural disasters. Longonot sub-location has witnessed a decrease in water levels of L. Naivasha, thus resulting in residents using water vendors as a source of water.

Satellite sub-location

There has been a change in rainfall patterns caused by deforestation over the last five years. This has led to drought and strong winds that

occur every year. Also, the area has experienced flooding in the past five years, which occurred 10 times. The flooding occurred in 2019, 2020, and

2021, leading to the death of two children. The prevalent income generated in the area is sand harvesting and mining. Mining has a negative impact on the environment in that quarry holes pose a risk to both humans and livestock during the rainy seasons.

Flu and eye complications are the most common illnesses caused by natural disasters. The community does not have access to civic education offered by CHVs. To improve the health sector in the community, they proposed to have health facilities, i.e., dispensaries that are easily accessible by all, and have civic education to sensitize the community on disease prevention. The community mainly sources its food from outside, i.e., in Kijabe, because floods and drought

have affected food production. The residents use charcoal and firewood as their sources of cooking energy due to their easy accessibility. However, these energy sources cause respiratory diseases. The area has a dumping site known as Karima dumping site where they dispose of their garbage. Garbage collection is done twice per week, i.e., on Wednesdays and Fridays. The community has constructed water paths to handle their wastewater.

The community does not have an inventory of hazards in the community. It is not fully prepared to handle a disaster due to the lack of disaster management resources. However, the county government has been involved in repairing roads to reduce the risk in case of a disaster.

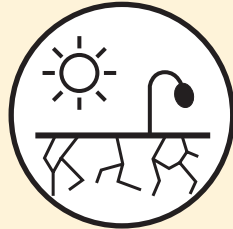


Key Priority Areas of Mai Mahiu Ward

- 1. Afforestation**
- 2. Water-related projects**
- 3. Disaster management**
- 4. Education-related projects**
- 5. Food security**

NAIVASHA EAST WARD

Most Frequent Reported Risks



Droughts

59%



Winds

21%

** Percentages show the percentage of households reporting a disaster in the Household Analysis.*

Community Preparedness

53%

Feel Unprepared

47%

Feel Partially Prepared

0%

Feel Fully Prepared

** According to the question in Household Analysis Tool (Appendix 2): How prepared is your family to handle natural disasters? (Fully prepared, somehow prepared, and not prepared.)*

Major Impacts on Vulnerability



High Food Prices



Water and Food Shortage



Health Problems



Displacement



Property Destruction



Water and Air Pollution



Environmental Deterioration

Overview

In Naivasha East ward, 55 household questionnaires were administered from different settlements such as AIC, Arimi Arimuru, Bondeni, Booster, Duka Mooja, Kanjogo, Kayole, Kianyaga, Kinungi, Kwa Ng’ang’a, Line, Maraigushu, Mararo, Merry land, Munyu, Naivasha Boys, Naivasha hill, Panda, Signature, and Vision. 68% of the respondents were females, while 32% were males. The most common household typology is a regular household (57%) which means it is male-headed but lives with the wife and children.

Climate Trends and Impacts of Natural Disasters on Livelihoods

The most prevalent natural disasters reported are drought (59%) and strong winds (21%). Other natural disasters experienced in this ward include; low farm productivity due to pests and diseases (4%), fires (4%), flooding (8%), and high urban temperatures (4%). Drought has negatively affected this area. Some of the effects are; high living standards due to lack of food leading to an increase in food prices, Low farm productivity as crops end up drying, malnutrition, migration, water shortage, and residents forced to seek food relief. Also, strong winds destroy properties and cause air pollution.

Natural Disaster Response

The majority of Naivasha East residents responded to natural disasters by actively planting trees, minimizing food wastage and migrating to other areas. Community members planted trees and started a dam project to help in the aftermath of the disasters. Nonetheless, other community-based organizations and the government were said to have done nothing

to respond to the natural disasters.

Impacts of Natural Disasters/Environmental Hazards on Energy

The sources of energy used are LPG (35%), electricity (35%), Firewood (24%), and charcoal (6%). They stated that they employ these energy sources because they are easily accessible. However, the use of charcoal contributes to deforestation and causes air pollution.

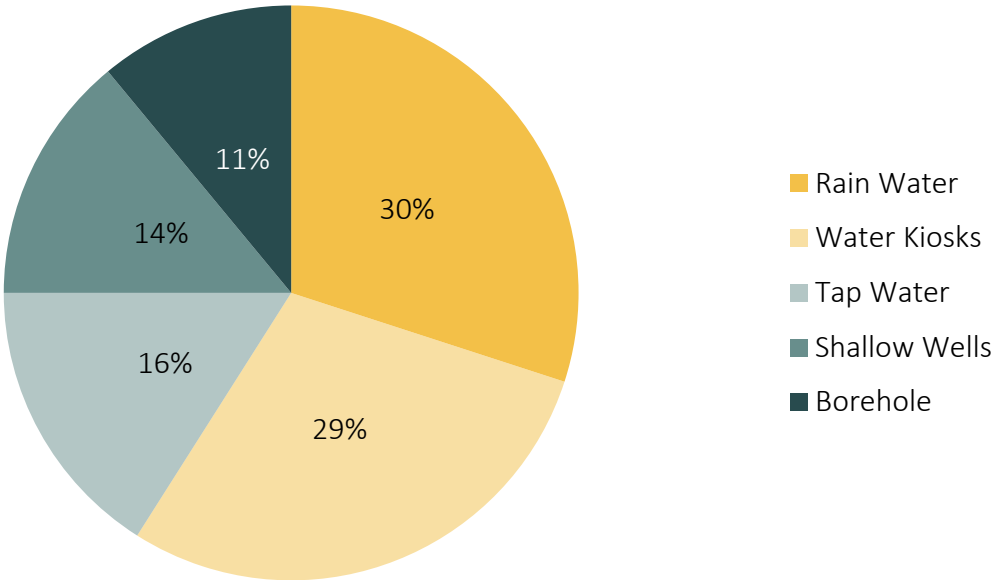
Impacts of Natural Disasters/Environmental Hazards on Physical Infrastructure

Majority (30%) of people in this ward use rainwater, and 29% source from water kiosks. Other sources of water are piped water (16%), shallow wells (14%), and boreholes (11%). The area experiences a shortage of water, leading to an increase in the price of water.

Household Disaster Preparedness and Governance

In Naivasha East ward, 53% of the community stated that they are unprepared in case of a disaster because of the lack of information on disaster management. In comparison, 47% stated they are somehow prepared in case of an occurrence of a disaster. Disaster preparedness training and sensitization forums should be necessary, as 13% have attended a disaster preparedness meeting, 4% have attended a first aid training session, none have engaged in a disaster drill, and 38% have taken part in volunteering-related activities. Households attempt to mitigate natural disasters and environmental hazards by planting trees, engaging in more environmentally friendly activities, undertaking soil tests, and creating awareness of disasters.

Sources of Water in Naivasha East Ward



Kinungi Sub-Location

Over the last five years, the area has experienced strong winds, drought, flooding, soil erosion, fire, and deforestation. Floods were very rampant in 2019 which carried away crops, and animals caused soil erosion and increased the school dropout rate. Drought was experienced during the data collection and causes low production, starvation, and a relative increase in the school dropout rate. Fires also affect the place oftentimes causing displacement and loss of property. Strong winds have been experienced continuously and have been a serious disaster since it affects almost everybody and causes property destruction, destruction of crops, and respiratory illnesses. The last strong wind was witnessed in April 2022.

Farming is the major economic activity for men, women, and children. The major crops grown in the area are Kales which do not perform as expected due to the tremendous effects of floods and drought which highly affects the level of production. Lack of crop rotation and deforestation of the Kinare forest and other forests within the area has also affected the produce due to a reduction of soil fertility. This has resulted in rising poverty levels and famine in the area which in turn causes starvation of a high percentage of the residents. The residents also engage in small business enterprises as an alternative source of income. Women in the area majorly engage in business. The disasters majorly affect entire families since starvation cuts across every cohort of the human population as well as animals.

Fever, cold, tainted teeth, typhoid, and headaches are some of the diseases caused by natural disasters. Fever and cold are majorly caused by the strong wind. Typhoid is caused by flooding since it results in contamination of drinking water. The high level of fluoride in the water consumed

causes teeth tainting. The FGD participants highlighted that they have not been trained on any disease prevention measures/mechanisms hence they suggested civic education to be one of the priorities in their community. They also suggested there should be mass tree planting to help cure most of the environmental issues experienced. There should also be tree-cutting prevention policies employed and implemented by the government.

The majority of the FGD participants stated that they dispose of their waste in the garden. There is only one collection point which is located in the market in the area where the waste is collected once per week specifically on Sunday. Lack of proper waste disposal has caused a bad odor in the area and the waste heaps act as the breeding ground for germs which later cause disease outbreaks. Liquid waste is also not well handled and therefore it destroys crops and roads but the participants had hope since there is already a proposed recycling plant.

The community usually keeps an inventory of the disasters experienced and they often advocate for their leaders to set aside money to help recover during the onset of disasters. They usually inform the ward administrator to inform the necessary officials in charge of disasters at the county or national level. The community majorly communicates using phone calls and screaming. The community is united and hence able to handle disasters more efficiently since the disasters are more frequent. They suggested that the government should prioritize the disaster response since it affects the majority of the society since the community uses unity as their response strategy and it's sometimes not satisfactory in responding to the disaster's occurrence.

Kayole Sub-Location

Drought has struck the area three times in the last five years, with the recent occurrence being in 2022 as a result of reduced rainfall patterns and deforestation due to the increasing demand for housing structures. This has led to the community

sourcing its food products from outside due to low food production resulting from insufficient rainfall. The area also witnessed strong winds that destroyed the housing structures as the winds blew away the roofing sheets and heavy rain

causing soil erosion, thus causing a disturbance in the food production, leading to an increase in food prices. Kayole has experienced fires that have occurred thrice in the past five years. The fires affected 203 people in 2020 and 2021. The area experienced landslides in 2020 and 2021 that occurred twice. Kayole also experienced strong winds that occurred thrice in 2022 and 2016, and the latest occurrence was in February 2022.

Construction is the most prevalent source of income for Kayole residents. However, construction work has a detrimental impact on the environment since it destroys forest cover because part of the construction materials is wood, causing drought. Typhoid is the most frequent disease induced by the natural catastrophes that have occurred in the area. As a result, community members proposed to have a health facility in the area that would provide health services to the population. Cooking is generally done using charcoal, firewood, and LPG gas in the neighborhood. They did propose, however, that they embrace new sources of cooking energy, such as briquettes, to lessen

the health and environmental repercussions that charcoal and firewood emit when used.

The sub-location has two waste management groups, namely Kayo and Wiper sanitary, which collect garbage from households once per week on a door-to-door basis. After waste collection, the groups transport the wastes to a recycling plant outside the Kayole sub-location. Solid waste disposal has harmed community health and land productivity. It degrades soil fertility and clogs drainage systems, resulting in disease outbreaks such as cholera and malaria.

Some of the coping mechanisms used by the community to deal with the negative impacts of the natural disasters experienced in the area include planting crops that do not require a lot of water, irrigating the crops, using chlorine to treat water, and fundraising to construct their roads to prevent further landslides from reoccurring. Those in attendance stated that they are less likely to handle a disaster due to a lack of platforms to create awareness and offer civic education on disaster response and management.



Key Priority Areas of Naivasha East Ward

- 1. Water-related projects**
- 2. Health-related projects**
- 3. Infrastructure-related projects**
- 4. Environmental conservation**
- 5. Disaster management**
- 6. Education-related projects**

WAY FORWARD & RECOMMENDATIONS FOR CLIMATE JUSTICE

WAY FORWARD



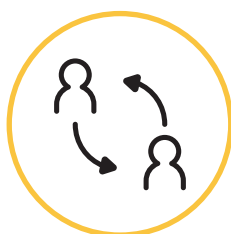
1. County Inputs

County government to make sure departments are represented in the climate change forums.



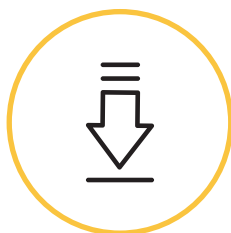
2. Disaster Management and Training

Communities to be trained on disaster response and management.



3. Involve Communities

Communities to be fully involved in designing plans to help solve their challenges.



4. Local-scale Actions

To prioritize issues/challenges at the ward level.



5. Community-led Projects and Prioritization

Community members should identify projects they want to push forward to amplify their voices in society. These projects should be implemented based on their priority level within the ward.



6. Local Representatives

To have influential people in the ward planning committee who can be outspoken and advocate for projects that can sustain the community.



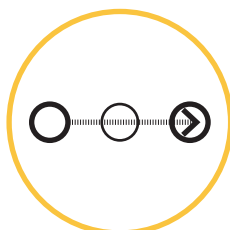
7. Understand the Context

To understand the Nakuru County Climate Change Act 2020 and the responsibilities and roles of the ward committees.



8. Analyze Local Climate Impacts

To see how the climate change information trickles down to the community.



9. Continuity

Hold a second and third forum to share the climate information and form the ward committees.

Challenges Faced by the Co-researchers

It was challenging to persuade respondents to engage in the data collection process. The household questionnaire tool was overly time-consuming since it took more than 30 minutes to interview only one person. One data collector from Kihoto sub-location in the Lakeview ward described how five of her respondents dropped out of the survey midway because the tool was too long and they were becoming impatient. As a result, she began looking for additional respondents to participate.

Another challenge was that the households were sparsely populated, which increased the distance for the data collectors to cover to administer surveys using the provided sample strategy, i.e., skip a few households, more than five, before administering the next questionnaire.

The data collection took place during the rainy season; thus, the weather disrupted the process. Some had to stop and wait for the rain to decrease before administering the remaining questionnaires.

Feedback on the Issues That Came Out During the Discussion

The elderly, youth, people living with disabilities, women, and men were well represented in the focus group discussions (FGDs). The FGDs were held in several wards, leading to a great deal of knowledge exchange. Members of the community were able to think collectively and identify the most pressing issues they encounter, which the county government should prioritize. The community in Biashara ward is currently conducting several follow-ups based on the prioritized issues they identified. It was noticed that the residents desired change, but they were unsure of how to bring the county government on board to assist them in achieving the society that they desired. During the discussions, it was highlighted that some community members from Kihoto in the Lakeview ward and Kayole in Naivasha Eastward are unaware of their Member of County Assembly (MCA), thus having little or no impact on the community he/she is supposed to serve.

During the process, it was noted that the people of Kayole in Lakeview ward live in abject poverty, despite being perceived as a high-end neighborhood. There is a lot of hunger in the Lakeview flower farm regions. Residents rely on agriculture, which is underperforming due to little rainfall, resulting in lower crop yields. According to community members, some people have little or no income, which impacts their families' state in which they live. For example, some women would pretend to cook for their children at night, so they

would boil stones, giving the children the impression that food was being cooked. In the process of waiting for the food, the children would fall asleep without eating. Their mothers would put stones in their lunch boxes in the morning to trick them into thinking they had food to take to school. Fortunately, some schools offer feeding programs, so the students have one meal a day at school to endure the harsh conditions of life. The feeding program has increased school attendance as students rely on the food given for survival.

Due to the close vicinity of Mt. Longonot, community residents in the Kiambu region in Longonot sub-location, Mai Mahiu ward, encounter human-wildlife conflict. The mountain is not guarded and fenced, allowing wildlife to encroach on human settlements. The wildlife then eats the residents' farm produce, leaving them with no food even though they are also experiencing drought as a natural calamity. The wildlife encroachment also causes concern among school-aged children, as they cannot leave the house early due to the wildlife roaming around, even though they must travel for 3-5 kilometers to get to school.

Residents in the Kongoni sub-location in the Maiela ward do not have access to sanitation facilities, such as toilets. As a result, they must rely on the bushes to excrete. This is challenging at night since they are afraid to walk to the bushes because anything could happen that would endanger their lives. They also lack fresh drinking water, so they rely on the salty water from their boreholes and the Lake.

Through the discussions, it was highlighted that the community is not prepared for calamities because it lacks disaster response mechanisms. For example, flooding frequently occurs in the Satellite sub-location in Mai Mahiu ward, resulting in over 20 people losing their lives annually. This would not be the case if the community knew how they could respond to disasters in their settlements.

It was noted that the community has little information on climate change as they do not know the causes of climate change they experience within their settlements, they do not know the departments within the county government that deal with climate change; thus, this leads to unsustainable climate actions imposed by the government; and information on climate change and environmental hazards do not trickle down to the grass root levels.

The data collectors recommended ways to improve the data collection process. These include;

1. To create awareness and give the community information beforehand before data collection.

2. To shorten the household survey tool to take a short time to administer the questionnaires.

The stakeholders excluded during the data collection process were; MCA, ward administrator, public officers, sand harvesters, and groups dealing with climate actions, e.g., tree planting, kitchen gardening, urban farming, etc.

Opportunities Foreseen

Community members in the Kijabe sub-location, Mai Mahiu ward, have learned to exploit natural hazards to their advantage. For example, when it rains, and landslides occur, residents harvest sand, which serves as a source of revenue once sold and is also used in construction.

Most of the waste pickers from the Lakeview dumping site are from the Lakeview ward. Thus, there is an opportunity to have a recycling plant in the dumpsite, which can lead to an economic shift within the ward and reduce the high poverty levels witnessed in the ward.

Public Participation

It was noted that the committee is unaware of public participation. Thus, once the ward committees are formed, there should be a sustainable way of involving the community in the planning process. For effective public participation, the following should be incorporated;

1. Hold tournaments/football matches and have discussions on the climate change agenda.

2. Have different forums, i.e., women's forums, men's forums, and youth forums, that will ease sharing information as there will be freedom of speech.
3. To create awareness that will lead to more community members spreading the climate change message to more people.
4. To form school environmental clubs to create awareness and educate school-going children.
5. The process should be community-led
6. Share the climate change agenda on social media platforms.
7. Share the climate change agenda in churches, SACCOs, functions such as burials whereby nowadays people plant trees to replace the wood used to make caskets.
8. To be fully aware of the Nakuru County Climate Change Act, 2020.

Gaps Identified

1. There is a gap in dealing with and responding to disasters in the community.
2. There is a lack of understanding between the Area chiefs and the MCAs.
3. The community is not involved in designing their community plans; thus, this leads to the actions taken by the government being unsustainable as they do not cater to the prioritized issues that the community wants to address.

APPENDIX

FGD Tool: Vulnerability Mapping, Focus Group Discussion Guide

General Climate Trends.

1. What is your understanding of climate change/ global warming?
2. What change in weather have you noticed in this area over the last few years? What has caused these changes?

Natural Disasters/Environmental Hazards and Impacts on Community

3. What natural disasters or climatic changes have you experienced in your community? E.g flooding, rising water levels, drought e.t.c

4. What are the causes of climate risks and disasters mentioned above?

Natural hazards	No. of incidences (last 5yrs)	No. of people affected	Indicate Month and year of last occurrence	Type of damage (injuries, death loss of property, illness, displacement etc...)
Flooding				
Fires				
Landslides				
Earthquakes				
Strong winds				
Drought				
Others				

5. How often do the natural disasters occur in your community?

6. Indicate on the map provided the location of where each of the natural disaster indicated above occurred. (show the extent)

Type of Disaster	Action taken	Persons/institutions involved

7. What actions were taken to deal with the adverse effects of the natural disaster identified above.

8. In your opinion, were the actions taken against the natural disaster sufficient. Yes/No.

Impacts of natural disasters/Environmental Hazards on Livelihoods

9. What are the top three jobs/economic activities that men in the community mostly engage in?
10. What are the top three jobs/economic activities that women in the community mostly engage in?
11. What are the top three jobs/economic activities that the youth in the community mostly engage in?
12. From the jobs/economic activities identified, which ones have a negative effect on the environment/the community.
13. Are these common community IGAs affected by natural disasters/ environmental hazards such as flooding? How are they affected?
14. Who within the community are most affected economically by these disasters? (elderly, men, women, youth)

Impacts of Natural Disasters/Environmental Hazards on Social infrastructure.

I. Health and Safety

15. What are some of the common diseases that the community experience?
16. Which of the diseases mentioned above are caused by the natural disasters/environmental hazards in your community?
17. How do you think natural disaster/environmental hazards threatens your personal health and safety?
18. Is there civic education offered by health providers on diseases prevention? How often is this done and by whom?
19. What suggestions would you give to improve on the health sector in your community

II. Education

20. Which education facilities are easily accessible by the community

Name of education Facility	Type/level of education facility	Ownership of the facility	Location (within/ outside the community)	Distance to access the facility (km)	Common Mode of transport used

21. How do you think natural disaster/environmental hazards have impacted on school going children?

Type of disaster/hazard	Nature of impact on school going children	Groups affected (pre-school, primary, secondary, college)	Magnitude of impact (scale of 1-5) 1very low, 2 low 3 moderate, 4 high, 5very high

22. Indicate the response to natural disaster/environmental hazards on the education sector in your community.

Impacts of Natural Disaster/Environmental Hazards on The Energy Sector

23. What is the most commonly used source of lighting and cooking energy used in the community

Cooking energy	Most common	Other sources	Lighting energy	Most common	Other sources

24. Reasons for choosing the energy sources identified above

25. Indicate the impacts of the commonly used energy used on the environment and health. How can this be mitigated?

Impacts of natural disasters/Environmental Hazards on Food Safety and Security

26. Where do you get most of your food items? (locally produced, sourced from outside the community)

27. How have the natural disaster/environmental hazards affected food production/access in your community

28. What are some of the coping mechanisms used by the community to deal with the negative impacts of environmental hazards on food?

Waste Management

29. Where is most of the community garbage deposited

30. How many formal garbage collection points does your community have?

31. Who collects the garbage from these garbage collection points?

32. How many times per week is garbage collected from your community?

33. Has solid waste disposal had an impact on the community health and land productivity?

34. How is storm water/grey water/waste water handled in the community

35. Are there waste recycling plants within the community? If yes, what is mainly recycled and how is it beneficial to the community?

Impacts of natural disasters/Environmental Hazards on Physical Infrastructure

I. Water and Sanitation

36. What are the most common sources of water used by the community for drinking, cooking, and agriculture?

37. How has the quality and water access changed in the last 5 years?

38. What can you attribute to the changes identified above?

39. Are there residents who depend on fetching water directly from the rivers?

40. Has the quantity and quality of this water changed over the past 5 years? What has caused this?

II. Roads/Transport

41. By factoring in the roads condition in the sublocation, how accessible is this community during disasters e.g flooding and fire outbreaks?

Community Disaster Preparedness and Governance

42. Does the community have an inventory of hazards taking place at community level?

43. Do you as a community have a disaster response plan/strategy

44. During an occurrence of a disaster, how is it communicated to the community and to the government.

45. How prepared is your community to handle disasters/environmental hazards?

46. Compared to the last occurrence of the disaster, is your community more/less able to handle a disaster? If less, why

47. In your opinion, should climate related problems or natural disasters be given priority by the government?

48. In the past year, has the government been involved in any projects or activities related to reducing risk or vulnerability in the event of disaster in your community?

49. What type of responses/ interventions are offered?

50. Is this response sustainable?

51. What is the community coping strategy in case of a disaster?

52. Can your community access government resources or programs for disaster response and/or recovery?

53. In the event of a disaster, what people or organizations do you have confidence in to respond and provide assistance? (The government, The Red Cross, my family, Community members/organizations, Religious groups, NGOs or other civil service groups that work in the community, Nobody / No organization). What role would they play in disaster response?

Community Public Participation

54. Has your community been engaged in any climate change forums/discussions?

55. How often have you been engaged in climate change forums?

56. What is the mode of participation in these meetings/platforms?

57. Who is responsible for convening community forums to talk about climate change issues?

Community Priority

58. From the discussion above rank the important issues you need/want to address as a community. (in order of importance/urgency)

Household Analysis Tool: Climate Change Household Questionnaire

Location details

Village	
Settlement	
Ward	

Respondent's details

Name of the respondent	
Phone number	
Gender	

1. What is your age?

a) Below 18 years

- b) 18- 25 years
- c) 26- 30 years
- d) 31- 35 years
- e) 36- 40 years
- f) 41 - 45 years
- g) 46- 50 years
- h) 51 - 55 years
- i) 56- 60 years
- j) Above 60 years

2. Do you have any form of disability? (Yes/No)

3. If yes, please specify.

Demographic data

1. Were you born in this settlement, yes or no?

i. If no, where were you born?

- In another settlement within Naivasha
- In another county

ii. When did you migrate to this area?

iii. Why did you migrate to this area?

- a. Marriage
- b. Education
- c. Employment opportunities
- d. Displacement/Evictions
- e. Land inheritance/ancestral land
- f. Affordability of land
- g. Availability of services
- h. Others, specify

2. What is your household size?

Gender (1. Male 2. Female)	Age	Level of education 1. No formal education 2. Pre-primary 3. Primary incomplete 4. Primary complete 5. Secondary incomplete 6. Secondary complete 7. College 8. Tertiary (TVET) 9. University 10. Other (specify)	Occupation

3. What is your type of household?

- a. Regular house- male headed but lives with the wife and children.
- b. Female headed- husband lives elsewhere, does not regularly sleep in the house.
- c. Female headed- woman is single, separated, divorced or widowed.
- d. Male headed- wife lives elsewhere, does not regularly sleep in the house.
- e. Male headed- male is single, separated, divorced or widowed.
- f. Others, (Specify)

Climate Trends

1. Have you heard of the term climate change or global warming? (Yes/No)
2. What is your understanding of climate change or global warming?
3. What change in weather have you noticed in this area over the last few years?

Weather factor	Change (Increase/shift or Decrease/no shift)	Cause of the change
Seasons		
Rainfall patterns		
Prevalence of drought		
Seasonal pests and diseases (e.g locusts and army worms)		
Rising water tables		
Temperature		
Wind		

Natural Disasters/Environmental Hazards and Impacts on Community

4. Kindly indicate the natural disasters that you have experienced in your household.

Flooding
 Fires
 Landslides
 Earthquakes
 Strong winds
 High urban temperatures
 Drought
 Rising water levels
 Low farm productivity from pests e.g locusts
 Others (specify)

5. Indicate the natural disasters that you have experienced at village level

Flooding
 Fires
 Landslides
 Earthquakes
 Strong winds
 High urban temperatures
 Drought
 Rising water levels
 Low farm productivity from pests e.g locusts
 Others (specify)

6. What are the causes of climate risks mentioned above?

Natural disaster	Cause of disaster
Flooding	
Fires	
Landslide	
Strong winds	
Earthquakes	
High urban temperatures	
Drought	
Rising water levels	
Low farm productivity from pests e.g locusts	
Others	

7. How has the climate risks mentioned above affected your household?

Economically	
Environmentally	
Socially	

8. What actions were taken to deal with the adverse effects of the natural disaster identified above?

Type of Disaster	Action taken	Persons/institutions involved
Flooding		
Fires		
Landslide		
Strong winds		
Earthquakes		
High urban temperatures		
Drought		
Rising water levels		
Low farm productivity from pests e.g locusts		
Others		

9. In your opinion, were the actions taken against the natural disaster sufficient. Yes/No. Explain.

Impacts of natural disasters/Environmental Hazards on Livelihoods

10. What is the primary source of income for your household?

- Formal employment (e.g. TSC teacher, NGO)
- Regular casual labour (e.g. in industries)
- Irregular casual labor (e.g. washing clothes in surrounding neighborhood)
- Business
- Financial and/ or food Aid (Specify if from family organization)
- Urban agriculture
- Household transfers and credit (receiving remittances)
- Others(specify)

11. What is the secondary source of income for your household?

- Formal employment(e.g. TSC teacher, NGO stuff)
- Regular casual labor(e.g. in industry)
- Irregular casual labor(e.g. washing clothes in surrounding neighborhood)
- Business
- Financial and/ or food Aid (specify if from family organization)
- Urban agriculture
- Household transfers and credit (receiving remittances)
- Others(specify)
- None

12. Has your income generating activity been impacted by natural disasters? (Hint: flooding, fires, landslides, strong winds, earthquakes, drought, high temperatures, drought, rising water levels and low farm productivity)

Type of Job/income generating activity	Impact (negative, not affected, positive)	How? Explain the impact

Impacts of Natural Disasters/Environmental Hazards on Social infrastructure.

13. What are some of the common diseases that your household experiences?

- a. Flu
- b. Eye complications
- c. Malaria
- d. Cholera
- e. Diarrhea
- f. Tuberculosis
- g. Others

14. Which of the diseases mentioned above are caused by the natural disasters/environmental hazards in your household?

15. Which health facilities are easily accessible by your household?

Name of Health Facility	Type/level of health facility <i>1. Clinic</i> <i>2. Pharmacy/ Chemist</i> <i>3. Dispensary</i> <i>4. Health centres</i> <i>5. Sub-county hospitals</i> <i>6. County referral hospitals</i>	Ownership of the facility (public, private, community, FBO)	Location (within/ outside the village)	Time taken to access the facility from your household (minutes of walking)	Common Mode of transport used to access the health facility <i>1. Matatu</i> <i>2. Tuktuk</i> <i>3. Bus</i> <i>4. Private car</i> <i>5. Bicycle</i> <i>6. Motorcycle</i> <i>7. Walking</i>

16. How do you think natural disaster/environmental hazards mentioned above threatens your personal health and safety?

Type of disaster/hazard	Impact on health and safety	Groups affected (elderly, men, women, youth, children)	Magnitude of impact (scale of 1-5) <i>1 very low, 2 low 3 moderate, 4 high, 5 very high</i>
Flooding			
Fires			
Landslide			
Strong winds			
Earthquakes			
High urban temperatures			
Drought			
Rising water levels			
Low farm productivity from pests e.g locusts			
Others			

17. What suggestions would you give to improve on the health sector in your community?

II. Education

18. Which education facilities are easily accessible by the community

Name of education Facility	Type/level of education facility	Ownership of the facility (public, private, community, FBO)	Location (within/ outside the village)	Distance to access the facility (km)	Common Mode of transport used

19. Has natural disasters/ environmental hazards affected school going children in your household? (yes/no)

20. If yes, how has the natural disasters/ environmental hazards affected school going children in your household?

Type of disaster/hazard	Nature of impact on school going children	Groups affected (pre-school, primary, secondary, college)	Magnitude of impact (scale of 1-5) 1very low, 2 low 3 moderate, 4 high, 5very high
Flooding			
Fires			
Landslide			
Strong winds			
Earthquakes			
High urban temperatures			
Drought			
Rising water levels			
Low farm productivity from pests e.g locusts			
Others			

21. How did your household, community, CSOs and government respond to the impacts mentioned above?

Type of disaster	Household response	Community Response	Response from CSOs	Government response

22. In your opinion, were the interventions sustainable?

23. If no, what should be done to improve these interventions?

24. Who do you think should have the main responsibility for tackling natural disasters/environmental hazards? Please tick 3 boxes in order of priority :

- International organizations (e.g., the UN)
- The National government
- County government
- Environmental organizations/ lobby groups (e.g., NEMA)
- Non-Governmental Organizations
- Community Based Organizations
- Faith Based Organizations
- Business and industry
- Individuals
- Other (specify)

Impacts of Natural Disaster/Environmental Hazards on the Energy Sector

25. What is the common source of lighting and cooking energy used in your household?

Cooking energy	Most common <i>1. Electricity</i> <i>2. Liquefied petroleum gas (LPG)</i> <i>3. Kerosene</i> <i>4. Biogas</i> <i>5. Firewood</i> <i>6. Charcoal</i> <i>7. Biogas</i> <i>8. Briquettes</i> <i>9. Biofuel e.g Koko</i> <i>10. Others (specify)</i> <i>11. Not applicable (no cooking at household)</i>	Other sources	Lighting energy	Most common <i>1. Electricity</i> <i>2. Liquefied petroleum gas (LPG)</i> <i>3. Kerosene</i> <i>4. Biogas</i> <i>5. Firewood</i> <i>6. Charcoal</i> <i>7. Biogas</i> <i>8. Briquettes</i> <i>9. Batteries (Torch)</i> <i>10. Biofuel e.g Koko</i> <i>11. Others (specify)</i> <i>12. Not applicable (no cooking at household)</i>	Other sources

26. Reasons for choosing the cooking energy sources identified above

27. Reasons for choosing the lighting energy sources identified above

28. In your opinion, does your cooking energy have any impacts to the environment? Yes/No

29. If yes, which are some of these environmental impacts

30. Does your cooking energy have an impact on the household health status? Yes /No

31. If yes, what is its impact on health?

32. In your opinion, which type of cooking energy do you consider to be environmentally friendly? Explain

33. In your opinion, does your lighting energy have any impacts to the environment? Yes No

34. If yes, which are some of these environmental impacts

35. Does your lighting energy have an impact on the household health status? Yes /No

36. If yes, what is its impact on health?

37. In your opinion, which type of lighting energy do you consider to be environmentally friendly? Explain

38. Indicate how natural disasters/environmental hazards have impacted on energy access in your household.

Type of environmental hazard/natural disaster	Type of energy affected	Impact on Energy access	Cost of energy source
Flooding			
Fires			
Landslide			
Strong winds			
Earthquakes			
High urban temperatures			
Drought			
Rising water levels			
Low farm productivity from pests e.g locusts			
Others			

39. Have the current fluctuations on energy cost resulted in seeking alternative energy sources within this household? Yes/No

40. What cooking energy was your HH using before the cost fluctuations

41. What lighting energy was your HH using before the cost fluctuations

42. In your opinion, what are some of the recommendations to improve on the energy delivery?

Impacts of natural disasters/Environmental Hazards on Food Safety and Security

43. Which of the following statements best describes the food situation at your household?

- a. We always eat enough of what we want
- b. We eat enough, but not always what we would have liked
- c. We sometimes do not eat enough
- d. We frequently do not eat enough
- e. Other (Specify)

44. How has the natural disaster/environmental hazards affected food situation/access in your household?

Type of environmental hazard/ natural disaster	Type of food most affected	Impact on Access/availability	Impact on Cost
Flooding			
Fires			
Landslide			
Strong winds			
Earthquakes			
High urban temperatures			
Drought			
Rising water levels			
Low farm productivity from pests e.g locusts			
Others			

45. What are some of the coping mechanisms used by your household to deal with the negative impacts of environmental hazards on food availability/ access?

Waste Management

46. Does your household receive any waste collection services? (Yes/no)

47. If yes, who provides the waste collection services?

- a. Registered local community groups
- b. Unregistered local community groups
- c. Local community groups (registration is uncertain)
- d. County governments
- e. Private companies
- f. Others, specify

48. If there are no waste collection services, how do you dispose your household waste?

- a. Burning
- b. Composting (used as manure)
- c. Dispose to nearby land
- d. Dispose to nearby water body i.e. rivers, lakes
- e. Recycling and reusing
- f. Burying
- g. Others

Impacts of natural disasters/Environmental Hazards on Physical Infrastructure

I. Water and Sanitation

49. What are the most common sources of water used by the community for drinking, cooking, and agriculture?

Source of water	Drinking	Cooking	Agriculture

50. What are the impacts of natural disasters/ environmental hazards on access to water in your household?

51. How does your household dispose its liquid waste?

On open drains

On closed drainages

In pit latrines

Septic tanks

On the road sides

Open compounds/fields

Others

52. What Types of sanitation facility is used by this household (sewer system, septic tank, pit latrine, open drain, Composting toilet, Bucket Hanging toilet/latrine, no facility / Bush / Field Others(specify))?

53. Are there public toilets in this area? (Yes/No)

54. If yes, how much do you pay for the facility per usage? (Ksh.)

a. Kshs. 5

b. Kshs. 10

c. Above Ksh. 10

d. None

55. In your opinion, what are some of the recommendations to improve on the water and sanitation sector?

Household Disaster Preparedness and Governance

56. How prepared is your family to handle natural disasters?

a. Fully prepared

b. somehow prepared

c. Not prepared

57. Explain the answer above

58. Compared to the last occurrence of the disaster, is your household more/less able to handle a disaster? If less, why

59. In the past year, have you or your family members

a. Attended a meeting on how to be better prepared for a disaster?

b. Attended a first aid training?

c. Participated in a disaster drill?

d. Participated in a volunteer activity related to disaster preparedness and prevention?

Community Priority

60. In your opinion, should climate related problems or natural disasters be given priority by the government?

61. In your opinion, what is your household role in mitigating natural disasters and climate effects?

62. From the discussion above rank the important issues you need/want to address as a household. (in order of importance/urgency)