Kampala

Disaster Risk and Climate Change Resilience Strategy

REPUBLIC OF UGANDA

KCCA
KAMPALA CAPITAL CITY AUTHORITY
For a better City

GFDRR

ACP-EU Natural Disaster Risk Reduction Program
An initiative of the African, Caribbean and Pacific Group, funded by the European Union and managed by GFDRR

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

Kampala

Disaster Risk and Climate Change Resilience Strategy

REPUBLIC OF UGANDA

KCCA
KAMPALA CAPITAL CITY AUTHORITY
For a better City

GFDRR

ACP-EU Natural Disaster Risk Reduction Program
An initiative of the African, Caribbean and Pacific Group, funded by the European Union and managed by GFDRR

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

Disclaimer page

CONTENTS

SECTION II

DIAGNOSTICS OF DISASTER RISK AND VULNERABILITY TO CLIMATE CHANGE

SECTION III

PROGRAMMATIC COMPONENT

List of Figures

List of Tables:

ABBREVIATIONS AND ACRONYMS

AAD	Annual Average Damage
ACP-EU NDRR	Africa Caribbean Pacific–European Union Natural Disaster Risk Reduction
AFD	Agence Française de Développement
AfDB	African Development Bank
BRT	Bus Rapid Transit
CBO	Community-Based Organisation
CCCI	Cities and Climate Change Initiative
CCD	Climate Change Department
CCHF	Crimean-Congo Haemorrhagic Fever
CCU	Climate Change Unit
CDM	Clean Development Mechanism
CDMTC	City Disaster Management Technical Committee
CDPC	City Disaster Policy Committee
CDRPC	City Disaster Risk Policy Committee
CECOC	City Emergency Coordination and Operations Committee
CPDRMC	City Policy Disaster Risk Management Committee
CPF	Country Partnership Framework
CSO	Community Service Organization
CTDRMC	City Technical Disaster Risk Management Committee
DDPC	District Disaster Policy Committee
DDPM	Department of Disaster Preparedness and Management
DDRMC	Division Disaster Risk Management Committee
DECOC	District Emergency Coordination and Operations Centre
DFID	Department for International Development
DGIS	Directorate-General for International Cooperation
DISO	Division Internal Security Officer
DJF	December-January-February
DPC	Disaster Policy Committee
DRM	Disaster Risk Management
DRMTC	District Disaster Management Technical Committee
DRR	Disaster Risk Reduction
DTM	Digital Terrain Model
EARS	East African Rift System
EP&R	Emergency Preparedness & Response
EU	European Union
EWS	Early Warning System
FAO	Food and Agriculture Organization
FSN	Food Security and Nutrition
GCF	Green Climate Fund
GDP	Gross Domestic Product

GFDRR	Global Facility for Disaster Reduction and Recovery
GHG	Greenhouse Gas
GKMA	Greater Kampala Metropolitan Area
GOU	Government of Uganda
GPCC	Global Precipitation Climatology Centre
GSURR	Global Practice for Social, Urban, and Rural Development and Resilience
GVA	Gross value added
ICT	Information and communications technology
IFM	Integrated Flood Management
IMS	Incident Management System
IPCC	Intergovernmental Panel on Climate Change
IUFRM	Integrated Urban Flood Risk Management
JICA	Japan International Cooperation Agency
JJA	June-July-August
KCCA	Kampala Capital City Authority
KDPD	Kampala Physical Development Plan
KFCRUP	Kampala Flyover Construction and Road Upgrading Project
KIIDP1	Kampala Institutional and Infrastructure Development Project
KIIDP2	Second Kampala Institutional and Infrastructure Development Project
LC	Local Community
LiDAR	Laser Imaging Detection and Ranging
LRT	Light Rail Transit
M/TDMRC	Municipal/Town Disaster Management Technical Committee
M/TDPC	Municipal/Town Disaster Policy Committee
MAAIF	Ministry of Agriculture, Animal Industry, and Fisheries
MAM	March-April-May
MDAs	Ministries, Departments, and Agencies
MoFPED	Ministry of Finance, Planning, and Economic Development
MoH	Ministry of Health
MoLHUD	Ministry of Lands, Housing and Urban Development
MoLG	Ministry of Local Government
MoWT	Ministry of Works and Transport
MRT	Mass Rapid Transit
MWE	Ministry of Water and Environment
NCCAC	National Climate Change Advisory Committee
NCCPC	National Climate Change Policy Committee
NDA	National Designated Authority
NDPII	Uganda's Second National Development Plan
NECOC	National Emergency Coordination and Operations Centre
NGO	Nongovernmental Organisation

NIE	National Implementing Entity
NO_2	Nitrogen Dioxide
NPA	National Planning Authority
NWSC	National Water and Sewerage Corporation
OPM	Office of the Prime Minister
PCE	Policy Committee on Environment
PFCC	Parliamentary Forum on Climate Change
PGA	Peak Ground Acceleration
PHEOC	Public Health Emergency Operations Centre
PM	Particulate Matter
PPP	Public-Private Partnership
RCM	Regional Climate Model
RCP	Representative Concentration Pathway
RDC	Resident District Commissioner
RVF	Rift Valley Fever
SDGs	Sustainable Development Goals
SDMCs	Sub-County Disaster Management Committees
SGR	Standard Gauge Railway
SO_2	Sulphur Dioxide
SON	September-October-November
SOP	Standard Operating Procedure
SPI	Standardised Precipitation Index
SUDS	Sustainable Urban Drainage Systems
TOR	Terms of Reference
UGX	Ugandan Shilling
UNBC	Uganda National Building Code
UNDP	United Nations Development Programme
UNDRR	UN Office for Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change
UPDF	Uganda People's Defence Force
UNMA	Uganda National Meteorological Authority
URCS	Uganda Red Cross Society
VDMCs	Village Disaster Management Committees
WASH	Water, Sanitation, and Hygiene
WFP	World Food Program
WHO	World Health Organization
WRSI	Water Requirement Satisfaction Index

ACKNOWLEDGMENTS

The Kampala Disaster Risk and Climate Change Resilience Strategy was produced by the Kampala Capital City Authority (KCCA). The team was led by Patrick Musoke, Deputy Director, Strategy Management and Business Development, and Consolate Nakyagaba Kiyingi, Manager, Risk Management Unit.

Contributors included the following:

- KCCA Department of Strategy Management and Business Development
- KCCA Risk Management Unit
- Directorate of Physical Planning
- Directorate of Engineering and Technical Services
- Directorate of Public Health Services and Environment
- Directorate of Education and Social Services
- Directorate of Gender, Community Services, and Production
- Directorate of Legal Affairs
- Directorate of Treasury Services
- Information and Communications Technology (ICT) Department
- Administration and Human Resources
- Occupational Health and Safety
- Public and Corporate Affairs
- Town Clerk

We thank for their support the World Bank team led by Ana Campos (Senior Disaster Risk Management Specialist, Team Leader) and James P. Newman (Disaster Risk Management Specialist, Co-Team Leader) and comprising Carlos Costa (Senior Disaster Risk Management Consultant), Scott Ferguson (Senior Flood Management Consultant), Paul Hayden (Senior Disaster Risk Management Consultant), Judy Maureen Waturi (Disaster Risk Management Consultant), Cristiano Giovando (Geospatial Technology Specialist Consultant), Andres Achury Garcia (Urban Planning Consultant), Theresa Maria Abrassart (Building Regulation Consultant), and Pelayo Gonzalez-Escalada Mena (Disaster Risk Management Consultant). Strategic guidance was also provided by Martin Onyach-Olaa (Senior Urban Specialist) and Stephen Ajalu (Senior Urban Specialist).

Financial support was provided by the Global Facility for Disaster Reduction and Recovery (GFDRR) and the European Union, in the framework of the Africa Caribbean Pacific-European Union Natural Disaster Risk Reduction (ACP-EU NDRR) Program, managed by GFDRR.

KCCA and the World Bank wish to acknowledge and extend their appreciation to the numerous organisations that provided assistance and support for the preparation of this report and for their availability for discussions during the assessment, including the United Nations Development Programme (UNDP), United Nations Office for Disaster Risk Reduction (UNDRR), the African Development Bank (AfDB), and the European Union (EU).

Disaster Risk Management and Climate Change Resilience

Key Concepts

The following list provides key terms pertaining to disaster risk and climate resilience concepts and definitions used throughout this document. They are adapted from existing sources (IPCC 2012; UNDRR 2016b):

Climate Change Adaptation

The adjustment of human and natural systems to actual or expected climate and its effects to moderate harm or exploit its beneficial opportunities.

Disaster Risk

The likelihood over a specified time period of alterations in the normal functioning of a community or a society as a result of interactions of hazardous physical events with vulnerable social conditions, leading to adverse human, material, economic, or environmental effects that require some form of response to restore normal societal functions and meet basic human needs, and the recovery from which may require external support.

Disaster Risk Management

Processes for designing, implementing, and evaluating strategies, policies, and measures to improve the understanding of disaster risk, foster risk reduction and transfer, and promote continuous improvement in disaster preparedness, response, and recovery practices, with the explicit purpose of increasing human security, well-being, and quality of life and ensuring sustainable development.

Exposure

The presence of people, infrastructure, housing, production capacities, and tangible human assets in hazard-prone areas. Under exposed conditions, the levels and types of adverse impacts will be the result of a physical event (or events) interacting with socially constructed conditions, or vulnerability.

Hazard

The potential occurrence of a natural or human-induced physical event that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, and environmental resources.

Resilience

The ability of a system, community, or society exposed to hazards to resist, avoid, absorb, accommodate, adapt to, transform, and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.

Urban Resilience

A resilient city is one that is able to absorb, adapt, and recover from the shocks and stresses that are likely to happen. Urban resilience is the measurable ability of any urban system, with its inhabitants, to maintain continuity through all shocks and stresses, while positively adapting and transforming towards sustainability.

Vulnerability

Vulnerability is the propensity or predisposition to be adversely affected. Such predisposition constitutes an internal characteristic of the affected element. In the field of disaster risk, this includes the characteristics of a person or group and their situations that influence their capacity to anticipate, cope with, resist, and recover from the adverse effects of physical events. Vulnerability conditions are determined by physical, social, economic, and environmental factors or processes that increase the susceptibility of a community to the impact of hazards. The importance of the concept of vulnerability to the disaster risk management community is in the way it has helped highlight the role of social factors in the constitution of risk, moving away from purely physical explanations and attributions of loss and damage.

New road bypass between Entebbe and Kampala, Uganda . Photo: Andi Edwards

Executive Summary

Kampala faces a wide array of hazards that hinder economic growth and opportunity. Flooding, fires, human epidemics, air pollution, environmental degradation, building collapses, earthquakes, erosion, and landslides impose shocks and stresses on Kampala's people, livelihoods, and economy. Rising temperatures and changing climate patterns will likely increase the frequency and intensity of hazard events, putting further strain on the coping capacity of the city and its residents.

The Kampala Disaster Risk and Climate Change Resilience Strategy enables the city—its leaders, stakeholders, and residents—to understand better the risks they face and the measures and investments by which they can manage and reduce these risks to achieve resilience.

Why and how is Kampala seeking resilience?

Section I: Introduction sets out the objective of the Kampala Disaster Risk and Climate Change Resilience Strategy for an integrated approach to (1) avoid creating risks, (2) reduce existing risks, (3) respond more efficiently to disasters, and (4) mitigate climate change and build climate resilience.

The Kampala Capital City Authority (KCCA) developed this strategy by consolidating and prioritising the most effective and essential actions and measures among the several hundred that have been proposed over the past five years in its key strategy and guiding documents.

In line with Uganda's Second National Development Plan (NDPII) 2015/16–2019/20, the World Bank Country Partnership Framework (CPF) FY16–21, and the KCCA Strategic Plan 2014–19, the Kampala Disaster Risk and Climate Change Resilience Strategy supports the city's local alignment to and implementation of the principles underlying the Sendai Framework for Disaster Risk Reduction, the Paris Climate Agreement, and the Sustainable Development Goals (SDGs).

The strategy presents risk as a product of hazard, exposure, and vulnerability and proposes actions and investments that address and manage these. In some cases, it is possible to manage hazards directly, such as through flood risk and drainage investments and improved runoff control. The strategy also presents options to manage and reduce exposure—such as risk-informed land use planning—and vulnerability—such as enhanced infrastructure design standards and emergency preparedness and response activities to help the poor and vulnerable.

The physical nature of Kampala as the City of Seven Hills makes it susceptible to flooding, while the environment faces pressure and degradation from rapidly expanding, unplanned urbanisation. In response to rapid population growth, the built-up area increased at an annual rate of 4.1 percent between 1975 and 2014, expanding into the neighbouring districts that make up the Greater Kampala Metropolitan Area. The quality of infrastructure investment and maintenance has not kept pace with this growth.

Uganda has established essential institutional and social capacities for disaster risk management and climate change adaptation. From the constitution to specific legislation and policies, the government of Uganda and subnational governments have affirmed their responsibility to address and manage disaster and climate risk. While the National Policy for Disaster Preparedness and Management (2010) and related documents describe various structures that should be in place, further investment and action are required to operationalise the structure. KCCA has produced proposals for disaster preparedness and management at the city level and below. These are broadly in line with the national policy and are presented below. Additional investment of time and resources will be required to plan, design, and implement.

What's at risk for Kampala?

Section II: Diagnostics of Disaster Risk and Vulnerability to Climate Change presents an overview of the city's key hazards, exposure, and vulnerability. It shows that, since 1991, Kampala has experienced a total of 153 disaster events, resulting in thousands of deaths and injuries, destroyed and damaged infrastructure, and billions in economic losses. Floods dominate Kampala's risk profile and have the biggest potential for impact on human life and disruption of economic activity. Epidemic outbreaks—often a result of flooding—and human-induced hazards present high risks to human life and are also considered in the strategy for priority actions.

Every year, Kampala faces average damages of US$49.6 million from floods. This strategy shows that more than 170,000 people are frequently affected by floods,[1] and more than 10 percent of all jobs and main roads lie in flood-prone areas. A severe flood event could cost Kampala US$101.4 million in damage and affect nearly 30,000 buildings in the city.

With no change in the trajectory and type of urban development, floods in Kampala will get much worse. As Kampala's population and spatial development continue their rapid growth, the number of people and assets exposed will increase. The development in flat low-lying areas—formerly wetlands or floodplains—and in the upper sections of the catchments will increase runoff and reduce infiltration capacity. In addition, informal settlements are expanding, and their residents are the most vulnerable to shocks and stresses, including fires and earthquakes. Poor drainage system maintenance and inadequate management of solid waste will result in increased flooding downstream and local flooding. Sedimentation of the drainage system from soil erosion, already a serious issue, will increase from future urban development. Climate change may escalate the intensity of strong storms and flood risk and exacerbate a variety of heat-related hazards and vulnerabilities imperilling the city.

Expected Damage from Average and Severe Floods

US$ 49.6 million Average annual damage from floods

US$ 101.4 million Expected damage from 100-year flood

This strategy sets out a rigorous diagnostic framework and analysis for floods, but additional hazards threaten the development of the city, as well, including air and water pollution, environmental degradation, and human epidemics. A summary of hazards identified by Kampala has been developed in the strategy, denoting those with the greatest expected relevance. Taking a comprehensive approach to address these challenges, particularly given climate change, will be crucial to Kampala's development.

Hazard	Hazard type
Flood	Climatological and meteorological
Human epidemic	Ecological and biological
Environmental degradation	Human-induced or technological
Water pollution	Human-induced or technological
Air pollution	Human-induced or technological
Fire and built environment	Human-induced or technological
Road accidents	Human-induced or technological
Drought/dry spells	Climatological and meteorological
Soil erosion	Geological
Food security/nutrition	Climatological and meteorological/human-induced or technological
Earthquake	Geological

Hazard level: High Medium Low

[1] The term "frequently affected" in this report signifies events expected to occur at least once in a ten-year period.

What can Kampala do to manage risk and achieve resilience?

Section III: Programmatic Component sets out key measures to address and manage the risks described in this strategy that Kampala seeks to implement across six targeted resilience pillars:

RESILIENCE PILLAR 1

Institutional and Governance Strengthening

1.1. Develop, update, and strengthen the regulatory and policy framework on disaster risk management and climate resilience

1.2. Improve inter-institutional coordination for risk management

1.3. Establish a financial strategy for risk management and climate resilience

1.4. Strengthen institutional capacity on risk management and climate resilience

1.5. Conduct monitoring and evaluation of institutional risk management performance

RESILIENCE PILLAR 2

Understanding Risk

2.1. Enhance surveillance and monitoring networks

2.2. Conduct comprehensive, continual, and detailed risk assessment and studies

2.3. Design and activate an integrated information system for risk management and climate resilience

2.4. Strengthen community awareness of risk management and climate resilience

RESILIENCE PILLAR 3

Investment in Disaster Risk Reduction for Resilience

3.1. Include risk management as an essential component of land use and strategic planning

3.2. Increase sustainability and effectiveness of Kampala's drainage system

3.3. Reduce vulnerability of key physical infrastructure

3.4. Adopt a resilient and risk reduction approach to neighbourhood planning

3.5. Integrate wetlands into city planning, making them a priority to ensure the best long-term sustainable use

In addition to the key measures needed, the resilience pillars cover the agencies tentatively responsible for carrying them out and the current prioritisation and timeline for initiating action. Kampala will need to ensure the provision of financing, detailed policy and investment design, and implementation capacity to achieve its vision for a resilient Kampala.

Photo: Dennis Wegewijs

RESILIENCE PILLAR 4

Preparedness, Response, and Resilient Recovery

4.1. Develop and strengthen contingency planning and preparedness policy framework

4.2. Develop and strengthen KCCA's operational capacity for response (staff, logistics, supplies, and equipment)

4.3. Develop and improve early warning systems

4.4. Develop and implement a recovery strategy

RESILIENCE PILLAR 5

Climate Mitigation and Resilience

5.1. Improve mitigation by improving air quality, reducing emissions, and protecting green areas

RESILIENCE PILLAR 6

Health Resilience and Prevention

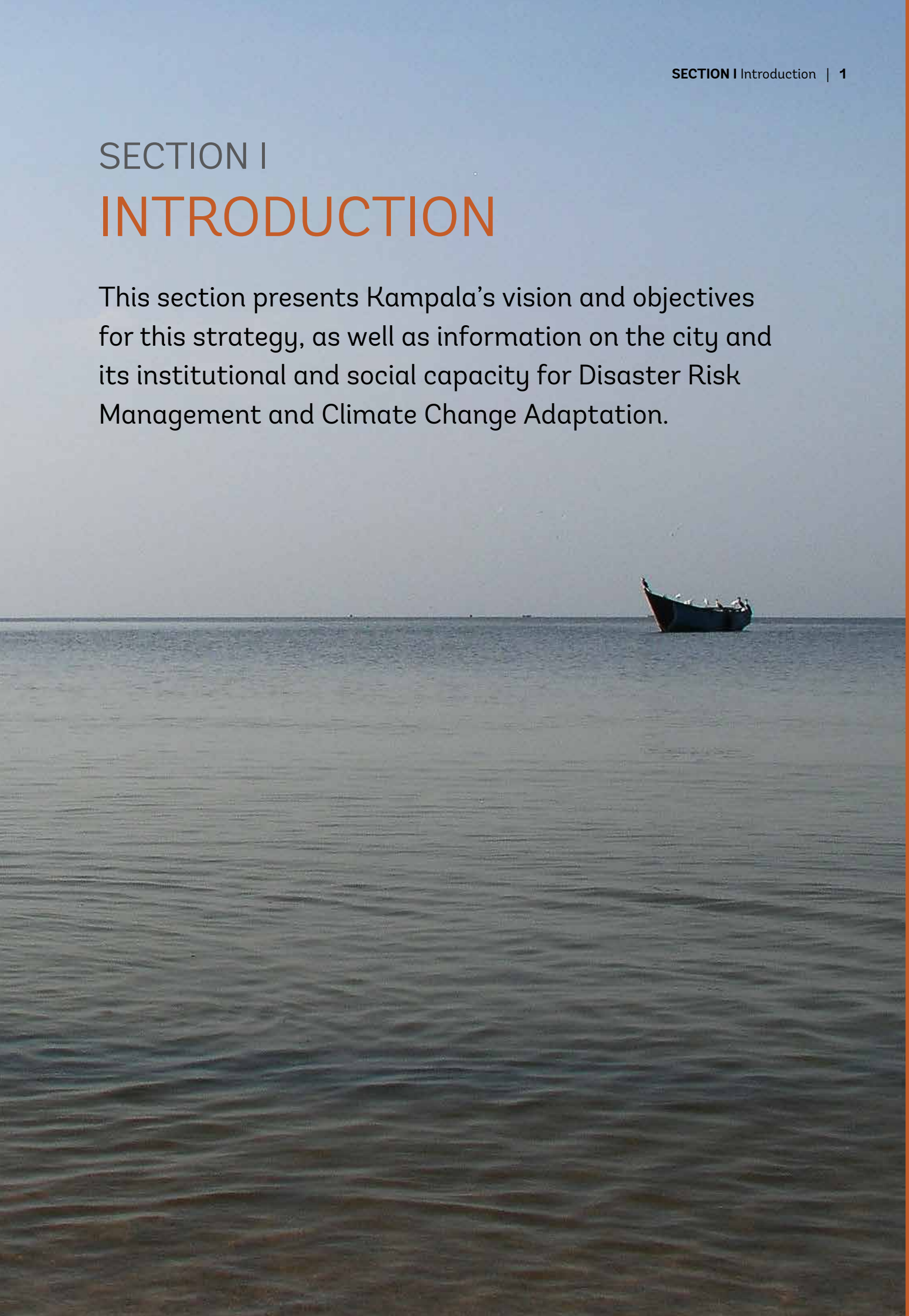
6.1. Enhance health prevention measures and emergency preparedness

6.2. Ensure coordination and awareness of health resilience and prevention efforts among government officials and the general public

Photo: Arne Hoel / World Bank

SECTION I
INTRODUCTION

This section presents Kampala's vision and objectives for this strategy, as well as information on the city and its institutional and social capacity for Disaster Risk Management and Climate Change Adaptation.



Chapter 1
Vision and Objectives of the Strategy

Kampala's more than 1.5 million residents face a wide array of hazards that hinder economic growth and opportunity. Kampala's population suffers shocks and stresses from floods, epidemics, building collapses, fires, environmental degradation, air pollution, and, to a lesser extent, erosion and landslides, earthquakes, and dry spells, along with rapid urbanisation, inadequate land use planning, and the growth of high-density informal settlements. Climate change can alter the frequency and intensity of hydrometeorological events, putting further strain on the coping capacity of the city and its residents.

In KCCA's Strategic Plan 2014–19, KCCA states its "Vision to Be a Vibrant, Attractive, and Sustainable City." This entails efficient use of the environment, guaranteeing intergenerational respect for and protection of biodiversity and natural ecosystems through the people, natural resources, physical infrastructure, and landscape within the defined territory of Kampala Capital City.

To achieve this vision of a sustainable city, the objective of the Kampala Disaster and Climate Resilience Strategy is to set out an integrated approach to (1) avoid creating risks, (2) reduce existing risks, (3) respond more efficiently to disasters, and (4) mitigate climate change and build climate resilience.

1.1. Context for Kampala's Development and Disaster and Climate Resilience

Following its inception in 2011, the Kampala Capital City Authority (KCCA) carried out a comprehensive institutional reform to improve service delivery in Kampala, with the vision of bringing about a "vibrant, attractive, and sustainable city." Through a consultative process, KCCA developed a strategic plan for the period 2014/15–2018/19, which set out the main plans for the city's development and daily operations. The plan sought to transform Kampala by strengthening key institutional, infrastructural, and social structures and responding to the challenge of increasing urbanisation (KCCA 2014) by establishing five thematic priority areas, among which were a planned and green environment and integrated city transport infrastructure. Actions and projects under these priority areas have since been guided by key sectoral plans at the national, regional, and local levels; these are presented below.

In June 2015, the government of Uganda issued its Second National Development Plan (NDPII) 2015/16–2019/20, the second in a series of six five-year plans for achieving the Uganda Vision 2040, which aims to propel the country to middle income status by 2020 by strengthening competitiveness for sustainable wealth creation, employment, and inclusive growth. NDPII recognises that inadequate preparedness for and response to natural disasters has allowed destructive droughts, flooding, landslides, and severe storms to result in a diversion of resources from development interventions to the procurement of relief commodities and emergency response needs. The plan notes the "need for robust early warning systems and disaster preparedness plans to build resilience capacities in order to mitigate the impact of natural disasters on infrastructure and productivity" (NPA 2015), and it specifically includes disaster preparedness and resilience among its objectives for enhancing the development of agriculture and infrastructure.

NDPII also established the main objectives and strategic interventions for Kampala's development, which include improving the city's physical infrastructure through expansion and upgrading of the transport network; improving physical planning and control of development through the upgrading of declining areas and slums and the development of detailed city neighbourhood physical plans; and improving environmental and ecological planning by reviewing and updating the Kampala Drainage Master Plan, strengthening wetlands conservation and management, and developing and implementing a KCCA low-carbon and climate change–resilient strategy (NPA 2015).

The World Bank Country

Partnership Framework (CPF) for 2016–21 recognises the need to bolster Uganda's resilience to climate change and lays out a course to support the country's efforts to enhance public infrastructure. It targets continued enhancement of access to urban services and the business environment, as well as increased resilience of the poor and vulnerable (World Bank 2016a).

The Kampala Physical Development Plan (KDPD), launched in 2012, is a central planning component in Kampala that provides guidance for the orderly and sustainable physical development of the city over the short to medium terms. The plan seeks to improve urban functionality and liveability by improving infrastructure (drainage, sewage, water supply, and electricity) and providing adequate spaces for business, facilities for tourism and recreation, and sustainable and affordable housing for poor communities. According to KPDP, specific development plans must be devised for every neighbourhood, including pilot projects for improved housing sites (KCCA 2012a).

Drainage infrastructure is a key element of disaster risk management in Kampala. The Kampala Drainage Master Plan, originally developed in 2002, guided the design and construction of several drainage and flood management systems in the city. In 2012, through support from UN-Habitat's Cities and Climate Change Initiative (CCCI), Kampala benefited from an Integrated Flood Management (IFM) project, which sought to complement technical flood risk analyses with multi-stakeholder engagement and proposed actions the stakeholders could undertake to reduce flood risk (UN-Habitat 2013). The continuous increase in built-up surface and the growing settlements in low-lying areas have rendered the existing infrastructure unable to cope with increasing runoff volumes, leading to frequent localised flooding. As a result, the plan is being updated by KCCA, with support from the World Bank's Second Kampala Institutional and Infrastructure Development Project (KIIDP2), to guide the redesign and reconstruction of drainage infrastructure and investment in several tertiary channels.

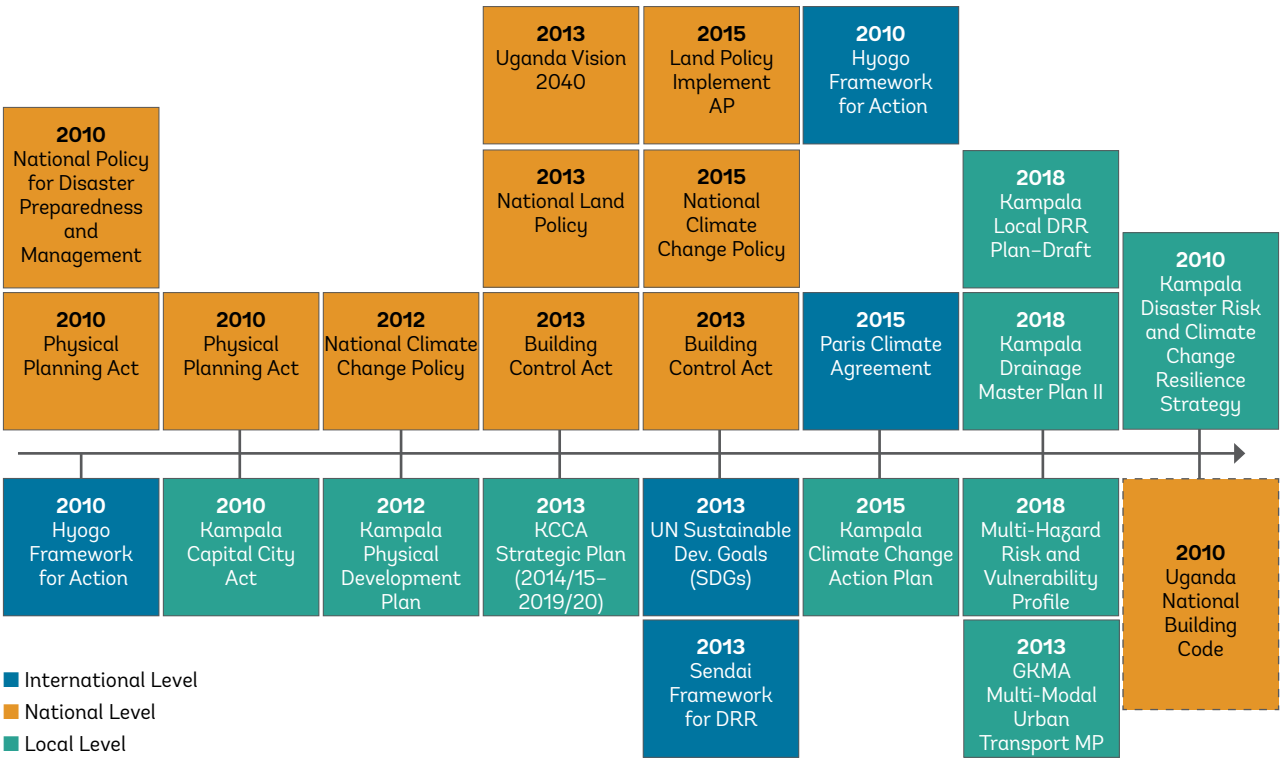
In 2018, to ensure Kampala is developed in a sustainable manner and to build resilience against the impacts of climate change, KCCA launched the Kampala Climate Change Action Plan. The priority actions established in this plan are based on a low-carbon approach and seek to mainstream climate action in KCCA's services and operations, thus contributing to national and international commitments on climate action. In 2017, KCCA received a grant of €951,504 from the European Union (EU) to finance the strategic actions set out in the plan during a three-year period (KCCA 2017).

For the transport infrastructure, KCCA has developed the Multi-Modal Urban Transport Master Plan for the Greater Kampala Metropolitan Area (GKMA) through KIIDP2. The plan envisions the development of a mass rapid transit (MRT) network, including light rail, buses, and cable cars, to be completed in several stages by 2040. Its goals are to replace less sustainable modes of transport—such as cars and boda-bodas (motorcycles)—with more sustainable means, improve mobility by reducing travel times, reduce the number of road accidents and fatalities, and reduce energy use, air pollution, and emissions (KCCA 2018b).

An essential analysis of Kampala's development and existing risk conditions is included in the Multi-Hazard Risk and Vulnerability Profile for Kampala Capital City (KCCA 2018c), which KCCA developed with support from Strengthening Capacities for Disaster Risk Management and Resilience Building, a United Nations Development Programme (UNDP) project. In addition to a comprehensive analysis of field data, this document contains zonation maps for the various natural and human-induced hazards to which Kampala is exposed, and it provides fundamental inputs for the development of this strategy.

Figure 1.1 shows the key planning documents informing development and disaster risk management (DRM) in Kampala.

Figure 1.1 **Kampala Development and DRM—Main Planning Framework**



1.2. Resilience Strategy Development Process

To meet the challenges presented by increasing levels of exposure and vulnerability to disasters in Kampala, KCCA has set the goal of developing and implementing a more rigorous framework to strengthen urban resilience. The Kampala Disaster Risk and Climate Change Resilience Strategy is a key component for understanding risks and identifying actions to build resilience. Building on Kampala's existing action plans and strategies, this document consolidates and develops analysis and recommendations for improving the management of disaster and climate risk in Kampala. The resilience strategy will inform KCCA's investment planning and operations under its KCCA Strategic Plan 2019–24, as well as sectoral plans and investments.

To achieve KCCA's vision of sustainability of the city, the objective of the Kampala Disaster Risk and Climate Change Resilience Strategy is to set out an integrated approach to (1) avoid creating risks, (2) reduce existing risks, (3) respond more efficiently to disasters, and (4) mitigate the effects of climate change and build climate resilience. The strategy is in line with the NDPII, the World Bank CPF FY16–21, and the KCCA Strategic Plan, and it supports the city's local alignment to and implementation of the principles underlying the Sendai Framework for Disaster Risk Reduction, the Paris Climate Agreement, and the Sustainable Development Goals (SDGs).

Figure 1.2 illustrates the five stages for developing the strategy. The process began with the comprehensive mapping and assessment of existing action plans and strategies related to disaster risk management and climate change in Kampala and the consolidation of recommendations that would inform the priority actions it proposed. Next, extensive surveys and interviews conducted among KCCA staff and key stakeholders from the national government and private sector aimed to further the assessment and consultation process for the identified risks.

In the third stage, KCCA hosted a series of workshops involving key institutional stakeholders to identify the geographical areas of the city critically affected by disaster and climate risk and the dynamics of critical scenarios, as well as to set out major options for managing and reducing these risks. At this stage, KCCA organised site visits to flood-prone areas and hotspots along the drainage network to assess

Figure 1.2 **Strategy Development Process**

flood risks and devise corrective measures. Once the assessment was complete, KCCA established the main priorities and expected outputs of the strategy and organised discussions with key stakeholders to prioritise and build consensus around the most effective and efficient actions proposed in the strategy for building resilience.

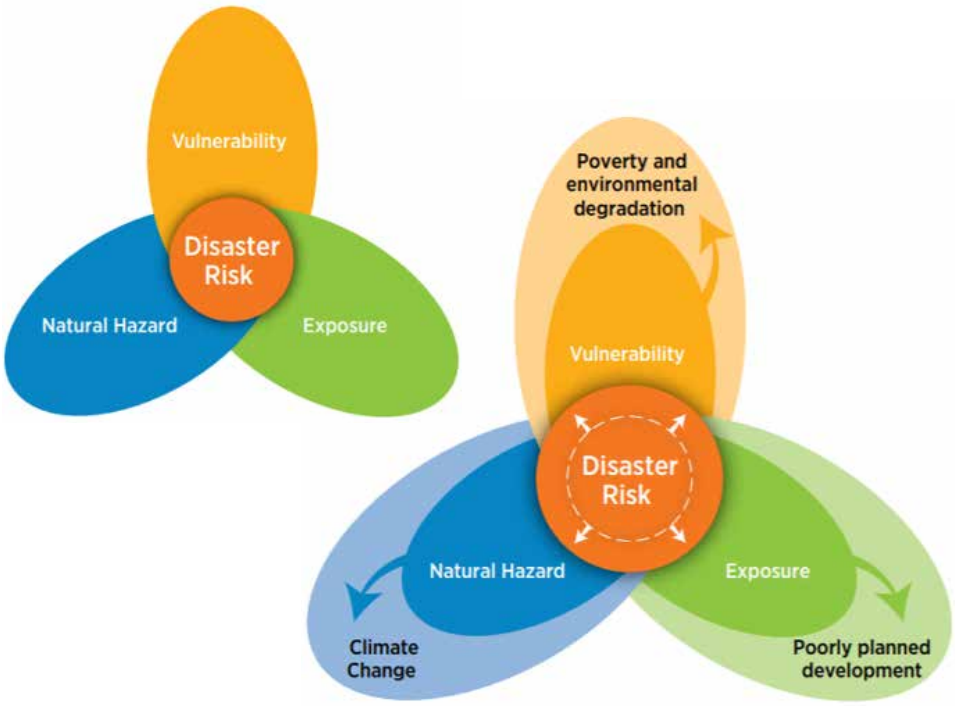
1.3. Conceptual Framework for Disaster and Climate Risk Management

In the context of the international consensus on the importance and efficacy of action to manage shocks and stresses that can set back development gains, Kampala aims to understand and address the disaster and climate risks affecting the city. **Figure 1.3** represents disaster risk as the product of three converging factors: hazard, exposure, and vulnerability. Disaster risk is the probability that a natural or human-induced event or phenomenon will occur at a specific location (hazard), combined with the number of people and assets located in the hazard-prone area (exposure) and the various conditions that affect their susceptibility to being affected by the event (vulnerability). Thus, the impact of a disaster is not only determined by the severity and frequency of hazards, but also by the exposure and vulnerability of people and assets to them.

Hazard, exposure, and vulnerability conditions can change over time and space. They are determined by physical, environmental, geographical, social, economic, demographic, and institutional factors. Figure 1.3 also shows the changing nature of disaster risk. Climate change may exacerbate the frequency and intensity of natural hazards, while the expansion of human settlements and investments in hazard-prone areas can increase the exposure of people and assets to these hazards. Poverty, inadequate physical infrastructure, and environmental degradation can increase the vulnerability of people, assets, and environments to the shocks and stresses of natural hazards.

Sometimes the frequency and intensity of natural

Figure 1.3 **Risk as a Function of Hazard, Exposure, and Vulnerability**



Source: Adapted from World Bank 2013.

hazards can be managed or reduced at the local or regional level—for example, through the construction and operation of flood risk and drainage infrastructure or the management of runoff conditions to reduce or slow the volume of rain flowing into drainage channels. Such efforts in hazard reduction often prove expensive, however, and are most effective in coordination with neighbouring or regional jurisdictions. Direct management of some hazards, such as earthquakes, may not be possible at all. The nature of the risks posed by these hazards often shifts the priority to managing exposure and vulnerability. When exposure or vulnerability are extensive, even a moderate hazard event can cause large impacts—for example, destruction resulting from poor construction during a small earthquake.

Chapter 2
General Information about Kampala City

This chapter presents relevant information on the geography, environment, demographics, economy, land use, urbanization trends, and infrastructure in Kampala.

2.1. Geographical and Environmental Features

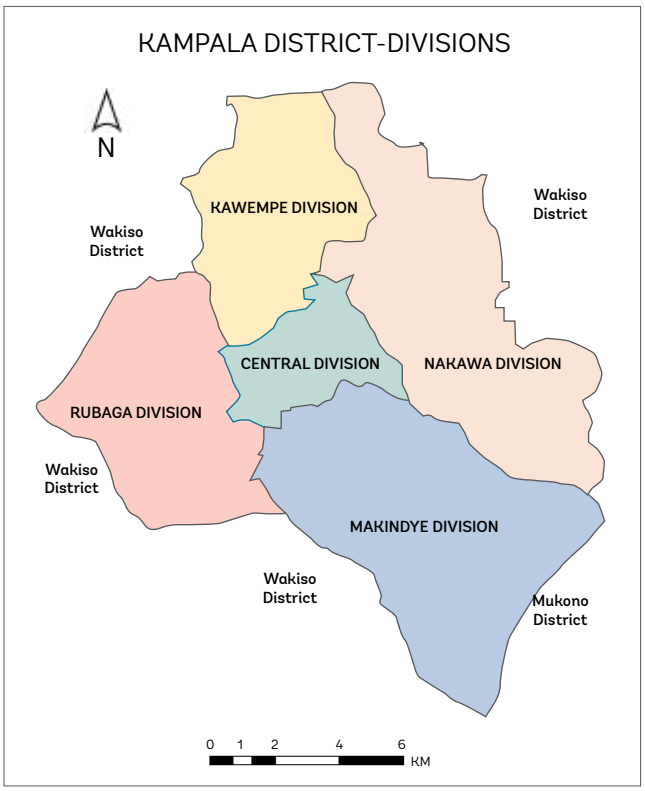
Kampala, located in Uganda's central region, is the country's administrative capital and largest city. It comprises five divisions: Central, Nakawa, Makindye, Lubaga, and Kawempe (see **figure 2.1**). The city lies at an altitude of 1,190 m and has a total area of around 195 km^2, with 33 km of shoreline on Lake Victoria; and it is surrounded by the Wakiso District on the north, west, and south and the Mukono District and Lake Victoria on the east (see **figure 2.2**). Kampala is built on a series of rolling hills and small valleys, with many water channels flowing through wetlands into Lake Victoria from the south-eastern part of the city. The remaining parts of the city drain towards the west and a river and marsh network that eventually feeds into Lake Albert.

Kampala's soil characteristics make the low-lying areas unsuitable for development, not only because of high groundwater levels within the soil, but because of the poor load-bearing properties of the underlying peat. Prior to urban development, natural vegetation consisted of relatively dense forest and scrub, providing a natural drainage system in which water was released slowly through the wetlands along the valley floor. Typical runoff coefficients (that is, the percentage of rainfall that is not absorbed and ends up as runoff) for this kind of vegetated land surface would be between 5 and 10 percent.

Figure 2.1 **Topographic Map of Kampala**

Source: KCCA 2014.

Figure 2.2 **Administrative Map of Kampala**



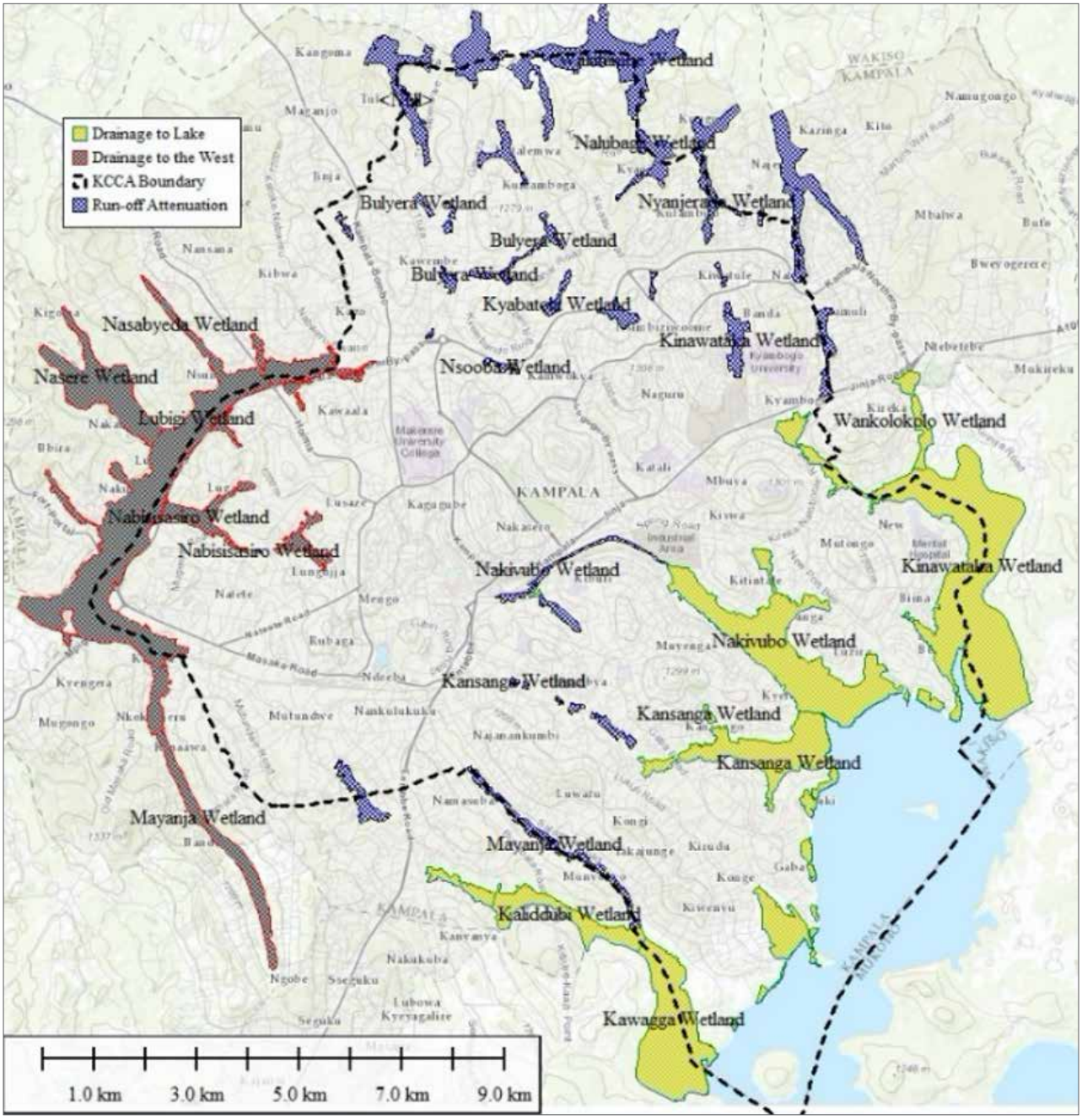
Source: UBOS 2014c.

2.1.1. Wetlands

Approximately 70 remaining wetlands have been identified by KCCA within the city (see **figure 2.3**). They can be considered in three broad categories, based on their current and potential functions:

1. *Wetlands that drain towards the west of the city, consisting of the Lubigi and other connected wetland areas that form one of Kampala's largest wetland systems.* Both the Lubigi and Nalukolongo primary channels, which drain an area of approximately 100 km^2, discharge into this large and flat area, where extensive inundation is frequent. These wetlands are at the lower end of the urban drainage network and have very little impact on flood risk within the city, regardless of their condition, discharging to a vast, largely rural, wetland and river network that eventually drains into Lake Albert in the northwest of Uganda.

Figure 2.3 **Wetlands in Kampala**



Source: KCCA 2018f.

2. *Wetlands that drain towards Lake Victoria, consisting of five main systems: Kinawataka, Nakivubo, Kansanga, Ggaba, and Kawagga.* Similar to the Lubigi wetland system, these areas have little impact on flood risk, apart from the flood hazard created when development occurs within their boundaries. The key importance of these wetlands is their beneficial impact on the quality of water draining from the city into the lake.
3. *The remaining small wetlands, distributed mainly across the northern parts of the city.* These remnants of larger wetlands that have been largely lost through gradual encroachment are important to the city for the role they play in flood risk management through their natural capacity for flood attenuation. Their location within the upper parts of the drainage basins, their ability to slow down runoff and encourage infiltration, and their natural tendency to flood during heavy rainfall enable them to limit flooding farther downstream.

2.1.2. Current Climatic Conditions

Despite its proximity to the equator, Kampala has a tropical rather than a typical equatorial climate. This is mainly because of the city's high altitude, its long distance from the sea, and its proximity to the large water mass of Lake Victoria. Kampala has very stable temperatures throughout the year, with daily annual means ranging between 20°C and 22°C, an average high of 27°C to 28°C, and an average low of 17°C to 18°C. (Kampala Climate Change Action Plan 2016)

Annual rainfall in Kampala varies between 1,750 mm and 2,000 mm per year, concentrated in two annual rainy seasons, the first of which runs from March to May, peaking in April, and the second of which runs from August to November, peaking during October and November. Although the former is shorter, it is also more intense, with April typically experiencing the heaviest precipitation. The main dry season takes place from December to February, with a secondary dry season during June and July. Rain in Kampala is generally convective: rainstorms are highly localised, often covering less than 10 km^2, and they are violent and short, usually lasting an hour or less (Douglas et al. 2008). Because of their convective nature, heavy rains in Kampala can happen even in relatively dry months of the year, making rainstorms particularly damaging when they occur when citizens and responsible authorities might not be prepared (UN-Habitat 2009).

2.2. Demographic and Socioeconomic Profile

According to the Uganda Bureau of Statistics (UBOS), Kampala has an estimated population of 1,610,500 (2017a). The population under 30 years of age represents 77.8 percent of the total, with minors under 18 as the single largest group (41.3 percent of the total population) (UBOS 2017b). The GKMA hosts up to 4.2 million people (around 10 percent of Uganda's total population) and comprises parts of Wakiso, Uganda's most populous district, and Mukono District (World Bank 2012).

Kampala is one of Africa's fastest growing cities. The 2014 census recorded an annual population growth of around 2 percent, but more recent studies suggest this rate has accelerated to around 4 percent. The GKMA is expected to rise to between 8 million and 10 million by 2035 (World Bank 2015), with growth driven mainly by rural migration as the national economy becomes increasingly concentrated around Kampala. **Table 2.1** shows Kampala's population as reported by the most recent official censuses, as well as current and future estimates. According to projections under various growth scenarios, Kampala's population will be around 10 million by 2050, becoming one of the world's fifty-five largest cities and ranking among Africa's largest ten (Hoornweg and Pope 2014).

Table 2.1 **Kampala's Population**

	1991	2002	2014	2018 (estimated)	2020 (projected)	2050 (projected)
Population	774,241	1,189,142	1,507,114	1,610,500	1,665,600	9 million–12 million

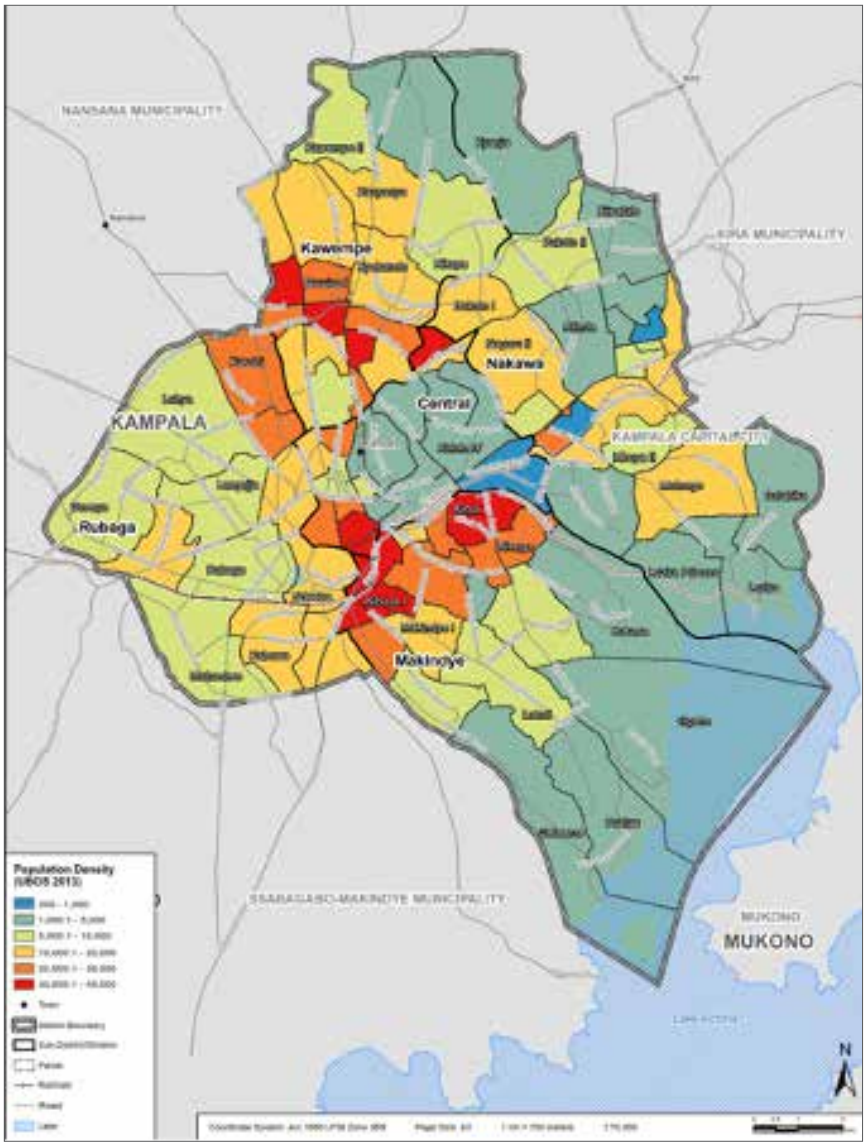
Sources: UBOS 2017a, 2017b; Hoornweg and Pope 2014.

Table 2.2 **Geographical and Demographic Data by Division**

Division	Central	Kawempe	Nakawa	Makindye	Lubaga	TOTAL
Area (% of total)	15.23 km² (8)	30.79 km² (16)	52.42 km² (27)	59.33 km² (30)	37.05 km² (19)	194.82 km²
Population (% of total)	75,168 (5)	338,665 (23)	317,023 (21)	393,008 (26)	383,216 (25)	1,507,080
Households (% of total)	23,142 (6)	94,202 (23)	83,853 (20)	107,997 (26)	105,212 (25)	414,406
Population density	4,935/km²	10,999/km²	6,048/km²	6,625/km²	10,343/km²	7,736/km²

Sources: UBOS 2017a, 2017b.

Figure 2.4 **Kampala's Population Density**

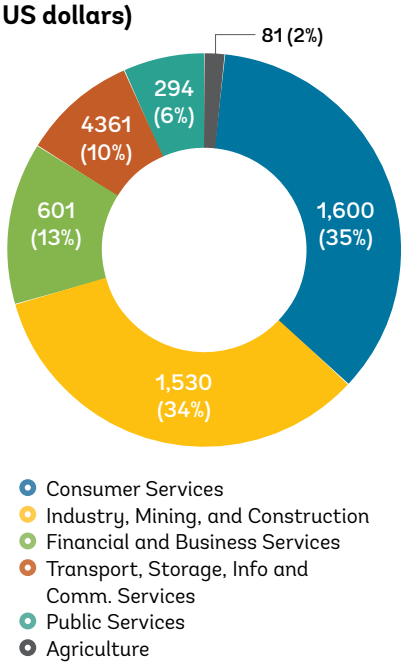


Source: KCCA 2018c.

At 7,736 people per km², Kampala's population density is in the top quartile of major cities in Sub-Saharan Africa, with density significantly less than Kinshasa, Democratic Republic of Congo (19,000 per km²), and Freetown, Sierra Leone (13,000 per km²), but more than Bamako, Mali (7,384 per km²), and Nairobi, Kenya (6,318 per km²) (World Bank 2018a). As shown in **figure 2.4**, population density is highest around central Kampala, especially in the northwestern part of Makindye (Kibuye, Katwe, and Kibuli parishes) and the southern part of Kawempe (Bwaise and Mulago parishes).

Kampala is Uganda's economic and trade hub. The GKMA accounts for 31.2 percent of Uganda's national gross domestic product (GDP), 9.5 percent of employment, and 80 percent of its industrial sector (Hobson and Kathage 2017). Kampala's GDP is expected to grow at an annual rate of 7.5 percent between 2019 and

Figure 2.5 **Kampala's GVA Components (in millions of US dollars)**



Source: Oxford Economics 2018.

2035, becoming Africa's third fastest growing urban economy during this period (Oxford Economics 2018). **Figure 2.5** shows the main components of the city's economy, measured by their gross value added (GVA). The consumer services sector (35 percent) and the industry, mining, and construction sectors (34 percent) account for the largest share of Kampala's production (Oxford Economics 2018).

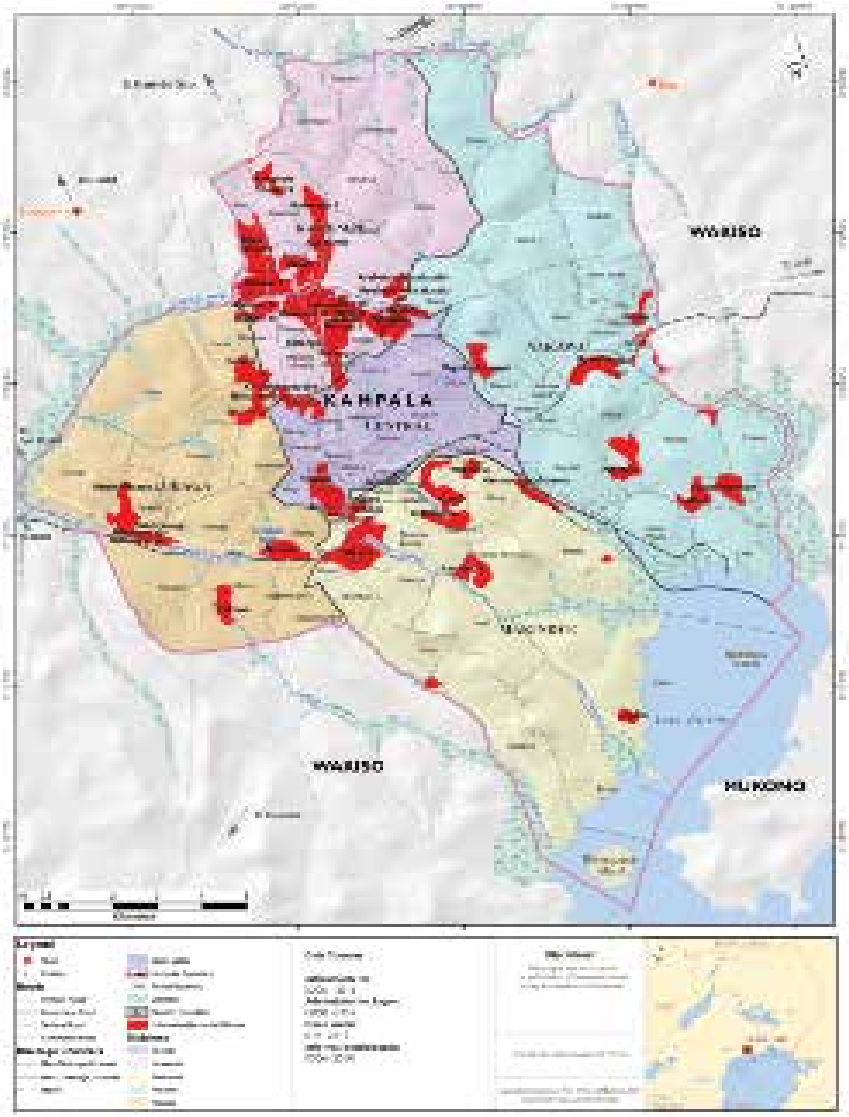
According to UBOS, 65.1 percent of the population ages 14 to 64 is employed, with the largest occupation category being sales and service work (representing 30.6 percent of the employed in this age group), followed by craft and related trade work (10.3 percent) (2014b). Among youth (18 to 30 years of age), 12.5 percent are neither working nor in school.

In Kampala, higher-income inhabitants live in more structured and better-serviced neighbourhoods, while most of the city's parishes host a mixture of poor and working-class people living in informal settlements (see **figure 2.6**). One-third of the poorest population lives in densely populated slums lacking access to most public services (see **figure 2.7**) (World Bank 2015). Kampala City has 31 identified slums, and informal settlements are estimated to cover nearly a quarter of the total area of the city (UN-Habitat 2017). Unlike other African cities, such as Kinshasa or Nairobi, Kampala's slums are widely dispersed across several areas, not concentrated in pockets.

2.3. Land Use and Urban Expansion Profile

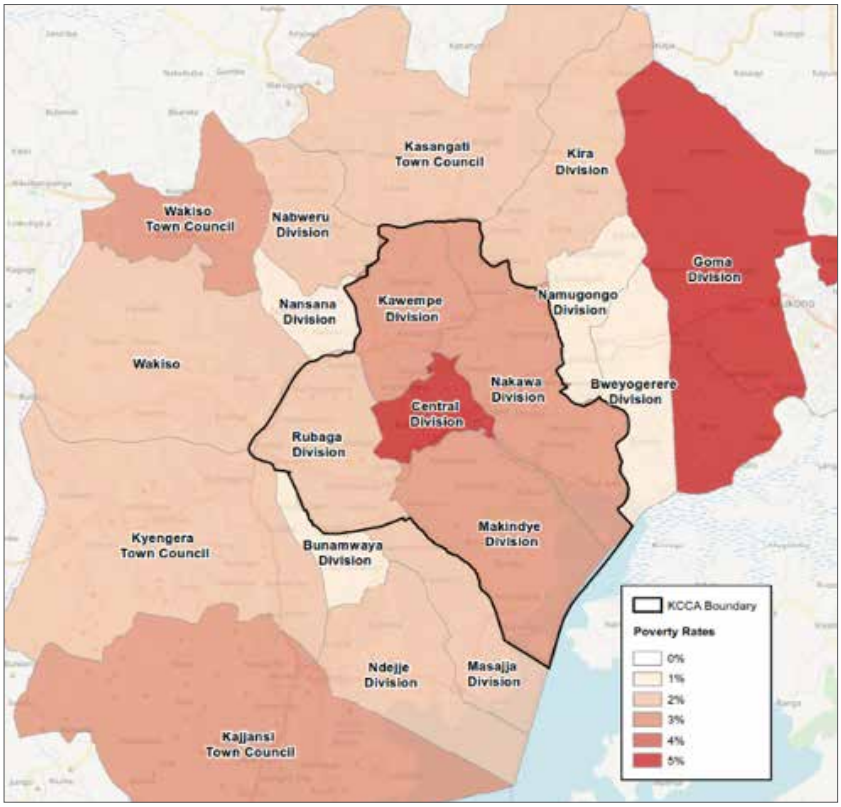
Kampala's urban development has not been uniform, as the city has expanded outwards from the City of Kampala into the neighbouring districts, with development occurring primarily along major transportation

Figure 2.6 **Informal Settlements in Kampala**



Source: KCCA 2018c.

Figure 2.7 **Greater Kampala's Urban Growth Map**



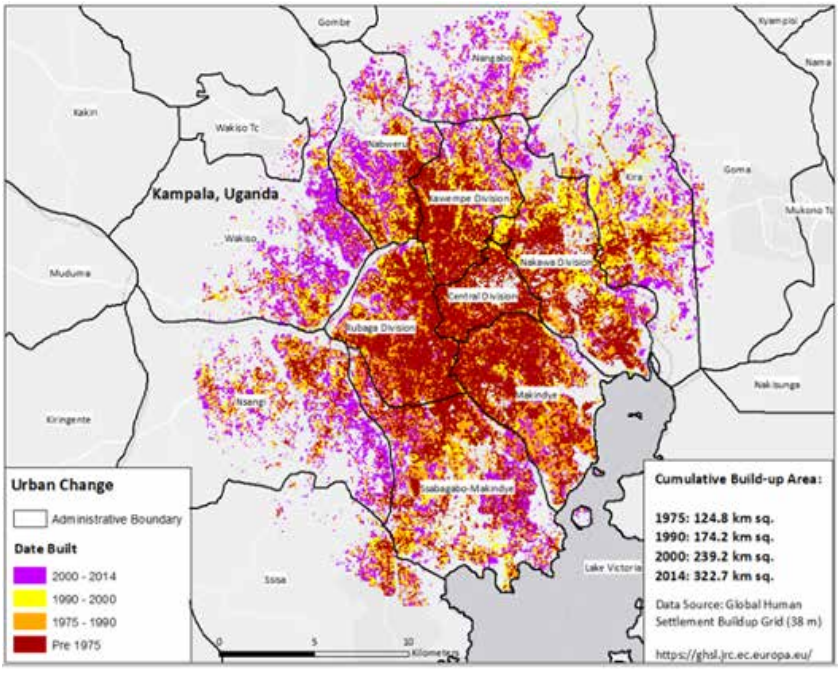
Source: Elaboration of World Bank data.

corridors and slowly encroaching on wetlands. As a result of rapid population growth, the built-up area expanded at an annual rate of 4.1 percent between 1975 and 2014 and now represents around 41 percent of the GMKA's total land cover (World Bank 2018a). This expansion is captured in **figure 2.8**.

Public infrastructure, industries, commercial properties, and both formal and informal settlements have been developed in permanent and seasonal wetlands, which represent 20 percent of the city's area (World Bank 2015). The accelerating loss of natural vegetation and high-value ecological areas is a key driver of flood risk in Kampala (see **chapter 5**).

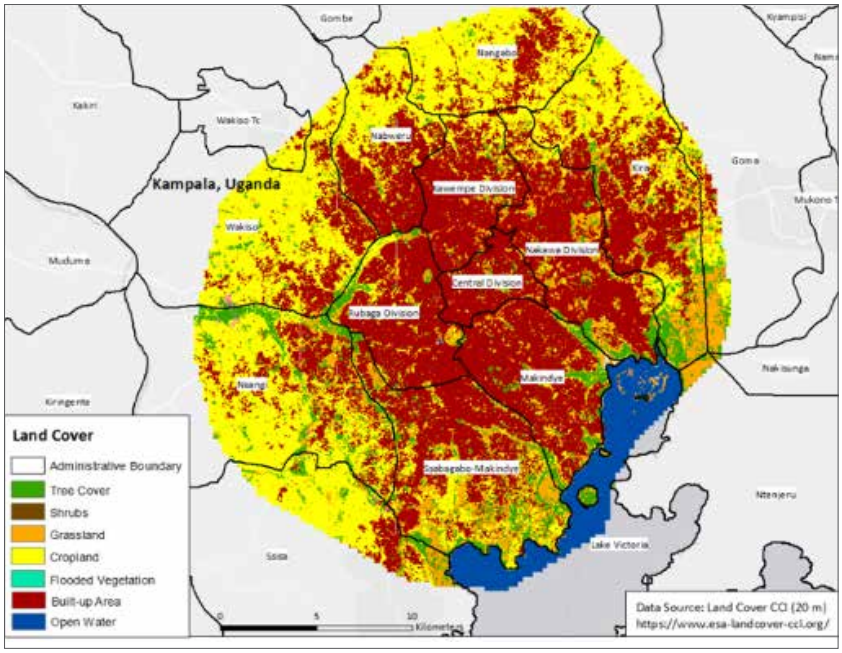
Since the 1990s, development in Kampala has moved from elevated areas to flat, low-lying areas that were formerly wetlands or floodplains. This trend has been complemented by infilling and intensified building. The type of construction that has taken place has created a largely impermeable surface that sheds its rainwater very quickly, preventing infiltration, and concentrates the runoff into local gullies and roadside drains. Typical runoff coefficients for this type of urbanised land surface are between 30 and 50 percent. In extreme scenarios in which dense vegetation has been replaced with impermeable surfaces with no runoff capture, the amount of peak runoff produced can increase tenfold. The rapid runoff from exposed surfaces has also resulted in soil erosion in the elevated parts of the city and sedimentation in the lower sections of the drainage system. This leads to blockage of the drains, particularly at culverts or road crossings, which is often exacerbated by the presence of solid waste and increased local flooding.

Figure 2.8 **Greater Kampala's Urban Growth Map**



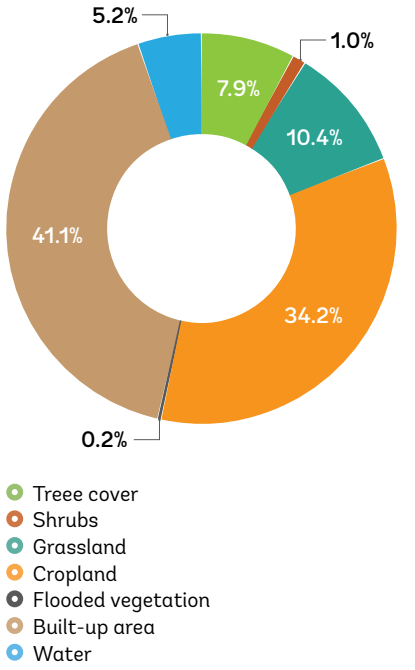
Source: European Commission 2019.

Figure 2.9 **Greater Kampala's Land Cover Map**



Source: EESA 2019.

Figure 2.10 **Kampala's Land Cover**



Source: World Bank 2018a.

As shown in **Figures 2.9** and **2.10**, these trends and developments have resulted in a very different set of conditions to the original natural ones. These are partially responsible for the frequent and significant flooding of communities, property, and infrastructure.

2.4. Infrastructure and Basic Services

Rapid urbanisation and increasing population challenge the quality, reliability, and sustainability of Kampala's infrastructure and services (KCCA 2014). These challenges are summarised below.

2.4.1. Transport

Kampala has a network of approximately 2,100 km of built roads, of which only 500 km are tarmacked (KCCA 2018d). As figure 2.11 shows, the main roads connecting Kampala to major towns in the region are Entebbe Road (southbound), Natete Road and Masaka Road (westbound), Bombo Road (northbound), and Jinja Road (eastbound). Kampala's motorised road network was developed in the 1960s, and its capacity has since been outpaced by the growing traffic flow.

Through both phases of the Kampala Institutional and Infrastructure Development Project (KIIDP 1 and KIIDP 2), roughly 100 km of road will be paved, and 160 km of footpaths, bridges, and walkways for pedestrians will be constructed (World Bank 2014a). In addition, two ongoing projects—the Standard Gauge Railway (SGR) project and the Kampala Flyover Construction and Road Upgrading Project (KFCRUP)—

Figure 2.11 **Kampala Main Roads**

Source: OpenStreetMap.

will further integrate Kampala into the Northern Corridor by connecting the city with its East African neighbours.

Under the Multi-Modal Urban Transport Master Plan for the GKMA funded by KIIDP2, the KCCA envisions constructing and operating 360 km of the MRT system by 2040, with the goal of improving the movement of people and reducing traffic congestion in Kampala and its neighbouring municipalities. The project, currently in the pilot phase, includes three metro lines, four Light Rail Transit (LRT) lines, and five Bus Rapid Transit (BRT) lines (KCCA 2018d).

2.4.2. Water Supply and Sanitation

The National Water and Sewerage Corporation (NWSC) provides piped water and sewerage services to the people of the Greater Kampala Metropolitan Area.

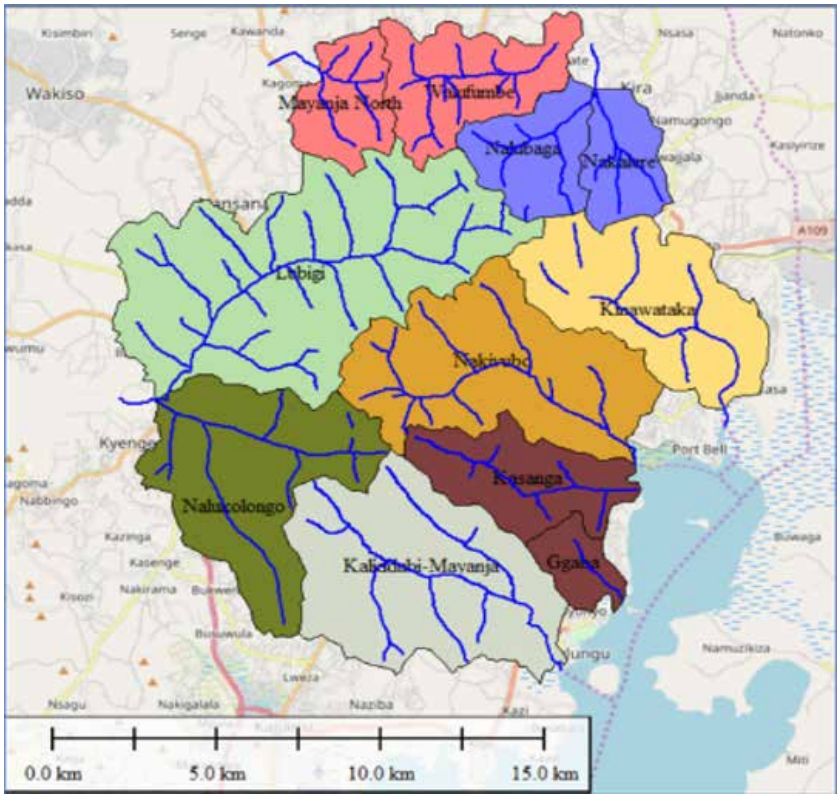
The city's largest source of water supply is the Murchison Bay, which is a shallow section of Lake Victoria. After being processed at treatment plants, water flows into secondary reservoirs around the city's hills. Statistics show that while access to piped water has significantly improved in the past decade (World Bank 2015), access and affordability is varied, with issues of quality and safety of untreated water (UN-Habitat 2017). Water availability and affordability will be affected by climate change, as water levels at Lake Victoria are expected to drop (see **section 6.3**).

The city of Kampala lacks comprehensive piped sewerage infrastructure, with only about 10 percent of its population, mainly in the central business district, having access to the system. The remaining 90 percent make use of septic tanks or onsite sanitation, which often discharge untreated waste directly into the environment (World Bank 2015). Most toilets and pit latrines serving multiple households are difficult to get access to and thus lack proper and regular maintenance. Consequently, many are either abandoned or directly emptied into the environment (MWE 2017). Projects to increase sanitation coverage include the expansion of the Bugolobi Sewage Treatment Works, the already completed Lubigi plant, and a planned sewerage pre-treatment plant in Kinawataka. Moreover, 135 acres have been procured by KCCA for a new landfill in Dundu (KCCA 2019).

2.4.3. Drainage

The low and flat areas in Kampala's hills are characterised by a series of shallow seasonal wetlands fed by the many small streams that drain the area. The southeastern portion of the city drains through these into Lake Victoria, while most of the northern and western parts drain westwards and eventually into Lake Albert. There are eight main drainage systems, shown in figure 2.12.[2] The drainage pattern within each basin consists of many short tributaries feeding

Figure 2.12 **Main Drainage Basins within Kampala**



Source: Kampala Drainage Masterplan Plan 2016, Final Technical Report.

[2] The eight main drainage systems are Lubigi, Kansanga, Kinawataka, Manyanja/Kaliddubi, Nakivubo, Nalubaga, Nalukolongo,and Walufumbe, and the smaller are Gaba, Mayanja North, and Nakelere.

the main channels, which can provide a naturally efficient drainage system. Soils in the area are relatively deep and consist of a mixture of clay and sandy loam, with the heavier clay soils more likely to be found in the valley bottoms, along with peat formations that have evolved over many centuries due to the waterlogged conditions.

Historically, development of the network has proceeded in an ad hoc manner, with the sole purpose of solving local drainage challenges by widening or deepening the natural drainage channels and lining them with concrete or blockwork and connecting urban drains to help remove surface water. This system is under great pressure from human activity and lack of adequate investment in maintenance and upgrading. Soil erosion and widescale dumping of solid waste has resulted in greater risk of blockage, particularly around poorly designed or maintained bridges and culverts, with an associated loss of drainage capacity and conveyance. Furthermore, development in previously undeveloped areas is reducing the capacity of Kampala's surface area to absorb stormwater, which increases the extent of impermeable surfaces, such as concrete, and reduces water infiltration and retention.

Several projects, including some with support from development partners, have aimed to manage and improve drainage and address other significant environmental issues. Recently, 3.6 km and 4 km of the primary and secondary drainage systems, respectively, were expanded and lined, and four tertiary drainage hotspots were repaired (World Bank 2014a). Current projects aim to build four primary drainage channels and improve the lining and engineering of the Kinawataka, Lubigi, and Nalukolongo systems (World Bank 2014b).

2.4.4. Solid Waste Management

Poor solid waste disposal and management continue to pose a major challenge for Kampala, as it is detrimental to the city's drainage infrastructure, environment, and public health. Solid waste management services are managed by private companies under contract with KCCA. Of an estimated kilogram of solid waste being generated per capita per day, only 40 to 50 percent is properly disposed of (KCCA 2018e).

Under Phase II of the Lake Victoria Environmental Management Project, the Ministry of Water and Environment and KCCA aimed to reduce flood risk and environmental pollution through drainage maintenance and restoration and increased public awareness of solid waste management practices. The maintenance equipment acquired through this project increased the amount of silt and waste removed from channels draining into Lake Victoria from 21,000 to 44,000 tons per year (World Bank 2016b).

Chapter 3
Institutional and Social Capacity for Disaster Risk Management and Climate Change Adaptation

This chapter presents the frameworks relevant to understanding the institutional and social capacity for disaster risk management and climate change adaptation.

3.1. Legal Framework for Addressing Disaster and Climate Risk

From the constitution to specific legislation and policies, the government of Uganda and subnational governments have affirmed their responsibility for addressing and managing disaster risk and climate change.

3.1.1. The Constitution of Uganda (1995)

At the national level, the Constitution of Uganda (1995), as amended in 2005, provides a starting point and overall regulatory framework for the implementation of climate change policy. Objective XIII of the constitution advocates for the management of the environment for sustainable development. Article 39 states that "every Ugandan has a right to a clean and healthy environment." Article 245 states that "Parliament shall, by law, provide for measures intended: (a) to protect and preserve the environment from abuse, pollution and degradation; (b) to manage the environment for sustainable development; and (c) to promote environmental awareness" (Republic of Uganda 1995).

Furthermore, under the section, "National Objectives and Directive Principles of State Policy," Uganda's constitution mandates that the state must put in place effective mechanisms to deal with any hazard or disaster caused by natural calamities or any event causing a general disruption of normal life or general displacement of people. The constitution also mandates the creation of the Disaster Preparedness and Management Commission, focused on both natural and manmade disasters.

3.1.2. The National Environment Act (1995)

The National Environment Act of 1995 contains several references to links between climate change adaptation and disaster risk reduction. It provides for the development of guidelines and action plans to coordinate environmental disaster response and mandates assessments of the potential impact of development on the environment. These include several elements of disaster risk assessment and mitigation measures to control environmental degradation. Furthermore, the National Environment Act was the first law to incorporate environmental education, with elements related to disaster risks, into the national school curriculum (Office of the Prime Minister 2015).

3.1.3. Additional Legislation

National legislation related to disaster risk management and climate change adaptation includes the following:

Plant Protection Act (1937)

- Red Cross Act (1964)
- Constitution of the Republic of Uganda (1995)
- National Development Plan (1995)
- National Environment Act (1995)
- Water Act (1997)
- Prohibition of the Burning of Grass Act (1974)
- Traffic and Road Safety Act (1998)
- Environmental Impact Assessment Regulation (1998)
- National Forestry and Tree Planting Act (2003)
- Occupational Safety and Health Act (2006)
- Food and Nutrition Bill (2009)
- Land Act (Amendment) (2010)
- Public Health Act (Amendment) (2000)

- Physical Planning Act (2010)
- Building Control Act (2013)
- Principles for the Disaster Preparedness and Management Bill (2018)

A number of planning instruments also relate to disaster risk management and climate change adaptation:

- National Water Policy (1999)
- Internally Displaced Persons Policy (2004)
- National Oil and Gas Policy (2008)
- National Policy for Disaster Preparedness and Management (2010)
- National Health Policy II (2010)
- National Climate Change Policy (2012)
- Climate Change Risk Management and Adaptation Strategy (CRMAS) for the transport sector (2012)
- Uganda Standard: Seismic Code of Practice for Structural Designs (2013)
- Uganda National Building Code (2019)
- The Building Control Regulations (2020)
- National Land Policy (2013)
- National Agricultural Policy (2013)
- Kampala Physical Development Plan (2013)
- National Physical Planning Standards and Guidelines (2011)
- National Development Plan II (2015)
- National Climate Change Policy (2015)
- National Land Policy Implementation Action Plan (2015)
- Kampala Climate Change Action Plan (2016)
- National Integrated Cholera Prevention and Control Plan (2017)
- Green Growth Development Strategy (2017)
- Kampala Drainage Masterplan II (2018)

3.2. Institutional Governance Structure of Kampala

As established by the Kampala Capital City Authority Act (2010), the Kampala Capital City Authority (KCCA) administers Kampala on behalf of the central government.[3] It is composed of the lord mayor, the deputy lord mayor, and councillors directly elected or appointed to represent youth, people with disabilities, and the engineering, architecture, medical, and law associations of Uganda. National mandates to address and manage disaster and climate risk are thus often carried out through local action by and investment from KCCA.

The authority's functions include initiating and formulating policy and enacting legislation; setting service delivery standards; determining taxation levels; monitoring the general administration and provision of services in the divisions; constructing and maintaining roads, major drains, and street lights; organising and managing traffic; carrying out physical planning, development control, and building control; assisting in the maintenance of law, order, and security; and performing any other function assigned to the authority by the central government. The ministries responsible for health and environment oversee public health and environment matters, respectively, in the capital city.

The Minister for Kampala Capital City and Metropolitan Affairs oversees the performance of the metropolitan authority, makes an annual Ministerial Policy Statement for KCCA to Parliament, exercises general powers to give directives on policy and general development of the capital city, and appoints and removes members of the authority. The ministry is tasked with supervising, guiding, inspecting, monitoring, and coordinating the governance activities of the capital city.

The lord mayor is the political head of the capital city, presiding over meetings of the metropolitan authority, monitoring the administration of the city, providing guidance to the division administrations, and representing the capital city on the authority.

The executive director serves as KCCA's chief executive, heading public service and the administration of the authority, including divisions and wards. Functions include serving as the accounting officer of the authority; managing all public funds of the authority and maintaining

[3] The text of this section is based closely on that of the 2010 Kampala Capital City Act (KCCA 2010).

accountability to Parliament; coordinating and implementing national and council policies, laws, regulations, byelaws, programmes, and projects; advising the mayor and authority on government policy; presenting the annual budget to the authority; advising the authority on technical, administrative, and legal matters pertaining to its management; implementing lawful decisions taken by the authority; delivering high-quality services to the population within the capital city and taking remedial action where service delivery standards are below the expected minimum; ensuring proper physical planning and development control in the urban councils; monitoring and coordinating the activities of the directorates of the authority and of the lower authority; promoting trade order; mobilising the urban community for development and sustainability of infrastructure and services; enforcing ordinances and byelaws made by the authority and its lower council units; among others.

KCCA's directorates include the Executive Director's Office, Administration and Human Resources Management; Treasury Services; Engineering and Technical Services; Public Health and Environment; Education and Social Services; Legal Affairs; Revenue Collection; Gender, Community Services, and Production; Internal Audit; and Physical Planning.

3.3. Institutional Disaster Risk Management Framework at the National and Local Levels

Uganda's National Policy for Disaster Preparedness and Management (2010) established the institutional network responsible for managing disaster risk and implementing the policy at the national level. The Department of Disaster Preparedness and Management (DDPM) within the Office of the Prime Minister (OPM), headed by the commissioner and the assistant commissioner, is the main agency coordinating disaster preparedness and management with all stakeholders at the national level (see **figure 3.1**).[4]

In 2014, the Department of Disaster Preparedness and Management established the National Emergency Coordination and Operations Centre (NECOC), a central body in charge of early warning and coordination of emergency and crisis response, available twenty-four hours a day, seven days a week. NECOC aims to improve Uganda's preparedness and response capabilities by establishing and endowing institutions at national and local levels, promoting research and the use of technology for disaster risk reduction, disseminating early warning information, and establishing effective coordination and emergency response mechanisms at national, local, and municipal levels, with the ultimate goal of reducing the vulnerability of the people and the natural environment. Uganda's Disaster Risk Information Centre is part of NECOC.

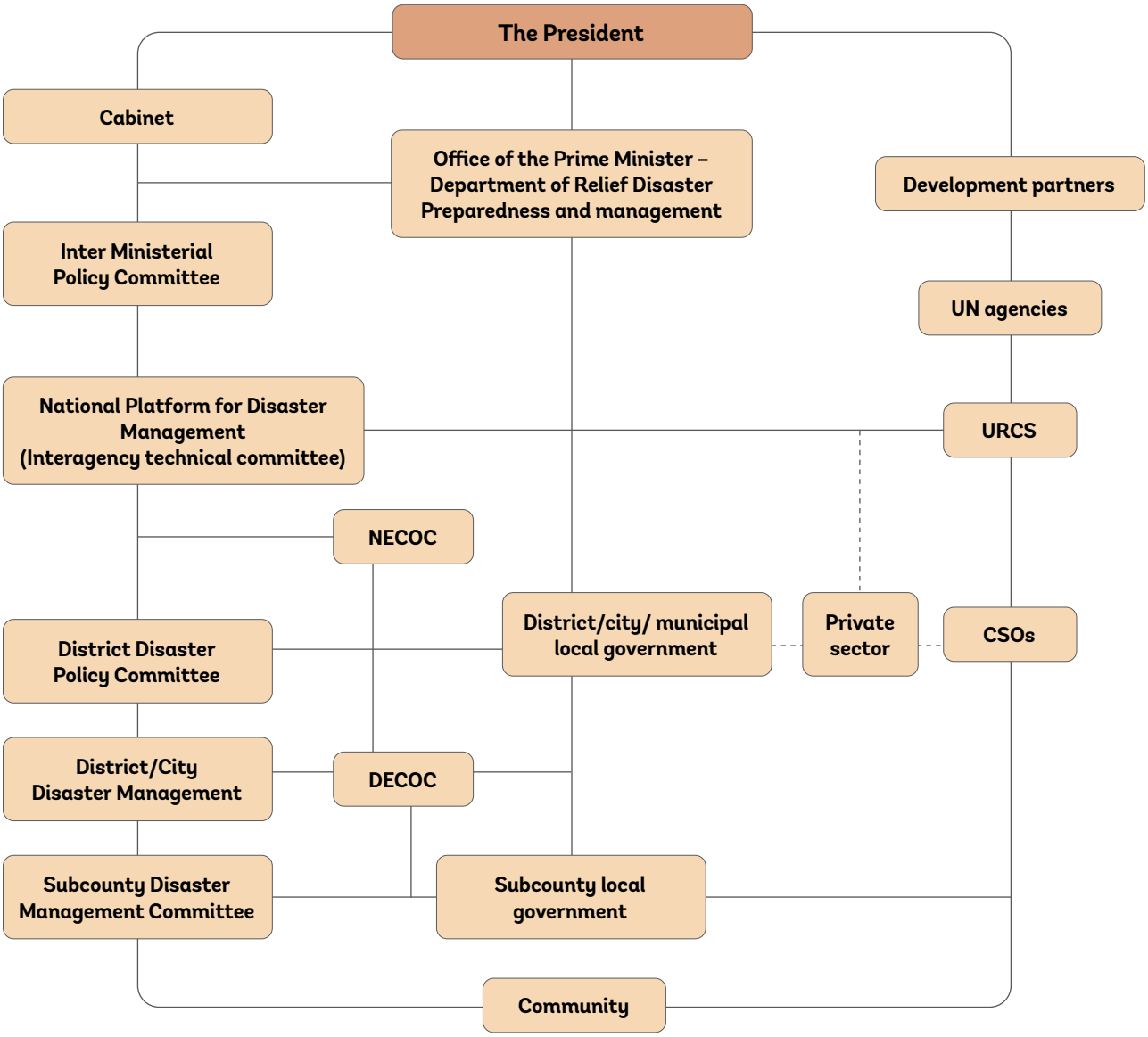
The institutional structure and various bodies responsible for disaster preparedness and management are set out in the national policy and include the following:

- National Disaster Risk Reduction Platform
- City Disaster Policy Committees (CDPCs)
- City Disaster Management Technical Committees (CDMTCs)
- District Disaster Policy Committees (DDPCs)
- District Disaster Management Technical Committees (DRMTCs)
- District Emergency Coordination and Operations Centres (DECOCs, based at district police stations)
- Municipal/Town Disaster Policy Committees (M/TDPCs)
- Municipal/Town Disaster Management Technical Committees (M/TDMTCs)
- Subcounty Disaster Management Committees (SDMCs)
- Village Disaster Management Committees (VDMCs)

While national policy describes the various structures that should be in place, further work is required to operationalise the structure. KCCA has produced proposals for disaster preparedness and management at the city level and below, which are broadly in line with the

[4] Portions of this section are based closely on the text of Directorate of Relief, Disaster Preparedness and Refugees 2010.

Figure 3.1 **Uganda's Institutional DRM Structure**



Source: Directorate of Relief, Disaster Preparedness and Refugees 2010.

national policy and are presented below.

3.3.1. City Disaster Risk Policy Committee (CDRPC)

As per the national policy, each city is expected to have a City Disaster Risk Policy Committee (CDRPC). The CDRPC is chaired by the lord mayor, while the executive director designates a secretary from the technical team. It comprises members of the City Executive Committee; Resident District Commissioners (RDCs); DPC(s); Division Internal Security Officer (DISO) or Officers; a representative of the army; and division mayors. The committee meets every six months or when a disaster occurs in the city. The lord mayor also co-opts four councillors on the committee. The CDRPC has the following functions:

1. Gives policy direction to the City Disaster Risk Management Technical Committee
2. Informs the council about the nature and effects of disasters in the district
3. Provides a link between the national Disaster Preparedness and Management Committee and the city structures responsible for disaster preparedness and management
4. Identifies city priorities for disaster preparedness
5. Monitors the

implementation of disaster response activities in the city

6. Ensures and authorises expenditures for disaster-related activities in the city

3.3.2. City Disaster Management Technical Committee (CDMTC)

The National Policy for Disaster Preparedness and Management provides for the establishment of a City Disaster Management Technical Committee (CDMTC) in each city. Each committee is chaired by the city's executive director and comprises city heads of directorates, departments, and divisions, the police, and other relevant government agencies and representatives of the army, the business community, the transport bodies, and development partners within the city. The secretary to the committee is the risk manager. The committee meets quarterly or when there is a disaster in the city. The CDMTC has the following functions:

1. Reviews vulnerability assessments and hazard and risk mapping of the whole city and updates the data annually
2. Reviews city preparedness and its contingency plan and ensures the data are updated annually
3. Publishes, not later than 30 January, an annual city state of disaster report, which highlights vulnerability levels, risks, hazards, disaster events, and respective actions taken during the previous 12 months and gives indicative forecasts of vulnerabilities, risks, hazards, and disaster events and planned actions for the next 12 months
4. Ensures mainstreaming of disaster preparedness and management activities into the city development plans
5. Implements the national policy on disaster preparedness in the city
6. Coordinates and implements disaster preparedness and management interventions in the city
7. Initiates the formulation and enforcement of ordinances on disaster preparedness and management in the city
8. Submits assessment reports on disaster preparedness and management to the OPM and other relevant organs quarterly
9. Reviews city-calibrated contingency and disaster preparedness plan
10. Establishes and maintains an updated database on hazards, risks, and disasters in the city
11. Coordinates with ministries, departments, and agencies (MDAs), development partners, the private sector, and communities on disaster preparedness, response, and "build back better"

3.3.3. Division Disaster Risk Management Committees (DDRMC)

The Division Disaster Risk Management Committee is chaired by the division mayor, and the town clerk is the secretary. Members include the division engineer, division head for public health and environment, division physical planner, division head for enforcement, division internal security officer (DISO), and division police commander, along with members from among the business community, manufacturers, transport body, and development partners, nongovernmental organisations (NGOs), and community-based organisations (CBOs) within the division, as well as a representative from the Risk Management Unit. The committee meets quarterly, before the City Management Technical Disaster Risk Management Committee meets, and has the following functions:

1. Reviews vulnerability assessment and risk mapping of the whole division
2. In coordination with the Risk Management Unit, develops division preparedness and contingency plans
3. Completes and sends to the Risk Management Unit, not later than 31 December, an annual division state of disaster report, which highlights the current and future vulnerability levels, risks and disaster events, and respective actions taken during the previous 12 months
4. Ensures mainstreaming of disaster preparedness and management activities into division development plans
5. Implements policies, guidelines, standards, and strategies on disaster risk preparedness and

management

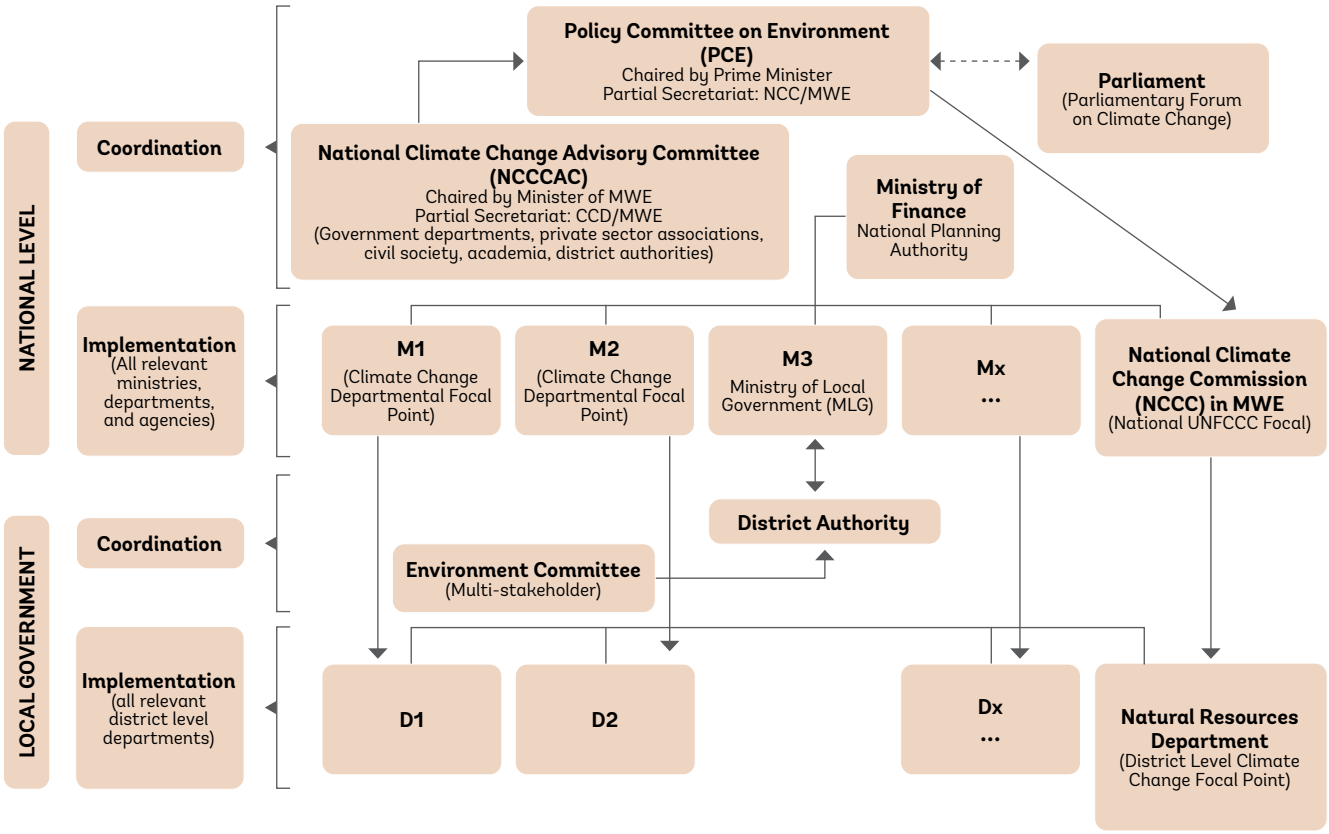
6. Coordinates with the Risk Management Unit on the development and updating of division databases on hazards, risks, and disasters
7. Coordinates with government agencies, partners, and private sector organisations

3.3.4. Village Disaster Risk Management Committee

The Village Disaster Risk Management Committee, as stipulated in the national policy, meets quarterly, before the Division Risk Management Committees meet. In the case of Kampala, these committees are chaired by the ward administrator, and all local chairpersons are members. Members also include parish executives, the parish internal security officer, representatives of NGOs, religious leaders, representatives of civil society organisations at the parish level, and the officer in charge of the parish police station or post. Any others are invited to be on the committee on a case by case basis. The committee has the following functions:

1. Participates in preparedness and management of disasters in the ward or parish
2. Participates in vulnerability and risk assessment in the parish
3. Documents and submits information on risks and disasters to the Division Disaster Management Committee
4. Conducts community mobilisation and sensitisation before, during, and after disasters
5. Monitors the teaching of disaster risk management in the community and parish schools
6. Keeps records of disasters in the parish

Figure 3.2 **Uganda's Institutional Structure for Addressing Climate Change**



Source: Government of Uganda 2017.

3.4. Environmental Institutional Framework

Figure 3.2 shows Uganda's institutional structure for addressing climate change. The body at the highest level is the Policy Committee on Environment (PCE) or the National Climate Change Policy Committee (NCCPC), both chaired by the prime minister. This body coordinates climate change policy implementation and ensure the free flow of information on resource allocation for this purpose. The National Climate Change Advisory Committee (NCCAC) ensures coordination at the working level and provides technical input to the NCCPC. This committee is chaired by the minister of water and environment and brings together technical representatives from the various government sectors at the national level, along with representatives of private sector associations, civil society, academia, and district authorities.

The Parliamentary Forum on Climate Change (PFCC) promotes awareness and climate change actions within the Parliament of Uganda. The details of climate change are normally discussed in the Parliament's Standing Committee on Natural Resources.

The day to day coordination and follow-up of climate change activities in the country are in the hands of the Ministry of Water and Environment (MWE), which is the national focal climate change institution, and the National Implementing Entity (NIE) for the Adaptation Fund. The Climate Change Department (CCD), formerly the Climate Change Unit (CCU), was created in 2008 directly under the Office of the Permanent Secretary of the Ministry of Water and Environment. CCD is the operational unit at the ministry in charge of undertaking its responsibilities.[5]

3.4.1. Climate Change Role of National Ministries, Departments, and Agencies

Considering the cross-sectoral nature of climate change, many MDAs have responsibilities in the implementation of climate change policy. As a result, they must integrate climate change in their annual work plans, as guided by the climate change policy and its implementation strategy. Both the Ministry of Finance, Planning, and Economic Development (MoFPED) and the National Planning Authority (NPA) are mandated to provide support and resources in this regard, as well as to monitor the implementation of the policy.

3.4.2. Climate Change Responsibilities at Local Level

While the climate change focal points at district level are the districts' natural resources departments, all departments ensure climate change issues in their respective sectors are integrated into the district development plans. The existing Environment Committee structure at the district level acts as a mechanism to ensure cross-sectoral coordination.

In this regard, the Ministry of Local Government (MoLG) is responsible for providing support to local governments and monitoring the implementation of the policy at local level. In particular, MoLG should do the following:

- Provide guidance to the districts in translating the policy priorities and implementation strategy into coherent plans at the district level
- Ensure the districts make adequate provisions in their development plans, annual plans, and budgets for the implementation of the climate change policy
- Ensure these plans are acted upon through a review of relevant reports from the districts and appropriate follow-up actions by the MoLG, as required

3.4.3. Climate Change Management at KCCA

Coordination of climate change policy at KCCA is within Office of the Executive Director. The directorate works with a team to undertake this task and implement some of the climate change projects. The responsibility to formulate and implement the climate change policy at local level is, however, a shared function within all the directorates. The lead units involved in the formulation and implementation of the Kampala Climate Change Action Plan and in the Climate

[5] Further details on the key functions of the CCD can be found in Annex A.

Change Agenda in general are Public Health and Environment, Risk Management, Strategy Management and Business Development, Physical Planning, Engineering and Technical Services, and Administration and Human Resources. Strategy Management and Business Development coordinates the implementation of the KCCA strategy.

3.5. Key Actors for Addressing Disaster and Climate Risk

Table 3.1 indicates the key permanent actors in municipal, regional, national, and international entities on disaster and climate risk management in Kampala. Mapping these entities is essential to understanding which is responsible for each of the six resilience pillars and to identifying which governmental, public, or private stakeholders act at the secondary level through support or direct action.

Table 3.1 **Key Actors by Resilience Pillar**

Resilience pillar	Primary responsible entities	Related entities
1. Institutional and Governance Strengthening	• KCCA Office of the Executive Director—Risk Management Unit • KCCA Directorate of Legal Affairs	• Ministry of Finance, Planning, and Economic Development • KCCA Directorate of Treasury Services • KCCA Directorate of Physical Planning • KCCA Directorate of Engineering and Technical Services
2. Understanding Risk	• KCCA Office of the Executive Director—Risk Management Unit	• OPM, Department of Disaster Preparedness and Management • Uganda National Meteorological Authority (UNMA) • KCCA Directorate of Physical Planning • KCCA Directorate of Engineering and Technical Services • Uganda Bureau of Statistics (UBOS)
3. Investment in Disaster Risk Reduction for Resilience	• KCCA Office of Treasury Services • KCCA Office of Strategy Management and Business Development • All directorates	• Ministry of Finance, Planning, and Economic Development • Parliament of Uganda • OPM, Department of Disaster Preparedness and Management
4. Preparedness, Response, and Resilient Recovery	• OPM • KCCA Office of the Executive Director—Risk Management Unit • Uganda Police Force Fire and Rescue Services • Metropolitan Police Force • Directorates of Public Health and Environment, Engineering and Technical Services, Gender Community Services and Production, Education and Social Services	• UNMA • KCCA Public Health Department • Uganda Red Cross Society • Uganda People's Defence Force • KCCA Public and Corporate Affairs • NGOs
5. Climate Mitigation and Resilience	KCCA Office of the Executive Director Directorate of Public Health Services and Environment	Ministry of Energy and Mineral Development Ministry of Water and Environment Ministry of Works and Transport (MoWT)
6. Health Resilience and Prevention	Directorate of Public Health Services and Environment	Ministry of Health Uganda Red Cross Society

Note: At the international level, related entities may include KCCA's development partners: The World Bank, the African Development Bank (AfDB), the European Union (EU), the Directorate-General for International Cooperation (DGIS), the Department for International Development (DFID), the Japan International Cooperation Agency (JICA), and Agence Française de Développement (AFD).

3.6. Institutional and Regulatory Framework for Physical Planning and Building Control

Uganda has developed the institutional and regulatory framework for physical planning and building control in the country, often with a focus on the context of Kampala.

3.6.1. Physical Planning

Physical planning is set out and overseen at the national level, with key responsibilities for implementation set at the local level.

National Level

The Ministry of Lands, Housing, and Urban Development (MoLHUD) is responsible for providing policy direction and coordination for physical planning across the country. The Department of Physical Planning is responsible for setting planning guidelines and standards, developing the national and regional physical development plans, and supporting the development of local physical development plans. The Department of Land Use Regulation and Compliance monitors the enforcement of these physical development plans at the local level and provides support for local authorities to strengthen their enforcement capacity. The ministry also hosts the National Physical Planning Board, responsible for, inter alia, approving physical development plans, fostering coordination for physical planning across government ministries and departments, and providing oversight to local government physical planning committees.

The Physical Development Act (2010) is the primary legal instrument for controlling development and provides for the preparation and implementation of physical development plans across the country (see **table 3.2** for the types and hierarchy of physical development plans). With the passage of the Physical Planning Act, the entire country was, for the first time, declared a planning area. The National Physical Planning Standards and Guidelines (2011) were developed shortly afterwards to provide guidance on the scale, location, and site requirements for different land uses and facilities. Significantly, from a resilience perspective, neither document includes provisions for the integration of hazard maps or hazard zonation into physical development plans. They do, however, include provisions and standards for environmental protection, including buffer zones for lakes, rivers, forests, swamps, and wetlands.[6]

Local Level

The Physical Development Act (2010) provides for the establishment of district, urban, and local Physical Planning Committees (as shown in **figure 3.3**). At the urban level, each committee is chaired by the town clerk, with the urban physical planner acting as the secretary. The committee comprises the department heads responsible for engineering, environment, community development, health, and other areas pertinent to physical planning. The functions of Physical Planning Committees include overseeing the preparation of physical development plans and issuing development permits. The Secretariat of the Board falls within the Directorate of Physical Planning.

Table 3.2 **Types and Hierarchy of Physical Development Plans**

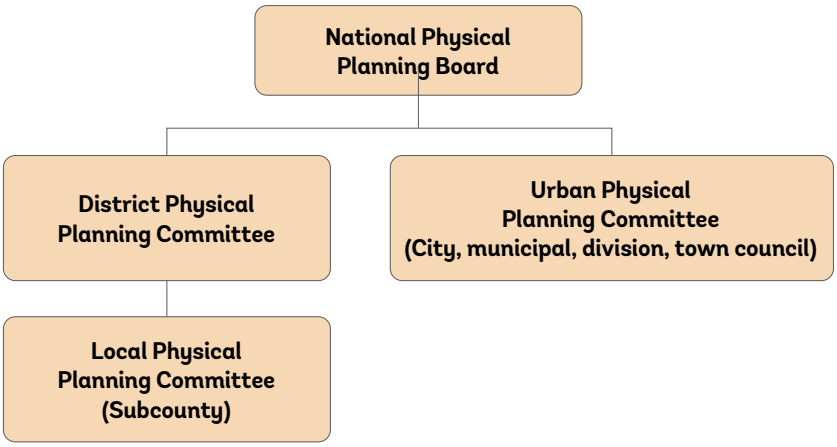
S/N	Plan	Scale
(a)	National physical development plan	1:250,000 to 1:3,000,000
(b)	Regional physical development plan	1:50,000 to 1:500,000
(c)	Special physical development plan/Subject plan	1:5,000 to 1:250,000
(d)	District physical development plan	1:50,000 to 1:200,000
(e)	Urban structure plan	1:5,000 to 1:50,000
(f)	Urban detailed plans	1:1,000 to 5,000
(g)	Urban action plan	1:500 to 1:5,000

Source: National Physical Planning Standards and Guidelines, 2011.

[6] Ministry of Lands, Housing and Urban Development, 2011, National Physical Planning Standards and Guidelines—Section 8.5 Environmental Management (Recommended Buffer Distances and Regulated Activities in Gazetted Wetlands). Buffer zones are stipulated for forests, lakes, and rivers and for wetlands; for buffer zones for wetlands, it is recommended that soil type, depth of water, topographical features, and recognized customary boundaries be considered. Government of Uganda, 2010, Physical Planning Act, Schedule Five—Matters to be Dealt with in District, Urban and Local Physical Development Plans. The Physical Planning Act stipulates that all district, urban, and local physical development plans should conserve the natural beauty of the area, including lakes and other inland waters, banks of rivers, hillsides, and summits and valleys.

Photo: Arne Hoel / World Bank

Figure 3.3 **Structure of Physical Planning Committees**



Source: Physical Planning Act, 2010.

Within KCCA, the Directorate of Physical Planning has a leading role in controlling development across the city. The Directorate is responsible for developing and enforcing planning rules by reviewing development applications and conducting site inspections to ensure compliance. The directorate is at the forefront of managing the rapid rate of urbanisation and unplanned settlement across the city.

In Kampala, the Kampala Physical Development Plan (KDPD), launched in 2013, is a central planning tool that provides guidance for orderly and sustainable physical development. Currently, however, detailed and up to date planning rules are lacking for most of the city. To address this gap, the authority is in the process of developing local physical development plans for its five administrative divisions and detailed neighbourhood plans for priority precincts. It is within these local plans that detailed and locally calibrated planning and zoning standards should be outlined, including such aspects as hazard zonation, building heights, and densities. For those areas without local physical development plans, building professionals and the KCCA technical review team have limited guidance or rules to follow when designing or reviewing building plans.

3.6.2. Building Control

Similar to physical planning, Uganda's building control framework is established at the national level, with key implementation and enforcement responsibilities resting at the local level.

National Level

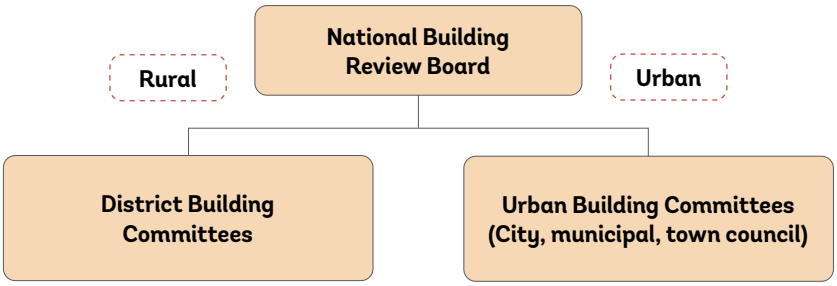
MoWT has a mandate to oversee the development and maintenance of Uganda's public infrastructure and built environment. The ministry hosts the National Building Review Board (NBRB), which has a leading role in overseeing building control across the country. The NBRB was established in 2018, following the enactment of the Building Control Act.[7] The NBRB is composed of representatives from national government departments, agencies, and professional associations with a stake in building control. The secretariat implements the day-day functions of the board. The functions of the NBRB include, inter alia, publishing and maintaining the National Building Code, monitoring and strengthening the enforcement of the building code through local government building committees, and studying new materials and methods of construction brought onto the market. The new institution is in the process of building its human resources and working to establish its operations.

The Building Control Act (2013) is the primary legal instrument for building control. The act is a comprehensive piece of legislation that provides the legal basis for the Uganda National Building Code (UNBC); establishes national and local government structures for building control (see **figure 3.4**); and outlines the procedures and penalties for the building permitting process. The National Building Code, published in 2019,[8] replaced the previous building rules promulgated under the Public Health Act, dating back to 1935.

[7] Minister of Works and Transport, 2018, Building Control Act, 2013 (Commencement Instrument, 2018).

[8] The National Building Code includes the National Building (Building Standards) Code, 2019;the National Building (Standards for Mechanical Installations in Buildings) Code, 2019; the National Building (Standards for Mechanical installations in Buildings) Code, 2019; the National Building (Standards for Electrical Installations in Buildings) Code, 2019; the National Building (Accessibility Standards for Persons with Disabilities) Code, 2019; the National Building (Structural Design) Code, 2019; and the National Building (Postcode Numbering) Code 2019.

Figure 3.4 **Structure of Building Committees**



Source: Building Control Act, 2013.

The Building Control Act and UNBC provide a much-needed update to the country's building regulations and legislation. The UNBC provides an updated unified set of standards for designing and constructing buildings across Uganda. Going forward, the resilient design standards within it should be strengthened to account for the country's exposure to natural and chronic hazards.

Acknowledging the prevalence of unregulated low-income housing across the country, the Ministry of Housing also developed an Earthquake Resistant Construction Handbook (2010) providing guidance for single story, non-complex buildings using commonly used local materials.[9]

Local Level

The Building Control Act (2010) provides for the establishment of district and urban building committees to lead the enforcement of the National Building Code. These building committees have yet to be established, but their principal role will be to review and approve building plans and issue building permits. Each committee will include representatives from departments with a stake in building health and safety, including engineering, environment, fire prevention, and disability inclusion departments. As per the act, each building committee will also hire building control officers to support building plan reviews and conduct site inspections during construction to ensure building code compliance.

To date, in KCCA, and in several other local authorities, physical planning committees have been issuing building permits, and physical planning departments have been conducting building site inspections in the absence of a dedicated building committee and officers. KCCA is in the process of reforming its institutional framework and process for building control in line with the enactment of the Building Control Act.

[9] Including wood, mud, clay, stone, bamboo, concrete, and steel.

Photo: Dennis Wegewijs

SECTION II

DIAGNOSTICS OF DISASTER RISK AND VULNERABILITY TO CLIMATE CHANGE

This section presents the historical inventory of disasters, hazard conditions in Kampala, and critical elements to consider in assessing the potential effects of climate change.

Chapter 4
Historical Inventory of Disasters (1991–2018)

The first step in determining disaster risk levels for Kampala is to identify and understand the set of hazards to which it is exposed.

Depending on their cause, hazards can be natural (generated by physical events), human-induced (generated by human activity), or socionatural (generated by the combination of physical dynamics and human activity). Hazards can further be categorised as geological or geophysical (originating from internal earth processes, such as earthquakes and volcanic eruptions), hydrometeorological (of atmospheric, hydrological, or oceanographic origin, such as cyclones, floods, droughts, and heat waves), biological (conveyed by biological vectors carrying disease-causing agents, such as bacteria, viruses, or parasites), and technological (caused by technological or industrial conditions or specific human activities, such as road accidents, fires, structural collapse, or chemical spills) (UNDRR 2019b).

Kampala's hazard exposure is dominated by hydrometeorological and technological hazards—mainly, floods, droughts, and human-induced events associated with urban environments, including fires, structural collapse, road accidents, and epidemics. This chapter analyses the disaster events recorded in Kampala between 1991 and October 2018 and quantifies their impact on the city's population and infrastructure. **Table 4.1** contains the headline statistics from disaster-related events during this period,[10] and **figure 4.1** shows the annual distribution by type of event from 2008 to 2018, as more frequent and consistent reporting has become available. The dynamics and impact of these risks will be analysed in chapter 5.

As shown in **figure 4.2**, floods have been the most frequently recurring natural hazard in Kampala, accounting for 40 percent of the total number of events recorded from 1991 to 2018, and they mainly take place during the two annual rainy seasons. Furthermore, floods are responsible for 84 percent of the total impact on humans from non-traffic-related disaster events (**figure 4.3**), which highlights their disruptive and destructive potential. In the last 15 years, an annual average of three major flood events have been recorded, with hotspots in low-lying areas remaining flooded from several hours up to several days. Flood events generate large economic losses and health-related risks, compromise essential infrastructure and services, and disrupt social activity, in addition to disproportionately affecting poor communities.

The Multi-Hazard Risk and Vulnerability Profile for Kampala City also rates fires as an important hazard across the city (KCCA 2018c). Most historical

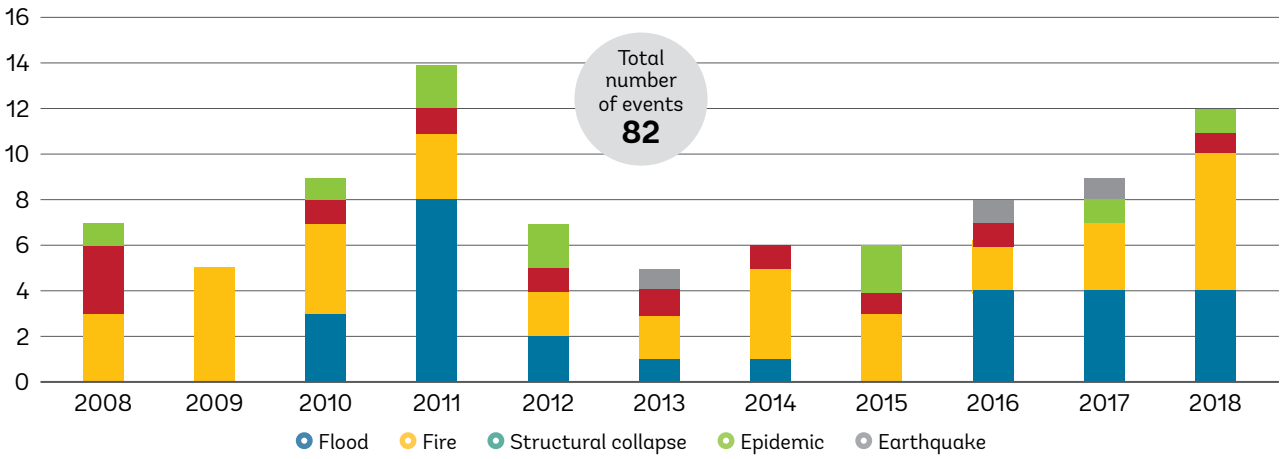
Table 4.1 **Data from Disaster Events, 1991–October 2018**

	Flood	Fire	Structural collapse	Epidemic	Earthquake	Road accident	TOTAL
Number of events	62	47	14	25	5	N/A	153
Deaths	35	42	73	68	0	3,853	4,071
Injured/affected	86,285	2,163	497	13,137	0	12,596	114,678
Buildings destroyed/damaged	2,006	174	14	N/A	0	N/A	2,194

Sources: CRED Em-Dat, UNDRR Desinventar, Reliefweb, and national and local media articles.

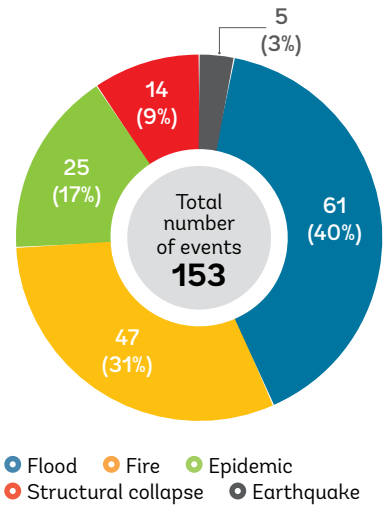
[10] All data in this section were obtained from disaster databases (CRED Em-Dat, UNDRR DesInventar), government reports on epidemics obtained from Reliefweb, and media articles from national and local newspapers describing various events and their impact. To obtain the final figures presented here, a unified database was created to avoid double counting and to present information in different categories.

Figure 4.1 **Prevalence—Events by Hazard Type, 1991–2018**



Sources: CRED Em-Dat, UNDRR Desinventar, Reliefweb, and national and local media articles.
Note: This figure includes data from the last 10 years, when more and better records were produced than previously. Trends may be attributed not only to trends in hazard events but may reflect differences in reporting. Data for road accident events are not included, as they were provided by UNDRR DesInventar as an aggregated number in most years.

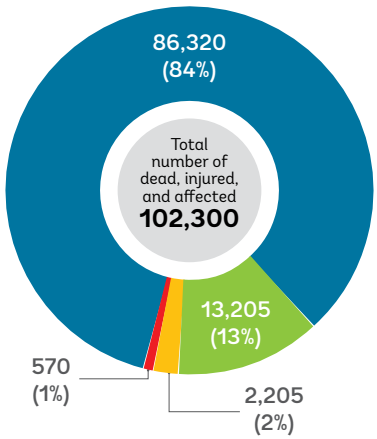
Figure 4.2 **Prevalence—Events by Hazard Type, 1991–2018**



Sources: CRED Em-Dat, UNDRR Desinventar, Reliefweb, and national and local media articles.

Note: Data for road accident events are not included, as they were recorded in the UNDRR DesInventar database as an aggregated number for most years.

Figure 4.3 **Impact—Dead, Injured, and Affected, 1991–2018**



Sources: CRED Em-Dat, UNDRR Desinventar, Reliefweb, and national and local media articles.

Note: For graph scaling purposes, data for road accident events (which represent 94 percent of all recorded disaster-related deaths in the analysed period) are not included.

records report fire events in public buildings (education centres, police barracks, and city markets) and commercial facilities. In particular, repeated events in Owino/St. Balikuddembe, Nakivubo, and Kisekka markets have been triggered by charcoal cooking stoves and generated multi-million-dollar economic and material losses. Nevertheless, there is reason to believe historical records underreport fire events in residential buildings, where the risk is higher.

Structural collapse, though less prevalent, accounted for 34 percent of non-traffic-related disaster deaths from 1991 to 2018. Most recorded events took place in the built-up areas within and around central Kampala. Negligence from developers, lack of enforcement of regulations, and use of poor-quality construction materials are often cited as triggering these events. The most fatal recorded events were those that occurred at a church in Kalerwe in 2006 (27 deaths and 100 injured), a building under construction in Central Kampala in 2004 (12 deaths, 183 injured), NSSF Pension Towers on Lumumba Avenue in 2008 (7 deaths, 2 injured), and a construction site in Kansanga in 2015 (5 deaths, 5 injured).

Kampala has also been at high risk for human epidemics. Since 1991, the city has experienced a total of 25 epidemic disease outbreaks, the majority of which have been related to inadequate sanitation conditions and extended periods of flooding. Cholera stands out as the most common type of epidemic

disease, followed by dysentery and Ebola.

Finally, traffic-related events have posed the highest risk of death to Kampala's residents. Road accidents often result in serious injuries and fatalities, accounting for 94 percent of disaster-related deaths from 1991 to 2018. Risk is higher for motorists on the primary roads that go through the city and connect it to other districts and for pedestrians on busy roads in central areas. The most lethal events, in which dozens may die at a time, occur on the fringes of the city and involve trucks, fuel tankers, and buses.

Kampala's disaster and climate risk profile takes into account its hazards, exposure, and vulnerability. Climate change may become a major driver of risk for climatological and meteorological hazards, while also making them less predictable based on historical patterns. Kampala's exposure is increasing as the city's population, built environment, and economic activity grow. The city's investments in new infrastructure will also put more public assets at risk. Finally, vulnerability is expected to grow as a result of the influx of new residents and the proliferation of unplanned, underdesigned, and underconstructed buildings.

Chapter 5
Hazard Conditions in Kampala City

Kampala is subject to multiple hazards and has worked to understand their scope, nature, and severity. Through the Multi-Hazard, Risk, and Vulnerability Profile for Kampala City (2018), the city has prioritised its key hazards by perceived level of threat: high, medium, or low (see table 5.1).

Table 5.1 **Kampala Risk Matrix (Selected Hazards)**

Hazard	Hazard type	Section
Flood	Climatological and meteorological	5.1
Human epidemic	Ecological and biological	5.5
Environmental degradation	Human-induced or technological	5.9
Water pollution	Human-induced or technological	5.9
Air pollution	Human-induced or technological	5.8
Fire and built environment	Human-induced or technological	5.4
Road accidents	Human-induced or technological	5.7
Drought/dry spells	Climatological and meteorological	5.2
Soil erosion	Geological	5.3
Food security/nutrition	Climatological and meteorological/human-induced or technological	5.6
Earthquake	Geological	5.4

Source: Adapted from KCCA 2018c.

Hazard level: High Medium Low

5.1. Floods

Floods present a critical hazard to Kampala. This subsection presents aspects relevant to understanding this hazard.

5.1.1. Kampala's Flood Context

No major rivers run through Kampala, so the city is primarily exposed to pluvial flooding, in which the source of water is direct rainfall within the city's general boundary. Within this category are three distinct mechanisms of flooding:

1. The encroachment into former wetlands and floodplains places large numbers of people and infrastructure at risk from the natural inundation that is now considered flooding. This type of flooding is usually relatively slow to develop, with low water velocities. It is generally quite shallow but extends over large areas. Flooding can be prolonged and very disruptive.
2. Flash flooding results from the dramatic change in runoff characteristics caused by the expansion of impermeable surfaces and the consequent increase in both the volume and speed of the surface water runoff from the surrounding hillsides into low-lying areas. This type of flooding is characterised by rapid onset and high velocities. With little warning it can be very damaging and, in some circumstances, dangerous to life.
3. Surface water flooding occurs due to undersized, poorly maintained, or, some cases, non-existent drainage infrastructure. The resulting frequent flooding causes widescale disruption and, although generally not deep, can be fast flowing and therefore still damaging. This type of flooding is not specifically associated with low-lying wetland areas, and it can result locally from a single point of drainage network failure, such as an undersized channel or culvert.

Box 5.1 **Flood Diagnostic Key Concepts**

- **Average annual damage (AAD):** Expected damage per year for a given hazard.
- **Channel flow:** Amount of drainage/stormwater flowing through a channel, often measured in cubic meters of water per second (m3/s).
- **Conveyance:** Ability of a channel or other drainage element to move stormwater.
- **Fluvial flooding:** Flooding resulting from excessive rainfall for an extended period that causes a river or stream to overflow.
- **Pluvial flooding:** Flooding resulting when a heavy downpour of rain saturates drainage systems and the excess water cannot be absorbed.
- **Runoff coefficient:** Coefficient of 0 to 100 percent relating the amount of runoff to the amount of precipitation received. A higher coefficient implies precipitation quickly becomes runoff, such as in areas with low infiltration and high runoff (pavement, steep gradient). A lower coefficient occurs in permeable, well-vegetated areas (forest, flatland).
- **Stream velocity:** Speed of water in a channel, measured in meters per second (m/s).

It can also occur unexpectedly when drainage paths become clogged by solid waste or sedimentation.

Although similar, the mechanisms differ in important ways, and addressing one can exacerbate another. Correcting for surface water flooding, for example, by increasing the effectiveness and efficiency of local drainage channels—that is by increasing the rate and volume of discharge—may worsen flooding downstream in the low-lying wetland areas.

While climate change may influence future flood risk in Kampala, currently available evidence does not support a statistically significant shift in rainfall patterns in the area that would result in a dramatic change in flooding characteristics. A number of drivers currently affect flood risk in the city:

1. Increased runoff from the expansion and increasing density of the built environment with no proper control of rainwater discharge rates and volumes, resulting in more flooding downstream
2. Increasing soil erosion linked to future urban development and removal of land cover, resulting in more sedimentation problems and drain blockages
3. Increased dumping of solid waste that ends up in the drainage network, causing blockages and local flooding
4. Changes in the drainage network—either ill-considered improvements or deterioration from poor maintenance—that result in undesired changes to runoff characteristics and increased flooding downstream or local incapacity leading to local flooding
5. Increases in population that place more people at risk within both their homes and workplaces, as well as in transit, where, statistically, most flood-related fatalities occur
6. Further development of buildings and changes in land use, both informal and approved, in areas prone to flooding, placing more people and assets in harm's way
7. Current levels of poverty, which reduces the ability of individuals and communities to respond or adapt to flood conditions

5.1.2. Flood Hazard

Flooding in Kampala frequently follows heavy rainfall during the wet seasons. Locations most prone to flooding include the Bwaise roundabout with the Kampala Northern Bypass; the Kalerwe-Gayaya road roundabout; areas around Nsoba; areas near the Bukoto roundabout with the Kampala Northern Bypass; areas around the Entebbe Road Clock Tower; the Jinja Road traffic lights area; Kamwokya II; and several locations in the industrial area.

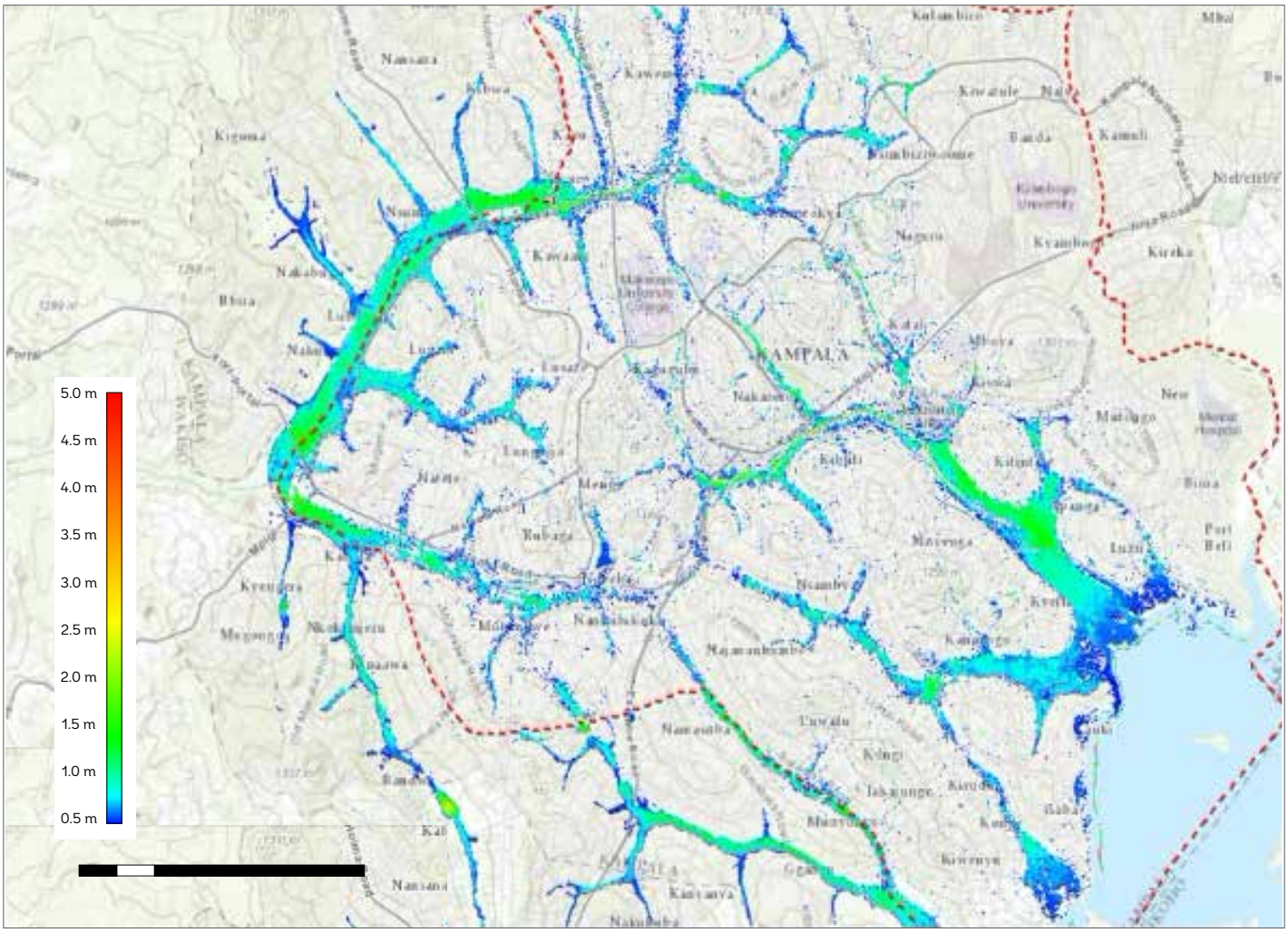
A flood model developed using HEC-RAS flood modelling software and a high-resolution

digital terrain model (DTM) derived from Laser Imaging Detection and Ranging (LiDAR) underlies the analysis in this strategy, enabling flood hazard mapping at a horizontal resolution of 5 m and a vertical resolution of 10 mm. The inputs to the model are rainfall storm events derived from local rain gauge data, along with roughness and infiltration coefficients derived from local studies, satellite imagery, and international best practice. Flood hazard maps have been prepared for 10-, 50-, and 100-year return period events. This means that every year there is a 10 percent, 2 percent, and 1 percent probability, respectively, of a flood occurring that is equal to or exceeds that severity of flooding (i.e., the flood presented in that scenario). These maps provide information on the extent, depth, and likely frequency of flooding across the whole city, not just the flooding associated with the main drainage system. Technical notes on the flood modelling exercise are presented in Annex B, Kampala Flood Risk Assessment Technical Summary.

Examples for the different return periods are provided by **figures 5.1, 5.2,** and **5.3**, each of which presents a map of the city overlain with a flood depth grid. The validity of these maps was verified by the stakeholder workshop, whose participants identified flood hotspots and compared their knowledge of flood-prone areas with the mapping of flood hazard. Further corroboration was provided by site visits with local drainage, planning, and disaster risk management experts.

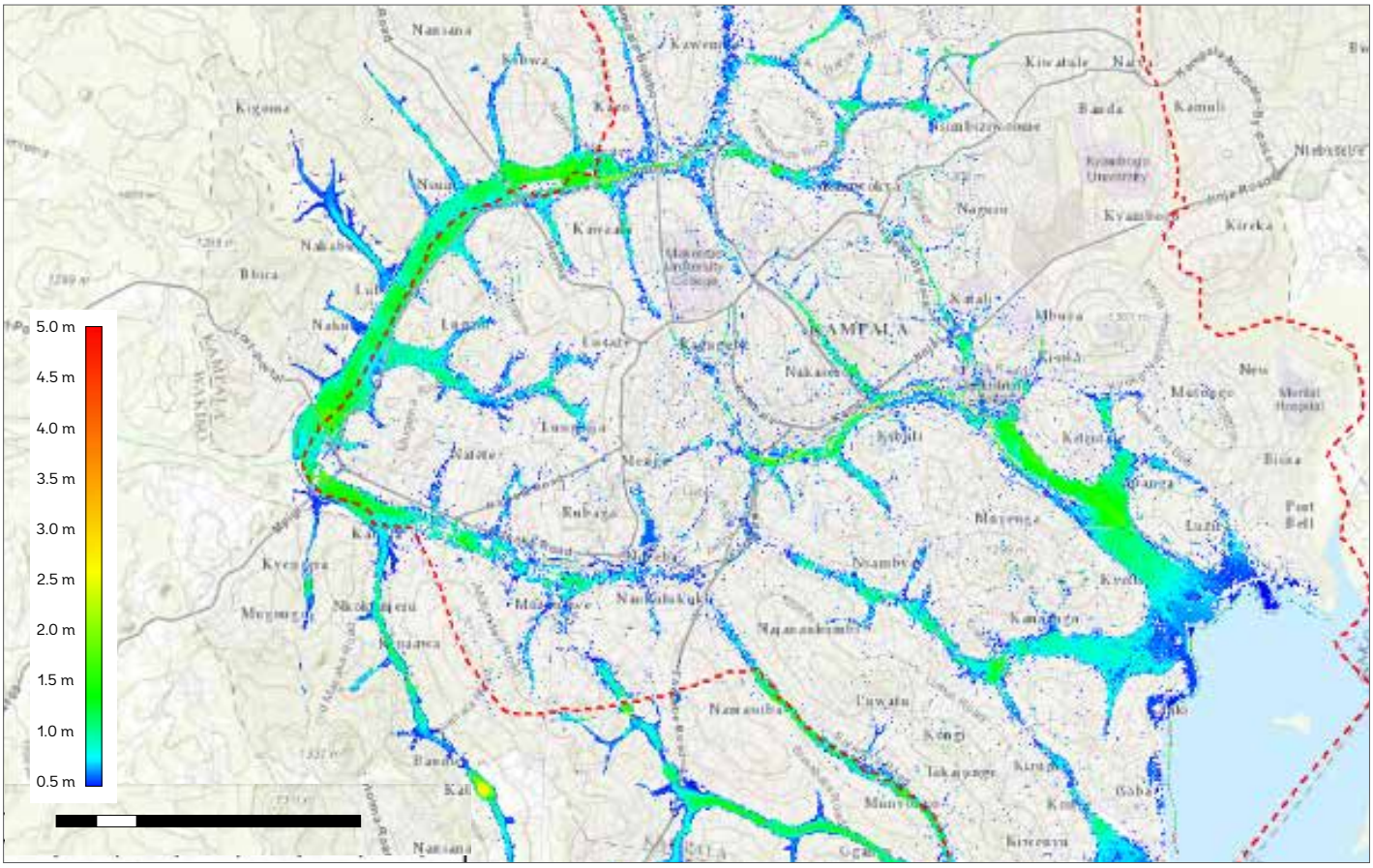
As the figures suggest, a feature of the flooding in Kampala is that the flood extents are quite similar for the various return periods—that is, the 100-year flood outline in many areas is not significantly larger than the 10-year outline.

Figure 5.1 **Depth Grid for 10-Year Return Period Flood in the City of Kampala**



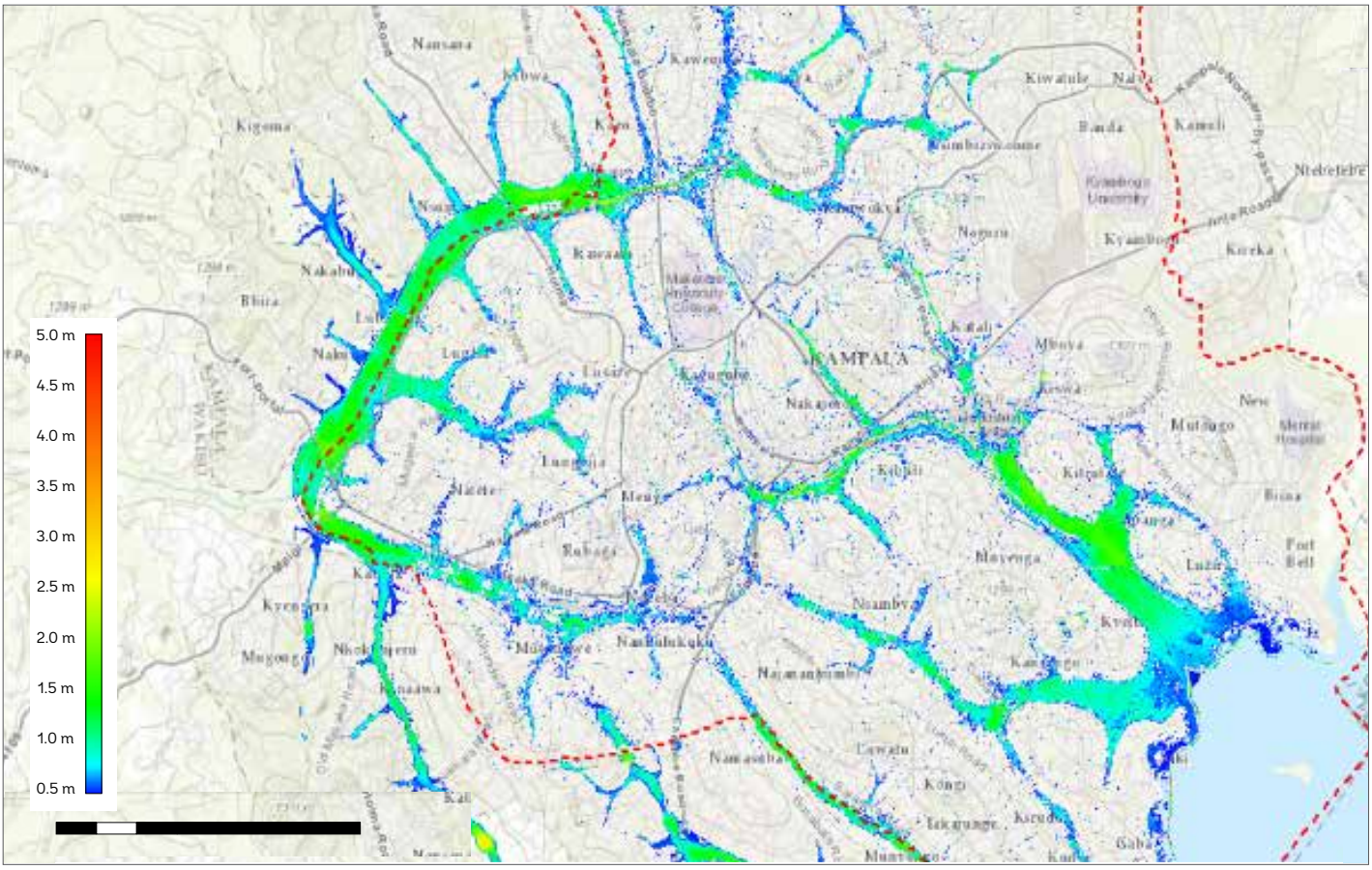
Source: World Bank 2018b.

Figure 5.2 **Depth Grid for 50-Year Return Period Flood in the City of Kampala**



Source: World Bank 2018b.

Figure 5.3 **Depth Grid for 100-Year Return Period Flood in the City of Kampala**



Source: World Bank 2018b.

The relatively frequent flooding experienced across Kampala typically reaches depths of between 0.5 m and 1.2 m, with only a few localised deep spots where channels are constrained or run through heavily eroded gullies. Flooding across the low-lying wetland areas where the water has room to spread tends to be less than 0.5 m deep. The more extreme flood events (that is, 100-year events) result in deeper flooding, although the modelling shows this increase is, on average, around 0.3 m.

The onset of flooding in parts of Kampala can take less than a few hours—which is classified as "flash flooding"—and it is more closely associated with impermeable surfaces and short tributaries than with the speed of the flood water. A rapid onset also implies floods of relatively short duration, however. The exception to this takes place in the large wetlands in the lower catchment areas, where flood water collects across a wide area and drains more slowly, taking many hours or even days to recede.

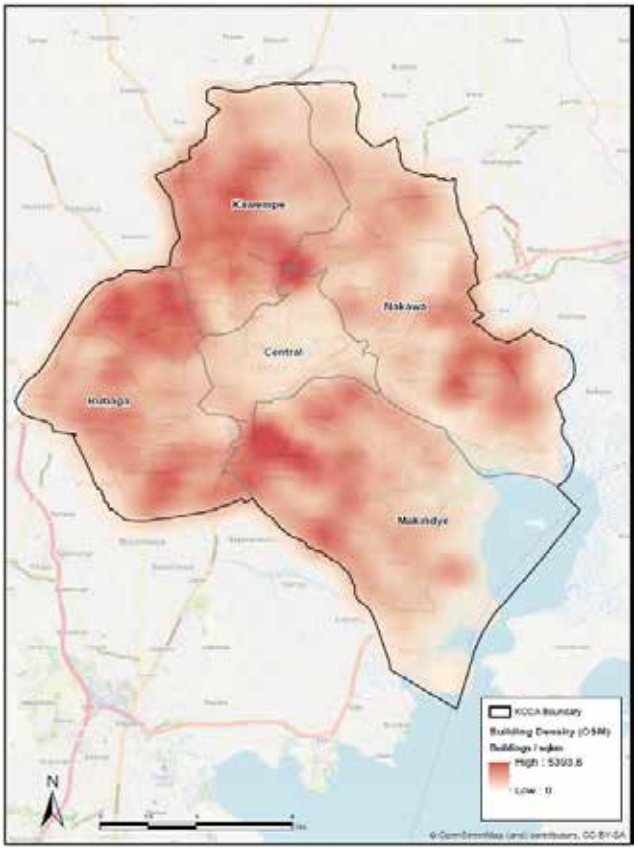
The maximum velocity of flood water experienced in Kampala is generally less than 0.5 m/s, which is considered moderate. Even though some of the steeper tributaries show velocities exceeding 1.0 m/s, these are not considered life threatening, unless combined with deep water. Nevertheless, dangerous deep and fast-flowing flood water can occur in local hotspots with specific features likely caused by erosion or blockages, which should prompt extreme caution. These are noted in the section below.

5.1.3. Exposure

Figure 5.4 shows a building density map of Kampala, which is consistent with the population density map in **figure 2.4** and points to areas of potentially concentrated exposure of the built environment in northern Lubaga, northwestern Makindye, and the intersection of the Kawempe, Nakawa, and Central divisions.

Figure 5.5 and **Table 5.2** show parishes identified as flood hotspots, where commercial and residential property is frequently damaged and major transport routes are

Figure 5.4 **Kampala Building Density Map**



Sources: World Bank 2019 and OpenStreetMap.

Figure 5.5 **Map of Identified Hotspot Parishes over Informal Settlements**

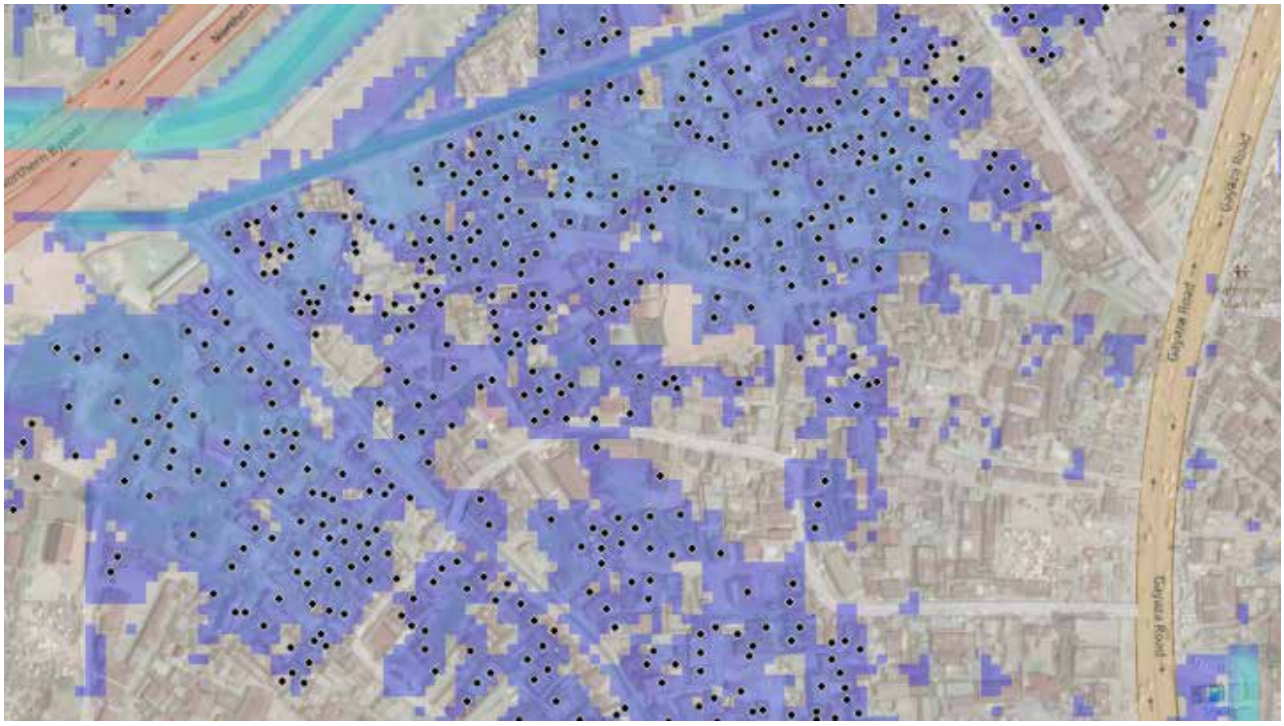
Sources: World Bank 2019 and OpenStreetMap.

Table 5.2 **Divisions and Parishes with Flood Hotspots**

Central	Kawempe	Nakawa	Makindye	Lubaga
Industrial area	Bwaise	Luzira	Bukasa	Busega
Kamwokya	Bwaise II	Mbuya	Ggaba	Mutundwe
Kisenyi II	Bwaise III	Naguru	Katwe II	Nateete
	Makerere III		Salama	Ndeeba

Source: Based on results from Kampala Resilience Workshop: World Bank, October 2018.

Figure 5.6 **Example Building Location Data for the 100-Year Flood Outline in Makerere III**



Source: World Bank 2018b.

disrupted. Infrastructure is most vulnerable in low-lying areas, such as Jinja Road in Kyambogo or Bombo Road in Bwaise. Traffic is particularly disrupted in Central Kampala, where commercial activity is most concentrated around busy, narrow roads and where response services are based. In some cases, flooding directly compromises the livelihoods of locals by disrupting the main food supply routes and hubs, such as Masaka Road and Hoima Road in Lubaga, or access to the shores of Lake Victoria. The potential for damage and economic loss is greatest in highly concentrated commercial and industrial areas, such as Nalukolongo Industrial Park in Lubaga, or the stores and markets in Central Kampala.

By reviewing flood extents expected for different return periods, the analysis conducted for this strategy finds 25,000 buildings at risk of 10-year return period floods, 28,000 buildings at risk in 50-year return period floods, and 30,000 buildings at risk from 100-year return period floods (World Bank 2018b). A sample area in a 100-year flood event is shown in **Figure 5.6**.

Further refinements of the process are achieved by integrating the detailed land use dataset developed by KCCA for the Multi-Hazard Risk and Vulnerability Profile for Kampala with OpenStreetMap data on individual building usage (KCCA 2018c). These data define the main areas of formal residential, commercial, industrial, and informal settlements, which has made it possible to allocate a building type to each of the 30,000 buildings identified as being at risk. In the analysis, the majority of buildings affected are residential, comprising both formal and informal housing, as presented in **table 5.3**.

Table 5.3 **Numbers of Buildings Exposed to Flooding, by Type and Return Period**

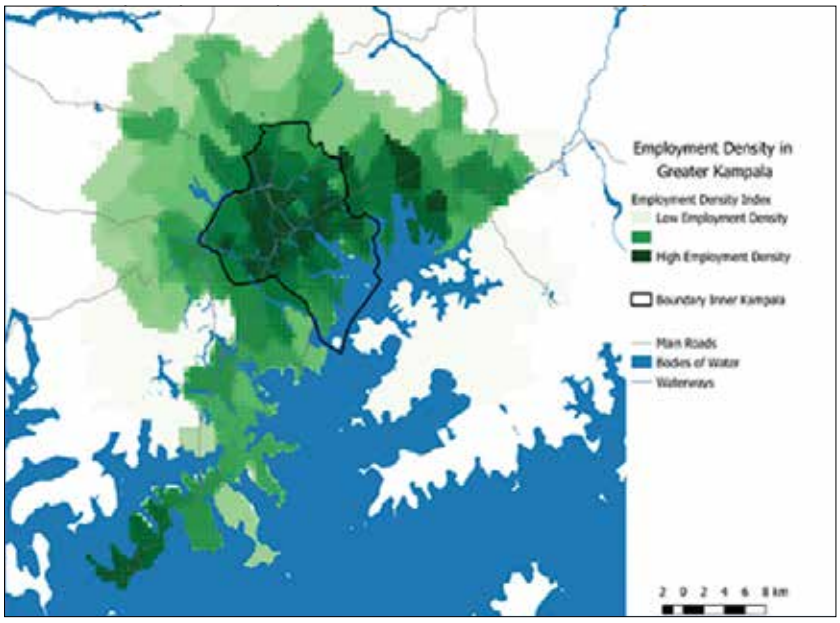
Flood event return period	Residential buildings	Commercial buildings	Industrial buildings	Informal settlement buildings
10-year flood	10,783	85	44	14,118
50-year flood	12,037	96	54	15,995
100-year flood	12,757	102	54	17,022

Source: World Bank 2018b. *Note:* These values are indicative only.

Factoring in data on local demographics and household occupancy, additional analysis shows the following:

- It is estimated that more than 50,000 people living in formal residential areas and nearly 120,000 living in informal settlements—more than 170,000 people—are subject to relatively frequent flooding in their homes (Action Against Hunger 2012; UBOS 2017b).[11]
- Road transport is also greatly affected by flooding. Disruption to Kampala's road network from flooding is a frequent and commonly reported event that causes serious delays. Overlaying the current road network with the modelled flood map shows more than 5 percent of all roads in Kampala City are likely to be inundated, with an annual probability of 10 percent. Crucially, main roads, including primary roads, motorways, and trunk roads, are disproportionately

Figure 5.7 **Employment Density Grid for the Greater Kampala Area**



Source: Hallegatte et al. 2019.

at risk from flooding within the city shows the following facilities lie within the flood zone: 28 of the city's 246 listed hospitals (12 percent); 21 of 380 banks (6 percent); 7 of 220 doctor surgeries (3 percent); 14 of 504 schools (3 percent); 2 of 185 kindergartens (1 percent) (Hallegatte et al. 2019).

associated with the impacts on public transport, social, health, and environmental aspects of the city have not been calculated directly as part of this strategy. In terms of infrastructure damage not calculated, transportation infrastructure is expected to be among the costliest. While paved roads are

[11] The average number of people per dwelling is estimated at 7 for informal settlements in Kampala and 4.7 for formal residential areas (averaged across the city as a whole).
[12] The employment density grid shows that 60 percent of all jobs in the Greater Kampala Metropolitan Area are in Kampala City.
[13] Vulnerability relates to the impact of flooding on exposed assets. For those buildings already identified within the flood-prone areas (i.e., within the 100-year event outline) that have been classified into use and type categories, vulnerability to flooding can be expressed in terms of depth damage curves for different types of buildings. Based on a combination of international standards and good practice, these have been verified with local valuations of common materials and goods. While the outputs of this assessment do not represent the damage that would occur in any specific building, when applied to a city-scale analysis they provide a meaningful and useful estimate of average damage across large numbers of buildings or properties. They help define the overall contingent liability governments face in response to a flood disaster and can be particularly important in assessing the relative impact a mitigation option or other resilience change might have. Quantifying vulnerability relating to the less tangible impacts of flooding, such as transport and social, health, and environmental aspects, is not possible under this study. These factors need to be addressed, however, and poverty is an important part of vulnerability to flooding, involving a number of different complex and interrelated social factors that must be considered.

Table 5.4 **Average Modelled Flood Damage to Buildings, by Return Period (millions of US dollars)**

	Residential	Commercial	Industrial	Informal settlements	Total Damage ($m)
10-year flood	62.4	2.9	3.6	4.3	73.2
50-year flood	76.1	3.5	5.0	5.6	90.3
100-year flood	85.2	3.9	5.8	6.5	101.4
AAD	42.2	2.0	2.5	2.9	49.6

Source: World Bank 2018b. *Note:* These values are indicative only.

generally resilient to shallow flooding and low flood water velocity, the high frequency of flooding at some locations can create structural problems over time. The older and unpaved roads are more prone to damage, and areas where flood water velocity is sufficiently high to cause erosion and collapse of the road structure are common. In terms of indirect losses resulting from the effects of flooding, these aspects were considered in terms of potential disruptions to flows of people, goods, and services within and beyond the city, but an estimate of losses also was not developed in this strategy. Technical notes on the flood modelling exercise are presented in Annex B, Kampala Flood Risk Assessment Technical Summary.

5.1.5. Estimated Damage from Floods

The analysis conducted for this strategy has quantified flood risk related to the cost associated with the damage to buildings and the assets within them, based on 10-, 50-, and 100-year return periods, and has estimated the annual average damage (AAD) at city scale, as well as at the subdivision level.[14]

The AAD for Kampala City is presented in **table 5.4**, broken down by building use for each return period. Formal residential and commercial properties are the most affected by flooding. Fortunately, few industrial units, where the value of assets tends to be high, are in flood risk zones. Economically quantifiable damage to the large areas of informal settlements is relatively low, despite this category having the most buildings at risk. This is because the construction of many of the buildings is makeshift, and the estimated economic value of the building contents is low.[15]

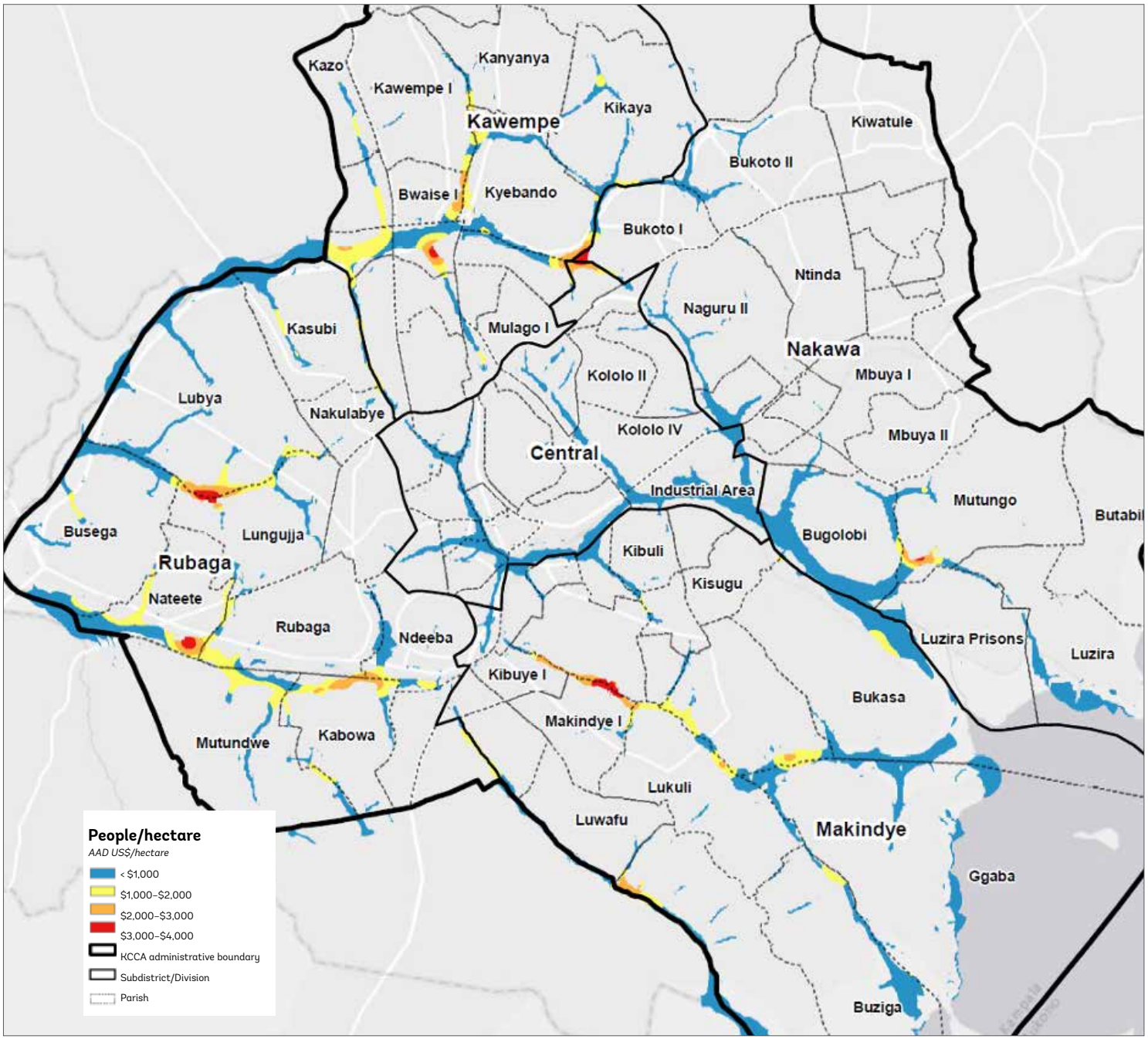
Figure 5.8 shows the spatial variability of AAD within the flood-prone areas across the city. The yellow and red shading on the map shows where the highest density of damage is likely to occur. These effects are due to flood impacts on a large number of medium-value buildings, such as residential properties, or a small number of high-value buildings and contents, such as large industrial or commercial buildings. The map also shows flood-prone areas within parishes such as Bwaise, Kasubi, and Nateete, where larger numbers of lower-value properties are frequently affected by flooding that results in lower AAD (blue/green). Some less recognised flood-prone areas, such as parts of Central and Lubaga divisions, are highlighted because the potential for damage is greater there if flooding does occur.

This type of assessment often underestimates or even ignores the less tangible impacts of flooding, however: social disruption, environmental degradation, health, microeconomic factors, and inability to recover from the flood events. **Figure 5.9** shows where the social impact is greatest by mapping the hotspots of highest demographic densities (taking into account the different occupancy levels in different building types) exposed to frequent flooding (that is, with a 10 percent annual probability of flooding). The areas with the greatest potential for social and

[14] Based on the digitised inventory of the buildings at risk from flooding, the estimated average building types and probable contents, and the relevant vulnerability curves, the average annual damage (AAD) was calculated for each building for each of the three flood events (10-, 50-, and 100-year). The AAD provides insight on where the greatest economic losses are likely to occur. It is a useful measure of flood risk, as it combines the scale of the hazard, the frequency of occurrence, the physical exposure to the flooding, and the impact of the flooding. The analysis does not explicitly state who suffers the economic losses.

[15] The vulnerability curves for industrial buildings assume that both the buildings and contents can often be relatively resilient to low levels of flooding, and significant damage does not occur until flooding reaches a certain threshold.

Figure 5.8 **Spatial Variability of AAD to Buildings across City of Kampala**



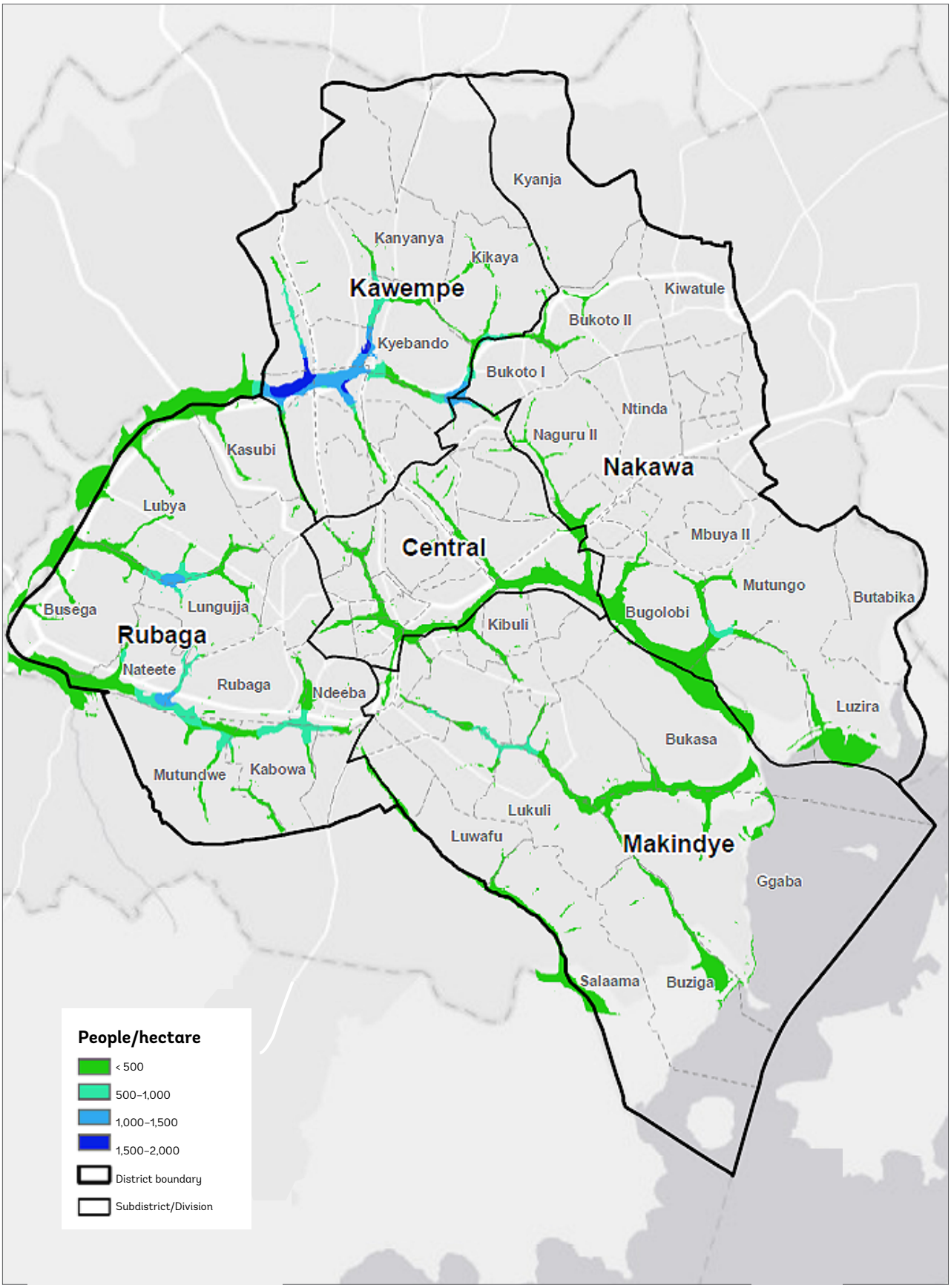
Source: Elaboration of World Bank data.

other intangible impacts are within the parishes of Bukoto I, Bwaise I, II, and III, Kamwokya II, Kyebando, Makerere I and III, and Mulago III.

Figure 5.10 provides an indication of the probability of total flood damage to buildings in any given year, as detailed in **table 5.4**. This information may provide a basis for estimating levels of contingent liability faced by the city and inform decisions regarding what might be considered an acceptable level of risk against the probability of the event's happening.

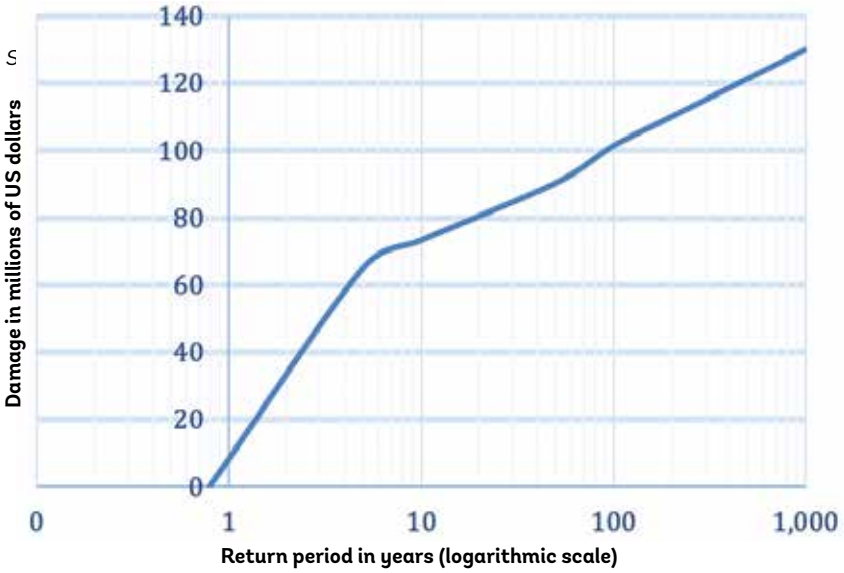
With respect to risks to roads and road congestion, **figure 5.11** shows the road network against the employment density map, with the sections of road affected by flood depths of more than 300 mm from the simulated 50-year flood event. The main ring roads of the city, both the Northern and Southern Bypass roads and the main A109 Masaka Road, are at risk from flooding. In these cases, there is little opportunity for extensive rerouting of traffic onto

Figure 5.9 **Spatial Distribution of People at Risk from Frequent Flooding (10 percent annual probability)**



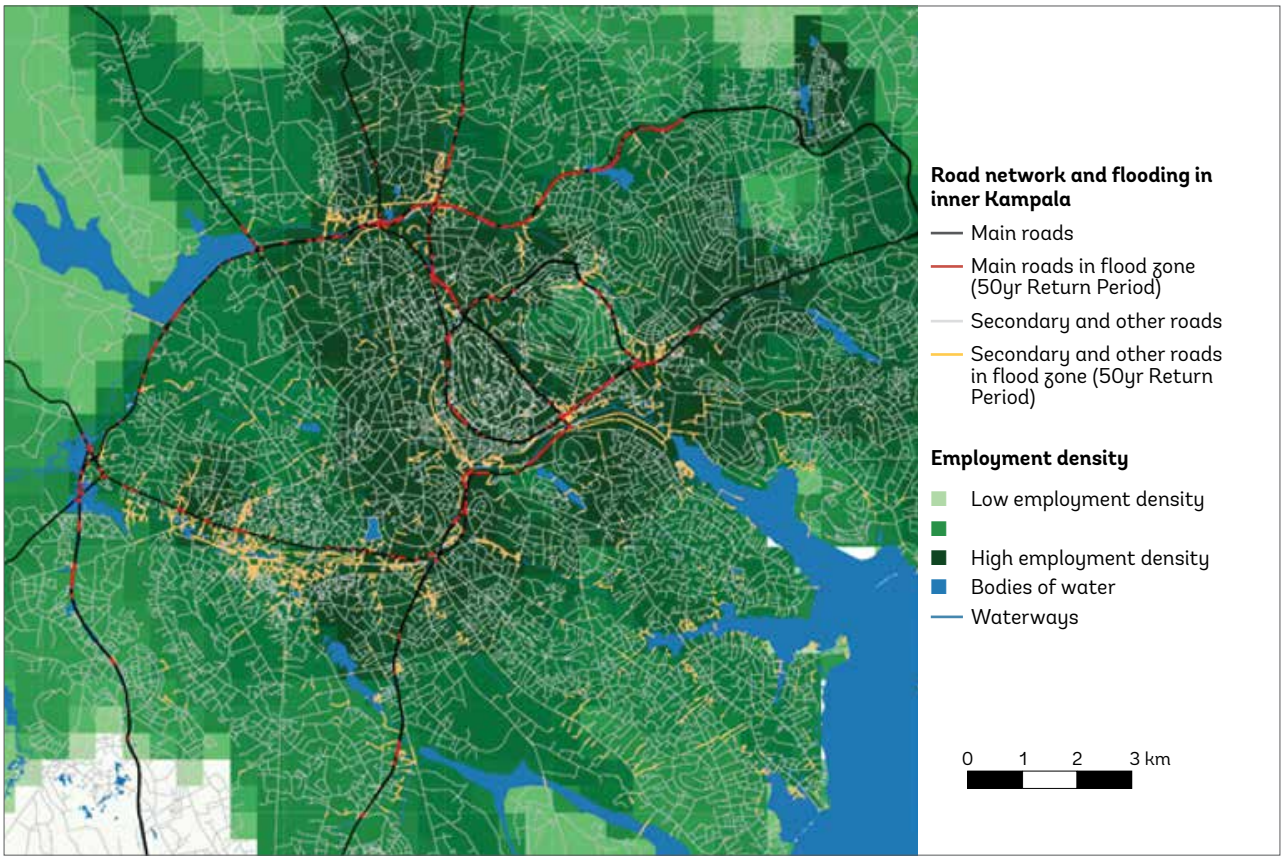
Source: World Bank.

Figure 5.10 **Probable Maximum Damage for Kampala City, by Return Period**



Source: World Bank 2018b.

Figure 5.11 **Road Network and Flooding Associated with a 50-Year Flood Event**



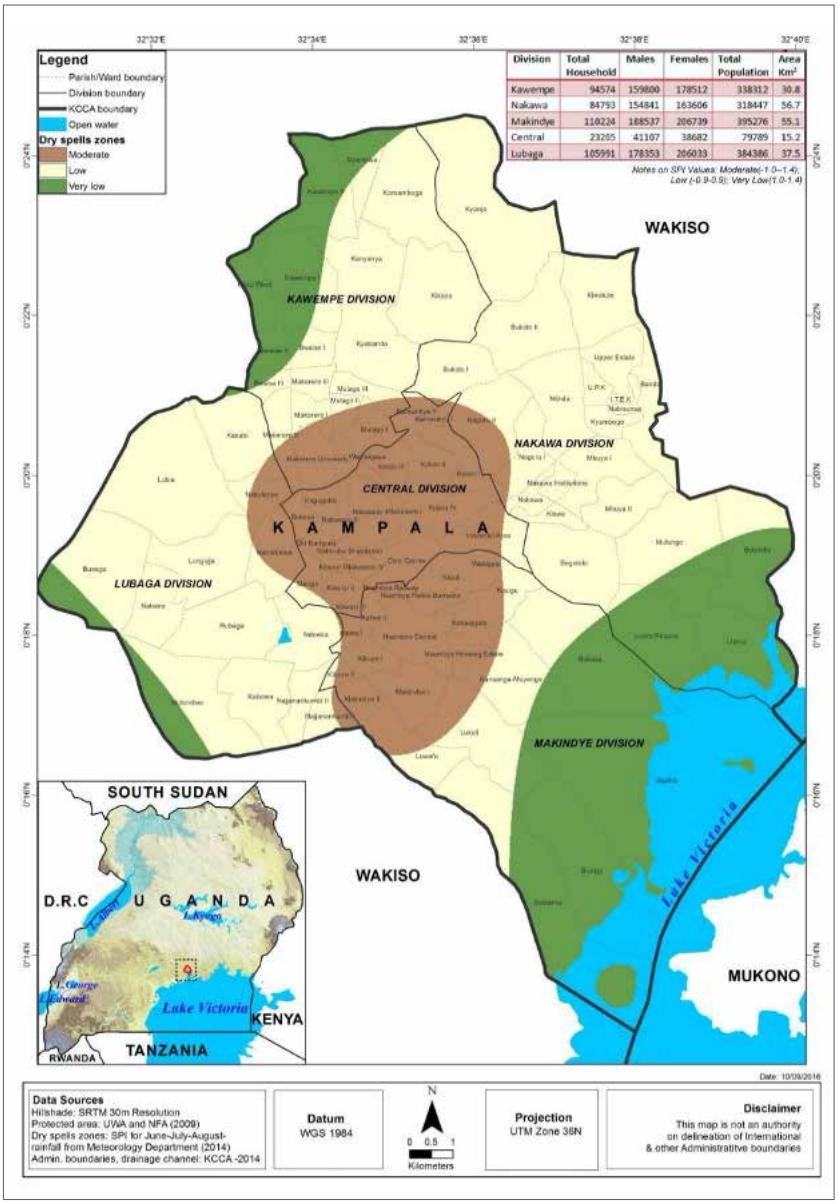
Source: Hallegatte et al. 2019.

alternative routes. Significant flooding is also shown on the many secondary roads within the known flood-prone areas of the city. Although not considered high, the risk posed by flooding to the commercial and financial functions of the city as a result of compromised transport is substantial and is exacerbated by the relative frequency and widespread nature of the disruption.

5.2. Droughts and Dry Spells

Kampala is located close to the equator and has a tropical rainforest climate, characterised by two annual wetter seasons and two annual drier seasons. A defining feature of this climate is that the drier seasons will typically have an average monthly rainfall of no less than 60 mm. While Kampala is not located in a drought-prone region, its rainfall during the drier periods can vary considerably, and the city is known to experience what is formally termed "dry spells."

Figure 5.12 **Dry Spells Zones for SPI, June-July-August**



Source: KCCA, Multi-Hazard, Risk and Vulnerability Profile for Kampala City, 2018.

An assessment of the scale and impact of these dry spells on the city of Kampala has been carried out under the Multi-Hazard, Risk, and Vulnerability Profile for Kampala City supported by the United Nations Development Programme (UNDP) (KCCA 2018c). The scope of this analysis is limited by insufficient length of hydrometeorological records, but, within these constraints, it provides a good insight into the scale and significance of the problem. A summary of that analysis is provided here for completeness.

A dry spell is a period of below-normal average precipitation in a given region, resulting in prolonged shortages in its water supply, whether atmospheric, surface, or groundwater. A dry spell can last for months or years. It can have a substantial impact on the ecosystem and agriculture of the affected region and can harm the local economy.

As with droughts, dry spells are defined in three main ways:

- Meteorological dry spells come about after a prolonged time with less than normal average precipitation. They usually precede the other two kinds of dry spells.
- Agricultural dry spells are dry spells that affect crop production or the ecology of the natural environment. This condition can also arise independent of any change in precipitation levels when soil conditions and erosion triggered by poorly planned agricultural endeavours

cause a shortfall in water available to the crops.

- Hydrological dry spells come about when the water reserves available in sources such as aquifers, lakes, and reservoirs fall below the statistical average. They tend to show up more slowly because they involve stored water used but not replenished. These dry spells can be triggered by more than just a loss of rainfall.

The Standardized Precipitation Index (SPI) is widely used to characterise meteorological drought on a range of time scales. On short time scales, the SPI is closely related to soil moisture, while at longer time scales, the SPI can be related to groundwater and reservoir storage. The SPI can be compared across regions with markedly different climates. It quantifies observed precipitation during a drought period as a standardised departure from a selected probability distribution function that models the long-term precipitation data.

Understanding fully the mechanisms of dry spells in Uganda is very difficult because of the highly variable rainfall patterns, compounded by poor recording of rainfall and other climate- and water resource–related information. Even more difficult, as a result, is to establish early warnings for dry spells and to put into place mitigation to minimise damage and create resilience in the event dry spells happen.

As climate change and climate variability impacts keep worsening, dry spells could cause much suffering in city communities by destroying crops, animals, and livelihoods. Long-term monitoring of climate is highly recommended.

Finally, the Water Requirement Satisfaction Index (WRSI) could be employed to study drought conditions in the city, along with further investigation of soil types and their ability to store water and the presence and depth of groundwater supplies. All these factors play important roles in the occurrence of drought.

Figure 5.13 **Soil Erosion–Prone Areas Map**

Source: KCCA 2018c.

5.3. Soil Erosion

Local efforts in Kampala to map soil erosion and rock falls employed a combination of participatory mapping and spatial multicriteria analysis. Participatory mapping involved close stakeholder collaboration with the OPM DRM team and the city disaster management focal persons and included focus groups and key informant interviews.

The Multi-Hazard Risk and Vulnerability Profile for Kampala identifies a number of high-risk areas across the city's five divisions, as shown in **figure 5.13** and listed in **table 5.5**. Soil erosion is often manifested as

Table 5.5 **Areas Most Commonly Affected by Soil Erosion**

Division	High-risk areas
Central	Bukesa, Kagugube, Kamwokya I, Kamwokya II, Kisenyi I, Kisenyi II, Kisenyi III, and Kololo II
Kawempe	Butakabukilwa (Mulago I), Bwaise III, Kakungulu (Kawempe II), Kanyanya ward, Kazo-Angola (Jackana road), Kiganda (Kawempe I), Kilokole (Kawempe I), Kisalosalo (Kyebando), Upper Nsooba (Mulago III)
Lubaga	Hilly areas of Mutundwe, parts of Kasubi, Nakulabye, and Namungona
Makindye	Bukasa, Buziga, Kasanga, Lukuli, Luwafu, Muyenga, and Salama
Nakawa	Bukoto, Kinawataka, and Ntinda

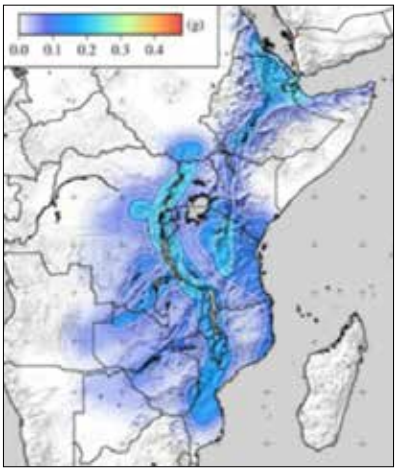
Source: KCCA 2018c.

damage to roads and buildings, silting of drainage channels and culverts, damage to crops, and the creation of gullies, which represent a threat to human life. During rainy seasons, deaths by drowning have been recorded in deep gullies and borrow pits.

5.4. Earthquakes

Uganda is located in the East African Rift System (EARS), the world's largest continental-scale, seismic rift system (see **figure 5.14**). Approximately 6,000 km in length, this system extends from Djibouti to western Mozambique, generating volcanism and earthquakes and fracturing the Earth's crust. Despite a slow rate of divergence, EARS is characterised by frequent seismicity, with large and shallow earthquakes occurring occasionally.

Figure 5.14 **500-Year Return Period Ground Acceleration Map for East Africa**



Source: World Bank 2019.

Kampala is near the middle of both the western and eastern branches of the EARS and has generally experienced tremors resulting in minor or insignificant damage. In Kampala, as in the Rift Valley, residents have not experienced a high-magnitude earthquake in their lifetimes, leading many people to conclude that the seismic risk is low or non-existent. This is not the case, as even an earthquake of medium magnitude—between 5.0 and 6.0—can cause devastating losses due to the inherent vulnerability of the region. Building quality is low, as informal housing and nonengineered buildings predominate. When such structures are subjected to even moderate shaking, their vulnerability puts a great many people at physical risk, while social vulnerability puts the urban poor at further risk of shocks and disruptions to their lives.

Kampala has a history of structures collapsing, resulting in loss of life and significant injuries. Many of these events have involved buildings under construction or in the process of being improved or have been attributed to poor construction methods and standards or poor-quality building materials.

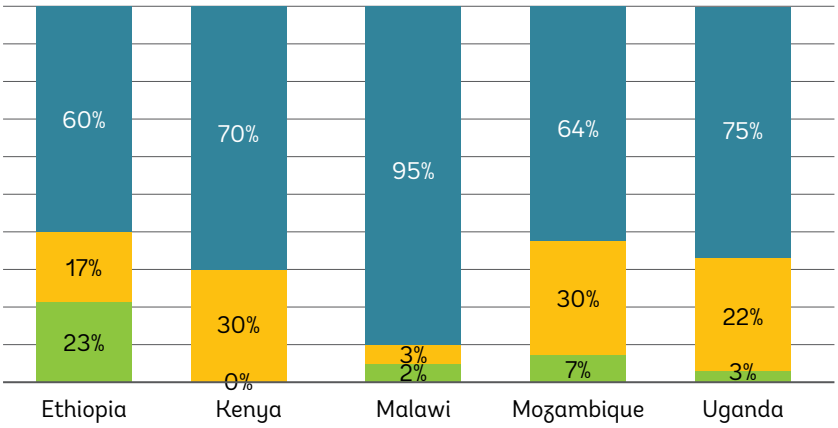
While Kampala has a comprehensive suite of building standards and regulations, it faces significant enforcement challenges. The building industry also faces challenges with regards to improving industry standards and the quality and reliability of building materials. Data shown in **figure 5.15** indicate that, at the national level, 75 percent of Ugandan buildings—including earthen, wattle and daub, and masonry buildings—are considered highly vulnerable to even moderate shaking.

As building collapse—even in the absence of seismic or other shocks—is common in East Africa, further review of the quality and resilience of Kampala's building stock, as well as its regulatory and enforcement capacity, are recommended to inform policy and investment decisions.

5.5. Fires

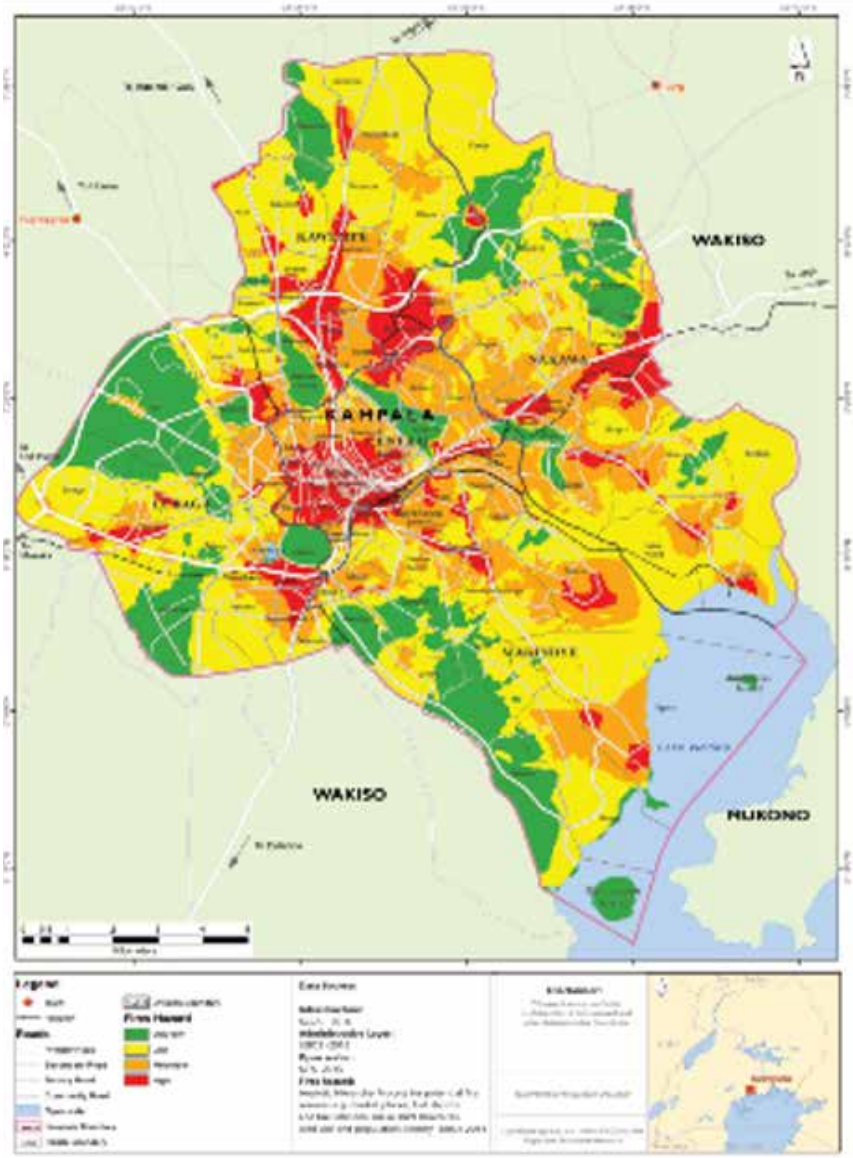
The common use of flammable construction materials, the proximity of structures to one another, and everyday human activities, including cooking in homes, have made fire an important hazard in Kampala.

Figure 5.15 **Vulnerability of Buildings in the EARS by Construction Type**



Source: World Bank 2019.

Figure 5.16 **Fire Hazard Zonation Map**



Source: KCCA 2018c.

Chapter 4 noted the major fires occurring within and around central Kampala, mainly in large public buildings and in industrial and commercial areas. The most significant causes of fire reported are the use of charcoal cooking stoves, especially in the numerous restaurants in the markets, poor electrical wiring or illegal electrical connections, poor fire safety behaviours, and arson.

A key dynamic in urban fire risk is the rate at which a fire will spread to adjacent buildings and structures and the speed and efficiency of any firefighting intervention. Buildings and market stalls in many parts of Kampala have been constructed very close to one another, increasing the risk that fire will spread rapidly and cut off access routes for firefighters, reducing their ability to put it out. In the central business district, additional fire risks and challenges for responders come from the presence of high-rise and industrial buildings, along with the storage of hazardous goods (see **figure 5.16**).

While the city has had no significant history of wildfires, the projected changes in climate patterns in the region could increase the probability, severity, and geographical range of this hazard. The fire season is expected to last longer as a result of rising temperatures and longer periods without rain (GFDRR 2018).

5.6. Human Epidemics

Diseases that have resulted in human epidemics in Kampala in the recent past include cholera (Kahungu 2018), malaria, measles, typhoid fever, and viral haemorrhagic fevers, such as Crimean-Congo haemorrhagic fever (CCHF), Ebola, Marburg, Rift Valley Fever (RVF), and yellow fever (see **figure 5.17**).

Disease pathogens are spread via several vectors. These include contaminated water supplies, faecal-oral transmission due to poor sanitation, mosquitos, and direct human transmission. While these can be mitigated through risk-reducing development, human epidemics also spread through complex social systems that provide many opportunities to disrupt the vulnerability chain.

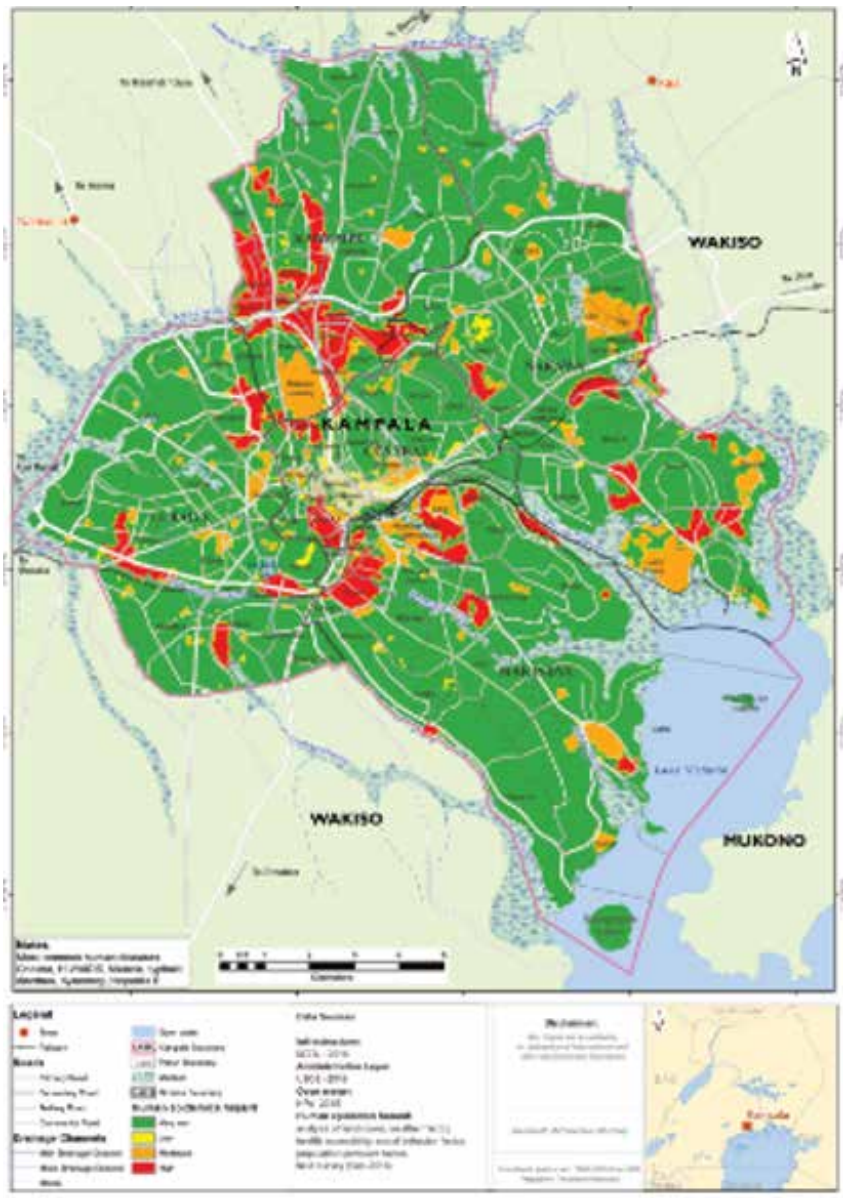
Vaccination coverage in Kampala is incomplete, with only 51 percent of children in their second year having received all their vaccinations (UBOS and ICF 2016). Although vaccinations on the government schedule are free for children, many health facilities struggle to keep all the vaccines in stock.

KCCA's disaster risk and public health teams have described how migration and transportation into Kampala result in human vectors of disease constantly entering and exiting the capital. Migrants from rural Uganda move to Kampala daily, looking for job opportunities and services provided by KCCA and the government. Refugees from the Democratic Republic of Congo (DRC) and other countries find their way to Kampala, with a total of more than 76,000 coming to the district as of December 31, 2019 (UNHCR 2019). Alongside migration, Kampala is also the main transport hub for Uganda. Regionally, international buses and planes connect Kampala and Entebbe to travellers from across East Africa. Many come from areas with weak health care and surveillance systems, such as Beni, DRC, and Juba, South Sudan.

Kampala, in contrast, has a robust epidemiological surveillance system. Medical surveillance officers assigned by KCCA are responsible for local supervision and epidemiology in each of the five divisions. Every Monday, more than 600 health facilities report on the communicable diseases they observe to the Directorate of Public Health and Environment, where an automated algorithm alerts management to anomalous clusters that warrant investigation.

In addition, Uganda's Ministry of Health (MoH) operates a Public Health Emergency

Figure 5.17 **Human Epidemic Diseases Hazard Zonation Map**



Source: KCCA 2018c.

Operations Centre (PHEOC), whose mission is to coordinate response to acute or evolving disease outbreaks, disasters from natural hazards, or terrorist attacks (Ministry of Health 2013). When the MoH activates the Incident Management System (IMS) during a response, PHEOC coordinates the National Task Force. These initiatives are part of the One Health Approach, the central theme of the Uganda One Health Strategic Plan, 2018–22, developed by MoH, the Ministry of Agriculture, Animal Industry, and Fisheries (MAAIF), the Ministry of Water and Environment, and the Ministry of Tourism, Wildlife, and Antiquities. MoH intends KCCA's response to an epidemic to be coordinated through these mechanisms.

In addition to the Directorate of Public Health and Environment, several KCCA directorates have some responsibility for raising public awareness of health threats. KCCA may wish to strengthen the role of the inter-directorate health system and clarify the roles of the directorates for an efficient and effective epidemic response.

5.7. Food Security and Nutrition

The nutritional status of children in Kampala is generally better than the Ugandan average, with lower levels of stunting and average levels of wasting (UBOS and ICF 2016). Similarly, the percentage of young children in Kampala receiving the minimum acceptable diet is above the national average. Kampala residents still have high rates of food insecurity and malnutrition, however, relative to globally acceptable levels. Several risk factors influence food security in Kampala:

- Kampala, with its own agriculture currently limited, is reliant on food grown elsewhere.
- Staple foods are of low nutritional value, with little dietary diversity.
- Awareness of nutrition principles is low among the Ugandan population.
- Changing rainfall and temperature patterns—aggravated by climate change—have led to sharp fluctuations in food prices in recent years.
- Recent political uncertainty with neighbouring Kenya and Tanzania over food exports (which are protected by East African free-trade agreements) could reduce access to international coping mechanisms for food shortages.
- Kampala agriculture is subject to threats that include dry spells, plant pests and diseases, livestock parasites and diseases, vermin, invasive species, and large-scale epidemics, such as an Ebola outbreak (KCCA 2018c).
- In a 2015–16 study, 17.7 percent of urban households in Uganda reported food shocks (including from natural hazards) within the previous 12 months (NPA 2017).

Efforts are underway to reduce food insecurity in Kampala. For one, the Food and Agriculture Organization (FAO) has begun exploring with KCCA the opportunity to support city residents with highly nutritious crops grown on urban agricultural plots.

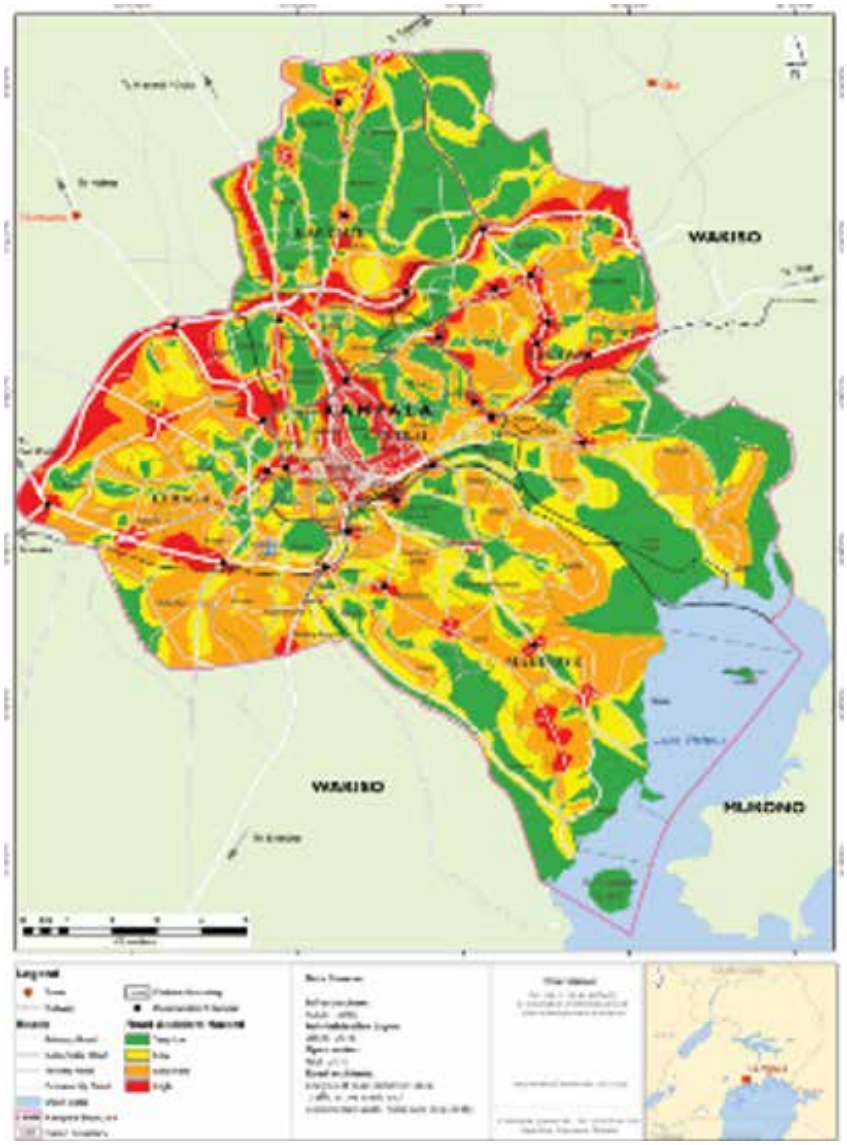
In October 2018, KCCA began work with the World Food Program (WFP) to conduct a detailed food security and nutrition (FSN) assessment of Kampala (WFP 2018). The exercise includes a capacity-strengthening component, intended to help KCCA understand and utilise the results. This project will provide a better understanding of the current FSN conditions in Kampala and will allow KCCA to update the assessment periodically to monitor for shocks to the FSN status of Kampala residents.

5.8. Road Accidents

Road traffic accidents are among the top five causes of mortality in Uganda, and the country's estimated 29 deaths per 100,000 people is one of the highest rates in Sub-Saharan Africa (WHO 2016). The greatest number of road traffic accidents in Uganda, as well as related deaths and injuries, is registered in the GKMA (Balikuddembe et al. 2017b).

As shown in **figure 5.18**, the KCCA Multi-Hazard Risk and Vulnerability Profile (KCCA 2018c) notes geographical distributions of risk for road accidents, with high incidence of accidents recorded at the

Figure 5.18 **Road Accident Hotspot Zonation Map**



Source: KCCA 2018c.

following locations:

- In Nakawa Division, along the Mugerwa Road junction along Nakawa-Banda Road, where there are open culverts, potholes, and missing manhole covers
- In Kawempe Division, along the stretch of Sir Apollo Road between the Makerere Hill Road junction and the flyover at Northern Bypass and along Gayaza Road, with Bombo Road also prone to accidents
- In Makindye Division, Salama Road and Kalungi Road, which are both hotspots, with the latter reportedly quite narrow; and Military Junction on Makindye Road from Kibuye Roundabout
- In Lubaga Division, along the stretch of Mityana road between Northern Bypass and Busega Roundabout and along Natete Road from Kibuye, especially the junction onto Lubaga
- In Central Division, in the civic centre along Industrial Street Road from the Kitgum House Jinja traffic lights, crossing the railway line from Mukwano Industries

Rising mortality and injury rates from road traffic accidents have followed Kampala's urbanisation rate, and this trend is expected to continue as the number of inhabitants and vehicles grows. Most traffic accidents involve minibus vehicles (*matatu*) or motorcycles (*boda-bodas*), in part because of their prevalence in the city's roads and streets, but also, as **table 5.6** shows, as a result of risky behaviours—the non-use of safety equipment (such as helmets, seatbelts, child restraints, and so on), driving while intoxicated, and speeding—and other risk factors, such as overcrowding and poor maintenance of vehicles and poor infrastructure (Bakama and Bakama 2006).

In particular, *boda-bodas* account for 41 percent of all traffic-related injuries in Uganda and most of the cases in Kampala, followed by accidents involving pedestrians (Tumwesigye et al. 2016). This has major demographic and economic implications, as the large majority of the injured or dead are 20- to 30-year-olds. Furthermore, data show that traffic accident victims tend to receive serious injuries and require significant hospital care. A study conducted in 2010 determined that the cost of health care for people suffering from injuries related to boda-boda accidents accounted for 15 percent of Mulago Hospital's annual budget and 62.5 percent

Table 5.6 **Top 10 Reported Exposure and Vulnerability Factors of Road Traffic Accidents in GKMA**

	Exposure		Vulnerability
1.	Indiscipline among road users	1.	Alcohol and substance abuse
2.	Inadequate driver training	2.	Lack of appropriate infrastructure for pedestrians and non-motorised road users
3.	Drinking and driving	3.	Absence of traffic segregation facilities for non-motorised road users
4.	Lack of segregated lanes and mixed traffic streams	4.	Unaccompanied children on road
5.	Inadequate pedestrian and cyclist infrastructure	5.	Mixed traffic streams
6.	Failure to use protective safety and visibility gear	6.	Demographic aspects (age, sex, peer influence, economic status, and domicile)
7.	Poor road engineering design and planning	7.	Failure to use protective safety and visibility gear
8.	Unregulated proliferation of boda-bodas	8.	Failure of road designs and maintenance to consider vulnerable road users
9.	Excessive speed	9.	Inadequate regulation of public passenger transport services
10.	Lack of driving permits or licences among drivers	10.	Lack of appropriate driver training

Source: Balikuddembe et al. 2017a.

of its surgery budget (Kigera et al. 2010).

5.9. Air Pollution

Kampala's air quality is ranked among the worst in the world, with high levels of particulate matter (PM), which are known to increase residents' risk of stroke, heart disease, lung cancer, and chronic and acute respiratory diseases, including asthma. According to analysis of the World Health Organization's Ambient Air Quality Database (WHO 2018), Kampala's recorded levels of PM_{10} and $PM_{2.5}$ have put the city in the bottom 1 percent of urban air quality globally—among 4,300 registered cities—and given it the second worst air quality in Africa.

In Kampala, the expansion of public transport has not kept pace with the spread of the city, which has increased its overreliance on private motor vehicles, with the result that emissions have been rising (UN-Habitat 2009). The prevalence of *boda-bodas* is a key driver of mobile source pollution, which, along with volatile organic compounds and oxides of nitrogen, contribute to the generation of ground-level ozone (see **figure 5.19** and **table 5.7**). The consequent inhibition of respiratory function poses a risk to the health of Kampala's residents, wildlife, and plants (World Bank 2015).

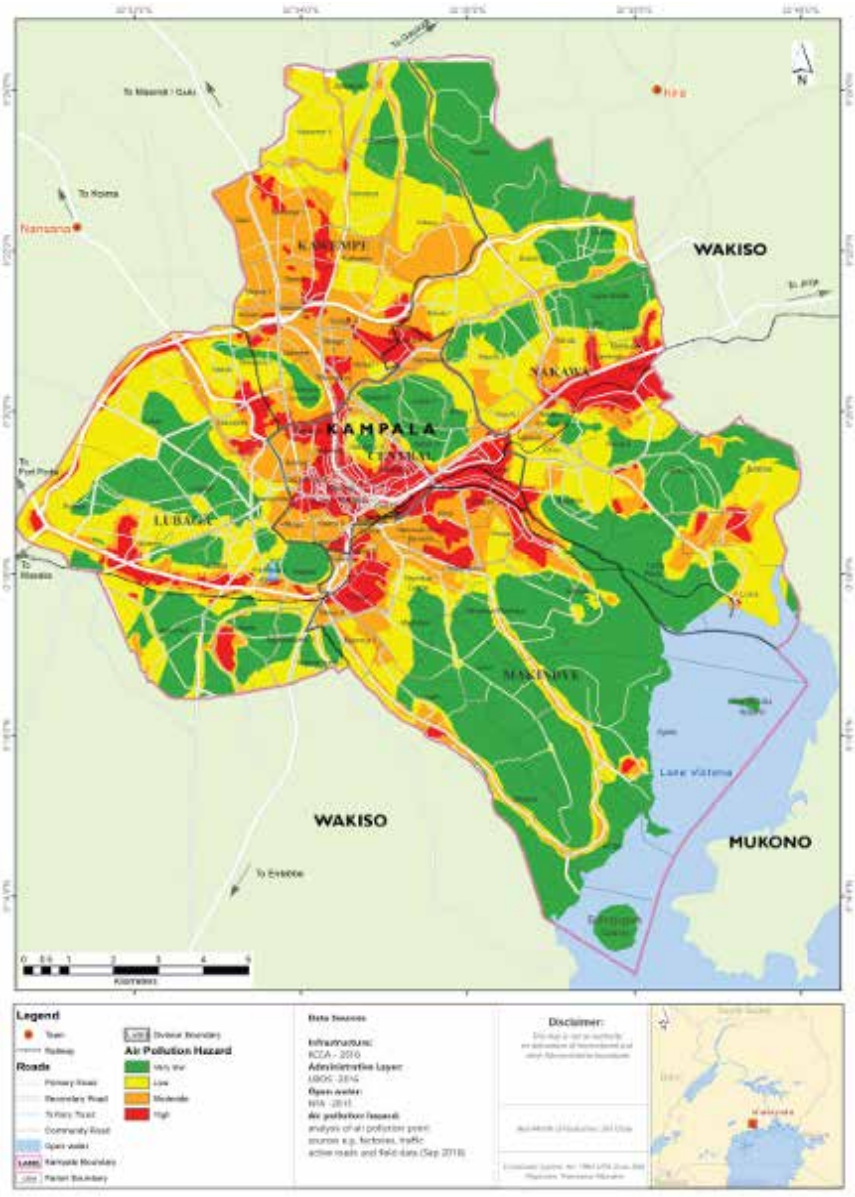
Private buildings, industries, and transport account for most of Kampala's annual carbon emissions. Existing literature focuses on the transport sector, which consumes 80 percent of the diesel fuel and all of the oil used in Uganda, and highlights the positive correlation between poor air quality and vehicle and road density (World Bank 2015).

5.10. Environmental Degradation and Water Pollution

The natural hazards and human-related urban dynamics analysed in this document all have an impact—to varying degrees—on Kampala's environment. Encroachment on wetlands, soil erosion, and decrease in tree cover compromise the quality, productivity, absorption, and mitigation capacity of local environmental resources, directly affecting the livelihoods of residents and generating higher disaster and climate risks. Poor practices and inadequate management and treatment of solid waste, wastewater, and industrial waste result in spills damaging to Kampala's wetlands and water sources.

Despite often being described as one of Africa's greenest cities, the increasing share of land converted by urbanisation in Kampala has resulted in loss of vegetation, lower soil coverage, and higher erosion. The forests in low-lying areas have virtually disappeared, and some parks and other green areas have been diminished (World Bank 2015). Green areas are important for

Figure 5.19 **Air Pollution Potential Zonation Map**



Source: KCCA 2018c.

counterbalancing air pollution, and fewer of them also means less water absorption and more sedimentation, which compromise Kampala's protection against floods.

In Kampala, both point- and nonpoint-source water pollution is increasing. Most point-source pollution originates from industrial areas and wastewater treatment plants. In the Nakawa-Ntinda industrial area, discharges from food, metal, chemical, and pharmaceutical industries are degrading Kinawataka's wetland watershed and the Murchison Bay catchment. Nonpoint pollutants largely consist of stormwater runoff that becomes contaminated throughout the city during the wet season (World Bank 2015).

A vulnerability that has been identified for water supply pollution is water supply pipes. Poor infrastructure or maintenance in some areas not only may lead to loss of drinking water, but may also allow for the infiltration of wastewater into the water supply distribution network (Nyakaana 2007).

Table 5.7 **Most Common Air Pollutants Reported in Kampala**

Pollutant	Source area
Sulfur dioxide (SO_2)	Industrial area (Nakawa), particularly from industrial activity (factories, waste incinerators)
Nitrogen dioxide (NO_2)	Industrial area, Kawempe, and Kyambogo (Nakawa), from high-temperature combustion processes
Particulate matter (PM) pollutants	Industrial area, Kawempe, and Kyambogo (Nakawa), from industrial activity
Toxic metal pollutants	Particularly in areas with garages, battery manufacturing, and repair facilities
Odor pollution	Bugolobi (Nakawa), areas around Kiteẓi landfill (Kawempe), from solid waste, sewage, and industrial waste

Source: Adapted from KCCA 2018c.

In addition, increased pollution of Lake Victoria at Murchison Bay is compromising natural resources essential to Kampala's economy and has driven up the cost of water supply to the city (Isunju et al. 2015). A major challenge to drinking water treatment is the pollution level at Ggaba, where water sources are highly saturated with sewage discharges from Nakivubo Channel (World Bank 2015).

The condition of Kampala's wetlands is varied, with many in poor condition and, in some cases, possibly beyond the capacity to recover naturally. A major factor behind damage to wetlands is small-scale agriculture or subsistence farming, which alters the drainage and the plant populations within the wetlands. Although these areas may appear to revert quickly to natural wetlands once vacated, regaining their natural value and qualities may take significantly longer. More than half the area of Nakivubo wetland has been altered by encroachment from industries and human settlements and by the construction of channels that disrupt its natural flow system and its capacity to act as a natural water prefiltering system (World Bank 2015).

Chapter 6
Climate Change Impacts and Vulnerability in Kampala

This chapter highlights critical ways in which climate change are expected to exacerbate risk factors for Kampala.

6.1. Climate Change in Kampala

A brief review of expected changes in climate is presented below.

6.1.1. Observed Impact of Climate Change in Kampala

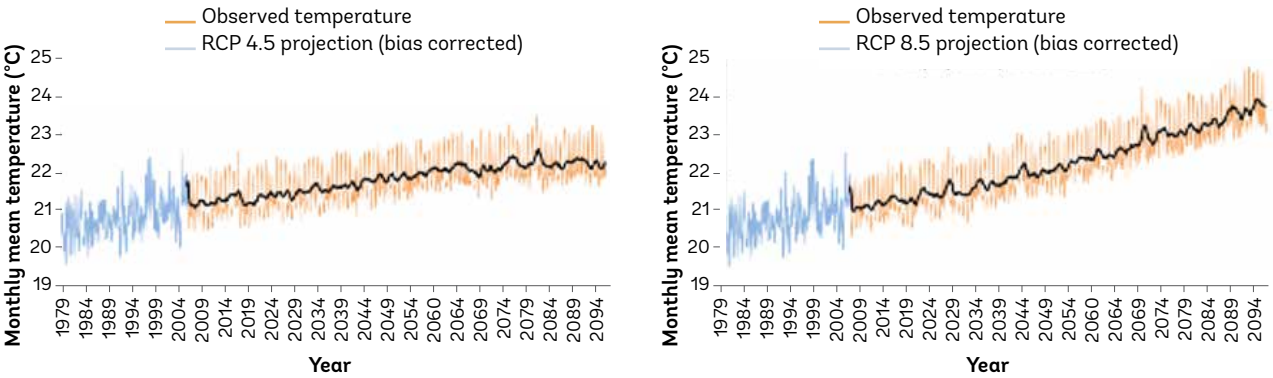
Clear evidence indicates that temperature in Kampala has risen as a result of climate change. According to Rautembach, the average near-surface temperature increased by about one degree Celsius between 1979 and 2005 (Rautenbach 2014). Annual rainfall, on the other hand, appears to have remained constant, with data from theUganda Bureau of Statistics showing no significant change in Kampala between 2000 and 2014 (UBOS 2014).

Although a generalised perception holds that extreme weather events such as heavy rains and prolonged droughts are becoming more frequent (MWE 2015), no scientific study, unfortunately, has been carried out to confirm past changes in the frequency and intensity of such extreme events in Kampala. Lack of systematic rainfall ground data for a long period makes analysis inconclusive.

6.1.2. Climate Change Projections for Kampala

Rautembach offers the only specific climate change projections for Kampala produced to date. This study is part of the Economic Assessment of the Impacts of Climate Change in Uganda within the Climate and Development Knowledge Network and is funded by the UK's Department for International Development (DFID) and the Netherlands' Directorate-General for International Cooperation (DGIS). Its main results are summarised in **figures 6.1** and **6.2**.

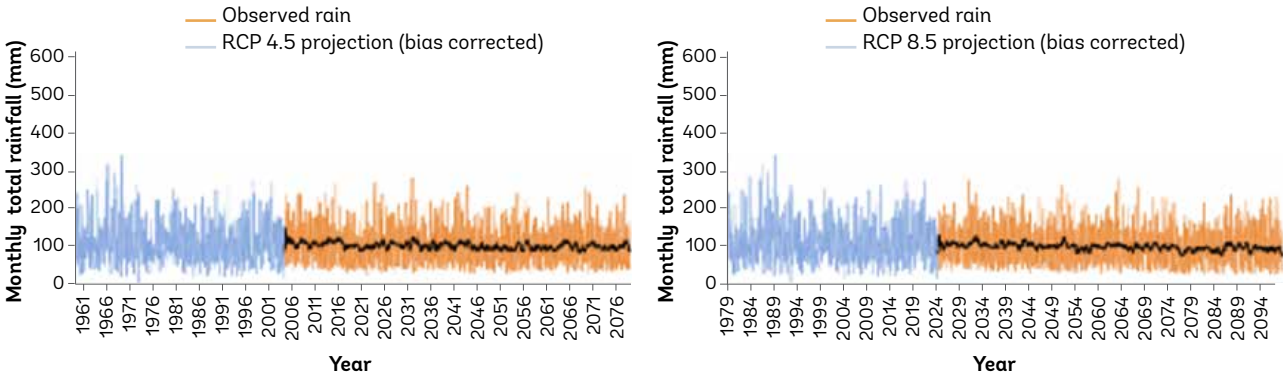
Figure 6.1 **Monthly Rainfall Totals and Projections incorrect figure head in file**



Source: Rautenbach 2014.

Note: Kampala domain area averaged observed ERA-Interim reanalysis (blue) monthly near-surface temperature averages (°C), with bias corrected CCLM 4.8 RCM near-surface temperature projections (orange), under conditions of the RCP 4.5 (left) and 8.5 (right). The black lines represent 12-month running averages.

Figure 6.2 **Monthly Rainfall Totals and Projections**



Source: Rautenbach 2014.

Note: Kampala domain area averaged observed GPCC (blue) monthly rainfall totals (mm), with bias corrected CCLM 4.8 RCM rainfall projections (right, orange), under conditions of the RCP 4.5 (left) and 8.5 (right). The black lines represent 12-month running averages.

Near-surface temperatures in Representative Concentration Pathway (RCP) 4.5[16] are predicted to increase by approximately 1.5°C by the end of the century (2095). The average near-surface temperatures could be higher in some periods—for instance, around 2080—and the average in some months could go as high as 23°C. In RCP 8.5, the simulation exercise conducted for the study predicted an increase in near-surface temperatures by approximately 3°C by the end of the century (2095), although the 12-month average could be higher in some periods—for instance, around 2070—and the average near-surface temperatures in some months could go as high as 24°C.

As noted, projected annual rainfall totals in Kampala are not expected to change significantly in this century because of climate change. In both RCP 4.5 and RCP 8.5, a small decline is predicted in the annual rainfall average of approximately 20 mm over a 12-month running mean (about 1 percent of current total annual rainfall in Kampala).

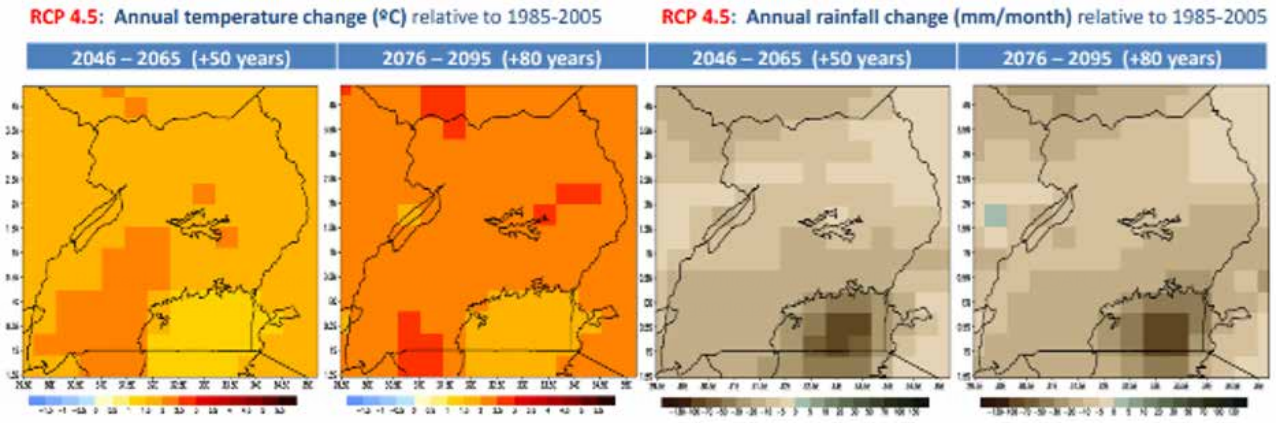
With regards to extreme weather events, studies have not reached conclusions on the future impact of climate change in terms of the frequency and intensity of heavy rains and droughts for GKMA. The absence of such studies, together with the lack of clear evidence of past changes in the frequency and intensity of extreme events, makes this issue a speculative one. Evidence does not currently support the conclusion that climate change in general will contribute to an increase in the frequency and intensity of rainstorms.

Although Kampala is so far expected to experience little change in rainfall, less rain is expected to occur over the rest of Uganda. **Figure 6.3** and **figure 6.4** show maps of the annual mean near-surface temperature change and total rainfall change from the median projected over 50 years and 80 years from present in both RCP 4.5 and 8.5, respectively. The decrease in rainfall over most of Uganda is expected to be combined with a significantly wetter DJF (December-January-February) season and significant temperature increases, especially during the MAM (March-April-May) and JJA (June-July-August) seasons. This will result in a longer wet season extending from SON (September-October-November) towards DJF but significantly drier conditions for the traditionally wet months.

Of particular relevance to Kampala are the rainfall and temperature over Lake Victoria, since the lake's water levels are important to water and power supply for the city. Rainfall over Lake Victoria might drop significantly (by 20 percent from present), while temperature is expected to increase by about 1°C. This will reduce the water intake and increase the evaporation of Lake Victoria, putting more pressure on the already dropping water levels.

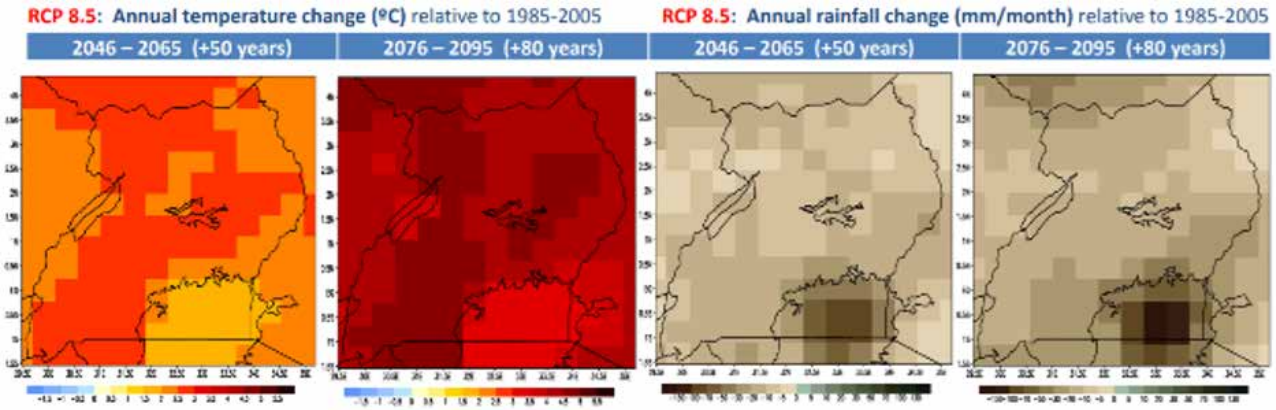
[16] RCPs are potential greenhouse gas concentration trajectories adopted by the Intergovernmental Panel on Climate Change (IPCC). The pathways describe different climate futures, all of which are considered possible depending on the volume of greenhouse gases (GHG) emitted in the years to come. Of the seven RCPs currently considered by the IPCC (1.9, 2.6, 3.4, 4.5, 6, 7, and 8.5), emissions in RCP 4.5 would peak in approximately 2040, then begin to decline.

Figure 6.3 **Annual Mean Near-Surface Temperature and Total Rainfall Change in RCP 4.5 Scenario**



Source: Rautenbach 2014. Image from https://news.mak.ac.ug/sites/default/files/downloads/Rautenbach_IPCC_5AR_Regional-scale%20climate%20change%20projections%20temp%20and%20rainfall%20in%20Uganda.pdf.

Figure 6.4 **Annual Mean Near-Surface Temperature and Total Rainfall Change in RCP 8.5 Scenario**



Source: Rautenbach 2014. Image from https://news.mak.ac.ug/sites/default/files/downloads/Rautenbach_IPCC_5AR_Regional-scale%20climate%20change%20projections%20temp%20and%20rainfall%20in%20Uganda.pdf.

6.2. Implications of Climate Change for Natural Hazards

The expected changes in near-surface temperature and rainfall summarised above have different implications for natural hazards associated with extreme weather events, such as floods, rain-triggered landslides, heat waves, drought, and agricultural drought.

6.2.1. Rainstorm Floods

No conclusive evidence indicates the frequency or intensity of heavy rains will be altered by climate change. The perception, however, is that at least the frequency of extreme rainfall is increasing, and that rainstorms are occurring all year round. Whether climate change is altering this hazard or not, Kampala is already heavily affected by floods caused by today´s rainstorms.

Furthermore, the projection of an extended wet season into DJF will mean an increase in the flood hazard events experienced during these traditionally dry months, requiring Kampala to be prepared for rainstorms and flooding almost throughout the year.

6.2.2. Rain-Triggered Landslides

Landslides are not currently a serious hazard in Kampala, but as the city grows in size, population, and density, informal settlements in hilly areas may become more at risk. Preventing the establishment of new informal settlements on steep slopes would be the best way to avoid or reduce this risk, since rain is the main trigger of landslides, and rainstorms are anticipated to remain as frequent and intense as they are today.

6.2.3. Heat Waves

Temperature in Kampala has increased by at least one degree Celsius, and a continuous increase of at least another degree and a half is projected to happen by

the end of the century. In RCP 8.5, the average near-surface temperatures could go as high as 24°C in some months (the maximum daytime temperature will be much higher) by 2070. Because the climate of Kampala is temperate, no serious impacts are expected from these heat waves; however, climate-proof design and construction of housing and infrastructure is required, and close monitoring is advised in case unforeseen impacts occur.

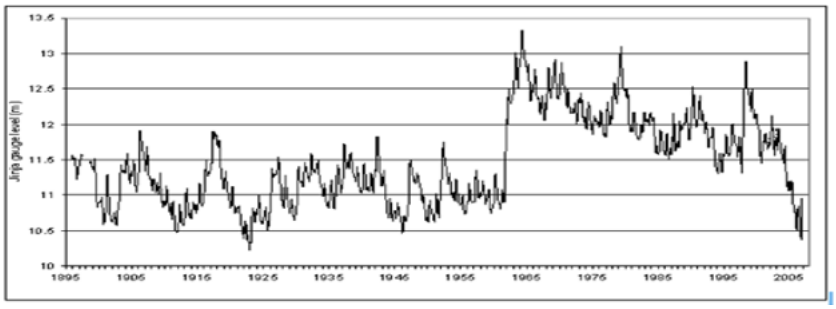
6.2.4. Drought and Agricultural Drought

The projected annual rainfall average in Kampala is just slightly less than today, while most of Uganda is expected to be drier. In addition, the SON rainy season will extend into DJF, which will result in a higher probability of dry spells during those months, since less rain will be distributed throughout a longer rainy season. This implies a higher probability of drought, especially agricultural drought.

6.3. Other Implications of Climate Change

The 20 percent reduction in rainfall over the Lake Victoria region will be one of the largest expected impacts of climate change in Uganda. Rainfall accounts for 85 percent of water intake in Lake Victoria, and evapotranspiration accounts for 85 percent of water outflow. As a result, water levels at the lake have proved sensitive to rainfall, with a large historical variation (Tindimugaya 2014). By the end of the 2006 El Niño event, the lake had registered its second lowest level in history (see **figure 6.5**).

Figure 6.5 **Observed Water Levels of Lake Victoria, 1895–2007**



Source: Tindimugaya 2014.

The result was reduced supply of water and energy to Kampala, since the lake is the city's main source of both drinking water and hydropower; these are discussed further below. Water transport and fisheries in the lake were also affected. The water level has been recovering since 2006, but, in the long term, the rainfall reduction and increase in evaporation brought about by climate change will inevitably lower the water level significantly again.

6.3.1. Water Supply

The only available water treatment plant for Kampala is located on Lake Victoria. In the past, water could not be pumped through the existing pipes during dry periods when the level of the lake would drop and water supply was restricted. As a result, pipelines had to be extended farther and deeper into the lake. Climate change will probably demand further extension of the pipes, increase the costs of pumping, and eventually force the city to migrate to underground water as its source of supply.

6.3.2. Energy Generation

The current installed capacity for hydroelectricity on the Ugandan shore of Lake Victoria is 630MW: 180MW from Nalubaale power station, 200 MW from Kiira power station, and 250 MW from Bujagali power station (completed in 2012). The fall in the level of the lake in 2006–7 seriously affected power generation. According to the 2009 Vulnerability Assessment of Ugandan Water Resources to Climate Change, the combined installed capacity of the two existing power stations at the time (Nalubaale and Kiira) was 380MW, equal to a water flow rate of 1,150 m3 s-1 (cumecs), and, by August 2007, flows had been reduced to 750 cumecs (about 120 MW) because of declining lake levels (Ministry of Water and Environment 2009).

In response to the decrease in hydropower capacity, the Government of Uganda introduced subsidies to help companies and households buy energy from alternative sources. In particular, the government waived taxes on diesel products and generators. Nevertheless, industrial production in Kampala was adversely affected. Greater use of alternative energy and the implementation of efficiency programmes will be required, as hydropower availability for Kampala is likely to be affected by climate change.

Photo: DFrankvandenBergh

SECTION III

PROGRAMMATIC COMPONENT

The diagnostic analysis presented in chapters 4, 5, and 6 demonstrates that Kampala is subject to risks from natural and human-induced hazards that frequently result in death, injury, destruction of and damage to infrastructure, and large economic losses. In the absence of major programmatic action, these risks are expected to increase as a result of rapid population growth and climate change, among other factors. The analysis points to factors that drive or exacerbate these risks, including inadequate policy and regulation, lack of enforcement, uncontrolled development in high-risk areas, inadequate maintenance of infrastructure, insufficient investment, and specific community practices.

Based on the diagnostic, **Section III: Programmatic Component sets** out recommended actions and an implementation roadmap to enhance Kampala's resilience to disaster risk and climate change.

Chapter 7
Recommended Actions and Prioritisation by Resilience Pillar

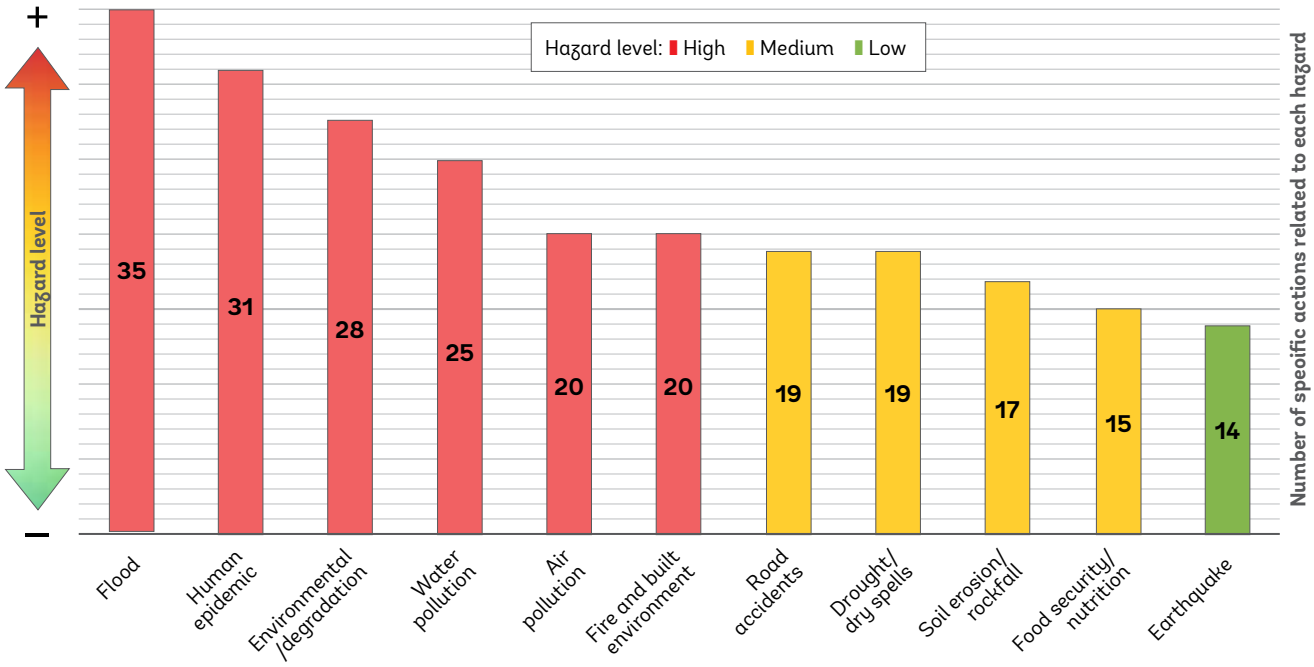
Drawing on the priorities established in the Sendai Framework for Disaster Risk Reduction, chapter 7 organises the recommendations for action into six resilience pillars, which represent primary areas of engagement for enhancing resilience, as shown in figure 7.1.

This strategy then sets out 21 priority actions, which provide objectives and overarching programmes to achieve the elements required under each resilience pillar, and 63 specific actions, which provide the projects and activities needed to achieve the priority actions. Identification of these actions was based on the hazard and risk diagnostic, the review of current efforts and previous recommendations, and participatory stakeholder workshops. Based on stakeholder prioritisation, each specific action has been proposed with a timeline to begin implementation: short-term implementation is to begin within one year, medium-term within two to three years, and long-term within three to five years.

The recommendations developed under this strategy are strongly related to the expected severity and frequency of the eleven hazards identified in Section II. **Figure 7.2** shows the numbers of specific proposed actions for resilience pertaining to these hazards. The number for each hazard is in line with its risk level.

Figure 7.1 **Resilience Pillars**

Figure 7.2 **Relationship between Diagnostic and Programmatic Components**



7.1. Resilience Pillar 1: Institutional and Governance Strengthening

The institutional, policy, and regulatory frameworks present the first opportunity for implementing transformative actions to improve disaster and climate resilience in Kampala.

The proposed strategic actions, detailed in **table 7.1**, provide for improvement of institutional capacities, including interagency coordination and clear roles and responsibilities; inclusion of local communities in learning and risk reduction processes at different levels; continuous training and awareness-raising programmes, using regional or global best practices; the establishment of financing mechanisms to allow for implementation of the strategy; and the creation of monitoring and evaluation mechanisms to assess risk management performance.

Table 7.1 **Recommended Actions Related to Institutional and Governance Strengthening**

Specific actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
Priority action					
1.1 Develop, update, and strengthen the regulatory and policy framework on disaster risk management and climate resilience **Strengthen the existing regulatory, policy and institutional framework by ensuring that planning and enforcement of building regulations include and comply with the main components of risk reduction and climate resilience.**					
1.1.1 Adopt the Kampala Disaster and Climate Resilience Strategy and make a connection link with and ensure a close linkage with the Kampala Strategic Plan.	Strategy Management and Business Development	Office of the Executive Director, Risk Management Unit Legal Affairs	NPA OPM-DDPM Development Partners	Short term (1 year)	(6)*
1.1.2 Develop and implement the Green Infrastructure Ordinance, with a focus on introducing Sustainable Urban Drainage Systems (SUDS) to address flood risk and integrate SUDS in government buildings	Physical Planning	Engineering and Technical Services	MoLHUD MoWT	Short term (1 year)	(6)
1.1.3 Support the implementation of the Uganda National Building Code through the development of guidance materials and the initiation of training with relevant stakeholders on resilience measures: fire prevention and safety (e.g., fire-resistant materials, electrical and mechanical design, egress, and extinguishment) and rainfall runoff-reduction (e.g., vegetation cover, excavation practices, re-planting, sediment traps, temporary drainage).	Physical Planning	Engineering and Technical Services, Legal Department Office of the Executive Director, Risk Management Unit	National Building Review Board (MoWT) MoLHUD Professional Bodies (i.e., Physical Planners, Architects, Surveyors, Engineers) Uganda Police Force - Directorate of Fire Prevention and Rescue Services	Short term (1 year)	(6)

Table 7.1 **Recommended Actions Related to Institutional and Governance Strengthening (cont.)**

Specific actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
1.1.4 Strengthen the risk reduction measures in the building code, including adding provisions for flood proofing and augmenting the current fire and seismic provisions.	Physical Planning	Engineering and Technical Services Legal Department	National Building Review Board (MoWT) MoLHUD Professional Bodies (i.e., Physical Planners, Architects, Surveyors, Engineers) Uganda Police Force - Directorate of Fire Prevention and Rescue Services	Medium term (2-3 years)	(6,8)
1.1.5 Develop hazard-specific plans and guidelines.	Public Health and Environment	Office of the Executive Director	OPM-DDPM Line Ministries, Dpartments and Agencies Academia Community Based Organizations	Medium term (2-3 years)	(2,6)
Priority action **1.2 Improve inter-institutional coordination for risk management** **Promote enhanced inter-institutional coordination on risk management and assessment processes by establishing interaction channels with clearly defined roles.**					
1.2.1 Adopt the Kampala Emergency Preparedness and Response (EP&R) Framework and enhance the role of the KCCA Risk Management Unit to coordinate with national, regional, and KCCA entities, including on risk-informed development, decision-making processes, and environmental assessments	Office of the Executive Director - Risk Management Unit	All Directorates, Departments and Divisions	OPM-DDPM Line Ministries, Departments and Agencies	Medium term (2-3 years)	(1,2, 6,8)
1.2.2 Establish the Disaster Risk Management Committees to implement the Kampala Emergency Preparedness and Response (EP&R) Framework.	Office of the Executive Director	All Directorates, Departments and Divisions	OPM-DDPM Line Ministries, Departments and Agencies Development Partners Uganda Police Force People's Defence Forces National Union of Disabled Persons of Uganda Business Community Civil Society Organisations Development Partners	Medium term (2-3 years)	(6)

Table 7.1 **Recommended Actions Related to Institutional and Governance Strengthening (cont.)**

Specific actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
1.3 Establish a financial strategy for risk management and climate resilience **Identify, establish and regulate KCCA's financial strategy to obtain, manage, and allocate the necessary resources for implementing the priority actions aimed at reducing disaster risk and strengthening climate resilience.**					
1.3.1 Develop and execute an annual funding plan to implement the highest priority measures of the Kampala Disaster and Climate Resilience Strategy with a specific target to reduce annual disaster losses.	Treasury Services	All Directorates, Departments and Agencies	MoFPED OPM-DDPM	Short term (1 year)	(6)
1.3.2 Implement a contingency fund to be used for emergencies. The fund will require the development and implementation of an operations manual, defining the fund's objectives, expected use, procedures in line with national and local budget and DRM policies.	Treasury Services	Office of the Executive Director - Risk Management Unit Strategy Management and Business Development	MoFPED OPM-DDPM NPA Development Partners	Medium term (2-3 years)	(6)
1.3.3 Develop and execute the Kampala Disaster Risk Financing Strategy, complementing the contingency fund with insurance and other instruments.	Treasury Services	Office of the Executive Director - Risk Management Unit, Strategy Management and Business Development	MoFPED OPM-DDPM	Long term (3-5 years)	(6)
1.4 Strengthen institutional capacity on risk management and climate resilience **Promote continuous training for relevant entities, with the goal of mainstreaming disaster risk management and climate resilience into municipal decision-making and operations.**					
1.4.1 Establish a municipal official training program on Disaster Risk Management that includes basic risk identification, surveillance, reduction and emergency preparedness and response for both internal KCCA staff and emergency response entities.	Office of the Executive Director - Risk Management Unit	Directorate of Administration and Human Resources Public Health and Environment Engineering and Technical Services Physical Planning Gender, Community Services and Production Public and Corporate Affairs	OPM-DDPM Line Ministries, Departments and Agencies Development Partners Private Sector such as Shell Ugand, etc.	Medium term (2-3 years)	(2)

Table 7.1 **Recommended Actions Related to Institutional and Governance Strengthening (cont.)**

Specific actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
Priority action					
1.5 Conduct monitoring & evaluation on institutional risk management performance					
Develop and implement a mechanism with key tools and indicators that allows for effective monitoring and evaluation of risk management performance from municipal authorities and entities.					
1.5.1 Develop and monitor key indicators to assess KCCA's risk management performance (e.g., quarterly entry of damage/ loss events in database, drills conducted) and share progress with the public.	Office of the Executive Director - Risk Management Unit	All Directorates, Departments and Divisions	OPM-DDPM Line Ministries, Departments and Agencies Development Partners Private Sector	Short term (1 year)	(6)

Sources: The sources referenced in the last column of the table are as follows: 1. Kampala Climate Change Action Strategy (2016), 2. Kampala Local Disaster Risk Reduction Plan (2018 - Draft), 3. Multi-Hazard, Risk and Vulnerability Profile for Kampala City (2018), 4. Kampala Drainage Master Plan (2016), 5. Kampala Physical Development Plan (2012), 6. Disaster Resilience Workshop (Oct 2018), 7. Uganda Disaster Preparedness and Management Policy (2010), 8. Uganda National Physical Planning Act (2010).

7.2. Resilience Pillar 2: Understanding Risk

The foundation of effective disaster risk and climate resilience policies must be a comprehensive understanding of hazard and environmental characteristics, as well as vulnerability, exposure, and capacity of communities and assets. To institute comprehensive disaster risk management, the Prime Minister's Office of Disaster Preparedness and Management and KCCA's Office of Risk Management should implement a monitoring system, conduct detailed risk studies identifying vital areas to inform policymaking, and improve information-sharing mechanisms. The recommended actions for accomplishing these goals are detailed in **table 7.2**.

Table 7.2 **Recommended Actions Related to Understanding Risk**

Specific actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
Priority action					
2.1 Enhance surveillance and monitoring networks. Expand and improve Kampala's Expand and improve Kampala's hydrometeorological (hydromet) and other hazard monitoring with the goal of informing all DRM process.					
2.1.1 Devise action plan for the development and expansion of a hydromet monitoring network, including river gauges at strategic locations on all major watercourses within the city and surrounding area. Define network design, cost, and roles and responsibilities, including ownership (e.g., outsourcing, hosted system), management, ongoing maintenance, and funding for hydromet systems.	Engineering and Technical Services	Physical Planning Office of the Executive Director - Risk Management Unit	MoWT MWE UNMA OPM-DDPM	Short term (1 year)	(1, 6)
2.1.2 Implement the hydromet monitoring network, establishing the necessary hydromet equipment and the necessary capacity to manage and deliver the services.	Engineering and Technical Services	Physical Planning Office of the Executive Director - Risk Management Unit	MWE UNMA	Medium term (2-3 years)	(1, 6)
2.1.3 Strengthen surveillance and enforcement of environmental guidelines, including enhancing current networks for monitoring air quality, water pollution, and environmental degradation.	Public Health and Environment	Physical Planning Office of the Executive Director - Risk Management Unit	MWE NEMA Development Partners Academia – Makerere University	Medium term (2-3 years)	(1, 6)

Table 7.2 **Recommended Actions Related to Understanding Risk (cont.)**

	Specific actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
Priority action						
2.2	**Conduct comprehensive and detailed risk assessments and studies.**					
	Ensure detailed risk studies and maps are produced to support the design of risk reduction and climate resilience measures, focusing attention on identifying communities and assets exposed to high risks					
2.2.1	Establish process and conduct regular updates of the flood risk assessment to (1) determine current locations, frequency, and severity of flooding, with the development of appropriate mapping; (2) identify locations and types of buildings, activities, and assets exposed to flooding; and (3) update the risk assessment with improved risk metrics, including vulnerability data. By producing spatially varying measurements of the impacts of flooding on different sectors and in different areas, KCCA will be better informed to carry out risk informed territorial and investment planning, as well as to support development control and emergency preparedness and response.	Engineering and Technical Services	Office of the Executive Director, Risk Management Unit	OPM-DDPM MoWT MWE NEMA Academia	Medium term (2-3 years)	(6)
2.2.2	Conduct a citywide geomorphology study to gain an understanding of dynamic erosion and sedimentation balance, and determine areas exposed to high risk of soil erosion, locations at high risk of sedimentation, and mitigation options to reduce the impacts.	Engineering and Technical Services	Physical Planning	OPM-DDPM Ministry of Energy and Mineral Development	Medium term (2-3 years)	(6)
2.2.3	Establish a process and conduct regular fire and built-environment risk assessment to determine locations, assets, and resources at high risk. This will be used to inform investment planning, as well as emergency preparedness and response.	Occupational Health and Safety	Physical Planning Engineering and Technical services Office of the Executive Director, Risk Management Unit	OPM-DDPM MoLHUD Uganda Police, Uganda Red Cross Society, Insurance Regulatory Authority of Uganda, Uganda Insurance Association	Medium term (2-3 years)	(6)

Table 7.2 **Recommended Actions Related to Understanding Risk (cont.)**

Specific actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
Priority action **2.3 Design and activate an integrated information system for risk management and climate resilience.** **Implement a system of information on risk and climate and integrate it with other systems of environmental information, cadastral information, etc., to improve information sharing and interoperability among users and data suppliers.**					
2.3.1 Consolidate risk information into a single platform accessible to all relevant entities (e.g., OpenStreetMap, GeoNode) and set out standard operating procedures for continual update, usage, and review.	Office of the Executive Director - Risk Management Unit	Department of Information, Communication and Technology Physical Planning	OPM-DDPM MoH Ministry of Agriculture, Animal Industry and Fisheries National Information Technology Authority Uganda Police Force MWE UNMA NEMA	Short term (1 year)	(2,6)
Priority action **2.4 Strengthen community awareness of risk management and climate resilience.** **Promote continuous awareness raising and dissemination of disaster and climate resilience information among local communities, with the goal of improving their understanding and capacity for risk reduction, preparedness, and response.**					
2.4.1 Design and implement a coordinated public communication structure to raise awareness of community-based risk reduction actions, warning systems, and response during emergencies, including effective dissemination and communication through multiple channels (e.g., education centres, media, government) and presenting risk information in a clear, user-friendly, and disability-inclusive manner.	Public and Corporate Affairs	Office of the Executive Director - Risk Management Unit Gender Community Services and Production Public Health and Environment. Physical Planning Engineering and Technical Services	OPM-DDPM National Union of Disabled Persons of Uganda Development Partners	Medium term (2-3 years)	(2,4,6)

Sources: The sources referenced in the last column of the table are as follows: 1. Kampala Climate Change Action Strategy (2016), 2. Kampala Local Disaster Risk Reduction Plan (2018 - Draft), 3. Multi-Hazard, Risk and Vulnerability Profile for Kampala City (2018), 4. Kampala Drainage Master Plan (2016), 5. Kampala Physical Development Plan (2012), 6. Disaster Resilience Workshop (Oct 2018), 7. Uganda Disaster Preparedness and Management Policy (2010), 8. Uganda National Physical Planning Act (2010).

7.3. Resilience Pillar 3: Investment in Disaster Risk Reduction for Resilience

To enhance the resilience of Kampala's communities, businesses, institutions, and environment, risk-informed investments and the implementation of sustainable mechanisms are essential in territorial planning, development control, and upgrading of critical public and private infrastructure, concentrating on high-risk and vulnerable areas. **Resilience Pillar 3** focuses on ex ante risk-reducing investments to manage Kampala's flood risk, and it includes measures that can also reduce risks from environmental degradation, water pollution, air pollution, fire, and earthquakes. While many measures under this pillar are likely to have co-benefits for managing air pollution and health risks, measures to manage these hazards are more directly the focus of **Resilience Pillar 5: Climate Mitigation and Resilience and Resilience and Pillar 6: Health Resilience and Prevention,** respectively. The recommended actions related to investment are detailed in **table 7.3**.

Table 7.3 **Recommended Actions Related to Investment in Disaster Risk Reduction**

	Specific actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
Priority action						
3.1	**Include risk management as an essential component of land use and strategic planning.** Incorporate information on risk management and climate resilience as fundamental components of territorial development planning to prevent or reduce exposure in high-risk areas.					
3.1.1	Establish territorial planning where land use is regulated in accordance with hazard zonation. Flood zonation should be the main factor but other hazards relevant to spatial development can be included.	Physical Planning	Engineering and Technical Services; Office of the Executive Director - Risk Management Unit	MoLHUD Ministry of Water and Transport NPA Development Partners	Short term (1 year)	(2,5,6)
3.1.2	Strengthen and fund enforcement mechanisms to manage and control development of both private and public projects (including infrastructure) in flood-prone areas, wetlands, slopes and hilltops, in line with NEMA & KCCA Physical Planning standards. This will reduce flood, environmental, water pollution, and other risks.	Physical Planning,	Legal Department Engineering and Technical Services	MoLHUD MWE MoWT NPA NEMA	Medium term (2-3 years)	(2,5,6,7)
Priority action						
3.2	**Increase sustainability and effectiveness of Kampala's drainage system.** Adopt innovative and effective stormwater management techniques and methods with the goal of increasing sustainability and effectiveness.					
3.2.1	Continue implementation and funding of the Kampala Drainage Master Plan, ensuring further development of Sustainable Urban Drainage Systems (SUDS) as the most effective tools.	Engineering and Technical Services	Physical Planning Gender, Community Services and Production	NPA MoFPED Development Partners	Short term (1 year)	(6)

Table 7.3 **Recommended Actions Related to Investment in Disaster Risk Reduction (cont.)**

Specific actions		Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
3.2.2	Strengthen community, public, and private engagement in solid waste management, land use, and environmental protection through more awareness-raising campaigns.	Public Health Services and Environment	Gender, Community Services and Production Public and Corporate Affairs	NEMA Private sector Development Partners	Short term (1 year)	(2,6)
3.2.3	Establish a strategic approach for the design of drainage infrastructure, ensuring the drainage is efficient and effective while sensitive to the needs of sustainable urban planning goals and to maintain green areas and natural streams and watercourses.	Engineering and Technical Services	Physical Planning	MoWT MoLHUD	Medium term (2-3 years)	1,6
3.2.4	Develop local schemes and work programmes to implement the findings of the geomorphology study, including a dredging/ desilting strategy and options for introducing sand traps and formal sand and aggregate extraction facilities in the middle and lower catchments and erosion protection in the upper catchments, with monitoring and routine surveying (using drones/satellites) to improve management practices.	Engineering and Technical Services	Physical Planning Public Health and Environment	MoWT MWE NEMA	Long term (3-5 years)	4, 6
Priority action						
3.3	**Reduce vulnerability of key physical infrastructure.**					
	Identify key urban infrastructure (roads, schools, health facilities, and municipal buildings) and conduct physical upgrades, applying innovative and effective risk reduction mechanisms and resilience standards, with the goal of reducing vulnerability.					
3.3.1	Integrate compulsory water harvesting and improvement of stormwater runoff management into KCCA buildings and infrastructure investments, and promote implementation in key national government buildings, as feasible	Engineering and Technical Services	Physical Planning	MoWT MoLHUD	Short term (1 year)	(6)
3.3.2	Identify, develop, and implement appropriate resilience standards and designs for new infrastructure (e.g., roads, schools, health facilities, and municipal buildings) and improve current construction standards (e.g., flood avoidance and resilience of roads, seismic resilience), ensuring use of the SUDS approach. Promote implementation in key buildings owned and operated by the national government.	Engineering and Technical Services	Physical Planning	MoWT MoLHUD Development Partners	Medium term (2-3 years)	(1,6)

Table 7.3 **Recommended Actions Related to Investment in Disaster Risk Reduction (cont.)**

Specific actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
3.3.3 Where placement of infrastructure within flood-prone areas cannot be avoided, implement construction designs and technologies that allow the natural performance of wetlands and floodplains to continue.	Engineering and Technical Services	Physical Planning	MoWT MoLHUD Development Partners	Medium term (2-3 years)	(1,6)
Priority action **3.4 Adopt a resilient and risk-reducing approach to neighbourhood planning.** **Conduct comprehensive improvement of selected neighbourhoods by upgrading local infrastructure, housing, and public spaces to enhance resilience in high-risk and vulnerable parishes.**					
3.4.1 Conduct targeted resilient neighbourhood planning, including integrated urban flood risk management (IUFRM), initiatives that include small infrastructure, and upgrading of works in selected informal areas. This will enhance flood, fire, and earthquake resilience, among other benefits.	Physical Planning	Engineering and Technical Services	MoWT MoLHUD Development Partners	Short term (1 year)	(1,2,6)
3.4.2 Implement neighbourhood upgrading interventions that combine with the flood risk management initiatives (e.g., new infrastructure, reduction of stress in channels). Incorporating nature-based solutions, non-motorised transport, upgrading works, public spaces, public facilities, housing solutions, and multimodal transport integration facilities.	Physical Planning	Engineering and Technical Services	MoWT MoLHUD MoFPED NPA Development Partners	Medium term (2-3 years)	(2,3,6)
Priority action **3.5 Integrate wetlands into city planning, making them a priority to ensure the best long-term sustainable use.** **Acquire a better understanding about the current state of Kampala's wetlands to develop intervention strategies for recovery, recover the wetlands, and generate positive effects for flood risk reduction and climate and environmental resilience.**					
3.5.1 Carry out and publish habitat and physical condition survey of all remaining wetlands, including detailed geospatial, ecological, and physical information.	Physical Planning	Public Health and Environment	MWE NEMA	Short term (1 year)	(6)
3.5.2 Review the current designated wetlands and develop management plan, which identifies high-priority areas where greater protection or improvement intervention should be targeted.	Public Health and Environment	Physical Planning, Engineering and Technical Services	MWE NEMA Development Partners	Medium term (2-3 years)	(6)

Sources: The sources referenced in the last column of the table are as follows: 1. Kampala Climate Change Action Strategy (2016), 2. Kampala Local Disaster Risk Reduction Plan (2018 - Draft), 3. Multi-Hazard, Risk and Vulnerability Profile for Kampala City (2018), 4. Kampala Drainage Master Plan (2016), 5. Kampala Physical Development Plan (2012), 6. Disaster Resilience Workshop (Oct 2018), 7. Uganda Disaster Preparedness and Management Policy (2010), 8. Uganda National Physical Planning Act (2010).

7.4. Resilience Pillar 4: Preparedness, Response, and Resilient Recovery

The growth in communities and assets exposed to various hazards in Kampala indicates the need to strengthen and update response mechanisms and resources by anticipating disaster events, ensuring the necessary capacities are in place for effective response and recovery at all levels. Engaging the local community—especially the most vulnerable groups—is crucial. Also essential to ensure effective and timely response to disaster events and emergencies is to update municipal contingency plans; increase available budget to expand and improve technical and human resources; and improve early warning systems and community awareness about risk reduction, preparedness, and response. Furthermore, the process of creating a post-disaster rehabilitation and recovery strategy presents a good opportunity to integrate disaster risk reduction into development, while reducing underlying vulnerabilities and enhancing community resilience. The recommended actions related to preparedness, response, and recovery are detailed in **table 7.4**.

Table 7.4 **Recommended Actions Related to Preparedness, Response, and Resilient Recovery**

	Specific actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
Priority action						
4.1	**Develop and strengthen contingency planning and preparedness policy.** Establish the overarching plan and principles regulating resources, operations, and logistics for all actors involved in emergency response.					
4.1.1	Develop and implement an emergency preparedness and response plan that establishes clear roles and responsibilities for KCCA, first responders, NGOs, businesses, and citizens. This should include arrangements for the effective coordination and mobilisation of resources at all levels in line with the principles established in the national policy framework.	Office of the Executive Director - Risk Management Unit	All Heads of Directorates, Departments and Divisions	OPM-DDPM Uganda Red Cross Society Uganda Police Force MoWT MoH NEMA Uganda Communications Commission Media Private sector Civil Society Organizations Development Partners Academia	Short term (1 year)	(6)
4.1.2	Develop hazard-specific plans and guidelines establishing preparedness and response protocols for different emergency scenarios.	Office of the Executive Director - Risk management Unit	Physical Planning Engineering and Technical Services Public Health and Environment Gender, Community Services and Production	OPM-DDPM Development Partners	Short term (1 year)	(2,6)

Table 7.4 **Recommended Actions Related to Preparedness, Response, and Resilient Recovery (cont.)**

Specific actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
Priority action **4.2 Develop and strengthen KCCA's operational capacity for response (staff, logistics, supplies, and equipment).** **Enhance emergency response capacities by conducting an assessment and modernising the human and physical resources of response and recovery agencies.**					
4.2.1 Evaluate municipal preparedness and response procedures, facilities, and resources, and develop a modernisation program that includes emergency information, personnel, equipment, and facilities. Continuous monitoring and evaluation should be conducted in future.	Office of Executive Director - Risk Management Unit	All Directorates, Departments and Divisions	MoH Uganda Police Force Uganda People's Defence Force Uganda Red Cross Society MoWT Uganda Communication Commission	Medium term (2-3 years)	(2,6)
4.2.2 Profile and establish memoranda of understanding with various MDAs and service providers on provision of equipment, facilities, and personnel for support in time of disaster.	Office of the Executive Director - Risk Management Unit	All Directorates, Departments and Agencies	OPM-DDPM	Medium term (2-3 years)	(2,6)
Priority action **4.3 Develop or improve early warning systems.** **Develop an early warning system to alert relevant agencies and residents of impending hazards. This will require strengthening of the logistical and technical hazard prediction and operational capacities of the agencies involved and active participation and engagement of local communities.**					
4.3.1 Develop an action plan for an early warning system, including monitoring and forecasting; warning dissemination and communication; response capabilities; and governance arrangements.	Office of the Executive Director—Risk Management Unit	Engineering and Technical Services, Public Health and Environment, Gender, Community Services, and Production	OPM-DDPM Development partners	Short term (1 year)	(6)
4.3.2 Design, procure, and install a multihazard forecasting and early warning system, identifying clear roles and responsibilities and operational structure and building on progress made in developing the hydromet monitoring system.	Office of the Executive Director - Risk Management Unit	Engineering and Technical Services, Public health and Environment Gender, Community Services and Production. Physical Planning Public and Corporate Affairs Strategy Management and Business Development	OPM-DDPM Development partners	Medium term (2-3 years)	(6)

Table 7.4 **Recommended Actions Related to Preparedness, Response, and Resilient Recovery (cont.)**

Specific actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
4.3.3 Conduct continuous monitoring and evaluation of the action plan implementation, including conducting drills to test the capacities and effectiveness of all early warning components.	Occupational Health and Safety	Office of the Executive Director - Risk Management Unit All KCCA Directorates, Departments and Divisions	OPM-DDPM	Medium term (2-3 years)	(6)
Priority action **4.4 Develop and implement a recovery strategy.** **Develop and implement a recovery plan to guarantee the continuation of critical operations in the city during emergencies, and improve post-disaster needs and recovery assessments.**					
4.4.1 Develop a strategy to plan for recovery after a large-scale event	Office of the Executive Director - Risk Management Unit	All Directorates, Departments and Divisions	OPM-DDPM MoFPED	Long term (3-5 years)	(6)

Sources: The sources referenced in the last column of the table are as follows: 1. Kampala Climate Change Action Strategy (2016), 2. Kampala Local Disaster Risk Reduction Plan (2018 - Draft), 3. Multi-Hazard, Risk and Vulnerability Profile for Kampala City (2018), 4. Kampala Drainage Master Plan (2016), 5. Kampala Physical Development Plan (2012), 6. Disaster Resilience Workshop (Oct 2018), 7. Uganda Disaster Preparedness and Management Policy (2010), 8. Uganda National Physical Planning Act (2010).

7.5. Resilience Pillar 5: Climate Change Mitigation and Resilience

Climate change can potentially alter the frequency and intensity of extreme weather events, increasing risks from hydrometeorological hazards and related events and exacerbating environmental degradation. To build resilience against existing and expected climatic impacts, Kampala needs to make the necessary preventive adjustments to its economic, social, and economic systems. The main lines of action should run through environmental protection, recovery, reduction of carbon emissions, and management of air pollution risks and are detailed in **table 7.5**.

Table 7.5 **Recommended Actions Related to Climate Change Mitigation and Resilience**

	Specific actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency ,or partner	Timeline	
Priority action						
5.1	**Improve mitigation by improving air quality, reducing emissions, and protecting green areas.** **Strengthen institutional capacities, policy, planning and enforcement, and implement initiatives for the reduction of carbon emissions, with the goal of mitigating the adverse environmental, climate, and health effects derived from air pollution.**					
5.1.1	Develop and implement an energy master plan by creating a KCCA Energy Office, and develop an energy inventory, efficiency measures, and a greenhouse gas tracking system.	Engineering and Technical Services	Administration and Human Resources Public Health and Environment, Physical Planning Strategy Management and Business Development	Ministry of Energy and Mineral Development MoWT MoLHUD	Short term (1 year)	(1)
5.1.2	Strengthen and widen the mandate of the Pollution Control Task Force, incorporating wetland management and ensuring review of industrial areas for sulphur dioxide (SO2), nitrogen dioxide (NO2), and particulate matter (PM), as needed.	Public Health Services and Environment		NEMA	Medium term (2-3 years)	(6)
5.1.3	Develop and implement an urban forestry management plan that includes tree planting and green space management objectives to be included in land use plans (Green Infrastructure Ordinance).	Physical Planning	Legal Affairs	NEMA	Medium term (2-3 years)	(2,6)
5.1.4	Develop a proposal to introduce and pilot environmental performance for motor vehicles.	Engineering and Technical Services	Legal Affairs	MoWT	Medium term (2-3 years)	(2,6)

Table 7.5 **Recommended Actions Related to Climate Change Mitigation and Resilience (cont.)**

Specific actions		Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency ,or partner	Timeline	
5.1.5	Develop a proposal for an incentive program to reduce carbon emissions from households (e.g., through purchase of energy-efficient stoves).	Treasury Services,	Gender Community Services and Production Office of the Executive Director - Risk Management Unit	MoFPED	Medium term (2-3 years)	(2,6)
5.1.6	Promote installation of non-fossil fuel and non-biomass energy backups and invest in solar power–generating mechanisms at KCCA facilities and for street lighting.	Engineering and Technical Services	Physical Planning	Ministry of Energy and Mineral Development	Medium term (2-3 years)	(2)
5.1.7	Complete and implement a plan to expand public mass transport systems (e.g., BRT, NMT, light rail).	Engineering and Technical Services	Physical Planning	MoWT, Uganda National Roads Authority	Long term (3-5 years)	(2)
5.1.8	Develop a plan and pilot projects to convert the KCCA fleet to hybrid fuels or electric vehicles.	Engineering and Technical Services	Administration and Human Resources	MoWT	Long term (3-5 years)	(2)
5.1.9	Develop an urban agriculture plan through pilot projects to produce positive environmental benefits (e.g., reduced emissions from transportation, reduced "urban heat island" effect, reduced food waste through composting).	Gender, Community Services and Production		Ministry of Agriculture, Animal Industry and Fisheries	Long term (3-5 years)	(1)

Sources: The sources referenced in the last column of the table are as follows: 1. Kampala Climate Change Action Strategy (2016), 2. Kampala Local Disaster Risk Reduction Plan (2018 - Draft), 3. Multi-Hazard, Risk and Vulnerability Profile for Kampala City (2018), 4. Kampala Drainage Master Plan (2016), 5. Kampala Physical Development Plan (2012), 6. Disaster Resilience Workshop (Oct 2018), 7. Uganda Disaster Preparedness and Management Policy (2010), 8. Uganda National Physical Planning Act (2010).

7.6. Resilience Pillar 6: Health Resilience and Prevention

The city of Kampala faces health-related risks derived mainly from flood events, precarious living conditions, large and rapid flow of people entering and leaving the city frequently, and inadequate vaccination coverage. To build health resilience, Kampala must strengthen its preventive measures and capacities for managing health-related events, ensure a larger share of its residents are immunised against diseases, and identify epidemic outbreaks quickly and prevent them from spreading. In addition to the measures explicitly noted under **Resilience Pillar 6**, which are detailed in table 7.6, measures under other pillars, including **Resilience Pillar 4: Preparedness, Response and Resilient Recovery and Resilience Pillar 5: Climate Mitigation and Resilience,** are expected to contribute to public health efforts in Kampala.

Table 7.6 **Recommended Actions Related to Health Resilience and Prevention**

	Specific Actions	Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
Priority action **6.1**	**Enhance health prevention measures and emergency preparedness.** **Improve and expand epidemiological prevention programs to anticipate and prevent epidemics, while connecting to general health care and service improvements for resilience.**					
6.1.1	Scale up health inspections and strengthen epidemiological surveillance.	Public Health Services and Environment		MoH, Uganda Red Cross Society Development Partners	Short term (1 year)	(6)
6.1.2	Scale up preventive measures with regards to primary health care and water, sanitation, and hygiene (WASH).	Public Health Services and Environment	Public and Corporate Affairs Education and Social Services	MoH Uganda Red Cross Society	Short term (1 year)	(6)
6.1.3	Strengthen the Public Health Directorate and response committees at all levels to ensure rapid and effective response to epidemics.	Public Health Services and Environment	Public and Corporate Affairs Office of the Executive Director, Risk Management Unit	MoH Uganda Red Cross Society	Medium term (2-3 years)	(6)
6.1.4	Engage community members through a community-based surveillance approach.	Public Health Services and Environment	Gender, Community Services and Production	MoH Uganda Red Cross Society Local Councils	Medium term (2-3 years)	(6)
6.1.5	Conduct assessment of the required number of people working on health, expand personnel as required, and build their capacity.	Public Health Services and Environment		MoH Uganda Red Cross Society	Medium term (2-3 years)	(6)

Table 7.6 **Recommended Actions Related to Health Resilience and Prevention (cont.)**

Specific Actions		Responsible KCCA directorate (primary)	Responsible KCCA directorate (secondary)	Responsible line ministry, department, agency, or partner	Timeline	
6.1.6	Strengthen supply chain management for health emergencies and epidemics (drugs, vaccines, etc.).	Public Health Services and Environment	Procurement and Disposal unit	MoH Uganda Red Cross Society	Medium term (2-3 years)	(6)
6.1.7	Develop and execute a vaccination improvement program (e.g., guarantee sufficient vaccine stock, public awareness campaign).	Public Health Services and Environment	Public and Corporate Affairs	MoH OPM-DDPM Uganda Red Cross Society Development Partners	Long term (3-5 years)	(3,6)
6.1.8	Connect efforts to expand health care access and service delivery with enhancement of disaster resilience efforts (e.g., see action 3.3.2 for appropriate resilience standards and designs for health care facilities).	Public Health Services and Environment		MoH OPM-DDPM Uganda Red Cross Society Development partners	Long term (3-5 years)	(6)
6.1.9	Establish well-equipped isolation centres for severe epidemics.	Public Health Services and Environment	Physical Planning Engineering and Technical Services	MoH Uganda Red Cross Society. OPM-DDPM Development Partners	Long term (3-5 years)	(6)
Priority action **6.2**	**Ensure coordination and awareness of health resilience and prevention efforts among government officials and the general public.**					
6.2.1	Develop and implement campaign for enhancing health resilience through public awareness of health threats (e.g., disease, environmental factors) in coordination with key DRM actors.	Public Health Services and Environment	Public and Corporate Affairs Office of the Executive Director - Risk Management Unit	OPM-DDPM MoH Uganda Red Cross Society	Short term (1 year)	(6)
6.2.2	Establish a health monitoring and coordination centre, including required tools and personnel.	Public Health Services and Environment	Office of the Executive Director, Risk Management Unit	MoH OPM-DDPM Development Partners	Medium term (2-3 years)	(6)
6.2.3	Ensure coordination of emergency and disaster preparedness and response efforts to include health threats (e.g., disease, environmental factors).	Public Health Services and Environment	Office of the Executive Director - Risk Management Unit	OPM-DDPM MoH Uganda Red Cross Society Development Partners	Long term (3-5 years)	(6)
6.2.4	Develop and implement user-friendly reporting systems and mobile applications to provide real-time updates of diseases and epidemics.	Public Health Services and Environment	Public and Corporate Affairs Office of the Executive Director	MoH Development Partners Private sector	Long term (3-5 years)	(6)

Sources: The sources referenced in the last column of the table are as follows: 1. Kampala Climate Change Action Strategy (2016), 2. Kampala Local Disaster Risk Reduction Plan (2018 - Draft), 3. Multi-Hazard, Risk and Vulnerability Profile for Kampala City (2018), 4. Kampala Drainage Master Plan (2016), 5. Kampala Physical Development Plan (2012), 6. Disaster Resilience Workshop (Oct 2018), 7. Uganda Disaster Preparedness and Management Policy (2010), 8. Uganda National Physical Planning Act (2010).

Chapter 8
Implementation and Financing Roadmap

This chapter presents elements needed to implement and finance this strategy.

8.1. Integration into Kampala's City Planning

Disaster and climate resilience are essential strategic elements for Kampala's sustainable development that build on and enhance the existing frameworks for territorial planning, environmental management, and urban development.

This strategy provides a roadmap establishing actions and priorities that must be harmonised and integrated into Kampala's strategic planning. Fundamentally, it envisions a shift from a sectoral towards a spatial approach, with the aim of creating proactive multidisciplinary investments. **Table 8.1** summarises this spatial approach and the shift towards it.

Table 8.1 **Spatial Approach for Integrating Resilience into City Planning**

	REACTIVE TO PROACTIVE	SILOED TO MULTIDISCIPLINARY	UNDERSTAND THE BUILT ENVIRONMENT
• Fundamental shift from sectoral to spatial that combines the built and natural environments. • Enabled by advances in technology, which has increased precision and lowered costs for spatial data to visualise outcomes. • Understanding the risks of today, and tomorrow, for a more sustainable future.	 Design investments with expectations of when and how shocks will occur. Design engineering solutions based on future climate scenarios.	 View risks through a multisectoral lens to manage them within a complex urban system	 Integrate geospatial solutions and innovative technology to maximise land value and resilient urban planning.

8.2. Plans for Implementation of the Strategy

KCCA will implement the strategy through a phased approach. For example, **Strategic Action 3.4**—"Adopt a resilient and risk-reducing approach to neighbourhood planning"—calls for conducting comprehensive improvement of selected neighbourhoods by upgrading local infrastructure, housing, and public spaces to enhance resilience in high-risk and vulnerable parishes. It can be achieved through the following specific actions:

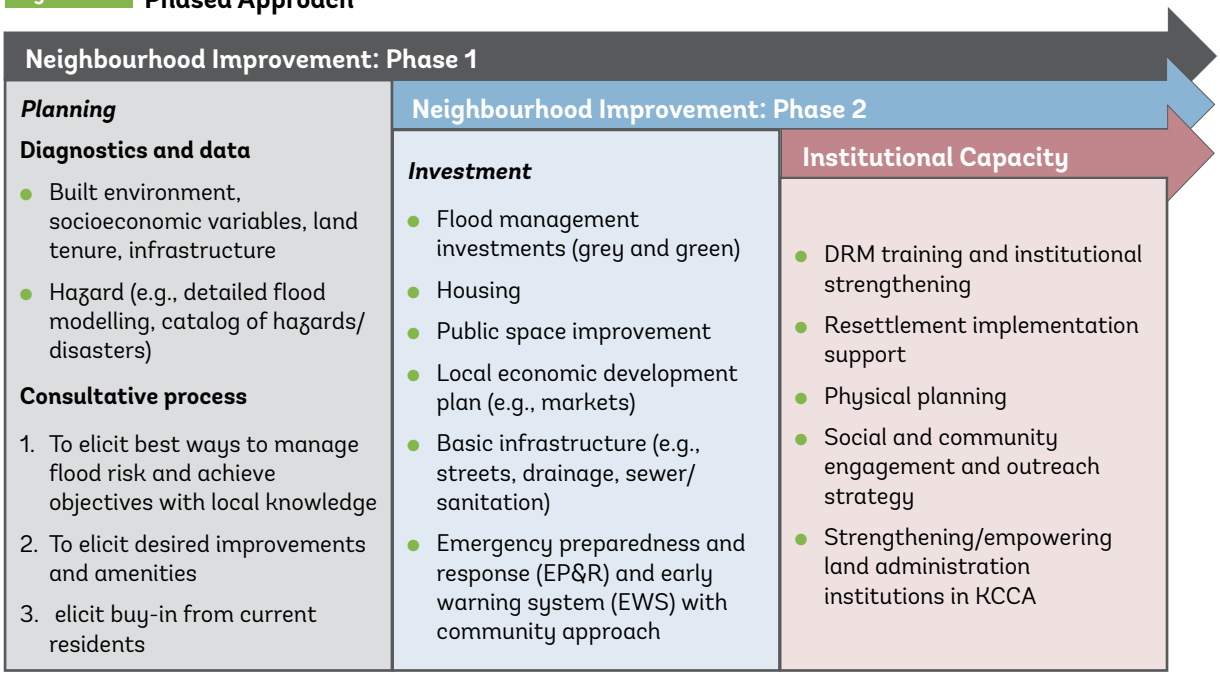
- **3.4.1. Conduct targeted resilient neighbourhood planning,** including integrated urban flood risk management (IUFRM), initiatives that include small infrastructure, and upgrading of works in selected informal areas. This will enhance flood, fire, and earthquake resilience, among other benefits.
- **3.4.2. Implement neighbourhood upgrading interventions** to be combined with the flood risk management initiatives (for example, new infrastructure; reduction of stress in channels), incorporating nature-based solutions, non-motorised transport, upgrading works, public spaces, public facilities, housing solutions, and multimodal transport integration facilities.

A phased approach will allow neighbourhood improvement through planning to take place under Phase 1, then investments under Phase 2, with institutional capacity development taking place throughout (see **figure 8.2**).

Overall, the strategy will be pursued as follows:

- Disseminate the strategy in both physical and electronic formats, and promote events to inform local institutions and communities about its content and recommendations.
- Update Kampala's emergency plan, based on the recommendations for preparedness, response, and recovery presented in the strategy.
- Design and implement management performance indicators to monitor, receive feedback on, and adjust the strategy as required.
- Establish financing mechanisms in coordination with national-level authorities, led by the Ministry of Finance and Economic Planning, and development partners to implement the strategic actions.

Figure 8.2 **Phased Approach**



8.3. Financing Strategy

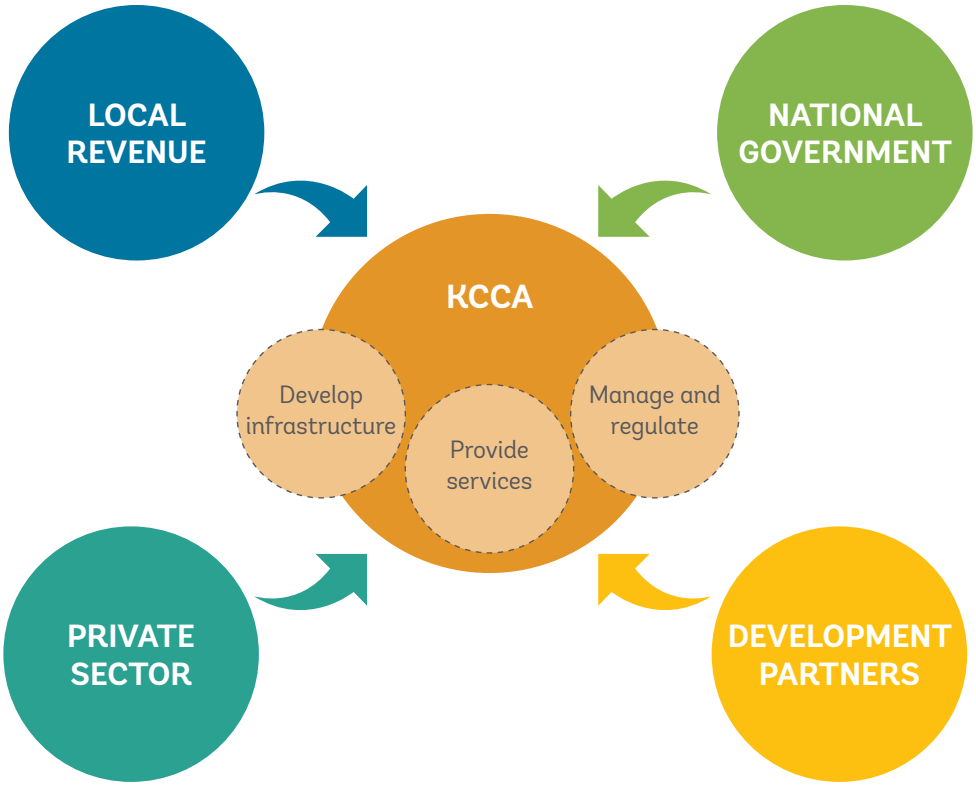
Implementing the priority actions established in this strategy to build resilience in Kampala requires the taking of specific policy actions, as well as the mobilisation of funding and financing sources. Actions will draw on KCCA's own-source revenues, as well as national budgetary transfers, development partner support, and private sector and individual investments, as shown in **figure 8.3**.

To enhance resources available for the city's strategic planning and execution, KCCA has set goals of enhancing the mobilisation of local revenue; promoting alternative financing mechanisms, including development partner financing, such as financing from the World Bank, the EU, DFID, the Japan International Cooperation Agency (JICA), the African Development Bank (AfDB), and public-private partnerships (PPPs); expediting the mass property valuation exercise currently in progress across the city; and working with the authority council to approve amendments to the proposed revenue enhancement measures.

Based on their scope and volume, their current prioritisation, and the responsible entities involved, the priority actions for resilience may be financed through KCCA's operational budget or different external sources. Specific costing and funding of measures depend on KCCA's ongoing budget process, including revenue enhancements, and the engagement of national, private, and development partners.

One key element of this strategy will be the extent to which KCCA is able to leverage a resilience dividend from its investments, reducing the overall lifecycle cost of infrastructure and other improvements by reducing losses, increasing economic growth, and managing intertemporal liabilities.

Figure 8.3 **Sources of Finance for Resilience in Kampala**



References

Action Against Hunger. 2012. Exploring livelihoods of the urban poor in Kampala, Uganda: An institutional, community, and household contextual analysis http://www.actionagainsthunger.org/sites/default/files/publications/Exploring_livelihoods_of_the_urban_poor_Uganda_12.2012.pdf. Action Contre la Faim.

Agaba, John. 2015. Uganda ranks highest in lightning fatalities. Kampala. https://www.newvision.co.ug/new_vision/news/1409551/uganda-ranks-lightning-fatalities. Kampala. New Vision.

Anguyo, I. 2013. IGP Kayihura warns against growing pine trees. https://www.newvision.co.ug/new_vision/news/1325684/igp-kayihura-warns-growing-pine-trees. Kampala. New Vision

Bakama, N. and Bakama B. 2006. Road Traffic Accidents in Uganda: Epidemiological and Transport Policy Implications in African Social Science Review, Vol. 1, Issue 3. https://pdfs.semanticscholar.org/199c/32024aefd8198474b4c27a8d75ac0142050f.pdf.

Balikuddembe, J. K et al. 2017a. Factors affecting the exposure, vulnerability and emergency medical service capacity for victims of road traffic incidents in Kampala Metropolitan Area. https://bmcemergmed.biomedcentral.com/articles/10.1186/s12873-016-0112-3. Kampala: BMC Emergency Medicine.

Balikuddembe, J. K et al. 2017b. Road traffic incidents in Uganda: a systematic review of a five-year trend in Injury and Violence. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5279989/.

CRED (Centre for Research on the Epidemiology of Disasters). 2019. EM-DAT: The international disasters database. https://www.emdat.be/emdat_db/. Louvain: Centre for Research on the Epidemiology of Disasters.

Directorate of Relief, Disaster Preparedness and Refugees. 2010. The Republic of Uganda: The National Policy for Disaster Preparedness and Management.

Douglas et al. 2008. Unjust Waters: Climate Change, Flooding and the Urban Poor in Africa in Environment and Urbanization.

Earthquake Report. 2018. Earthquake Reporting for Kampala. https://earthquake-report.com/?s=kampala. SOS Earthquakes

Earthquake Track. 2018. Recent Earthquakes Near Lake Edward, Uganda. https://earthquaketrack.com/r/lake-edward-uganda/recent. Earthquake Track.

European Commission. 2019. Global Human Settlement Buildup Grid. ghsl.jrc.ec.europa.eu. Brussels: European Commission.

European Space Agency (EESA). 2019. Land Cover CCI. www.esa-landcover-cci.org. Paris: EESA.

Fallon, Amy. 2013. Uganda motorbike deaths: concerns grow over silent killers. https://www.theguardian.com/global-development/2013/aug/13/uganda-motorbike-deaths-road-safety-boda-bodas. Manchester: The Guardian.

GFDRR (Global Facility for Disaster Risk Reduction). 2018. Wildfire hazard. http://thinkhazard.org/en/report/42182-uganda-kampala/WF.GFDRR. Washington, DC: GFDRR.

GFDRR (Global Facility for Disaster Risk Reduction). 2019. Think Hazard: Kampala. http://thinkhazard.org/en/report/42182-uganda-kampala/WF. Washington, DC: GFDRR.

Government of Uganda. 2017. Uganda Strategic Program for Climate Resilience. Kampala

Hallegatte, S. et al. 2019. Lifelines: The Resilient Infrastructure Opportunity. Sustainable Infrastructure. https://openknowledge.worldbank.org/handle/10986/31805. Washington, DC: World Bank.

Hobson, E.S.W., and Kathage, A.M. 2017. Uganda - From regulators to enablers: role of city governments in economic development of greater Kampala. http://documents.worldbank.org/curated/en/860311505816462189/Uganda-From-regulators-to-enablers-role-of-city-governments-in-economic-development-of-greater-Kampala. Washington, DC: World Bank.

Hoornweg, D. and Pope, K. 2014. Socioeconomic Pathways and Regional Distribution of the World's 101 Largest Cities. Toronto: University of Toronto.

Hynard, J., Rodger, T. (editors). 2014. Climate Change, a Risk Assessment. Cambridge: Centre for Science and Policy, Cambridge University.

IPCC (Intergovernmental Panel on Climate Change). 2007. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Geneva: IPCC.

IPCC (Intergovernmental Panel on Climate Change). 2012. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. https://www.ipcc.ch/report/managing-the-risks-of-extreme-events-and-disasters-to-advance-climate-change-adaptation/. Cambridge, United Kingdom: IPCC.

IRIN News. 2013. Uganda ill-prepared for a major earthquake. Geneva: IRIN News

Isunju, J. B. et al. 2015. Hazards and vulnerabilities among informal wetland communities in Kampala, Uganda. https://journals.sagepub.com/doi/full/10.1177/0956247815613689. SAGE Journals.

Kahangirwe, P. 2012. Linking environmental assessment and rapid urbanization in Kampala City in Impact Assessment and Project Appraisal Journal.

Kahungu, M. T. 2018. Uganda warned of cholera outbreak. https://reliefweb.int/report/uganda/public-warned-cholera-breaks-out-kampala. Kampala: The Monitor.

Kato, Joseph. 2018. Boda boda crashes crippling Kampala. https://www.monitor.co.ug/News/National/Boda-boda-crashes-crippling-Kampala/688334-4489582-kkmyluz/index.html. Kampala: Daily Monitor.

KCCA (Kampala Capital City Authority). 2010. The Kampala Capital City Act. Kampala: KCCA.

KCCA (Kampala Capital City Authority). 2012a. Proposed Kampala Physical Development Plan. https://www.kcca.go.ug/uploads/kcca%20proposed%20dev%20plan.pdf. Kampala: KCCA.

KCCA (Kampala Capital City Authority). 2012b. Updating Kampala Structure Plan and Upgrading the Kampala GIS Unit - Final Report. Kampala: KCCA

KCCA (Kampala Capital City Authority). 2014. Kampala Strategic Plan 2014/15-2018/19. https://www.kcca.go.ug/uploads/KCCA_STRATEGI_PLAN_2015-2016.pdf. Kampala: KCCA.

KCCA (Kampala Capital City Authority). 2016a. Kampala Climate Change Action Plan. http://www.kcca.go.ug/uDocs/Kampala%20Climate%20Change%20Action.pdf. Kampala: KCCA.

KCCA (Kampala Capital City Authority). 2016b. Kampala Drainage Master Plan. Kampala: KCCA.

KCCA (Kampala Capital City Authority). 2017. KCCA receives funds from the European Union to support climate change action in Kampala. https://www.kcca.go.ug/news/202/KCCA-RECEIVES-GRANTS-FROM-THE-EUROPEAN-UNION-TO-SUPPORT-CLIMATE-CHANGE-ACTION-IN-KAMPALA#.XQdoE4hKg2w. Kampala: KCCA.

KCCA (Kampala Capital City Authority). 2018a. Kampala Steward. Kampala: KCCA

KCCA (Kampala Capital City Authority). 2018b. Multi Modal Urban Transport Master Plan for GKMA - Cities that Work Workshop on Urban Transport presentation. https://www.theigc.org/wp-content/uploads/2018/04/KCCA-Presentation-Cities-that-Work-Multi-Modal-Urban-Transport-Master-Plan-Apr2018.pdf. Kampala: KCCA.

KCCA (Kampala Capital City Authority). 2018c. Multi-Hazard, Risk and Vulnerability Profile for Kampala City. Kampala: KCCA.

KCCA (Kampala Capital City Authority). 2018d. Public Transport Challenge. https://www.kcca.go.ug/news/308#.XM3PLo5Kg2x. Kampala: KCCA.

KCCA (Kampala Capital City Authority). 2018e. Services offered by KCCA: Waste management. https://kcca.go.ug/Waste%20Management. Kampala: KCCA.

KCCA (Kampala Capital City Authority). 2018f. Wetland GIS data

KCCA (Kampala Capital City Authority). 2019. Eight Years of KCCA. https://www.kcca.go.ug/news/361/8-Years-Of-KCCA#.Xa-LE-hKg2w. Kampala: KCCA.

Kigera, J. et al. 2010. *The Impact of Boda-boda Motor Crashes on the Budget for Clinical Services at Mulago* in East and Central African Journal of Surgery, Vol. 15 No. 1. http://www.bioline.org.br/pdf?js10009.

Lyaatu, J. 2018. Kampala roads are death traps - report. https://observer.ug/news/headlines/57356-kampala-roads-are-death-traps-report.html. Kampala: The Observer.

Ministry of Health. 2013. Public Health Emergency Operations Center Brochure (2013). Kampala: Ministry of Health.

Moyer, J. D. et al. 2017. Estimating District GDP in Uganda - Invited Research Paper for USAID. Denver: University of Denver.

MWE (Ministry of Water and Environment). 1995.The National Environment Act. https://www.mwe.go.ug/library/national-environment-act. Kampala: MWE.

MWE (Ministry of Water and Environment). 2015. Economic Assessment of the Impacts of Climate Change in Uganda. Kampala: MWE.

MWE (Ministry of Water and Environment). 2017. Water Supply Atlas 2017. https://www.mwe.go.ug/library/water-supply-atlas-2017. Kampala: MWE.

Nakibuuka, B. 2017. Why Buildings Collapse. https://www.monitor.co.ug/Magazines/HomesandProperty/-buildings-collapse-workers-money/689858-4133820-kmbtr/index.html. Kampala: Daily Monitor.

Nakiyimba, G. 2012. Boda-Boda: Uganda's silent killer. http://en.rfi.fr/africa/20120325-boda-boda-ride-silent-killer-uganda. Paris: Radio France International.

Nantaba, A. 2017. Uganda's Buildings Collapsing Due to Structural Failures. https://www.independent.co.ug/ugandas-collapsing-buildings-due-structural-failures/. Kampala: The Independent

NCHE (Uganda National Council of Higher Education). 2018. The State of Higher Education and Training in Uganda. https://www.unche.or.ug/the-state-of-higher-education-and-training-in-uganda/. Kampala: NCHE.

NECOC (National Emergency Coordination and Operations Centre). About NECOC. http://www.necoc-opm.go.ug/. Kampala: Government of Uganda.

New Vision. 2013. Poisonous yams flood Kampala. https://www.newvision.co.ug/new_vision/news/1321976/poisonous-yams-flood-kampala/. Kampala: New Vision.

Ngabirano, A. 2009. Uganda: Petrol Stations - Kampala is in Danger. https://allafrica.com/stories/200906291638.html. Kampala: The Monitor.

Ngwomoya, A. 2018. Why Kampala keeps flooding. https://www.monitor.co.ug/News/National/-Kampala-flooding-Residents-children--Kawempe/688334-4334100-fmqpre/. Kampala: The Monitor.

Ngwomoya, A. and Wandera, D. 2018. How is traffic jam in Kampala being addressed? https://www.monitor.co.ug/SpecialReports/traffic-jam-Kampala-being-addressed-/688342-4351870-13085oez/index.html. Kampala: The Monitor.

Nouman, M. et al. 2011. Impact of education on poverty reduction. Munich: Personal RePEc Archive. MPRA Pap.

NPA (National Planning Authority). 2015. Second National Development Plan (NDPII). https://consultations.worldbank.org/Data/hub/files/consultation-template/materials/ndpii-final11.pdf. Kampala: NPA.

NPA (National Planning Authority). 2017. Towards Zero Hunger: A Strategic Review of Sustainable Development Goal 2 in Uganda. http://npa.go.ug/wp-content/uploads/2017/08/SDG2-Strategic-Review-Report-Final.pdf. Kampala: NPA.

Nyakaana, J. B. 2007. Population, Urban Development and the Environment in Uganda: the case of Kampala City and its Environs. http://www.cicred.org/Eng/Seminars/Details/Seminars/PDE2007/Papers/NYAKAANA_paperNairobi2007.pdf. Kampala: Makerere University.

Office of the Prime Minister. 2010. National Policy for Disaster Preparedness and Management. https://www.ifrc.org/docs/IDRL/Disaster%20Policy%20for%20Uganda.pdf. Kampala: Government of Uganda.

Office of the Prime Minister. 2015. Governance of disaster risk reduction and management in Uganda: A literature review. https://www.necoc-opm.go.ug/reports/4.%20DRR%20Governance%20in%20Uganda%20-%20literature%20review.pdf. Kampala: Office of the Prime Minister.

Ogwang, J. 2013. Rainwater harvesting; Uganda's untapped resource. https://www.newvision.co.ug/new_vision/news/1316932/rainwater-harvesting-uganda-untapped-resource. Kampala: New Vision.

Ogwang, J. 2013b. Traffic jams: Uganda's new health, economic and environmental disaster. https://www.newvision.co.ug/new_vision/news/1314780/traffic-jams-uganda-health-economic-environmental-disaster. Kampala: New Vision.

Okiror, S. 2016. Kampala strives to improve resilience. https://www.unisdr.org/archive/48860. Nairobi: UNDRR Regional Office for Africa.

Oporia, F. et al. 2018. An analysis of trends and distribution of the burden of road traffic injuries in Uganda, 2011 to 2015: a retrospective study. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6430845/.

Oxford Economics (2018): Global Cities: Which cities will be leading the global economy in 2035? Oxford, United Kingdom: Oxford Economics.

Rautenbach, H. 2014. Dynamical and statistical downscaling of climate change projections for Kampala, Uganda. Pretoria.

Relief Web. Public warned as cholera breaks out in Kampala. https://reliefweb.int/report/uganda/public-warned-cholera-breaks-out-kampala. Kampala: Reliefweb.

Rentschler, J et al. 2019. Three Feet Under: Urban Jobs, Connectivity, and Infrastructure. http://documents.worldbank.org/curated/en/410661560796289323/pdf/Three-Feet-Under-The-Impact-of-Floods-on-Urban-Jobs-Connectivity-and-Infrastructure.pdf. Washington, DC: World Bank.

Republic of Uganda. 1995. Constitution of Uganda. Kampala. http://statehouse.go.ug/sites/default/files/attachments/Constitution_1995.pdf. Kampala.

Sliužas, R. et al. 2014. Modelling Urbanization and Flooding in Kampala, Uganda In Proceedings of the 14th N-AERUS/GISDECO conference. https://pdfs.semanticscholar.org/546f/2ea13e914dc89c141eff4816312ea5198186.pdf. Enschede.

Social Science Review, Vol. 3. https://digitalcommons.kennesaw.edu/cgi/viewcontent.cgi?article=1018&context=assr.

Tindimugaya, C. 2014. Uganda's national security and the future of Lake Victoria.

Tindimugaya. 2014. Uganda's national security and the future of Lake Victoria.

Tractebel. 2018. Wastewater Treatment Plant in Bugolobi. https://tractebel-engie.com/en/references/wastewater-treatment-plant-bugolobi. Kampala: Tractebel.

Tumwesigye, N.M. et al. 2016. Factors Associated with Injuries among Commercial Motorcyclists: Evidence from a Matched Case Control Study in Kampala City, Uganda. https://www.ncbi.nlm.nih.gov/pubmed/26918871.

UBOS (Uganda Bureau of Statistics) and ICF. 2016. Uganda Demographic and Health Survey (DHS). https://dhsprogram.com/publications/publication-fr333-dhs-final-reports.cfm. Kampala and Rockville, USA: UBOS and ICF.

UBOS (Uganda Bureau of Statistics). 2014. Statistical Abstract. https://www.ubos.org/onlinefiles/uploads/ubos/statistical_abstracts/Statistical_Abstract_2014.pdf. Kampala: UBOS.

UBOS (Uganda Bureau of Statistics). 2014b. National Population and Housing Census 2014 - Analytical report. https://www.ubos.org/onlinefiles/uploads/ubos/2014CensusProfiles/National_Analytical_Report_nphc%202014.pdf. Kampala: UBOS.

UBOS (Uganda Bureau of Statistics). 2014c. Profiles of Higher Local Governments. https://www.ubos.org/onlinefiles/uploads/ubos/2009_HLG_%20Abstract_printed/CIS+UPLOADS/Profiles%20of%20Higher%20Local%20Governments_June_2014.pdf. Kampala: UBOS.

UBOS (Uganda Bureau of Statistics). 2016a. National Population and Housing Census 2014 - Main Report. https://www.ubos.org/wp-content/uploads/publications/03_20182014_National_Census_Main_Report.pdf. Kampala: UBOS.

UBOS (Uganda Bureau of Statistics). 2016b. Uganda Demographic and Household Survey. Kampala: UBOS.

UBOS (Uganda Bureau of Statistics). 2017a. Kampala District Population Projection 2015-2020. http://catalog.data.ug/pt_PT/dataset/uganda-s-district-population-projections-2015-2020/resource/83964884-7b43-40a9-9b40-0577309d9e2e?inner_span=True. Kampala: UBOS.

UBOS (Uganda Bureau of Statistics). 2017b. National Population and Housing Census 2014 - Area Specific Profiles: Kampala Capital City Authority. https://www.ubos.org/wp-content/uploads/publications/2014CensusProfiles/KAMPALA-KCCA.pdf. Kampala: UBOS.

UN Habitat, New York University (NYU) and Lincoln Institute of Land Policy. 2015. Atlas of Urban Expansion. http://atlasofurbanexpansion.org/.

UN Habitat. 2009. Kampala Climate Change Assessment. https://unhabitat.org/books/climate-change-assessment-for-kampala-uganda/.

UN Habitat. 2013. Integrated Flood Management Kampala. http://uni.unhabitat.org/wp-content/uploads/2015/03/ifm-kampala-policy-brief-final.pdf. Nairobi: UN Habitat.

UN Habitat. 2017. Addressing the Water challenge in Kampala. http://mirror.unhabitat.org/content.asp?cid=3294&catid=575&typeid=13.

UNDRR (United Nations Office for Disaster Risk Reduction). 2016. UNISDR Science and Technology Conference on the implementation of the Sendai Framework for Disaster Risk Reduction (2015-2030) - Concept Note: Exposure and Vulnerability. https://www.preventionweb.net/files/45270_unisdrcnws2wg2vulnerabilityandexpos.pdf. Geneva: UNDRR.

UNDRR (United Nations Office for Disaster Risk Reduction). 2016b. Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction. https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf.

UNDRR (United Nations Office for Disaster Risk Reduction). 2019a. DesInventar Disaster Database. https://www.desinventar.net/whatisdesinventar.html.

UNDRR (United Nations Office for Disaster Risk Reduction). 2019b. UNDRR Prevention Web: Hazard as a component of risk. https://www.preventionweb.net/risk/hazard.

UNHCR (United Nations High Commissioner for Refugees). 2018. Uganda Comprehensive Refugee Response Portal. https://ugandarefugees.org/en/country/uga.

WFP (World Food Programme). 2018. KCCA, WFP form partnership to address food insecurity, rising malnutrition in Kampala. https://www.wfp.org/news/news-release/kcca-wfp-form-partnership-address-food-insecurity-rising-malnutrition-kampala. Rome: WFP.

WHO (World Health Organization). 2016. Road Safety-Estimated road traffic death rate, 2016. http://gamapserver.who.int/gho/interactive_charts/road_safety/road_traffic_deaths2/atlas.html.

WHO (World Health Organization). 2017. Joint External Evaluation of IHR Core Capacities of the Republic of Uganda - Mission report. https://www.who.int/ihr/publications/WHO-WHE-CPI-REP-2017.49/en/.

WHO (World Health Organization). 2018. Ambient Air Quality Database (update 2018). https://www.who.int/airpollution/data/cities/en/.

WMO (World Meteorological Organization). 2012. Standardized Precipitation Index User Guide. http://www.wamis.org/agm/pubs/SPI/WMO_1090_EN.pdf. Geneva: World Meteorological Organization.

World Bank. 2012. GKMA Quick Facts. http://pubdocs.worldbank.org/en/595971521054661269/Great-Kampala-Metropolitan-Area-Quick-Facts.pdf.

World Bank. 2013. Building Resilience: Integrating Climate and Disaster Risk into Development. https://openknowledge.worldbank.org/handle/10986/1663. Washington, DC: World Bank.

World Bank. 2014a. Kampala Institutional and Infrastructure Development Adaptable Program Loan (APL): Implementation Completion and Results Report. http://documents.worldbank.org/curated/en/545191468349818537/pdf/ICR29160P078380IC0disclosed07020140.pdf. Washington DC: World Bank.

World Bank. 2014b. Project Appraisal Document on a Proposed Credit for the Second Institutional and Infrastructure Development Project. http://documents.worldbank.org/curated/en/504911468115450273/pdf/PAD8000P133590010Box382156B00OUO090.pdf. Washington DC: World Bank.

World Bank. 2015. Promoting Green Urban Development in African Cities: Kampala, Uganda. https://openknowledge.worldbank.org/bitstream/handle/10986/22941/Promoting0gree0nvironmental0profile.pdf?sequence=5&isAllowed=y. Washington, DC: World Bank.

World Bank. 2016a. Country Partnership Framework for the Republic of Uganda for the period FY16-21. http://documents.worldbank.org/curated/en/170721468179663842/pdf/101173-CAS-P155948-OUO-9-IDA-R2016-0049-2-Box394874B.pdf. Washington DC: World Bank.

World Bank. 2016b. Implementation Completion and Results Report: Lake Victoria Environmental Management Project. http://documents.worldbank.org/curated/en/866591545927201610/pdf/icr00001562-p100406-icr-document-12182018-636810265632510409.pdf. Washington DC: World Bank.

World Bank. 2016c. Project Performance Assessment Report - Uganda Millennium Science Initiative. Washington DC: World Bank.

World Bank. 2016d. The Uganda Poverty Assessment Report 2016: Farms, cities and good Fortune: assessing poverty reduction in Uganda from 2006 to 2013. https://openknowledge.worldbank.org/handle/10986/26075. Washington, DC: World Bank.

World Bank. 2018a. City Resilience Program: City Scan Kampala. Washington, DC: World Bank.

World Bank. 2018b. Kampala Flood Mapping Technical Report.

World Bank. 2018c. The World Bank in Uganda - Overview. https://www.worldbank.org/en/country/uganda/overview. Kampala: World Bank.

World Bank. 2019. Tectonic Shift: Rift 2018 - Regional Seismic Risk and Resilience Workshop. Washington, DC: World Bank. http://documents.worldbank.org/curated/en/325121555063464245/Tectonic-Shift-Rift-2018-Regional-Seismic-Risk-and-Resilience-Workshop

Xinhua. 2018. Uganda strives to contain raging cholera outbreaks. http://www.xinhuanet.com/english/2018-05/09/c_137164767.html. Kampala: Xinhua.

Annexes

Photo: gnm

Annex A. Institutional DRM Framework

This annex provides a brief review of the key tables describing Uganda and Kampala's DRM frameworks.

Table A.1 **Department of Disaster Preparedness and Management: Objectives, Outputs, and Key Activities**

	Department of Disaster Preparedness and Management (OPM)
Objectives	• Enhance the country's capacity to contain and minimise the effects of disasters • Address disaster vulnerabilities of the community and alleviate human suffering from disasters • Prevent, mitigate, and prepare the country against disasters • Guide government disaster preparedness and management • Maintain a national warehouse for food and non-food items and procure relief
Outputs	• Contribute to building resilience of communities against disasters • Coordinate timely response to disasters and provide food and non-food relief to disaster victims • Coordinate other sectors and nongovernmental actors in fulfilling their mandates towards disaster preparedness and management
Key activities	*Effective preparedness and response to disasters* • Risk, hazard, vulnerability profile, and maps prepared • Disaster risk assessments conducted at district and community levels • Improved preparedness for disasters by communities for resilience undertaken • Participation in international workshops, meetings, and conferences facilitated • Strong and functional platform for DRR established • High visibility of DRR activities in the country supported • Strong and functional platform for peace building and conflict prevention established • High visibility of peace building and conflict prevention activities in the country supported • Moroto Regional Disaster Coordination office established • Peace policy completed • Draft disaster bill developed • NECOC activities supported *Relief for disaster victims* • Procure food and non-food items for disaster victims • Distribute and follow up distribution of food and non-food items to disaster victims • DDMC, DDPC, and regional trainings for data collectors • Contribute to the regional Disaster Management Centre of Excellence

Source: Republic of Uganda, Office of the Prime Minister web portal, https://opm.go.ug/disaster-preparedness-and-management.

Table A.2 **Current Responsibilities and Capabilities for Disaster Response at the Kampala and National Levels**

Subject	Kampala City	National level	Nominated lead ministry
Isolation and security	Metropolitan Police	Ugandan Police	Ministry of Defence
Search and rescue	Fire and Rescue, Red Cross	OPM, military, Red Cross international responders	Ministry of Internal Affairs (fire brigade lead institution) Uganda Police (lead institution for transport-related rescue)
Firefighting	Metropolitan Police Fire and Rescue	Ministry of Internal Affairs (fire brigade lead institution) Civil Aviation Authority (airport fire and rescue teams)	Ministry of Internal Affairs (fire brigade lead institution)
Flood/water rescue	Metro Police Marine Unit, Fire and Rescue Services, Red Cross	OPM Coordinate, Metro Police Marine Unit, Fire and Rescue Services, Red Cross (basic level only)	No lead ministry nominated in national policy document—lead ministry for police and fire as above.
Prehospital care	KCCA, Department of Health, Red Cross	Ugandan Police Coordinate—capability gaps—local health/hospital resources used wherever available	Ministry of Health
Hospital care	KCCA, Ministry of Health, private	Ministry of Health, private	Ministry of Health
Public health	KCCA Public Health Department, Red Cross (depending on the issue, Ministry of Health may also be involved inside Kampala)	Ministry of Health, local hospitals, district health director, Red Cross	Ministry of Health
Mental health	Ministry of Health	Ministry of Health	No lead agency currently nominated in national policy document
Epidemiological surveillance	KCCA, Ministry of Health, Red Cross	Ministry of Health, Red Cross	Ministry of Health
Management of dead bodies	Ministry of Health, KCCA City Mortuary	Ministry of Health	Ministry of Health
Census of population and needs	Uganda Bureau of Statistics	Uganda Bureau of Statistics	Not included in national policy document
Delivery of humanitarian aid	OPM, Uganda Red Cross	OPM, Uganda Red Cross	No lead agency currently nominated in national policy document
Assembly and operation of temporary accommodation	OPM, Red Cross	OPM, Red Cross	Ministry of Internal Affairs (lead institution for internally displaced persons)
Community work	KCCA Directorate of Gender, Ministry of Gender, Red Cross	Ministry of Gender, Red Cross	Ministry of Gender, Labour, and Social Development
Damage assessment of housing and buildings	KCCA Engineering and Technical Services, Ministry of Works and Transport	Ministry of Works and Transport	Not included in national policy document

Table A.2 **Current Responsibilities and Capabilities for Disaster Response at the Kampala and National Levels** (cont.)

Subject	Kampala City	National level	Nominated lead ministry
Infrastructure damage assessment	KCCA Engineering and Technical Services, Ministry of Works and Transport, relevant agencies (water, electricity/ telecommunications, etc.)	OPM, line ministry for specific infrastructure, Infrastructure operator	Not included in national policy document
Monitoring of threats and related risks	OPM, KCCA, Metropolitan Police Fire and Rescue, security agencies, Red Cross, NGO partners	Interagency Technical Committee, OPM, Ugandan Police and Fire Services, security agencies, Red Cross, NGO partners	Interagency Technical Committee, reporting to the Ministerial Policy Committee
Environmental impact assessment	KCCA, National Environment Management Authority	National Environment Management Authority	National Environment Management Authority
Management of alerts	NECOC, in theory; in practice, all ministries may issue directions. KCCA issues lower-level community advice, Red Cross general advice	NECOC in theory; in practice, all ministries. Red Cross general advice	National Emergency Coordination and Operations Centre (NECOC)
Public information	Metropolitan Police Fire and Rescue, KCCA Public and Corporate Affairs, Red Cross	OPM, line ministries, National Metrological Services, Government Media Centre, Red Cross	Not included in national policy document
Legal aspects	KCCA Legal Affairs, Uganda Police Force Legal Services	Uganda Police Force Legal Services, attorney general	Attorney General
Financial aspects	KCCA Directorate of Treasury Services, Uganda Police Force, Red Cross project to distribute cash pre-emergency.	Ministry of Finance	Ministry of Finance
International cooperation	KCCA Public and Corporate Affairs, Strategy Management, and Business Development, Uganda Police HQ	Ministry of Foreign Affairs, OPM coordination within country	Ministry of Foreign Affairs
Definition and control of action plan	OPM, KCCA Risk Management, KCCA Strategy Management, Metropolitan Police Fire and Rescue, Red Cross	OPM, NECOC	NECOC, City Disaster Management Technical Committee
Communication system	Call handling centre at Fire and Police HQ; KCCA operates an office-hours only call centre. KCCA has radios for traffic teams and military. Police and fire services operate their own radios but not all are interoperable. Red Cross has its own independent system. All agencies are highly dependent on mobile phones.	Police radios, OPM mobile phones, military, Red Cross	Not included in national policy document

Table A.2 **Current Responsibilities and Capabilities for Disaster Response at the Kampala and National Levels** (cont.)

Subject	Kampala City	National level	Nominated lead ministry
Information system	Not yet integrated	OPM, Ugandan police, and military maintain internal systems. NECOC is responsible for providing responders at every level with information	Not included in national policy document
Volunteer management	Fire and rescue services coordinate Red Cross and St. John Ambulance; Red Cross coordinates volunteers. KCCA-trained and OPM-trained volunteers from Uganda People's Defence Force (UPDF) are first responders.	OPM or fire and rescue services coordinate Red Cross, St. John Ambulance; line ministries coordinate specific volunteers	Not included in national policy document
Management of resources and supplies	Limited line/individual budgets	OPM has access to national resources	Not included in national policy document
Additional stakeholders	Private hospitals, private sector, procurement frameworks (e.g., mobile phones, TV, radio), EU, and formal agencies—that is, all the individuals and bodies set out in the policy document at city, district, and village levels.	Private hospitals, EU, and formal agencies—all the individuals and bodies set out in the policy document at city, district, and village levels.	Not included in national policy document

Source: National Emergency Coordination and Operations Centre (NECOC) web portal, http://www.necoc-opm.go.ug/services.html.

Table A.3 **Climate Change Department: Functions, Key Achievements, and Ongoing Activities**

	Climate Change Department
Functions	• Serving as national focal point for the UNFCCC; responsible for preparation of the National Communications, the Intended Nationally Determined Contributions (INDC), and other status updates to the UNFCCC • Monitoring the implementation of the climate change policy and its implementation strategy • Acting as an information clearinghouse on climate change concerns • Providing policy and strategic advice on climate change • Supporting awareness raising, communication, and outreach on climate change • Ensuring the integration of climate change concerns into overall national planning through coordination with the relevant ministries, MDAs, and local governments • Providing secretarial services to the National Climate Change Policy Committee (NCCPC), the National Climate Change Advisory Committee (NCCAC), and the Designated National Authority (DNA) for Clean Development Mechanism (CDM) projects
Key achievements and ongoing activities	• Led the formulation of the National Climate Change Policy (NCCP), following a very wide-ranging stakeholder consultation and validation process • Undertook to lead the preparation of the Climate Change Bill, which is expected to be passed in FY 2016/17 • Guided the integration of climate change issues and priorities into the National Development Plans I (2010–15) and II (2015–20) • Prepared and submitted the First and Second National Communications (in 2002 and 2014), NAPA (2007), INDC (2015), and other periodic status updates to UNFCCC • Prepared and rolled out guidelines for mainstreaming climate change into sectoral and district local governments' policies and plans ("Guidelines for the Integration of Climate Change in Sector Plans and Budgets," June 2014). The CCD has also supported the preparation of sector-specific climate change mainstreaming guidelines for the agriculture sector. • Supported the formation of specific climate change task forces and appointment of focal officers in different ministries, departments, agencies, and district local governments • Established a National Climate Change Resource Centre (NCCRC) intended to house the National Greenhouse Gas Inventory System (GHG Inventory), National Climate Change Knowledge Management System (KMS), dynamic climate change actors' atlas, Monitoring Reporting Verification (MRV), and Performance Measurement Framework (PMF) for tracking of climate change policy implementation at national, MDA, and district levels, among others. • Supported the preparation of the Uganda Green Growth Development Strategy (2016–30) • Supported the preparation of the National Adaptation Plan for the Agriculture Sector (NAP-Ag), launched in December 2018 • Undertook to lead the preparation of the framework for the National Adaptation Plan (NAP), which will be a long-term national adaptation implementation strategy. The NAP roadmap was submitted to the UNFCCC in May 2015.

Source: Strategic Program for Climate Resilience: Uganda, 2017.

Table A.4 **Climate Change Roles of National Ministries, Departments, and Agencies**

Climate Change Roles of National Ministries, Departments, and Agencies	
Ministries, departments, and agencies of all sectors concerned with climate change	• Ensure adequate provision in annual work plans for the implementation of the climate change policy, building on the guidance provided in the costed implementation strategy, consistent with all relevant national policies and legislation
Ministry of Finance, Planning, and Economic Development (MoFPED)	• Ensure national, sectoral, and district-level budgets and indicative planning integrate climate change through appropriate provisions for the implementation of the policy and its strategy • Review quarterly and semi-annual reports from the ministries, departments, and agencies concerned to ensure resource use is in line with expected and actual progress in implementing the policy • Facilitate the introduction of relevant financial mechanisms and tools to the relevant stakeholders, as per the implementation strategy, to support financial resource mobilisation and investment for the implementation of the policy • Act as the National Designated Authority (NDA) for the Green Climate Fund (GCF)
National Planning Authority (NPA)	• Ensure the ministries, departments, and agencies concerned integrate climate change through adequate provisions in annual work plans for the implementation of the climate change policy, building on the guidance provided in the costed implementation strategy but consistent with all relevant national policies and legislation • Ensure the agreed-on work plans are implemented, through a review of quarterly and semi-annual reporting by the institutions concerned and appropriate follow-up actions by the NPA

Source: Government of Uganda 2017.

Annex B. Kampala Flood Risk Assessment Technical Summary

This annex provides a technical summary of the flood hazard modelling and risk assessment conducted in support of the development of this strategy.

B.1. Background and Objective

The flood risk assessment conducted in support of this strategy builds on several previous analyses, including the risk profile analysis prepared by the National Risk Assessment Team in partnership with the UN, OPM, and KCCA.

As a significant risk factor in Kampala City, flooding was widely highlighted both among the public and within government as a major issue requiring attention, solutions, and more information. In general, interventions to manage the city's flood risk have comprised engineering studies of and investment in sections of channel rather than on enhancing understanding of and addressing the wider catchment area, which will require the involvement of additional ministries and agencies and greater integration into the city's planning process.

A strategic citywide, risk-based analysis was carried out to help develop a more integrated urban management approach to flooding. The purpose was to obtain a better understanding of the complex dynamics of urban flooding and provide a decision-making tool to assist with spatial and investment planning.

B.2. Overview of Approach

This study sought to capture the dynamics of the basins and sub-basins that drain into and through the city. It did not include detailed drainage paths or individual drains. The main purpose was twofold: first, to gain an understanding of the flood dynamics of the system rather than just the individual parts and, second, to permit the analysis of "what if?" scenarios in a more strategic way. Accuracy in understanding relative changes in risk was prioritised over certainty in overall absolute values.

The hazard modelling was carried out with the best data readily available, mostly from sources collated for previous studies. A digital terrain model (DTM) based on the *light detection and ranging* (LiDAR) remote sensing method was used to form a two-dimensional hydraulic model. Local rainfall data from the International Airport at Entebbe were used to develop intensity, depth, and frequency (IDF) data for model input. Events for three return periods were used (10-, 50-, and 100-year), and flood hazard maps were produced for each as a spatially varying depth grid.

Exposure data (mainly from OpenStreetMap) and vulnerability curves (derived using global flood depth damage functions adjusted to local values) were used along with the hazard data to calculate spatially varying damage to different types of buildings and their contents across the city for each return period. Risk was quantified through an assessment of annualised average damage (AAD), calculated by estimating the area under the curve of a damage frequency relationship (where frequency = 1/return period).

B.3. Digital Terrain Model (DTM)

The DTM is one of the key data sets for developing a citywide flood model. The analysis for this study used a high-resolution LiDAR point cloud provided by KCCA and based on 2014–15 flights, supported under the World Bank–funded KIIDP2 programme of works. These data were processed using GIS software (Global Mapper V19.0) to form a bare earth DTM at 5m resolution for modelling. The DTM was further processed to remove bridges and culverts that were blocking flow paths. This process was initially automated using OSM bridge data; however, further manual checking and correction were carried out to ensure all significant flow paths and channels were properly represented.

B.4. Hydrology

Published rainfall data for the area were used in the form of IDF curves calculated from sub-daily rainfall records from a gauge operated by the Uganda National Meteorological Authority (UNMA)

at the Entebbe International Airport. Storm event totals from the IDF curve were distributed across a standard event profile to provide a rainfall hyetograph as a model input. The profile had hourly intervals with a distribution that spanned storm duration and ensured the hourly peak intensity matched the IDF hourly depth, and similarly with the 2-24 hour storms, ensuring the sum of the hourly totals matched the total event rainfall depth.

As no flow gauges were available for the study, effective rainfall was calculated using a loss rate, typical for an urban area, of 55 percent (from infiltration, canopy storage, retention, and so on), resulting in an average run-off of 45 percent of the total rainfall. This was applied to the hourly rainfall data for the selected events for each of the 10-, 50-, and 100-year return periods. A sensitivity check was carried out on this assumption to check that the 10-year flood event was creating flooding in areas and at depths recognised by local stakeholders.

A number of storm durations were considered, looking at the critical duration for different parts of the city—that is, the small upland catchments responding most rapidly and the lower wetland areas responding to longer-duration events. Trials of three-, six-, and nine-hour storm durations were tested using the 50-year event to identify the duration (or combination of durations, if necessary) that produced the maximum flood extent over most of the city. The six-hour event demonstrated to be the critical storm duration was applied for all subsequent analysis.

Downstream boundary conditions were set as normal depth boundaries, apart from those directly representing Lake Victoria; the latter were set as a constant water level.

B.5. Land Use/Land Cover

Land use data were required for the flood risk assessment for two main purposes: to determine the relative area of impermeable surfaces and to determine the friction (or roughness) factor to use in the model for various parts of the city, ranging from paved roads and drains with very low friction coefficients to parkland and heavily vegetated areas with high factors. These data had been digitised from satellite imagery and local mapping initiatives carried out in August 2018 as part of the Multi-Hazard Risk and Vulnerability Profile of Kampala City and provided by KCCA.

B.6. Hydraulic Modelling—Flood Hazard

The latest version of HEC-RAS software (HEC-RAS V 5.0.6) from the *U.S. Army Corps of Engineers* was used for the hydraulic modelling. This software is free with no licence requirement, is widely used throughout the world for all types of modelling studies, and has a large online support community. It is regularly updated with the latest technological advances in numerical modelling and processing and has a number of useful features for city-scale modelling.

The Kampala flood model consisted of a single two-dimensional domain, with a computational grid size of $20m^2$, but based on a 5m DTM for flow and cell storage characteristics, and flood mapping. The model was run using both the full momentum equations and the simpler diffusion wave equation set for a single run to assess the potential for increased error using the latter. The differences were negligible, as would be expected with a relatively simple setup that is essentially friction dominated with few areas of sudden acceleration or particularly high velocities. As the diffusion wave option was more stable and allowed larger computation grid cells and associated time steps, however, it was selected for all model runs.

Each scenario was run for 24 hours, with variable time steps, regulated by the courant number constrained between 0.5 and 3.

Manning's "n" was set using a detailed land use map provided by KCCA, which had been developed internally by the KCCA GIS department using OpenStreetMap (OSM) data as a starting point. The roads were also included as primary flow paths in many instances, reflecting the normal practice of linking the main drainage to the roads. River and primary drain centre lines were used to create a buffer strip, which was used in turn to adjust the Manning's "n" along all the main drainage channels throughout the city. "Manning's friction coefficient values were taken from the HEC-RAS Manual, with specific

reference to modelling overland sheet flow, which requires higher-friction coefficients than the more traditional channel and floodplain situation due to the very shallow flow depths (**Figure B.1**).

Break-lines were used to create the drain centrelines and other linear features within the model, ensuring the computational cell generation a sensible grid that captured the channel shape and size (**Figure B.2**).

Neither river flow nor level monitoring are currently functional in Kampala, so opportunities for calibration were limited to known and documented flood events, with media images providing estimates of flood depth and extent. One example is the Clock Tower roundabout near the centre of Kampala, which is well known as a flood hotspot (see **Figure B.3**). Further verification of the flood model results was carried out with local experts and the KCCA officials familiar with flood hotspots and expected flood extents during site visits with key staff.

Figure B.1 **Manning's "n" Roughness Coefficients from Land Cover Data Used for Model Runs**

Land Cover to Manning's n (2D Flow Areas Only)

Set Manning's n to Override Default Land Cover Values

Selected Area Edit Options

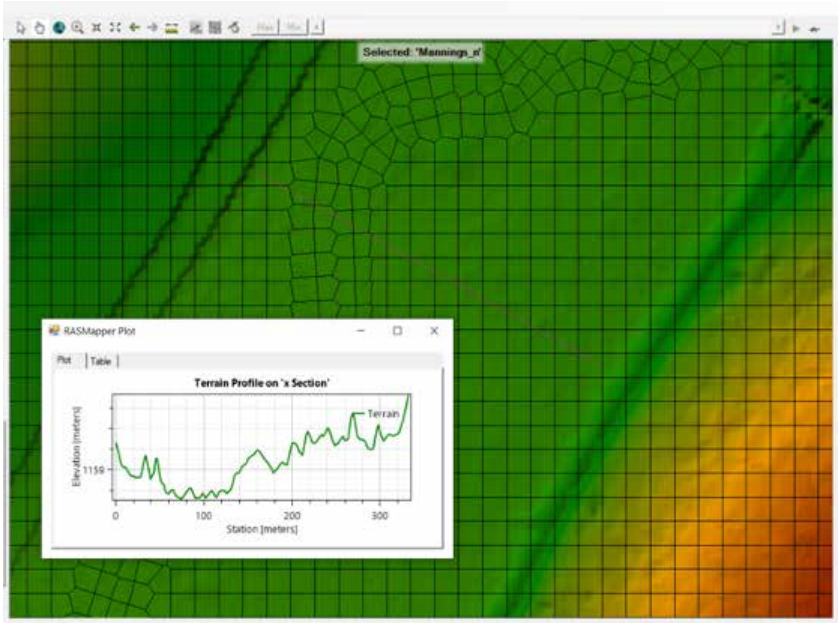
Add Constant ... | Multiply Factor ... | Set Values ... | Replace ...

	Land Cover Layer	Geometry Overrides (blank for Default Values)
	Name	Default Mann n	Base Mann n (blank for default)
1	nodata		
2	bare ground	0.016	
3	brick making	0.02	
4	cemetry	0.03	
5	commercial	0.02	
6	commercial industrial	0.03	
7	commercial residential	0.05	
8	cultural	0.06	
9	education	0.03	
10	health	0.05	
11	high density residential	0.02	
12	informal settlement - slum	0.025	
13	large scale industrial	0.018	
14	low density residential	0.04	
15	medium density residentia	0.03	
16	open shrubs	0.2	
17	open water	0.01	
18	parks	0.15	
19	planted forests	0.3	
20	public green gardens	0.18	
21	religious	0.07	
22	roads	0.015	
23	sand quarying	0.1	
24	small scale agriculture	0.2	
25	small scale industrial	0.03	
26	sports grounds	0.03	
27	wetland	0.4	

Associated Layer: C:\...\OneDrive\Documents\Scott Files\Applied Hydro Solutions\Kampala Model\Revised Model Files Feb 2019\Mannings_n

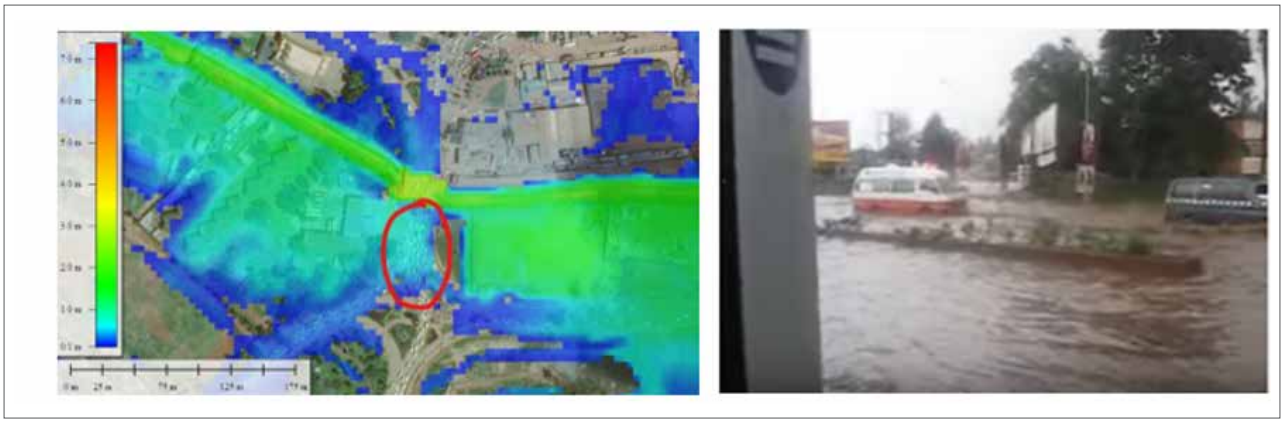
Source: HEC-RAS Manual, https://www.hec.usace.army.mil/software/hec-ras/documentation/HEC-RAS%205.0%20Reference%20Manual.pdf.

Figure B.2 **Nakamiro Wetland Grid Capturing Main Flow Path**



Source: HEC-RAS Model Grid File.

Figure B.3 **Modelled and Actual Flooding Example at Clock Tower Roundabout**



Note: The figure shows the Clock Tower roundabout with depth and extent match for a 10-year flood event and a notable recent large event.
Source: World Bank.

B.7. Notes on Hazard Model Results

A feature of flooding in Kampala is that the flood extents are quite similar for the various return periods—that is, the 100-year flood outline in many areas is not significantly larger than the 10-year outline. The main reason is the valley tends to be U-shaped, and its relatively flat bottom becomes inundated relatively easily, forming a well-defined floodplain. At the edge of the floodplain the rise in topography restricts any further horizontal spread of the flood water but increases flood depth and channel velocity. Another important reason for the apparent insensitivity of the flooding extent to frequency is the type of rainfall in tropical regions where convective processes dominate. This tends to produce high precipitation totals relatively frequently, but the physics of this process does not readily support the kind of conditions that would produce less frequent but significantly larger rainfall totals that would result in significantly greater flooding.

B.8. Exposure data

The risk assessment looked principally at quantifying the economic impact of flooding on buildings and contents, along with the social impact in terms of the numbers of people affected. OpenStreetMap (OSM) provided the building outlines as polygons for the vast majority of buildings within the city (see **Figure B.4**) that could be overlain with the flood hazard data. Flooding was considered to have occurred if inundation of more than 10cm occurred to the centroid of each building polygon.

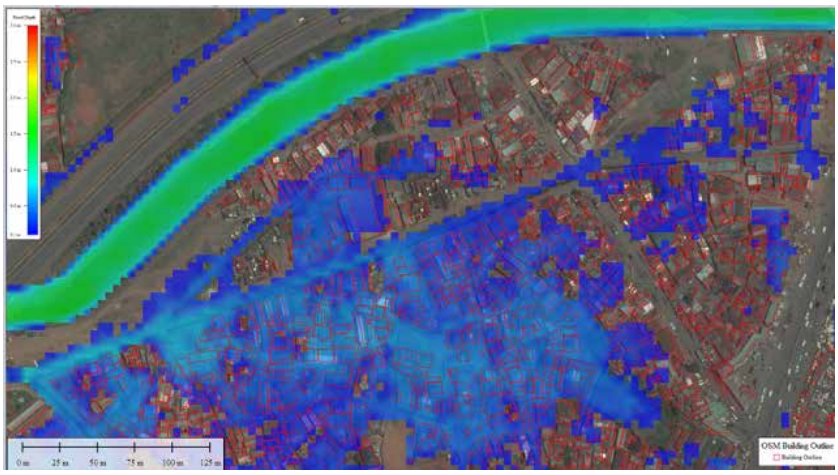
The type of building was determined using the land use mapping data provided by KCCA, which included the predominant building types at a reasonably high granularity (**Figure B.5**). The following classifications were available:

- Residential (several categories relating to density)
- Informal settlements
- Industrial
- Commercial

Nearly 30,000 buildings in total were identified as being at risk from flooding (**Table B.1**).

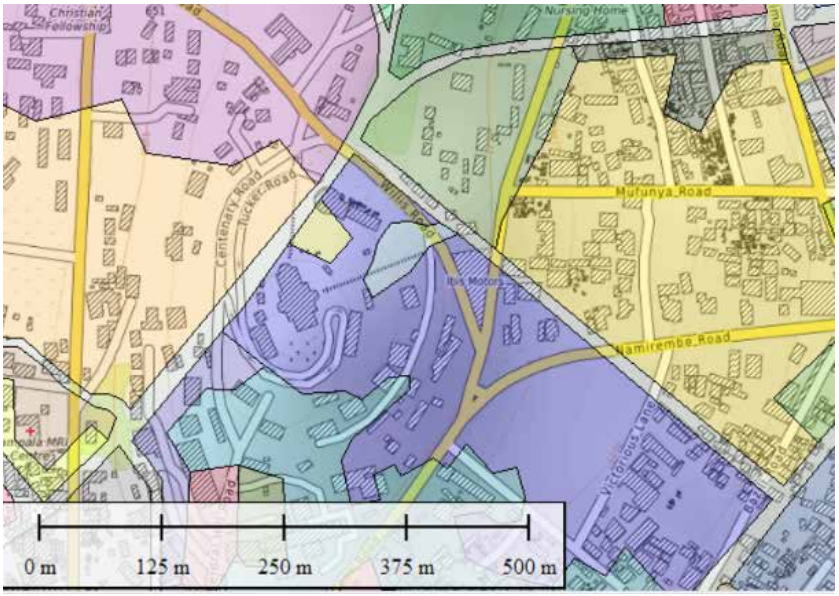
Exposure of transport links was

Figure B.4 **OSM Building Outlines for Kampala City**



Source: World Bank.

Figure B.5 **Building Classification from OSM for Kampala City**



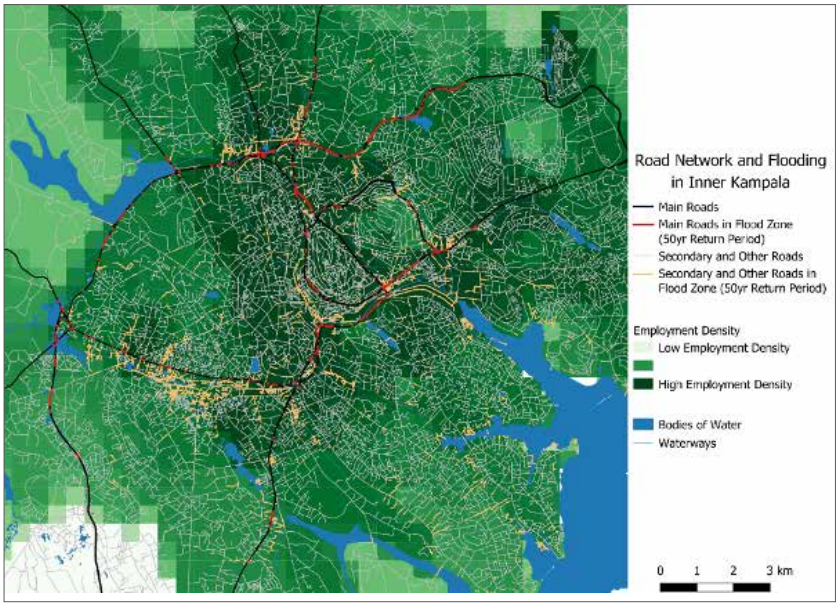
Source: World Bank.

Table B.1 **Total Properties at Risk from 1:100-Year Flood Event**

Numbers of properties					
	Residential	Commercial	Industrial	Informal settlements	Total
10-year flood	10,783	85	44	14,118	25,030
50-year flood	12,037	96	54	15,995	28,182
100-year flood	12,757	102	54	17,022	29,935

Source: World Bank.

Figure B.6 **Road Network at Risk from Flooding**



Source: World Bank.

quantified by the length and type of roads inundated by more than 30cm of flooding, as this was assumed to be the depth at which most vehicles would be prevented from passing. Analysis of this 30cm flood depth outline showed expected transportation bottlenecks, while mapping of employment activity allowed a qualitative assessment of the impact of flooding on the wider economy (**Figure B.6**). The road network was provided by the KCCA GIS team.

B.9. Vulnerability data

The vulnerability curves used were derived through an iterative process of review and verification against a number of data sources. They were based on a combination of the UK Flood and Coastal Erosion Risk Management Handbook and Data for Economic Appraisal 2018 for the initial depth damage functions and then validated against the EU European Commission "Global Flood Depth-Damage Functions" Joint Research Centre (JRC) Technical Report (EUR 28552 EN), 2017 (**Figure B.7**). Total losses for buildings and contents were based on local information and revised following a further discussion and local review.

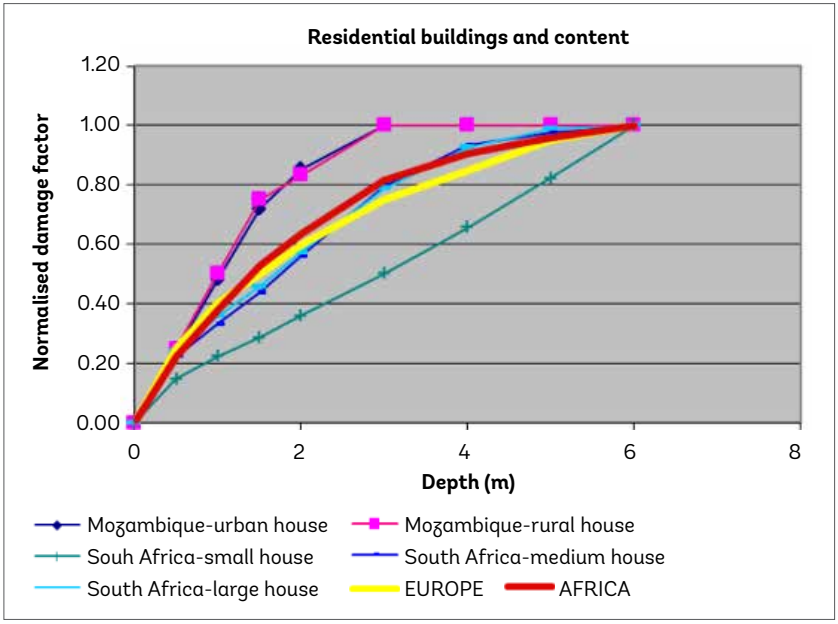
Baseline data were collected from a number of sources, including a review of residential property land values and typical contents and discussion with local engineers and specialists. This allowed verification of the regional data and functions and development of the Uganda-specific functions (**Figure B.8**) and data sets (**Table B.2**). For this example (that is, residential

flooding), the curve used resulted in slightly less damage than the average African curve shown in **Figure B.7**, reflecting the urban nature of the flooding in Kampala—with relatively short duration and mainly low velocities—and also the fact that a separate curve was used to reflect contents for the Kampala study (for example, the general Sub-Saharan African curve would result in a factor of 0.45 at 1m depth, while the selected Kampala curve would result in a factor of 0.38 at the same depth).

B.10. Risk calculations

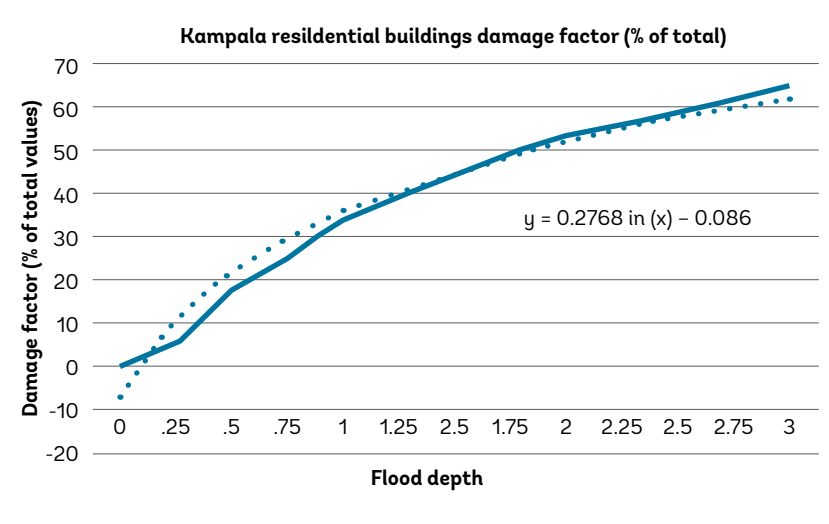
Integrating the previous results, the analysis reviewed the location of each individual building footprint (centroid of the OSM polygon) and the type of building (residential, informal settlement, commercial, or industrial). The depth of flooding for each return period was allocated to each building and, depending on the type of building and depth of flooding, the damage value (building and contents) was estimated by multiplying the depth by the building area, the building total value, and the appropriate damage function. This provided estimates of damage to individual buildings

Figure B.7 Regional (Africa) Flood Depth-Damage Function Example Curve



Source: JRC Technical Report, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC105688/global_flood_depth-damage_functions__10042017.pdf.

Figure B.8 Example of Kampala Specific Damage Factor



Note: Function used in damage calculation.
Source: World Bank.

Table B.2 Summary of "Total Damage" Values Used

Kampala building type	Damage contents ($/m²)	Damage structure ($/m²)	Average area (m²)	Average single building contents damage ($)	Average single building structure damage ($)
Residential	77	124	200	15,400	24,738
Commercial	146	145	900	131,400	130,473
Industrial	180	109	2,500	450,000	272,650
Informal Settlements	14	25	60.0	864	1,516

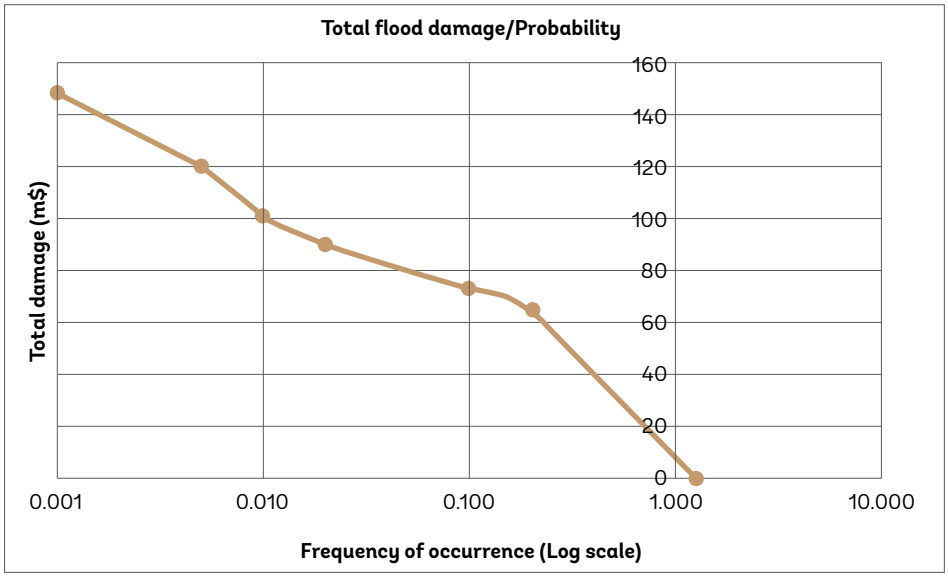
Source: World Bank.

for events in all three return periods, as well as a total for each building type (by sector) and a total for all buildings. Because the values were calculated by individual buildings, the totals could be broken down by district or other sub-division as required, as well as plotted as a spatially varying grid. To quantify the risk, the total damage for all building types for each return period was plotted against frequency (that is, 1/Return Period), as shown in **Figure B.9**.

The annualised damage was then calculated by estimating the area under the curve of the damage/frequency plot. The zero point was assumed to be a flood with a frequency of greater than one (that is, 1.2 events per year), as it was known that some minor flood damage was usually experienced several times every year.

The same analysis was carried out independently for each of the different sectors (informal, residential, commercial, and industrial), providing a breakdown of AAD for each individual building. This allowed the spatial variation of AAD to be plotted and, using GIS software, the generation of heat maps of the highest risk areas.

Figure B.9 **Total Flood Damage against Frequency Plot**



Source: World Bank.

B.11. Results

The results of the analysis are presented in two main ways, as shown in **Table B.3**. First, they are presented for expected damage values for each of the different building types and for the three return periods that were simulated. Total damage was estimated for a number of additional return periods by extrapolation and local knowledge (regarding the frequency of the less damaging but frequent floods). These additional values were considered indicative and were not used in the risk assessment calculations. Second, annual average damage (AAD) was calculated, as described above, for each type of building as well as the total, providing a measure of the risk posed by flooding to each sector as well as the total risk to the city building stock.

As each building was georeferenced, and therefore the specific damage associated with each calculated, it was possible to plot all the results as spatially varying damage and risk maps.

Table B.3 **Damage to the Different Sectors**

	Value of damage				
	Residential (US$m)	Commercial (US$m)	Industrial (US$m)	Informal settlements (US$m)	Total damage (US$m)
0.8-year flood					0.0
5-year flood					65.0
10-year flood	62.4	2.9	3.6	4.3	73.2
50-year flood	76.1	3.5	5.0	5.6	90.3
100-year flood	85.2	3.9	5.8	6.5	101.4
200-year flood					120.0
1,000-year flood					147.9
AAD	42.2	2.0	2.5	2.9	49.6

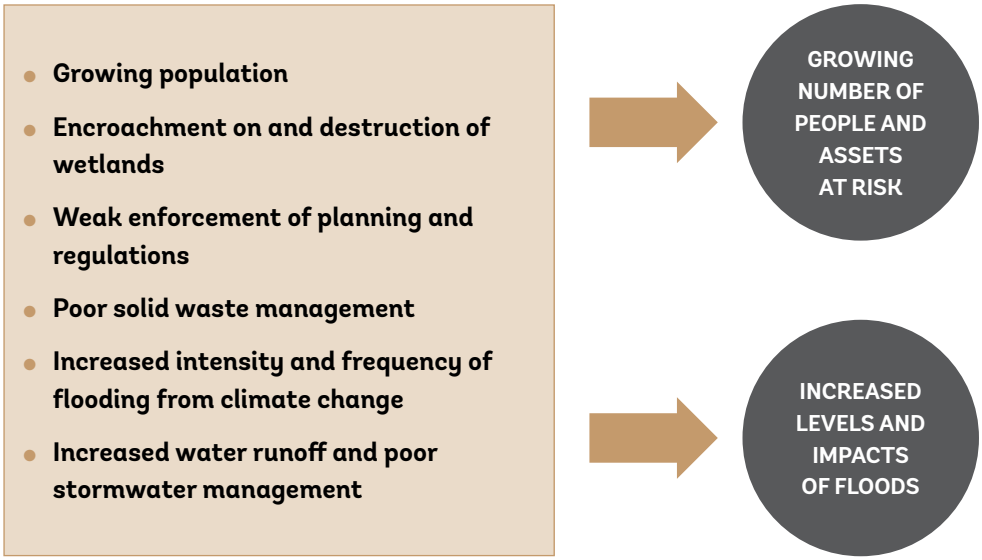
Source: World Bank.

Note: Pink cells extrapolated for indicative purposes only.

Annex C. Diagnostic and Recommendations for Managing Flood Risk in Kampala

In this strategy, section 5.1 sets out the main factors behind flood risk in Kampala. Estimates of the impact of several hazard probability scenarios on individuals, livelihoods, roads, buildings, and assets were based on these parameters and the modelling completed. This annex complements and expands on key points in this section, as Figure C.1 presents the drivers of continued and growing flood risk in Kampala.

Figure C.1 **Major Risk Drivers of Floods in Kampala**



Five main recommendations for better managing the risk were based on the conclusions drawn from the diagnostic and the understanding of the risk drivers (**table C.1** and **figure C.2**):

1. **Reduce runoff at the source:** In the upper and middle catchments, a Sustainable Urban Drainage Systems (SUDS) approach can be applied at local scale, reducing the amount of rapid runoff reaching the watercourses. This would be instrumental in bringing down runoff coefficients from drainage areas, from the current values of 30 to 50 percent closer to their predevelopment natural values of 5 to 10 percent.
2. **Implement a more strategic approach to drainage improvements:** In the upper and middle catchments, increased runoff from one area can adversely affect another. Plans are needed to manage the different catchments in a holistic way. Drainage work must be planned at basin scale and must be supported by an appropriate flood risk assessment that covers all aspects of the basin drainage, with the primary purpose of reducing flood risk overall while not creating risk elsewhere. The drainage strategy needs to factor in soil erosion, sedimentation, and solid waste, as well as simple removal of water. The objective of this policy is to promote a more balanced and sustainable approach to drainage that incorporates and complements natural drainage, rather than fighting against it.
3. **Implement and enforce risk-based land use planning:** Across all catchment areas, incorporate the principle that no development should be authorised that increases flood risk in any way, either in its location or elsewhere This requires demarcating "no-go" areas and flood risk zoning areas, along with areas appropriate for permitted development, supported by formally agreed on and

Table C.1 presents relevant analysis of key catchment sections in Kampala.

Table C.1 **Descriptions and Recommendations for Kampala's Key Catchment Sections**

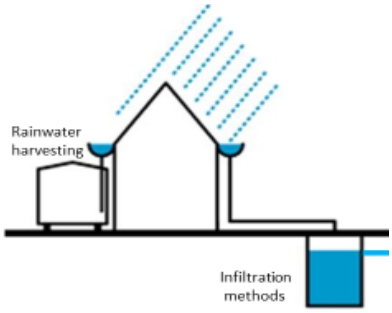
Catchment section	Description	Recommended approach	Sample area in Kampala
Upper catchment	Natural infiltration and retention reduced and previously low runoff increased by encroachment and continuing increase in runoff from development	Reduce runoff at sources (private and public), and implement risk-based land use planning to reduce loss of natural infiltration and retention.	
Middle catchment	Drainage channels with development near flood-prone areas	Implement integrated urban flood risk management and risk-based land use planning, and reduce runoff and manage floodplains and exposure.	
Lower catchment	Wetlands with previous water quality management potential undermined by encroachment	Implement risk-based land use planning, including positive demarcation for floodplains, and manage and restore wetlands.	

approved flood hazard maps and building codes. The goal is to prevent further encroachment into valuable space required for natural flood and water management processes. Where possible, illegally occupied land should be returned to formal land use classes.

4. **Improve citywide resilience:** Across all catchment areas, increase public awareness, and approve education, monitoring, forecasting, early warning, and response. The objective of this is to reduce vulnerability to flooding within the city and help the city tackle the many intangible impacts already discussed.
5. **Manage wetlands and floodplains:** In the middle and lower catchment areas, identify and recognise wetland areas and existing open spaces associated with watercourses and adopt an appropriate strategy with relation to current and future uses. The objective of this policy is to utilise the remaining wetlands and green spaces in the best way possible for the overall benefit of the city.

Figure C.2 **Adapting Approaches to Nakamiro's Catchment Sections**

Upper catchment



Recommended approach

Reduce runoff at the source:

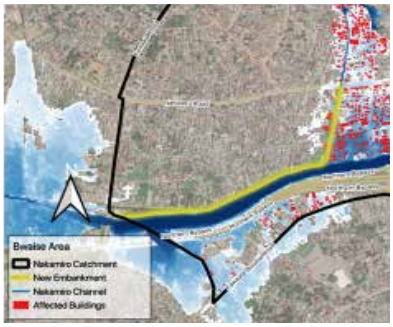
- Rainwater harvesting
- Infiltration methods, such as soak ways
- Land use planning and new development control
- Promotion of tree planting

Middle catchment

Recommended approach

- Urban scaping to improve life quality and ownership of the investment
- Enhance effectiveness of the upgrade of the channel (e.g., tertiary drainage discharge flaps)
- Increase public space area
- Neighbourhood planning

Lower catchment



Recommended approach

- Increase flood protection through localized raised emankments along the Lubigi and the lower section of the Nakamiro Channel
- Neighbourhood planning
- 'Early warning, ptreparedness and response

Annex D. Flood Impact Early Warning Action Plan

This annex presents a framework action plan for developing advanced flood impact early warning for Kampala, including conceptual underpinnings, institutional framework, and practical assessment of current capacities and identified needs, as well as detailed recommendations for action.

D.1. Scope and Objectives

The goal of integrated flood risk management (IFM) is to maximise the productive and efficient use of floodplains, while minimising the loss of life and impact on livelihoods and assets through protective measures. Absolute protection from flooding, however, is impossible. Planners of IFM, therefore, need to decide what level of risk is acceptable, decide how safe is safe enough, and put into place a comprehensive approach that includes reducing flood hazard, building protection against floods, regulating land use, raising awareness and preparedness, and mitigating residual risk.

This action plan focuses on the usefulness of early warning systems in enhancing preparedness, warning, and response to floods. It aims to provide relevant entities with a description of the main features of an effective EWS, an overview of existing capacities and identified needs under each EWS component in Kampala, and a list of key investments that can bridge the existing gaps in capacity. The analysis and recommendations included here were informed by the flood risk diagnostic presented in the Kampala Disaster Risk and Climate Change Resilience Strategy.

D.2. Conceptual Framework for Early Warning Systems

An early warning system is a crucial element in reducing fatalities, injuries, and property loss, and damage from disaster events. By providing timely and precise information, an EWS helps individuals, institutions, and businesses prepare for, respond to, and recover from disruptive events.

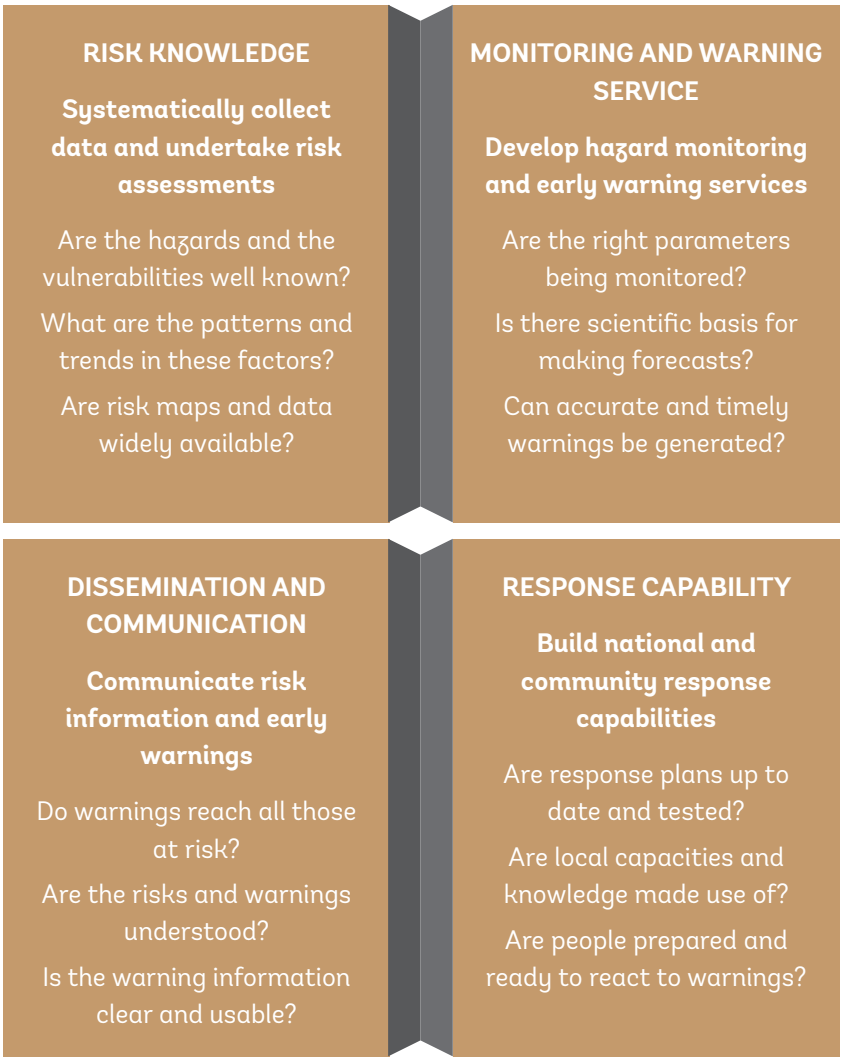
A comprehensive early warning system comprises four technical components:

1. **Risk knowledge:** Understanding of hazards, exposure, and vulnerabilities
2. **Monitoring and warning:** A system for monitoring the identified hazards, forecasting the likely impact, and triggering a warning
3. **Dissemination and communication:** Ensuring that warning to communities and organisations is delivered effectively so they can act
4. **Response capability:** An effective response by individuals, communities, and government and other institutions

For any warning system to be effective, each of these technical elements needs to be addressed in a cohesive way, and none can be developed in isolation. And to ensure an EWS can be designed, delivered, and operated cohesively, a fifth element is also essential: good governance, achieved through a regulatory framework that establishes institutional and financial arrangements, and continuous political commitment.

The four technical component elements of an EWS are presented in **figure D.1** and developed in further detail below. The section that follows reviews the key aspects of governance and institutional arrangements to be considered in developing an EWS, both in Uganda overall and Kampala specifically.

Figure D.2 **Technical Components of an EWS**



D.2.1 Risk Knowledge

As **figure D.1** indicates, appropriate assessment of risk requires the systematic collection of hazard information, as well as analysis of exposure and vulnerability in specific locations, as determined by dynamic human and environmental conditions. Risk assessment maps help with prioritisation of early warning system needs and guide preparations for disaster prevention and response.

D.2.2. Monitoring and Warning

A crucial EWS component, monitoring and warning services providing hazard forecasts and warnings must remain operative 24 hours a day and throughout the year. To ensure the reliability of forecasts and warnings, it is essential to monitor hazard parameters and precursors continuously and, where possible, share institutional procedures and communication networks.

D.2.3. Dissemination and Communication

Warnings must reach those at risk. Clear messages containing simple and practical information are critical to enabling responses that will help safeguard lives and livelihoods. Area- and community-level communication systems must be identified in advance and appropriate authoritative voices established. The use of multiple communication channels is essential to ensure warnings reach the maximum number of people and the information is conveyed in the event a specific channel fails.

D.2.4. Response Capability

As communities need to understand the existing risks and know how to react to warnings, education and awareness-raising programs play a key role in an EWS. To ensure appropriate response, DRM plans must be in place, and responders must regularly conduct practices and tests. The communities should receive clear information on safe behaviours, available escape routes, and how to avoid damage and loss to property.

Table D.1 **Draft Stakeholder Map for Kampala Flood EWS**

Responsible body	EWS role
CPDRMC	Policy direction and oversight
CTDRMC	Technical planning and implementation management
DDRMC	Local community plans and response plans
EWS Stakeholder Group	Stakeholder and community input and guidance

D.3. Governance and Institutional Arrangements in Uganda and Kampala

This subsection presents the relevant governance and institutional arrangements for EWS.

D.3.1. Ugandan National Context for EWS

The EWS is designed to support disaster risk management efforts at local and national levels, complementing a range of existing emergency preparedness and response structures. At the national level, the Constitution of Uganda (1995) and the National Environment Act (1995) provide key aspects of the DRM framework. Uganda's National Policy for Disaster Preparedness and Management (2010) established the institutional network responsible for managing disaster risk and implementing the policy. The Department of Disaster Preparedness and Management (DDPM) within the Office of the Prime Minister, headed by a commissioner and assistant commissioner, is the main agency coordinating disaster preparedness and management with all stakeholders at the national level.

While the National Policy for Disaster Preparedness and Management designates the Ministry of Water and Environment as the lead agency for flooding, the ministry is not responsible for providing flood warnings. Moreover, although it is also listed as one of many ministries and organisations responsible for management of storm policy issues, including provision of a storm warning system, no agency or ministry is expressly responsible for storm EWS.

Once warnings have been generated, the national policy document assigns responsibility to the National Emergency Coordination and Operations Centre (NECOC) for disseminating them among government agencies. NECOC is not, however, responsible for the technical monitoring of hazards or for initiating those warnings in the first instance, or for dissemination of warnings to the wider public.

The governance and institutional arrangements proposed in this document for a Kampala Flood EWS, if adopted, would provide legal standing and help define relevant stakeholders and service providers, and it may help determine budget allocation processes, among other key elements. These arrangements are a cross-cutting aspect of an EWS that sets out the key tasks and needs of the whole system and will need to be reviewed and updated regularly to account for changing needs and contexts and ensure the EWS is fit for purpose.

D.3.2. Kampala EWS Governance Model

A flood EWS for Kampala needs to operate in support of national DRM law and the National Policy for Disaster Preparedness and Management (2010). In the absence of a single, clearly identified lead government department for EWS, Kampala's Flood EWS has been developed in a pragmatic and organic manner through specific efforts by KCCA, national ministries, and key stakeholders, including the Red Cross and resident groups.

To ensure effective governance of the Kampala Flood EWS, it will be led by KCCA and managed through proposed multiagency emergency preparedness and response structures at the city land division level. These structures will include both a policy committee and a technical committee, comprising all key city agencies and stakeholders. The City Technical Disaster Risk Management Committee will be ideally placed to take primary technical responsibility for the EWS technical design and implementation and for establishing a stakeholder group responsible for community engagement (**table D.1**).

In terms of policy oversight, the City Policy Disaster Risk Committee (CPDRMC) will take responsibility for strategic oversight of the Kampala Flood EWS and for consideration and approval of any budgets or resource allocation necessary. The CPDRMC will be chaired by the lord mayor, while the KCCA executive director will designate a secretary from the technical team. It is to be composed of members of the City Executive Committee, RDC, DPC(s), DISO(s), a representative of the army, and division mayors. The lord mayor will also co-opt four councillors on the committee.

The functions of the City Disaster Policy Committee with relationship to the Kampala Flood EWS will be as follows:

1. Give policy direction to the City Disaster Risk Management Technical Committee on all EWS-related matters.
2. Identify city priorities for a flood EWS and approve the EWS design.
3. Monitor the implementation and operation of the flood EWS in Kampala, including response plans and community-level warnings.
4. Monitor the effectiveness of the Kampala Flood EWS, including review of post-incident and post-exercise reports.
5. Ensure and authorise expenditure for activities related to the flood EWS in the city.

In terms of technical oversight, the City Technical Disaster Risk Management Committee (CTDRMC) will take responsibility for oversight of all technical elements of the Kampala Flood EWS, including oversight of warning dissemination and response plans. The CTDRMC will be chaired by the KCCA executive director or his or her appointed deputy and will comprise city heads of directorates, departments, and divisions, the police, and other relevant government agencies and representatives of the army, the business community, transport and infrastructure bodies, and development partners within the city. The secretary to the committee will be the head of the KCCA Risk Management Unit.

The functions of the City Technical Disaster Risk Management Committee with relationship to the Kampala Flood EWS will be as follows:

1. Review flood vulnerability assessment and hazard and risk mapping of the whole city, and update the data annually.
2. Review city preparedness and contingency plans for flooding, and ensure data are updated annually.
3. Establish the technical and operational specifications for the EWS.
4. Monitor the operation, maintenance, and performance of the EWS to ensure it remains fit for purpose and is performing within the required standards.
5. Initiate the formulation of flood preparedness and response plans at the community and institutional levels, in liaison with the Kampala EWS Stakeholder Group.
6. Include a report on the flood EWS within the annual city state of disaster report presented to the CDRPC.
7. Coordinate plans for flood preparedness and management interventions in the city
8. Submit assessment reports on the flood EWS to the Office of the Prime Minister and other relevant organs annually or after any major event.

in terms of local response plans and engagement, the Division Disaster Risk Management Committee (DDRMC) will take responsibility for production of local response plans and for community and business engagement. The committee will be chaired by the division mayor, and the town clerk will be the secretary. Members will include the division engineer, division head for public health and environment, division physical planner, division head for enforcement, division internal security officer (DISO), and division police commander, along with members from among the business community, manufacturers, transport body, and development partners, nongovernmental organisations (NGOs), and community-based organisations (CBOs) within the division, as well as a representative from the Risk Management Unit.

The functions of the Division Disaster Risk Management Committee with relationship to the Kampala Flood EWS will be as follows:

1. Review flood response requirements and EWS priorities of the whole division.
2. In coordination with the Risk Management Unit, develop division preparedness and contingency plans.
3. Ensure mainstreaming of flood preparedness and EWS activities into division response plans.
4. Coordinate with the Risk Management Unit in providing assistance with development of community action plans.
5. Coordinate EWS planning and drills with government agencies, partners, and private sector organisations.

In terms of stakeholder engagement, multiple stakeholders are involved in

delivering the various components of an effective flood EWS in Kampala. Many of these are technical and professional stakeholders already well represented in CTDRMC. Some aspects of the EWS, however, such as dissemination and communication and flood response, involve a wider range of stakeholders from communities and NGOs.

Establishment of the Kampala EWS Stakeholder Group will provide an opportunity for local representatives to become engaged in the design and delivery of the flood EWS, including engagement in community-level dissemination and response plans. The stakeholder group will also be an invaluable resource for the CTDRMC, providing direct feedback on the effectiveness of systems and plans they have put in place.

The EWS Stakeholder Group will be chaired by the head of the KCCA Risk Management Unit or his or her nominated deputy, and members may be invited from the communities, agencies, and bodies most directly affected by, and potentially likely to benefit from, effective EWS in Kampala. The group should meet quarterly or after any major flood event in the city, and minutes of those meetings should be reported to the CTDRMC.

The functions of the Kampala EWS Stakeholder Group with relationship to the Kampala Flood EWS will be as follows:

1. Review and comment on EWS designs and flood vulnerability assessments and hazard and risk mapping produced by CTDRMC.
2. Review and comment on flood warning dissemination and communication plans produced by CTDRMC.
3. Review and comment on community-level flood response plans produced by any agency.
4. Assist with evaluation of the flood EWS, including post-event reviews.

D.4. Kampala's Existing Capacities and Identified Needs for EWS

This section provides an overview of current capacities within Kampala's flood EWS components, as well as the identified needs and the relevant entities responsible for capacity improvements, as summarised in **Table D.2**.

Table D.2 **EWS Requirements and Responsible Agencies**

EWS component	EWS function	Responsible national and city agencies	Stakeholders
1. Risk knowledge	Organisational arrangements for gathering risk data for EWS in place	KCCA Risk Management Unit	CPDRMC
	Flood hazards identified	Department of Disaster Preparedness and Management (DDPM)—OPM KCCA Risk Management Unit	Ministry of Water and Environment UNMA Research Organisations and International Bodies
	Community vulnerability analysed	KCCA Risk Management Unit	DDRMC, EWS Stakeholder Group
	Risks assessed	KCCA Risk Management Unit	DDRMC, EWS Stakeholder Group
	Information stored and accessible	KCCA Risk Management Unit	CTDRMC, EWS Stakeholder Group
2. Monitoring and warning	Institutional mechanisms established	KCCA	CPDRMC
	Monitoring systems developed	KCCA, advised by UNMA and others	CTDRMC, Ministry of Water and Environment, UNMA, research organisations and international bodies
	Forecasting and warning systems established	KCCA, CTDRMC	DDRMC, EWS Stakeholder Group
3. Dissemination and communication	Organisational and decision-making processes institutionalised	KCCA, CPDRMC	CPDRMC
	Effective communication structures and equipment installed	KCCA, CTDRMC	CPDRMC, EWS Stakeholder Group
	Warning messages recognised and understood	KCCA, DDRMC	NECOC, EWS Stakeholder Group, media outlets, NGOs and civil society groups
4. Response	Warnings respected and acted upon	DDRMC	CTDRMC, EWS Stakeholder Group
	Disaster preparedness and response plans established	DDRMC	CTDRMC, EWS Stakeholder Group
	Community response capacity assessed and strengthened	KCCA Risk Management Unit, DDRMC	CTDRMC, EWS Stakeholder Group
	Public awareness and education enhanced	NECOC, KCCA Risk Management Unit, DDRMC	CTDRMC, EWS Stakeholder Group

D.4.1. Risk Knowledge: Current Status and Gaps

KCCA and its partners have made progress on important aspects of the risk knowledge component in Kampala's flood EWS. These advances rely on several inputs essential to the measurement and understanding of flood risk. The Risk Management Unit at KCCA's Office of the Executive Director is expected to be responsible for filling these information gaps, disseminating risk knowledge, and identifying priorities and targets for warnings. Key responsibilities will include the following:

- Integrate information into plans and share them across all KCCA entities.
- Agree on an approved set of flood maps, and formalise use in all relevant DRM activities.
- Improve exposure and community vulnerability data sets.
- Develop and manage a database of key facilities (assets).
- Formalise and consolidate flood knowledge into an easily usable format, and make it available through the KCCA portal.
- Agree on and formalise a regular update cycle for flood risk assessment and planning.

Key existing capacities and identified needs are presented int **Table D.3**.

Table D.3 **Risk Knowledge**

Existing capacities	Identified needs
• KCCA has developed 10-, 50-, 100-year flood hazard and risk maps. • KCCA has access to a flood impact scenario application for warning and response coordination and management.* • KCCA has developed a list of problematic drains. • The Red Cross has developed a dashboard. • KCCA has developed drainage channel maps. • Communities have local knowledge, some of which has been documented in OpenStreetMap (e.g., known flood scenarios and flood hotspots).	• Integrate information into plans and share across all KCCA entities. • Agree on approved set of flood maps and formalise use in all relevant DRM activities. • Improve exposure and community vulnerability data sets. • Collate key facilities (assets) in a shared database. • Formalise and consolidate flood knowledge into an easily useable format, and make available through the KCCA portal. • Agree on and formalise a regular update cycle for flood risk assessment and planning.

* The application, with a database of pre-modelled scenarios, was handed over to KCCA by the World Bank in February 2019. The application allows the user to enter real-time and recent rainfall measurements and will select the most appropriate flood hazard map that shows the likely flood conditions across the city in the following six hours.

D.4.2. Monitoring and Warning: Current Status and Gaps

In terms of flood monitoring, Kampala benefits from several existing investments in rainfall monitoring, which UNMA and the Red Cross have completed, and in weather stations. Fire services and police, as well as community groups, also collect information on specific impacts. Both formal and informal sharing options, such as Whatsapp groups among private drivers to help them avoid flooded roads, are in use. In terms of warning, no clear policy framework or organisational structure exists for developing accurate, effective, and practical warning messages.

Identified needs across this component can be met by enhancing the river and weather monitoring network and appropriate systems for data collection and review, as well as by taking policy and organisational actions to bolster the warning decision process through EP&R reforms.

Key existing capacities and identified needs are presented in **Table D.4**.

Table D.4 **Monitoring and Warning**

Existing capacities	Identified needs
• No current water-level monitoring exists among agencies. • Limited rainfall monitoring exists (e.g., UNMA, Red Cross). • Efforts are underway to install weather stations (e.g., network of nine). • Some monitoring of impact exists (e.g., police/fire request, media). • Community monitoring exists. (e.g., taxi drivers' network, local experience). • The online platform "U-Report" also provides key monitoring.	• Develop and purchase a river/weather monitoring network (specifically for rainfall) and appropriate telemetry system for data collection (drainage, UNMA). • Develop scope and technical specifications for monitoring, forecasting, and warning interface studies. • Develop multi–data source dashboard to manage data and information systems and provide decision support and warning capability. • Bolster the warning decision process through EP&R reforms.

D.4.3. Dissemination and Communication: Current Status and Gaps

Kampala has established robust channels for disseminating general risk information and has some capacity for communicating warnings to residents through KCCA entities, emergency responders, and local community networks. Current dissemination and communication methods would need to be greatly enhanced, however, to fulfil the requirements of an EWS. This includes enhancement of the dissemination of warnings to all relevant agencies and response partners and the assurance of last-mile connectivity to provide warnings to community members adequate to enable them to take effective action.

Effective dissemination will require the development of clear communication messages and dissemination plans tailored for different flood scenarios and end users. This will require enhancement of outreach equipment and mechanisms and promotion of communication platforms within communities and professional groups.

Key existing capacities and identified needs are presented int **Table D.5**.

Table D.5 **Dissemination and Communication**

Existing capacities	Identified needs
• KCCA has traditional and social media presence (e.g., through Corporate Affairs). • KCCA has built community- and gender-based relationships, such as with existing local community (LC) leadership. • The police/KCCA/division communication structure is functional.	• Develop a clear communication message and dissemination plan for different flood scenarios and end users. • Develop/enhance outreach mechanisms (e.g., loudspeaker/sirens, telecom options, etc.). • Integrate/foster professional group communication/engagement (e.g., using driver network warning spots). • Integrate/foster community-level warning dissemination and communication.

D.4.4. Response: Current Status and Gaps

Kampala has developed a range of capabilities and capacities to assist in flood response, including having KCCA Drain Clearing Response Action teams pre-positioned to clean and ensure the functionality of drainage infrastructure known to have suffered from blockages during previous storm events. The Police Directorate of Fire Prevention and Rescue Services has primary responsibility for taking emergency calls for assistance from the public where life is at risk during flooding and for mobilising rescue resources. They are in turn assisted by the Red Cross Rapid Response Teams, who can also support residents affected by floods.

Command, control, and coordination of response efforts will be enhanced by KCCA's plans to establish a City Emergency Coordination and Operations Centre (CECOC) as a multiagency and multisectoral resource. CECOC will also provide a vital link between resources and actions at the city level and those taken at a national level, as directed by NECOC.

Current response efforts can be bolstered by ensuring further development and implementation of KCCA's plans for CECOC and flood hazard response action plans. Such plans would include aspects such as earlier targeted drain cleaning, as well as development and implementation of action plans for community response measures in support of KCCA's emergency preparedness and response framework and operational plans.

Key existing capacities and identified needs are presented int **Table D.6**.

Table D.6 **Response**

Existing capacities	Identified needs
• KCCA Drain Clearing Response Action does appear responsive to identified problem areas (e.g., engineering, police, Occupational Health and Safety). • Police Directorate of Fire Prevention and Rescue Services has response teams. • Red Cross Rapid Response Teams are functional and active.	• Deliver the planned CECOC and associated structures for command, control, and coordination. • Further enhance KCCA flood hazard response action plans (e.g., provide for earlier targeted drain cleaning, etc.). • Develop action plan for community response measures, in line with EP&R framework/plans. • Bolster Kampala response teams to support residents (e.g., add emergency flood responders, community volunteers at different levels).

D.5. Recommended Actions and Investments

To build a more effective and comprehensive flood early warning system in Kampala and bridge the existing gaps between needs and current capabilities, specific management actions and investments in systems, equipment, information, and human resources are necessary. **Table D.7** provides a description, estimated cost, and approximate time frame required to complete each proposed investment.

Table D.6 Proposed Key Investments

EWS component	Responsible entity (KCCA directorate /government of Uganda ministry)	Activity	Estimated cost (US$)	Approximate time to complete action
0. Governance and institutional arrangements	Office of the Executive Director—Risk Management Unit	Develop and agree on a formal governance structure to oversee design, operation, and maintenance of a Kampala-level flood EWS, enhance the KCCA response action plan, and improve community response capability.	100,000	12 months
1. Risk knowledge	Office of the Executive Director—Risk Management Unit	Procure a specialist flood forecast and early warning consultancy firm to prepare a flood forecasting and early warning development strategy, pulling together a fuller picture of the flood risk the city faces and the potential benefits of early warning and an effective response, and to develop a programme for risk data and information improvement and upgrade over time.	50,000	6 months
	Office of the Executive Director—Risk Management Unit	Set up modelling and forecasting systems, with alert thresholds or alarms configured with any automated warning messages or protocol, and with "end to end" system testing and support.	200,000	3 months
2. Monitoring and warning	Office of the Executive Director—Risk Management Unit (system design), UNMA (technical advisory)	Prepare a system design and monitoring strategy, with identification of sites; carry out site survey; and establish monitoring and installation requirements. Develop a procurement strategy for an instrumentation and telemetry system (software and hardware) and an installation plan. Define a modelling platform and forecasting and warning dashboard (hosted remotely or locally), with integrated data interface and communication links for data and system connectivity.	250,000	6 months
	Office of the Executive Director	Procure instrumentation (estimated at 50 level and velocity gauges, and 10 rain gauges), with spares and support contract.	100,000	3 months
	Office of the Executive Director	Procure a telemetry system—outstation, master station, software, and communications package with spares and support contract.	200,000	3 months
	Office of the Executive Director—Risk Management Unit (system design), UNMA (technical advisory)	Develop a modelling system and data interface, and establish forecast points, trigger levels, and lead-time parameters.	300,000	6 months

Table D.6 **Proposed Key Investments** (cont.)

EWS component	Responsible entity (KCCA directorate /government of Uganda ministry)	Activity	Estimated cost (US$)	Approximate time to complete action
2. Monitoring and warning	Office of the Executive Director—Risk Management Unit	Procure and preliminarily configure dashboard and early warning management system (assuming some level of automated alert system is included), establishing or revising the warning decision process through EP&R reforms.	200,000	4 months
	Office of the Executive Director, City Emergency Operations Control	Install instruments and outstations and configure telemetry system, with all data monitoring and interfaces fully set up.	200,000	8 months
3. Dissemination and communication **4. Response**	Kampala Metropolitan Police, Gender, Community Services, and Production	Conduct community outreach and training, and purchase flood warden equipment (e.g., phones, loud hailers, signage, information packs), and improve dissemination and communication capacity—particularly last-mile warning dissemination.	200,000	12 months
0–4. All components	Office of the Executive Director	Upgrade IT infrastructure.	200,000	3 months
	Office of the Executive Director—Risk Management Unit	Create documentation and conduct training.	100,000	6 months
	Office of the Executive Director	Provide project management.	200,000	24 months

Annex E. Risk-Informed Neighbourhood Planning: Sample Nakamiro Channel Terms of Reference

This annex presents a draft terms of reference for completing a risk-informed neighbourhood planning exercise in the Nakamiro Channel. This activity would support **Resilience Pillar 3: Investment in Disaster Risk Reduction for Resilience** and priority action **3.4 Adopt a resilient and risk-reducing approach to neighbourhood planning**.

E.1. Background

Kampala is severely affected by disaster risk. Flood-related challenges, in particular, threaten the condition of public spaces, such as streets, pathways, parks, and so on, that normally have not been addressed in the public discussion included in development plans. Yet such spaces are important, particularly for residents of informal settlements. Because of their crowded housing conditions, these residents depend on having open public spaces in which they can engage in recreational activities, rest, or socialise with friends to a much larger degree than people living in wealthier neighbourhoods.

E.1.1. Kampala Disaster Risk and Climate Change Resilience Strategy

Under the Kampala Disaster Risk and Climate Change Resilience Strategy, KCCA seeks to provide the city—its leaders, stakeholders, and residents—with a better understanding of the risks associated with climate change and the measures and investments that will enable it to manage and reduce those risks and achieve resilience. Kampala plans to address challenges associated with the generation of climate risk data and information for urban management, the application of urban and land use planning tools for risk reduction, and the identification and construction of climate-smart infrastructure. This programme will address four main areas:

- Avoiding the creation of risks
- Reducing existing risks
- Responding more efficiently to disasters
- Adapting and building climate resilience

Based on the analysis it presents in the risk diagnostic, the review of current efforts and previous recommendations, and the participatory stakeholder workshops conducted, this strategy sets out a total of 20 strategic actions categorised under six pillars: (1) Institutional and Governance Strengthening, (2) Understanding Risk, (3) Investment in Disaster Risk Reduction for Resilience, (4) Preparedness, Response, and Resilient Recovery, (5) Climate Adaptation and Resilience, and (6) Health Resilience and Response.

Reduction of urban vulnerability, risk-informed neighbourhood planning, and upgrading are among the strategic actions prioritised in the strategy. This consultancy will guide the first interventions Kampala will undertake in this regard.

E.1.2. Kampala Institutional and Infrastructure Development Project—KIIDP 2

With support from the World Bank, the city of Kampala is currently implementing the second phase of the Kampala Institutional and Infrastructure Development Project (KIIDP 2), whose objective is to enhance both the infrastructure and the institutional capacity of KCCA to improve urban mobility in Kampala. This project will reduce flood risk and its impact on mobility by improving the drainage network of the city, as a complementary investment to the enhancement of the road network.

The first drainage element to be targeted by KIIDP2 is the Nakamiro Channel, a 3.2 km-long channel that overflows frequently, resulting in the flooding of a densely populated and informally developed area. A section of the channel will be enlarged to increase conveyance and substantially reduce the risk of flooding, both along the channel and on the roads that cross it.

Reducing flood risk in the area will improve the living conditions of the community. To achieve that goal, KCCA wants to enhance this improvement further by investing in public infrastructure in the area, taking

advantage of the acquired corridor alongside the channel. To guide this investment, this consultancy is expected to produce a neighbourhood plan, an urban design concept, and guidelines and recommendations for the design of the corridor alongside the channel.

Risk-informed neighbourhood planning is essential to disaster risk reduction. Such informed decision making can reduce exposure and vulnerability, generating cost-effective actions that save lives, prevent or reduce losses, and ensure effective rehabilitation and recovery, as well as being instrumental to poverty reduction and economic development. To enhance the resilience of Kampala's communities, businesses, institutions, and environment, risk-informed investments and the implementation of sustainable mechanisms in planning are crucial. Likewise, promoting the enforcement of territorial development and critical public and private infrastructure upgrading, with particular emphasis on high-risk and vulnerable areas, will contribute to achieving Kampala's resilience goals.

The investment in the Nakamiro Channel is expected to become a pilot to guide future interventions in the channels of the city.

E.1.3.Assignment

The Kampala Capital City Authority (KCCA) is planning to engage an urban planning and design and/or landscape architecture firm to guide future interventions in the Nakamiro Channel area. The firm is to provide *a neighbourhood plan*; an *urban design concept*; and *guidelines and recommendations* for the design and construction specifications for the corridor alongside the channel.

E.2. Objectives

The consultancy intends to undertake a participatory, stakeholder-driven process including, among other things, community engagement and urban design workshops, whose objective is to establish a precedent for sustainable risk-based planning and urban development. The process can be piloted in the Nakamiro Channel area for eventual replication across many parts of the city. The assignment will have three specific outputs:

1. A neighbourhood plan for the Nakamiro Channel area (Bwaise II, Bwaise III, and Kazo parishes), including interventions compatible with resilient flood risk management, as well as with channel revitalisation, preservation of open space, mobility, recreation, and other complementary uses in the project area (approximately 2.49 km^2)
2. An urban design concept for the Nakamiro Channel corridor (strips 3.5 m wide on both sides of the channel and additional available adjacent plots)
3. Guidelines and recommendations for the designs and construction specifications for the elements of the proposed urban design concept, including the open spaces and public infrastructure of the strips along the channel and the additional available adjacent plots.

The project aims to demonstrate the importance and validity of an inclusive process for using public funds for neighbourhood improvement by financing visible but relatively low-cost public space enhancements through a collaborative process. It will also support improvements to selected administrative services and lay the foundation for better city management.

E.3. Scope of Work

The following aspects should be included in the scope of work of the selected consultants.

E.3.1. Coordination and Baseline Information

The consulting firm will become familiar with the Kampala Institutional and Infrastructure Development Project (KIIDP 1 & 2), through which roughly 100 km of roads are being paved and 160 km of footpaths, bridges, and walkways constructed, and the drainage network of the city is being updated. The drainage network includes the Nakamiro Channel, which is the area of interest for the services requested under this consultancy.

Detailed designs for the reconfiguration of the Nakamiro and Lubigi channels are already in place as part of the KIIDP 2 project. Other information is provided by the flood hazard maps for the area and the land available for the intervention,

including the strips along the channel and adjacent plots. The consulting firm should be familiar with this information and ensure full coordination between the proposed design to be provided and the ongoing intervention.

E.3.2. Neighbourhood Plan for the Nakamiro Channel Area

The goal in creating the neighbourhood plan is to produce an official policy guide for the future development and growth of the parishes of Bwaise II, Bwaise III, and Kazo, located in the urban area of Kampala along the Nakamiro Channel. The plan will capture the community's vision for the study area, highlighting goals and objectives based on a full consultation and participation process. It will provide the framework and basis for sound community development and land use decision making and establish clear direction and expectations for the selected parishes.

The consultants will review and analyse the current land uses (residential, commercial, and so on) within the three parishes, based on existing data (the Nakamiro Channel OpenStreetMap project) and propose recommendations for a redistribution of land use and corresponding public space improvements. This effort will include, but not be limited to, identifying opportunities for affordable housing and consolidation of commercial areas, as well as area-level improvement of public spaces, drainage, lighting, sidewalks, parks, and motorised and non-motorised mobility, among others. In this regard, "public spaces" refers to a range of urban spaces accessible to the public that may include footpaths, sidewalks, and roads; open spaces, like parks, playgrounds, and green areas; and buildings, such as markets, bus terminals, community centres, schools, and health facilities.

In its approach to the project, the consultants should consider clustering infrastructure improvements—that is, upgrading various components in the same area, such as drainage, lighting, sidewalks, parks, and so on. Making improvements to local areas in such an integrated manner is an efficient approach that results in a "synergistic," or network, effect whose overall result is greater than the sum of its parts. Improving a network of connected streets and public spaces, for example, is more meaningful than improving individual streets or scattering interventions across the city.

Since floods represent one of the biggest hazards for Kampala and its residents, the policies and programmes of this neighbourhood plan should focus in part on risk reduction and resilience. Planners should, for example, incorporate the flood hazard map into their decision-making process for establishing new areas for urban development and upgrading programmes. Likewise, they should develop strategies to control urban sprawl and the growth of informal settlements in flood-prone portions of the study area.

Previous development in the area has been informal, lacking a regular pattern and with an inefficient mobility network consisting mostly of footpaths along drainage and wastewater channels. This informality has serious implications for accessibility, the efficient use of space, and the provision of public services. Neighbourhoods whose development has been characterised largely by one-storey buildings, most of them built with low-quality recycled materials, emerge as great opportunities to meet KCCA's objective of identifying areas where a resettlement process, demolition, and reconstruction can be undertaken at relatively low cost. Implementation strategies to upgrade and reconfigure conditions in such places in ways that enhance the accessibility and provision of public services will transform them into attractive areas for urban development.

Along these lines, the following interventions have been identified as priorities to improve liveability in the neighbourhood:

- Improved infrastructure for pedestrian and other non-motorised mobility
- Better-quality public and open spaces
- Better drainage
- The provision of accessibility to tipper trucks for channel maintenance, including better management of intersections and footbridges over the channels

The improvement of public, open, and green spaces is of particular relevance, given the lack of these in the city and

their vital importance for the urban environment, especially for the poor. The importance of sanitation, including public toilets, solid waste collection, and drainage should also be considered.

E.3.3. Urban Design Concept for the Nakamiro Channel Corridor

In terms of the reconfiguration of the Nakamiro Channel, detailed designs are already in place for the 3.2 km drainage channel, as are 3.5 m strips along both sides of it, whose original purpose was to provide access for maintenance. In addition, KCCA has acquired plots connected to the channel that are destined for the public infrastructure that needs to be designed within this consultancy. The urban design concept for the channel corridor aims to maximise the use of the land available—that is, the 3.5 m strips and the additional plots—for the provision of multiple services and features, such as pedestrian and other non-motorised mobility, green landscape, playgrounds, a community centre, and public toilets, among others, in addition to access for maintenance of the channel and the additional land available.

The urban design concept should provide for the following:

- A comprehensive network for non-motorised mobility that includes bicycle paths, sidewalks, pedestrian bridges, and connections to open spaces, all of them compatible with the accessibility requirements for channel maintenance
- Pedestrian-friendly road crossing elements
- Improved flood protection for the Nakamiro and Lubigi channels, integrating raised embankments into the corridor design
- Sufficient space for flooding that contributes to an overall reduction in flood risk within the area, as it will still flood during more extreme events
- Public spaces that respond to the community needs
- Non-structural elements for the open public spaces along the channel to promote ownership, use by all members of the community, and leisure, including wall art, decoration, signposts for community information, and attractive streetscape elements, such as street furniture, signage and building-street connectivity, and so on, as part of the landscape design
- A street lighting design
- Public bathrooms to be run by the community (already successful in Kampala and other cities in Africa), with validation of the addition to the same compound of other services, including Wi-Fi, shops, sitting space, and so on
- Runoff management
- Solid waste management
- Recommendations for open space, solid waste, and channel maintenance and for environmental management

In addition, the consultant should do the following:

- Present several designs and land use scenarios and engage stakeholders in a decision-making process pertaining to a desired concept
- Produce thematic maps, diagrams, two- and three-dimensional drawings, cross-sections, and renderings during the workshops and for the final reports
- Include cost estimates and a phasing strategy

E.3.4. Guidelines and Recommendations for the Designs and Construction Specifications

The consulting firm should provide architectural and engineering blueprints, specifications, and structural designs for the infrastructure and streetscape elements proposed in the urban design concept.

E.3.5. Participatory Planning and the Urban Concept Design

The exercise should incorporate inputs from key stakeholders, including KCCA and the local community. The consulting firm should provide and implement a detailed plan for participatory strategy in preparation of the neighbourhood plan and the urban design concept (see above), including carefully structured workshops and/or interviews and/or surveys. These would assist in the development of consensus-based outputs. The consultative process itself is an important element of the project.

E.4. Activities

The Nakamiro Channel Corridor assignment will involve the activities outlined below.

E.4.1 Baseline and Initial Planning

Establishing a baseline and initial planning for the project will be accomplished through three activities.

The first, project mobilisation, has three parts:

1. Drafting of a brief inception report describing the consulting firm's approach to the assignment, assumptions, questions, roles, schedule, and so on
2. An initial project kickoff meeting to discuss the inception report and create a shared understanding between the consulting firm and KCCA of the project purpose, process, and schedule
3. Facilitation by KCCA of a kickoff meeting with key stakeholders to meet the consulting firm and for the consultants to present the approach to the assignment and receive feedback

The second stage involves collecting and reviewing background information and includes two steps:

1. A literature and data review of resources and documentation related to the assignment, to be provided by KCCA
2. Identification of any additional data needed, to be requested from KCCA

The third stage will be to prepare a work plan and time schedule for the activities and deliverables of the project.

E.4.2. Urban Design Concept

Developing the urban design concept for the Nakamiro Channel area will involve four activities. The first will be a kick-off visit to the project site. After conducting the background information collection and review stage described above, the consulting firm should carry out a comprehensive site visit with KCCA and local stakeholders to obtain an understanding of expectations, possibilities, and restrictions essential to the design process. The activity will include identification of possible additional data sources and collection of photographic information about the project area that could complement the design requirements.

Second, further site visits and workshops will be required to validate options and proposals and assess the availability and cost of construction materials and local construction practices to be considered for the project, and to generate guidelines and recommendations for the designs and construction specifications. As part of the workshops, which will be conducted with KCCA and key stakeholders, the consulting firm is expected to include a tentative list of specific urban elements to be included in the design concept, with an early assessment of outline costs based on utilising local materials and labour.

The third activity will be to produce a base map of the study area. The consulting firm will create a base map (based on the data generated in the OpenStreetMap project for the Nakamiro area) and identify clear boundaries within which to develop the urban design concept. The base plan should capture information regarding public areas, such as parks, open spaces, and public facilities, corridors for pedestrians and vehicles, and any other neighbourhood characteristics that would help in shaping the design concept, such as areas used by food and other street vendors. The consultant firm will also identify opportunities and challenges presented by the proposed study area.

The fourth and final activity is to elaborate the urban design concept, providing the conceptual elements that will guide the design process. This elaboration should encompass thematic maps, diagrams, two- and three-dimensional drawings, cross-sections, and renderings, with special attention paid to pedestrian and cycling connectivity and complementary uses of public space. All the stages of the process should take into consideration validation from and feedback of key stakeholders, and the final product should be approved by KCCA.

E.4.3. Guidelines and Recommendations for Design and Construction Specifications

Once the urban design concept has been developed, the consulting firm will generated the necessary architectural, engineering, and streetscape designs for all open spaces and public infrastructure proposed for the available land connected

to the Nakamiro corridor. This will involve elaborating all the visual materials, such as thematic maps, diagrams, two- and three-dimensional drawings, cross-sections, renderings, and reports, necessary to define the dimensions, materials, and rough cost estimates based on utilising local materials and labour. These guidelines and specifications should be validated by KCCA.

E.4.4. Neighbourhood Plan for the Nakamiro Channel Area

To develop the neighborhood plan for the Nakamiro Channel area, the consulting firm is to undertake a review of research and background documentation relevant to the preparation of the project. This will involve preparing and presenting samples of previous relevant work, conducting site visits, and generating three outputs: a base map neighbourhood plan, a neighbourhood plan, and an investment plan, described below.

E.4.4.1. Base Map Neighbourhood Plan

The consulting firm will create a base map (based on the data generated in the OpenStreetMap project for the Nakamiro area) and identify clear boundaries for the purpose of developing the neighbourhood plan. The base plan should capture information on public areas such as parks, open spaces, and public facilities, corridors for pedestrians and vehicles, and any other neighbourhood characteristics that would help in shaping the plan, such as areas used by food and other street vendors. The consultant firm will also identify opportunities and challenges presented by the proposed study area.

E.4.4.2. Neighbourhood Plan

This neighbourhood plan will identify long-term goals, policies, and physical improvements for the study area, presented in a document that will provide guidance to future decision makers and elected officials concerning development and programme proposals that affect the neighbourhood. The goal is to create a much more detailed view of the plan area than can be provided by Kampala's master plan.

Although the neighbourhood plan could, for example, identify a concept design for public space improvements, it does not take the place of the detailed design drawings necessary for their construction. With it, however, local agencies like KCCA will be able to maximise the potential of the area by influencing change and make the area a better place to live, grow up, work, and do business.

Likewise, this plan will give local people and businesses a much greater say in how the places in which they live and work should change and develop over time, helping them determine the location of shops, offices, and schools, identifying sites for public facilities, and providing recommendations for uses and activities.

To meet these goals, the consulting firm should consider structuring the document in four sections, as follows:

Section 1: Presents an overview or assessment of the area covered by the neighbourhood plan

Section 2: Presents a vision and objectives for the study area, as well as principles to guide urban development

Section 3: Presents the policies, associated projects, and vision for the study area, in three parts:

- Part A: Policies, projects, and programmes related to the neighbourhood plan area as a whole, considering such matters as design quality, green spaces, and transport
- Part B: Policies, projects, and programmes related to potential areas for future growth, such as vacant lots
- Part C: Policies, projects, and programmes related to high-risk environmental areas, such as flooding zones

Section 4: Presents the next steps for implementing the policies and programmes set out in the plan

Supplementing this document should be all the maps, graphics, and sketches necessary to explain the plan.

Finally, to present the plan in a complete and compelling way, the consulting firm should ensure the document does all of the following:

- Identifies existing conditions and characteristics, community challenges, and opportunities
- Guides local community, property owners, developers, and government entities (KCCA) with expectations

and standards for public investment and future development

- Supports the allocation and spending of funds
- Establishes the basis for land use policies and other implementation tools and programmes for the study area
- Improves the connectivity of the area through the use of non-motorised systems and last-mile strategies.
- Builds partnerships between residents and government entities (KCCA) for participation in implementing the plan
- Ensures compatibility with the existing urban concept and design for the Nakamiro Channel corridor
- Includes restrictions and guidelines derived from an understanding of flood hazard and flood risk
- Lists all possible opportunities to upgrade and reconfigure the area
- Creates people-centric public spaces that are walkable and accessible to residents of the study area
- Includes attractive streetscape elements, such as street furniture, landscaping, street lighting, building-street interface, and so on
- Presents designs for a comprehensive pedestrian network and circulation, including such elements as footpaths, sidewalks, road crossings, connections to open spaces, and footbridges
- Proposes enhancements for household solid waste management, considering the "garbage to truck" strategy adopted by KCCA
- Proposes accessible public open spaces and parks to encourage social interaction
- Proposes a land use plan for the neighbourhoods of the study area.
- Highlights the existing social infrastructure, defining the minimum additional required social infrastructure and proposing its location in the neighbourhood plan, which includes public bathrooms to be run by the community (already successful in Kampala and other cities in Africa) and validates the addition of other services to the same compound, such as Wi-Fi, shops, sitting spaces, and so on
- Pays particular attention to the open tertiary channels used for runoff and wastewater drainage and proposes an efficient network approach and a low-cost solution to cover them up, with easy access for maintenance

All the stages of the process should consider validation from and feedback of key stakeholders, and the final product should be approved by KCCA.

E.4.4.3. Investment Plan

The consulting firm is expected to include as part of the neighbourhood plan a set of specific possible investment projects, with an assessment of outline costs based on utilising local materials and labour. This will provide a list of interventions that can be used to select priority projects, in consultation with the client and the relevant stakeholders.

The consulting firm is expected to package the investment proposals and develop an urban upgrading investment plan reflecting priority intervention areas. The proposed investment projects should include a phased action plan (short, medium, and long term), which should take into consideration the available documentation and the need for further studies and surveys.

E.4.5. Report Preparation and Feedback

The final design reports should be written in English and must be clear and concise. Technical annexes should be included, but the main reports should be brief and easily digestible by a nontechnical audience. It is expected that the consulting firm will be expected to plan for feedback sessions at the technical level and present the results at a high-level event once agreement is reached on the final designs.

E.5. Deliverables

The following are the deliverables to be produced in each phase of the project:

- Baseline and initial planning: work plan, inception report
- Urban design concept: draft urban design plan package; final urban design plan package validated by KCCA

- Guidelines and recommendations for the designs and construction specifications: draft package designs and construction specifications; final package designs and construction specifications
- Neighbourhood Plan: draft report; final report
- Report preparation and feedback: presentation of final results at a high-level event

E.6. Firm Profile and Qualifications

KCCA is seeking a dynamic firm or firms (in the case of a partnership or consortium), with a team composed of leaders in participatory planning, green infrastructure, and open space design. The firm or firms should demonstrate leadership in sustainable urban development principles and environmentally and socially conscious design and assemble a team of experts who are capable of high-level dialogue with decision makers, as well as engagement at the grassroots level within affected communities.

Technical proposals will be evaluated on the basis of four criteria:

1. Understanding of the requirements and a clear technical response that includes the following:

- Methodology defining the approach that will be taken
- Program and resource allocation (including staff time, skills, and competencies required for specific roles and activities)
- Identification of project risks, constraints and dependencies, and the mitigation that will be put into place by the consulting firm
- Opportunities and/or additional benefits that could be obtained that have not specifically been identified within these terms of reference.

2. Firm qualifications

- A minimum of 15 years of experience in the urban sector and landscape architecture in particular and successful completion of at least two similar assignments in developing countries within the past 7 years
- Demonstrated experience in leading dialogue on complex urban planning and policy issues
- Clear examples of open space design and environmental planning using participatory design principles

3. Technical expertise and skills

- Ability to produce renderings and two-dimensional drawings, such as plans and section drawings
- Demonstrated experience in urban planning and urban design, including open space neighbourhood planning and urban riverbanks restoration, including in African cities
- Technical knowledge of and experience in designing with green infrastructure
- Expertise in community engagement and mobilisation, including experience on urban issues
- Demonstrated familiarity with Kampala, including national and local government structures and decision-making processes
- Demonstrated ability to convene communities, technical experts, and high-level government officials
- Excellent English language skills
- Experience in professional workshop planning and facilitation

4. Team composition

The client understands the consulting team will be multidisciplinary in nature, and consultants can propose a mixture of individuals that include the following expertise (individual team members may satisfy more than one criterion):

- Team leader with at least 15 years of experience in urban development, landscape architecture, environmental planning, or a related field
- Registered landscape architect with at least 10 years of experience
- Environmental or hydrological engineer or similar with at least 5 years of experience
- Geographical information systems (GIS) specialist with at least 5 years of experience
- Urban planner with at least 10 years of experience
- Community engagement specialist, with expertise in leading decision-making processes with multiple stakeholders, with at least 5 years of experience

Annex F. Emergency Preparedness & Response Framework – Draft Institutional Arrangements

This annex presents a draft terms of reference for completing a risk-informed neighbourhood planning exercise in the Nakamiro Channel. This activity would support **Resilience Pillar 3: Investment in Disaster Risk Reduction for Resilience** and priority action **3.4 Adopt a resilient and risk-reducing approach to neighbourhood planning**.

Kampala Emergency Preparedness and Response (EP&R) Framework Institutional Arrangements

DRAFT Date: November 15, 2019

1. Introduction

This annex presents the draft Kampala Emergency Preparedness and Response (EP&R) Framework Institutional Arrangements, as developed by KCCA, OPM, and key stakeholders.

1.1 Executive Summary

The 1995 Constitution of Uganda in the sixth schedule (Number 29) points out that the primary responsibility for disaster preparedness and management rests with the state, while Objective 23 of the Constitution states that, the State shall institute an effective machinery for dealing with any hazard or disaster arising out of natural calamities or any situation resulting in general displacement of people or serious disruption of their normal life. The National Policy for Disaster Preparedness and Management (2010) aims to create an effective framework through which disaster preparedness and management is entrenched in all aspects of development processes, including planning, saving lives, protecting livelihoods and the country's resources.

The 2010 Policy establishes several important principles for Emergency Preparedness and Response (EP&R) in Uganda. It establishes a robust multi-sectoral and multidisciplinary approach to Disaster Risk Management, involving all government ministries in collaboration with humanitarian and development partners, the private sector, local governments and the community.

The 2010 Policy also clearly sets out the various EP&R structures for Uganda and has identified lead government departments for various disaster types. The national policy sets out multiple levels of decision making and committees, from the level of the President to an individual Village. However, guidance setting out how the policy will be operationalised at the local and city level, including the various committees and decision-making structures for coordinating emergency response and recovery, have yet to be formalised and the Policy itself was published prior to the formulation of the Kampala Capital City Authority so does not reflect current institutional arrangements within the City. This lack of clarity is especially problematic for those responsible for resolving fast evolving emergencies in Kampala, where the effective mobilisation and coordination of all available resources at the City and Division level is essential if the adverse impacts of any event are to be minimised.

This Kampala Emergency Preparedness and Response Framework is designed to support the 2010 National Disaster Preparedness and Management Policy by providing additional detail to ensure that it can be operationalised at the Kampala level. It recognises and builds upon existing functional command and control protocols developed by emergency responders in Kampala, including the Police and Fire and Rescue Services. Extending these protocols to all agencies and organisations responding to emergencies within in the City will ensure that all available resources can be harnessed and coordinated effectively. The common multi-agency and multi-sectoral arrangements for command and control established within this framework and base plan arrangements can be used to guide effective emergency preparedness and response to any emergency impacting the City.

This Framework describes how the response to any emergency or disaster will be organized at the Kampala level in support of the central government's Department of Disaster Preparedness and Management within the Prime Minister's Office, and the National Emergency Coordination and Operational Command. It also sets out the structures for the effective coordination of disaster responses within Kampala, at the City, Division and Field level.

The Kampala EP&R Framework is not a stand-alone document. It supports national Legislation and Policies, providing the framework and operational plan for their practical delivery, setting out arrangements for ensuring an effective response to, and recovery from, any emergencies or disaster occurring in Kampala, irrespective of cause or location.

For the purpose of the Kampala Emergency Preparedness and Response Framework and these Institutional Arrangements, the term "emergency" is used to refer to any serious, unexpected, and dangerous situation occurring within the City requiring

immediate action. The term "disaster" is used to refer to the most significant emergencies that seriously disrupt the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community's or society's ability to cope. Unless there is a specific reason to differentiate between an "emergency" and a "disaster", the term emergency is used interchangeably.

1.2 Key Elements forming the Kampala EP&R Framework

The Kampala Emergency Preparedness and Response Framework has been developed to operationalize Uganda National Legislation and the 2010 National Disaster Preparedness and Management Policy at the Kampala level. It consists of two major component elements relating to Institutional Frameworks for EP&R and an Operational Plan for emergency response. Each of those major component elements is broken down into several subcomponents as set out below.

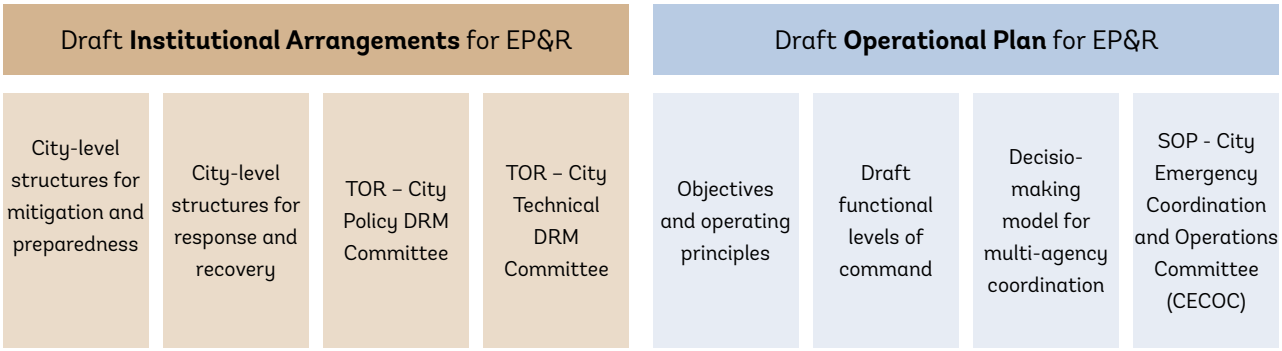


Figure F.1 **Key Elements of the Kampala EP&R Framework**

Within the EP&R Framework, the following definitions have been adopted;

EP&R Framework	The title given to the overall harmonised collection of Policy and Technical documents that, when considered together, form the basis for all emergency preparedness and response activities in Kampala
The EP&R Institutional	The Policy element of the Framework that establishes the governance,
Arrangements document	arrangements, organisational structures and relevant Committees responsible for oversight and delivery of EP&R in Kampala
EP&R Operational Plan	The Technical / Operational element of the Framework setting out how responders will coordinate their response to emergencies in the City

This document sets out the Institutional Arrangements for EP&R and provides the Policy and Governance framework for management and delivery of effective EP&R for Kampala.

The Institutional Arrangements document will be supported by an Operational Plan setting out an operational command system and coordination structures for emergency response, formalising and extending a system of "functional command" already used by Police and other responders in Kampala. Extending this system to KCCA and all other supporting agencies will enable a consistent multi-agency approach to emergency response to be adopted across the City. The system can and should be used by all agencies, for all emergencies, regardless of the hazard type or scale of event.

The Operational Plan sets out the essential technical "need to know" and any supporting information that is applicable to all stakeholders in respect of emergency response at the Kampala level, such as emergency coordination, command and control structures, and establishing these as a matter of public record. It also establishes several key technical principles essential for the successful management of emergency response operations in Kampala.

1.3 Governance Arrangements for the Overall EP&R Framework

Effective emergency preparedness and response in Kampala requires the coordination of multiple agencies at multiple levels. Some elements of the Framework relate to strategic Policy issues, like governance arrangements for EP&R at the City level, other elements are purely technical instructions for first responders.

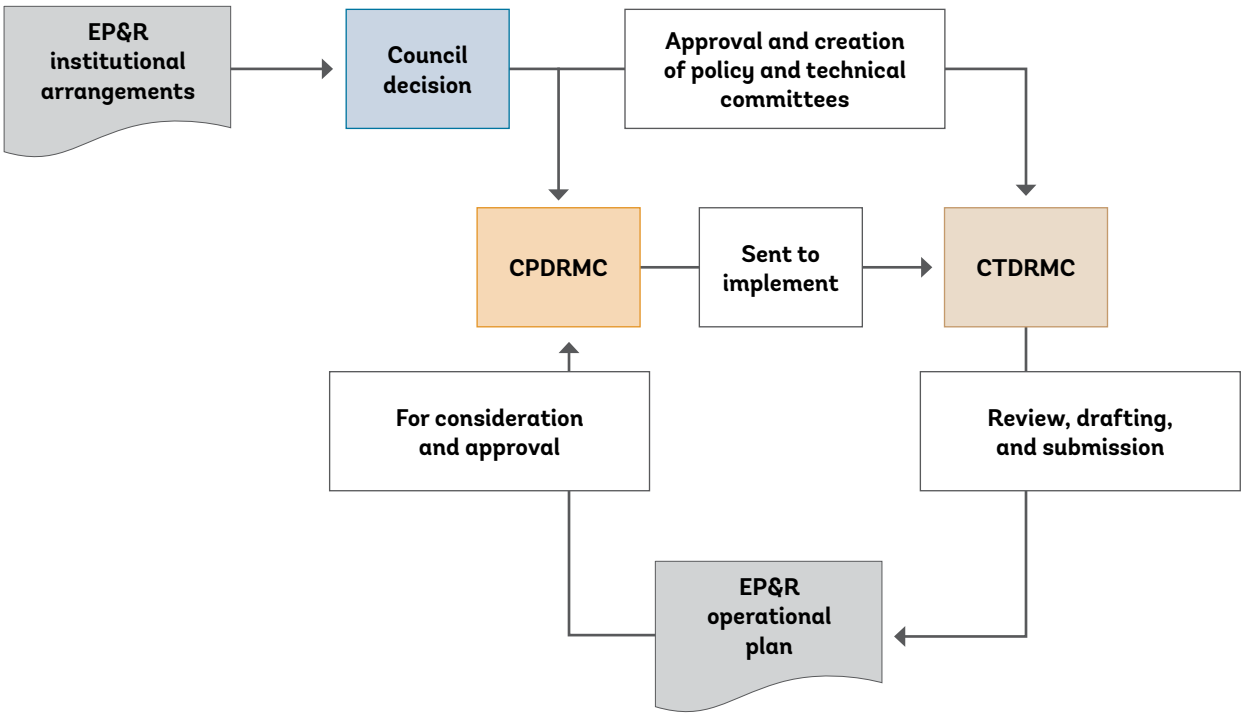
The primary element of the EP&R Framework is the document setting out the Institutional Arrangements that will apply to all emergency responders within the City. The Institutional Arrangements document is primarily a policy document, establishing the governance arrangements and Committees for oversight, management and delivery of all aspects of emergency preparedness. It also establishes the multi-agency and multi-sectoral structures necessary for the effective coordination of operational responses to any emergency in the City, from minor emergencies dealt with quickly and without injury or damages by first responders, to a major emergency impacting the entire City.

In order to operationalize the emergency response structures, set out in the Institutional Arrangements document, it is supported by an Operational Plan that describes the technical arrangements for delivery of an effective multi-agency emergency response in Kampala. These technical arrangements may require frequent updating, revision and additions to quickly take account of changing risks or experiences gained from emergencies. The Operational Plan itself will be supported by highly detailed and technical Standard Operating Procedures that may be drafted and submitted by multiple agencies and will again require frequent updating and revision.

In order to ensure proper control and oversite of policy issues arising from the EP&R Institutional Arrangements document, this must be considered and given approval by the City Council. Any future proposed changes to the document will also require approval of the City Council.

Once the EP&R Institutional Arrangements document is approved and its EP&R structures are enacted, control and oversite of purely technical matters, including the EP&R Operational Plan, will then pass to the City Technical Disaster Risk Management Committee (CTDRMC) responsible for drafting and examining the Operational plan and any future amendments, and the City Policy

Figure F.2 **EP&R Framework Components and Governance**



Disaster Risk Management Committee (CPDRMC) responsible for considering and approving them.

This arrangement enables regular technical updates and revisions to operational plans to be processed quickly to ensure operational safety and readiness, whilst remaining subject to both technical and policy level scrutiny prior to adoption.

1.4 Objectives for the Kampala EP&R Framework

The objectives of the Kampala EP&R Framework, including both the Institutional Arrangements and Operational Plan, is to:

1. Implement at the Kampala level the structures and principles established in the 2010 National Policy for Disaster Preparedness and Management;
2. Establish high institutional and governance arrangements for effective emergency preparedness and response in Kampala.
3. Establish the Committee structures necessary to integrate the efforts of all levels of government, sectors and communities in preparing for, responding to, and recovering from, emergencies and hazardous events in Kampala;
4. Establish a common operational plan for all government, civil society and private sector responders that can be applied to any emergency regardless of causation and scale;
5. Establish arrangements for emergency response which accommodate regional and local humanitarian support;

1.5 Overview of EP&R Institutional Arrangements

Once formally adopted by Council, the agreed institutional arrangements set out in this document must be implemented, including creation of the necessary governance committees and decision-making structures. Any proposals for future changes to the Kampala Institutional Arrangements for EP&R must be submitted to the City Council for consideration and approval.

Routine planning and emergency preparedness work is conducted by experts at a technical level, with oversight and direction provided at the policy level. However, when an emergency occurs, the city level institutional arrangements established for preparedness will need to expand to incorporate a number of additional stakeholders, and they will have to work at an entirely different speed and scale when responding to an emergency rather than carrying out routine preparedness work. During a major emergency, national legislation and policy also requires the technical officers and responders at City level responsible for response, to come under the command of a National Incident Commander at the National Incident Coordination and Operations Centre (NECOC). In recognition of this, the Kampala EP&R Institutional Arrangements acknowledge that City Level structures will need to operate in one of two modes:

1. **Emergency Preparedness Phase** - Normal circumstances where there is no ongoing emergency; and
2. **Response Phase** – During Emergency Response Operations

To ensure that coordination and technical support for emergency response operates quickly and efficiently, Kampala institutional arrangements will operate in a slightly different way during the response phase of any event. Institutional arrangements must also recognise that Operational decisions may need to be taken quickly to save lives and avoid escalation of an emergency.

In recognition of these Operational priorities, during a major emergency, the City Technical Disaster Risk Management Committee will expand its membership as required to become the City Emergency Coordination and Operations Committee (CECOC) for the purpose of responding to that emergency. When activated, CECOC will become a "unified command" to ensure effective coordination of multi-agency efforts at the Kampala level, delivering the mandate set out in 3.7 of the National Policy Document to "*Coordinate and implement disaster preparedness and management interventions in the city*". When activated, CECOC will report to, and take operational direction from, their National Counterpart at NECOC, whilst

also providing regular briefings and information updates to the City Policy Disaster Risk Management Committee (CPDRMC).

During a major emergency, the role of CPDRMC is to "Monitor the implementation of emergency response activities in the city" and to "Ensure and authorise expenditure for emergency related activities in the city". CPDRMC are also responsible for taking up any matters of Policy arising from the emergency through the Kampala Minister and Inter Ministerial Policy Committee.

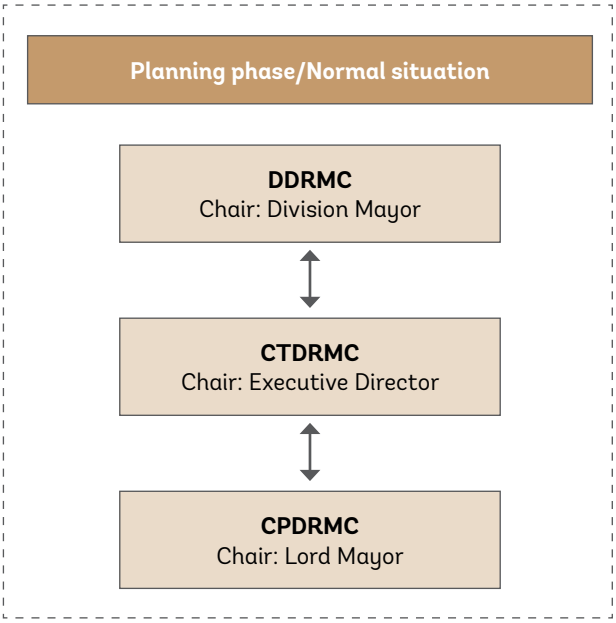
2. City-Level Structures for Emergency Preparedness

In line with the National Policy for Disaster Preparedness and Management, 2010, KCCA has adopted, with some modifications, key structures for governance of routine preparedness activities in Kampala city. These activities include preparations for any major emergency that could impact the city, and the more frequent emergencies that impact the lives of Kampala's citizens on a daily basis. Preparedness activities also encompass all types of hazard and emergency situation that may impact Kampala, including all of those identified in the National Risk Atlas in addition to any specific hazards that may be applicable only in Kampala.

These structures are to be convened regularly to undertake routine planning, exercising and other risk reduction activities.

- City Policy Disaster Risk Management Committee (CPDRMC)
- City Technical Disaster Risk Management Committee (CTDRMC)
- Division Disaster Risk Management Committees (DDRMC)

Figure F.3 **Kampala Institutional Structure for EP&R Planning / Non-Emergency Situations**



2.1 Membership, Role and Functions for the City Policy Disaster Risk Management Committee (CPDRMC)

The membership, role and function of the City Policy Disaster Risk Management Committee are set out in the 2010 National Policy for Disaster Preparedness and Management.

The CPDRMC shall be chaired by the Lord Mayor while the Executive Director, will designate a Secretary from the technical team. It will be composed of members of the City Executive Committee, RDC, DPC(s), DISO(s), a representative of the army and Division Mayors. The committee will meet every six months, or as and when there is an emergency in the city. The Lord Mayor will also co-opt 4 councillors on the committee.

The functions of the City Policy Disaster Risk Management Committee:

1. Give policy direction to the City Disaster Risk Management Technical Committee.
2. Inform council about the nature and effects of emergencies in the district
3. Provide a link between national Disaster Preparedness and Management Committee and the city structures responsible for disaster preparedness and management
4. Identify city priorities for disaster preparedness
5. Monitor the implementation of disaster response activities in the city.
6. Ensure and authorise expenditure for disaster related activities in the city

Further information on the membership, role and function of the City Policy Disaster Risk Management Committee is set out in the Committee Terms of Reference at Annex 1.

2.2 Membership, Role and Functions for the City Technical Disaster Risk Management Committee

The role, membership and function of the City Technical Disaster Risk Management Committee (CTDRMC) is in line with the 2010 National Policy for Disaster Preparedness and Management. The CTDRMC shall be chaired by the KCCA Executive Director or their appointed Deputy and will comprise of city heads of Directorates, Departments and Divisions, the Police, an Army representative and other relevant government agencies, representative of the business community, representative of the transport and infrastructure bodies and development partners within the city. The Secretary to the committee will be the Head of KCCA Risk Management Unit. The committee will meet quarterly, or as and when there is a disaster in the city.

The functions of the committee will be to;-

1. Review vulnerability assessment, hazard and risk mapping of the whole city and update the data annually.
2. Review city preparedness and contingency plan and ensure that data is updated annually.
3. Publish an annual city state of disaster report not later than 30th January. The Report will highlight vulnerability levels, risks, hazards, disaster events and respective actions taken during the past twelve months. It will also give indicative forecasts of vulnerabilities, risks, hazards, and disaster events and planned actions for the next twelve months.
4. Ensure mainstreaming of Disaster Preparedness and Management activities into the city development plans
5. Implement the national policy on disaster preparedness in the city.
6. Coordinate and implement disaster preparedness and management interventions in the city
7. Initiate the formulation and enforcement of ordinances on disaster preparedness and Management in the city.
8. Submit assessment reports on disaster preparedness and management to the Office of the Prime Minister and other relevant organs quarterly.
9. Review city calibrated contingency and disaster preparedness plans.
10. Establish and maintain an updated data base on hazards, risks and disasters in the city.
11. Coordinate with Government MDAS, development partners, private sector and communities on disaster preparedness, response and build back better communities after emergencies.

Further information on the membership, role and function of the City Technical Disaster Risk Management Committee is set out in the Committee Terms of Reference at Annex 2.

2.3 Division Disaster Risk Management Committees (DDRMC)

The Division Disaster Risk Management Committee shall be chaired by the Division Mayor and the Town Clerk will be the Secretary. Members shall include the Division Engineer, Division Head for Public Health and Environment, Division Physical Planner, Division Head for Enforcement, Division Internal Security Officer (DISO); Division Police Commander, A Member from the Business community,

Manufacturers, Transport body, Development partners/NGOs/ CBOs within the Division and a representative from Risk Management Unit.

The committee shall meet quarterly, but earlier than the City Technical Disaster Risk Management Committee.

The functions of the Committee shall be;

1. Review vulnerability assessment and risk mapping of the whole division.
2. In coordination with Risk Management Unit, develop division preparedness and contingency plans.
3. Completed and send to the Risk Management Unit, the Division state of disaster report not later than 31st December. The report shall highlight the current and future vulnerability levels, risks and disaster events and respective actions taken during the past twelve months.
4. Ensure mainstreaming of disaster preparedness and management activities into division development plans
5. Implement policies, guidelines, standards and strategies on disaster risk preparedness and Management
6. Coordinate with Risk Management Unit in the development and update division databases on hazards, risks and disasters.
7. Coordinate with Government agencies, partners, private sector.

Further information on the membership, role and function of the Division Disaster Risk Management Committee is set out in the Committee Terms of Reference at Annex 3.

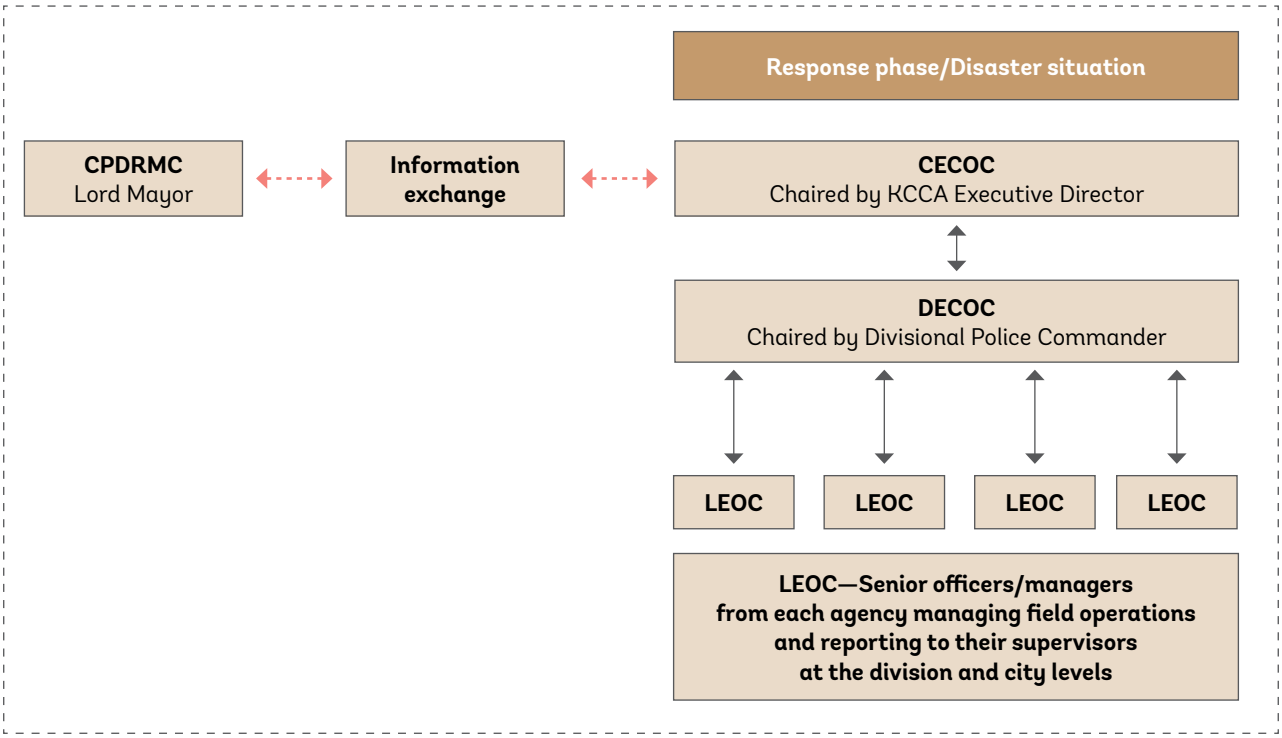
3. City-Level Structures for Operational Response & Recovery

At the City Level, KCCA has developed key structures for response and recovery operations based on the national policy but contextualised for Kampala.

To achieve this, several structures for emergency response and recovery have been established at the Kampala level, mirroring those set out in National Policy but contextualised to Kampala's requirements;

1. City Emergency Coordination and Operations Committee (CECOC)
2. Division Emergency Coordination and Operations Committee (DECOC)
3. Local Emergency Operational Control (LEOC)

Figure F.4 **Kampala Institutional Arrangements for Emergency Response**



3.1 Membership, Role and Functions for the City Emergency Coordination and Operations Committee (CECOC)

During a major City-wide emergency, the Chair of CTDRMC will activate the City Emergency Coordination and Operations Committee to establish strategic management of the response at the City level. CECOC will convene at the City Emergency Operations Centre where they will be supported by a Command Support Team. Membership of CECOC mirrors that of the CTDRMC, with the Chair being authorised to co-opt any additional members onto the CECOC as they see fit depending on the nature of the emergency.

The key role and function of CECOC is to;

1. Determine longer-term and wider impacts and risks with strategic implications;
2. Define and communicate the overarching strategy and objectives for the emergency response;
3. Ensure effective coordination of all emergency response and recovery efforts.
4. Establish the framework, policy and parameters for lower level response and recovery tiers; and
5. Monitor the context, risks, impacts and progress towards defined objectives.
6. Individual responder agencies may refer to the CECOC level as the "Gold Level" of functional command within the incident command system.

Where possible, CECOC shall be established at an early stage as a precautionary measure to ensure that partner agencies are convened and ready if a situation suddenly worsens. Precautionary CECOC's need not physically convene at the outset but will use other appropriate means to share and assess information on the extent of the emergency. The Kampala Operational Plan and supporting Standard Operating Procedures set out the various levels of CECOC activation and operation.

Emergencies can place considerable demands on the resources of responding agencies and can pose significant challenges in terms of business continuity management. Furthermore, they may have long-term implications for communities, economies and the environment. These may require the attention of CPDRMC and the CECOC Chair is responsible for ensuring that the CPDRMC Chair receives regular updates and briefings to enable them to consider any potential Policy implications.

Further information on the membership, role and function of the City Emergency Coordination and Operations Committee is set out in the Kampala Operational Plan.

3.2 Membership, Role and Functions for the Divisional Emergency Coordination and Operations Centre (DECOC)

The Division Emergency Coordination and Operations Centre shall be headed by the Town Clerk. When activated, the DECOC shall report to CECOC and comprise the DPC, DISO, a UPDF representative, District Director of Health Services, Medical Superintendent of the District Hospital, URCS and the in charge of Disaster Risk Management. Additional members may be identified by the DECOC Chair as necessary.

The DECOC shall be responsible for establishing the tactics required to achieve the strategic objectives set by CECOC and for local coordination of emergency response and recovery efforts in the field. For example, should CECOC order the evacuation of an area in the City, officers at DECOC are responsible for planning the tactics to achieve that goal and for managing the resources on the ground to ensure it happens.

Further information on the membership, role and function of the Division Emergency Coordination and Operations Centre is set out in Kampala Operational Plan.

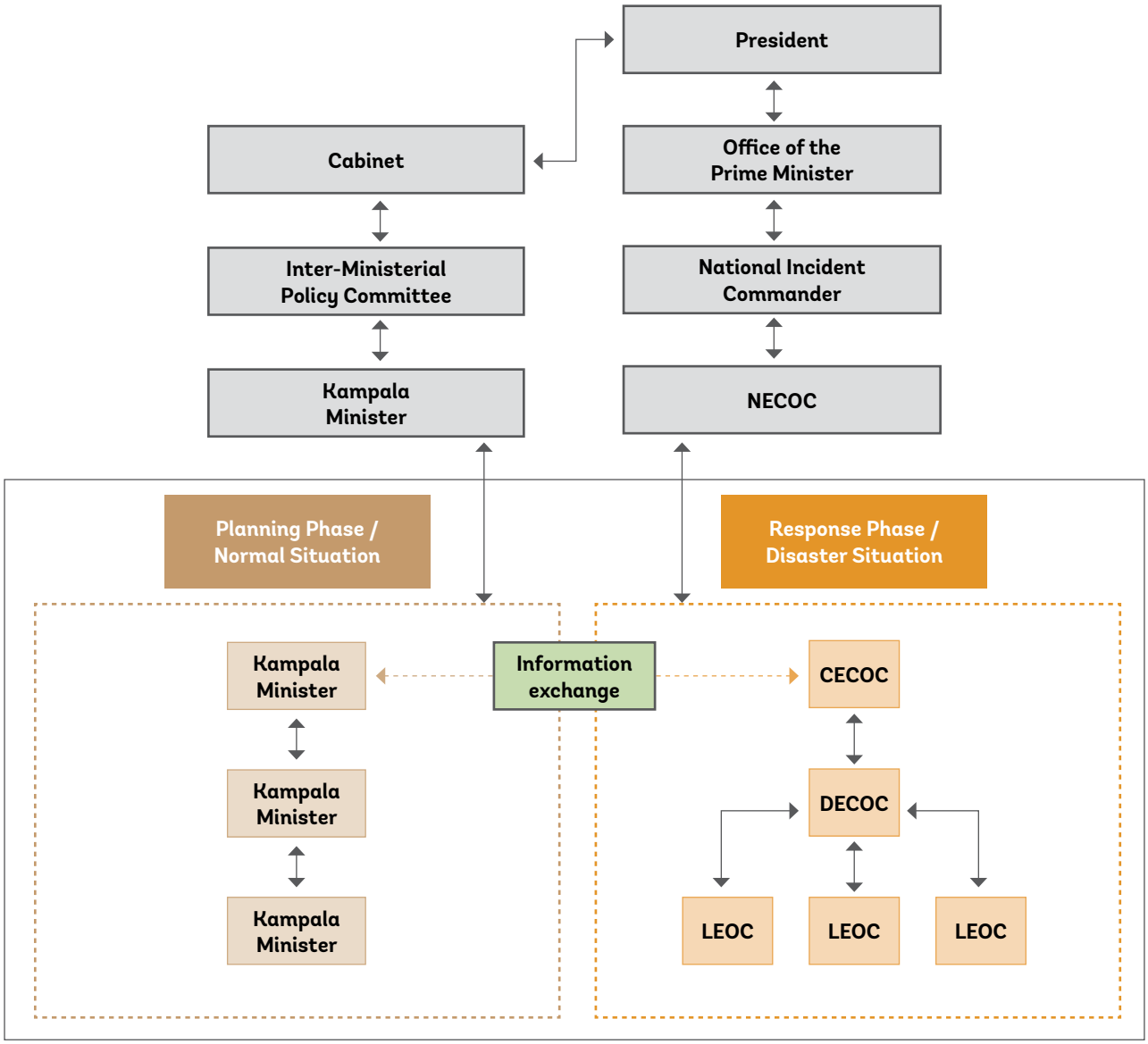
3.3 Institutional Relationship between City and National levels of Command during Response Operations

When CECOC is established, it will coordinate with NECOC (*when activated*) on all operational matters whilst also maintaining close liaison with the City Policy Disaster Risk Management Committee (CPDRMC), whose role during an emergency is set out in 3.6 of the National Policy Document as

"Monitoring the implementation of disaster response activities in the City".

For incidents involving National levels of Disaster Risk Management or where there is significant Political interest, both CECOC and CPDRMC refer up to, and take instructions from, their national counterparts in accordance with the National Policy Document. (*CECOC reporting on operational matters to NECOC and the CPDRMC reporting on policy matters to National Political Structures via the Kampala Minister*).

Figure F.4 **Kampala Institutional Arrangements for Emergency Response**



CECOC City Emergency Coordination and Operations Committee
DECOC Divisional Emergency Coordination and Operations Committee
LEOC Local Emergency Operational Command (field operations)

Sub-Annex 1. CPDRMC TOR

City Policy Disaster Risk Management Committee (CPDRMC)

Terms of Reference

Approval

The Terms of Reference for the City Policy Disaster Risk Management Committee (CPDRMC) is approved:

On ______________________ By ______________________

Chair Kampala CPDRMC ______________________ Date ______________________

Record of Reviews and Amendments

Nature of Change	Date of Change	Page(s) Affected	Changes Made By (Signature)

1. Overview

The Kampala City Policy Disaster Risk Management Committee (CPDRMC) is responsible for providing policy direction for all disaster risk management activities in Kampala. These activities may be summarised as follows;

Preparedness Preparing to handle an emergency

This includes activities to identify potential hazards and risks and making plans to reduce the damaging effects of unavoidable emergencies. Examples could include hazard and risk assessment work and other studies to better understand the challenges arising.

Preparedness also includes production of plans or preparations made to save lives by providing community information, plans and warnings, and plans and drills to support response and recovery operations. For example, producing Standard Operating Procedures (SoP's) and emergency plans, undertaking single and multi-agency training exercises, testing response capabilities across multiple agencies and capacity building for specialist responders are all examples of preparedness activities. Preparedness activities take place before an emergency occurs.

Response Responding to, and initial recovery from, Emergencies and Disasters

During an emergency or disaster, City level senior commanders and technical officers responsible for the operational response will coordinate their operational response through the City Emergency Coordination and Operations Committee.

When CECOC is established, they will coordinate with NECOC (when activated) on all operational matters whilst also maintaining close liaison with the City Policy Disaster Risk Management Committee (CPDRMC), whose role during an emergency is set out in 3.6 of the National Policy Document as "Monitoring the implementation of disaster response activities in the City".

For incidents involving National levels of Emergency Management or where there is significant Political interest, both CECOC and CPDRMC refer up to, and take instructions from, their national counterparts in accordance with the National Policy Document. (CECOC reporting on operational matters to NECOC and the CPDRMC reporting on policy matters to National Political Structures via the Kampala Minister).

2. Membership of the Committee

The CPDRMC shall be chaired by the Lord Mayor, Deputy Lord Mayor, while the Executive Director, will designate a Secretary from the KCCA technical team. It will be composed of members of the City Executive Committee, RDC, DPC(s), DISO(s), a representative of the army and Division Mayors. The committee will meet every six months, or as and when there is a disaster in the city. The Lord Mayor will also co-opt 4 councillors on the committee.

The functions of the City Disaster Policy Committee:

1. Give policy direction to the City Disaster Risk Management Technical Committee.
2. Inform council about the nature and effects of disasters in the district
3. Provide a link between national Disaster Preparedness and Management Committee and the city structures responsible for disaster preparedness and management
4. Identify city priorities for disaster preparedness
5. Monitor the implementation of disaster response activities in the city.
6. Ensure and authorise expenditure for disaster related activities in the city

3. Frequency of Meetings

The committee will normally meet every 6 months. Any Member may propose an extra ordinary meeting to deal with any urgent matters requiring decision. This request, in writing, should be submitted to the Chair for consideration.

If a disaster that impacts the City and necessitates the activation of the City Emergency Coordination and Operations Committee (CECOC) members of CPDRMC will convene to receive updates on operations and consider any policy implications.

4. Functions of the Committee

1. Give policy direction to the City Technical Disaster Risk Management Committee.
2. Inform council about the nature and effects of disasters in the district
3. Provide a link between national Disaster Preparedness and Management Committee and the city structures responsible for disaster preparedness and management
4. Identify city priorities for disaster preparedness
5. Monitor the implementation of disaster response activities in the city.
6. Ensure and authorise expenditure for disaster related activities in the city

5. CPDRMC Agenda

The Agenda for CPDRMC will be compiled and proposed by the Committee Secretariat and approved by the Chair.

Standing agenda items for the committee include;

1. Approval of minutes from the last meeting and consideration of any outstanding action items.
2. Receipt of reports on any significant emergencies occurring since the last meeting
3. Urgent matters arising from Divisions or members of CTDRMC.

In addition to the above and any items of administration, an annual cycle of work for the committee should be agreed at its first meeting, setting out key themes and activities for the various meetings throughout the year and establishing milestones for approval or submission of reports.

Members wishing to place additional items on the agenda should do so at least 14 days prior to the meeting and submit any supporting papers or reports no later than 7 days prior to a meeting.

The Chair may exercise her / his discretion and accept late items or papers in circumstance where an urgent decision may be required.

Sub-Annex 2. CTDRMC TOR

City Technical Disaster Risk Management Committee (CTDRMC)

Terms of Reference

Approval

The Terms of Reference for the City Technical Disaster Risk Management Committee (CTDRMC) is approved:

On _____ By _____

Chair Kampala CPDRMC _____ Date _____

Record of Reviews and Amendments

Nature of Change	Date of Change	Page(s) Affected	Changes Made By (Signature)

1. Overview

The Kampala City Technical Disaster Risk Management Committee (CTDRMC) is a multi-agency body responsible for coordination of all aspects of emergency preparedness for Kampala. These activities may be summarised as follows;

Preparedness Preparing to handle an emergency

This includes activities to identify potential hazards and risks and making plans to reduce the damaging effects of unavoidable emergencies. Examples could include hazard and risk assessment work and other studies to better understand the challenges arising.

Preparedness also includes production of plans or preparations made to save lives by providing community information, plans and warnings, and plans and drills to support response and recovery operations. For example, producing Standard Operating Procedures (SoP's) and emergency plans, undertaking single and multi-agency training exercises, testing response capabilities across multiple agencies and capacity building for specialist responders are all examples of preparedness activities. Preparedness activities take place before an emergency occurs.

The value in convening all appropriate stakeholders into a single, multi-agency CTDRMC, is that it provides a forum for the effective exchange of information and joint response planning across organisations. This will both reduce duplication of efforts and provide a more efficient and effective way of ensuring that all available information and data can be used to assess risks and make plans to reduce them and ensure that resources at the City level can be effectively harnessed should a disaster occur.

2. Membership of the Committee

The CTDRMC shall be chaired by the KCCA Executive Director or their appointed deputy with secretariat support provided by the KCCA Risk Management Unit.

Membership of CTDRMC will comprise;

1. City heads of Directorates / Departments
2. Divisions Town Clark
3. The Police
4. Police Directorate of Fire Prevention and Rescue
5. An Army representative
6. Other relevant government agencies as proposed by the Chair
7. Uganda Red Cross
8. City NGO's involved in disaster risk Reduction and Management
9. Representative of the Kampala business community
10. Representative of the transport, Power, Water and Telecommunications bodies
11. Development partners within the city.

3. Frequency of Meetings

The committee will normally meet quarterly. Any Member may propose an extra ordinary meeting to deal with any urgent matters requiring decision. This request, in writing, should be submitted to the Chair for consideration.

If a disaster that impacts the City and necessitates the activation of the City Emergency Coordination and Operations Committee (CECOC) members of CDRMTC will convene as the CECOC to provide oversight and management of emergency response and recovery operations.

4. Functions of the Committee

The functions of the committee are to; -

1. Review vulnerability assessment, hazard and risk mapping of the city and update the data annually.
2. Review the Kampala EP&R Operational Plan annually or following any Major Disaster in the City.
3. Publish an annual city state of disaster report not later than 30th January. The Report will highlight vulnerability levels, risks, hazards, disaster events and respective actions taken during the past twelve months. It will also give indicative forecasts of vulnerabilities, risks, hazards, and disaster events and planned actions for the next twelve months.

4. Ensure mainstreaming of Disaster Preparedness and Management activities into the city development plans
5. Implement the national policy on disaster preparedness in the city.
6. Coordinate and implement disaster mitigation and preparedness interventions in the city
7. Coordinate and implement an annual cycle of community safety messaging and public communications in support of risk reduction activities.
8. Initiate the formulation of ordinances on disaster preparedness and Management in the city and make recommendations to the appropriate Authority for their adoption and enforcement.
9. Submit assessment reports on disaster preparedness and management to the Office of the Prime Minister and other relevant organs quarterly.
10. Review city calibrated contingency and disaster preparedness plans, including those prepared at the Division level.
11. Establish and maintain an updated data base on hazards, risks and disasters in the city.
12. Establish and maintain an updated data base of emergency responders in the City and their capabilities and capacities, including lists of resources available and contact arrangements to ensure those resources can be effectively mobilised in response to a disaster.
13. Coordinate with Government MDAS, development partners, private sector and communities on plans for emergency preparedness and response.

5. CTDRMC Agenda

The Agenda for CTDRMC will be compiled and proposed by the Committee Secretariat and approved by the Chair.

Standing agenda items for the committee include;

1. Approval of minutes from the last meeting and consideration of any outstanding action items.
2. Receipt of reports on any significant emergencies occurring since the last meeting
3. Urgent matters arising from Divisions or members of CTDRMC.

In addition to the above and any items of administration, an annual cycle of work for the committee should be agreed at its first meeting, setting out key themes and activities for the various meetings throughout the year and establishing milestones for approval or submission of reports. The following proposals are for illustration only and an annual programme will be revised and amended at the first CTDRMC meeting;

January Meeting

1. Approval of the annual city disaster risk reduction report (publication / dissemination 30th January)
2. Approve quarterly report for OPM
3. Approve annual community safety communications and engagement plan

April Meeting

1. Review vulnerability assessment, hazard and risk mapping of the city and update the data as necessary.
2. Review city calibrated contingency and disaster preparedness plans, including those prepared at the Division and Ward level.
3. Approve plans for an annual city disaster exercise (to be conducted prior to the July meeting)
4. Approve quarterly report for OPM

July Meeting

1. Review the Kampala EP&R Framework document, Concept of Operations, and City Operational Plan for response and recovery and updated as necessary.
2. Review the data base of emergency responders in the City and their capabilities and capacities, including lists of resources available and contact arrangements to ensure those resources can be effectively mobilised in response to a disaster.
3. Review outcome report from annual city disaster exercise
4. Approve quarterly report for OPM

October Meeting

1. Review a draft annual city disaster risk reduction report

and provide consultation feedback.

2. Review mitigation and preparedness plans and plans for business continuity produced by partners from key business and infrastructure sectors, including; power, water, telecommunications and transport.
3. Approve quarterly report for OPM

Members wishing to place additional items on the agenda should do so at least 14 days prior to the meeting and submit any supporting papers or reports no later than 7 days prior to a meeting.

The Chair may exercise her / his discretion and accept late items or papers in circumstance where an urgent decision may be required.

Sub-Annex 3. CTDRMC TOR

Division Disaster Risk Management Committee (DDRMC)

Terms of Reference

Approval

The Terms of Reference for the Division Disaster Risk Management Committee (DDRMC) is approved:

On ______________________ By ______________________

Chair (enter Division Name) DDRMC ______________________ Date ______________________

Record of Reviews and Amendments

Nature of Change	Date of Change	Page(s) Affected	Changes Made By (Signature)

1. Overview

The Division Disaster Risk Management Committee (DDRMC) is a multi-agency body responsible for coordination of all aspects of emergency preparedness at the Division level in Kampala. These activities may be summarised as follows;

Preparedness Preparing to handle an emergency

This includes activities to identify potential hazards and risks and making plans to reduce the damaging effects of unavoidable emergencies. Examples could include hazard and risk assessment work and other studies to better understand the challenges arising.

Preparedness also includes production of plans or preparations made to save lives by providing community information, plans and warnings, and plans and drills to support response and recovery operations. For example, producing Standard Operating Procedures (SoP's) and emergency plans, undertaking single and multi-agency training exercises, testing response capabilities across multiple agencies and capacity building for specialist responders are all examples of preparedness activities. Preparedness activities take place before an emergency occurs.

2. Membership of the Committee

The Division Disaster Risk Management Committee shall be chaired by the Division Mayor and the Town Clerk will be the Secretary. Members shall include the Division Engineer, Division Head for Public Health and Environment, Division Physical Planner, Division Head for Enforcement, Division Internal Security Officer (DISO); Division Police Commander, A Member from the Business community, Manufacturers, Transport body, Development partners/NGOs/ CBOs within the Division and a representative from Risk Management Unit.

3. Frequency of Meetings

The committee shall meet quarterly, but earlier than the City Technical Disaster Risk Management Committee. Any Member may propose an extra ordinary meeting to deal with any urgent matters requiring decision. This request, in writing, should be submitted to the Chair for consideration.

4. Functions of the Committee

The functions of the committee are to; -

1. Review vulnerability assessment and risk mapping of the whole division.
2. In coordination with Risk Management Unit, develop division preparedness and contingency plans.
3. Completed and send to the Risk Management Unit, the Division state of disaster report not later than 31st December. The report shall highlight the current and future vulnerability levels, risks and disaster events and respective actions taken during the past twelve months.
4. Ensure mainstreaming of disaster preparedness and management activities into division development plans
5. Implement policies, guidelines, standards and strategies on disaster risk preparedness and Management
6. Coordinate with Risk Management Unit in the development and update of division databases on hazards, risks and disasters.
7. Coordinate with Government agencies, partners, private sector.

5. DDRMC Agenda

The Agenda for DDRMC will be compiled and proposed by the Committee Secretariat and approved by the Chair.

Standing agenda items for the committee include;

1. Approval of minutes from the last meeting and consideration of any outstanding action items.
2. Receipt of reports on any significant emergencies occurring since the last meeting
3. Urgent matters arising from Wards or members of DDRMC.

In addition to the above and any items of administration, an annual cycle of work for the committee will be published by the CTDRMC, setting out key themes and activities for the various meetings throughout the

year and establishing milestones for approval or submission of reports. The role of the DDRMC is to provide information, updates and reports on those subjects as required.

Members wishing to place additional items on the agenda should do so at least 14 days prior to the meeting and submit any supporting papers or reports no later than 7 days prior to a meeting.

The Chair may exercise her / his discretion and accept late items or papers in circumstance where an urgent decision may be required.

REPUBLIC OF UGANDA

KCCA
KAMPALA CAPITAL CITY AUTHORITY
For a better City

GFDRR

ACP-EU Natural Disaster Risk Reduction Program
An initiative of the African, Caribbean and Pacific Group, funded by the European Union and managed by GFDRR

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP