

# THE JINJA- KAMPALA-MPIGI CORRIDOR

## PHYSICAL DEVELOPMENT PLAN

JUNE 2023

### CHAPTER 7

## ENVIRONMENTAL ASSETS, MANAGEMENT AND CLIMATE CHANGE STRATEGY: BUILDING RESILIENCE



**Government of Uganda**  
Ministry of Lands, Housing and Urban Development

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## 7 ENVIRONMENTAL MANAGEMENT AND CLIMATE CHANGE STRATEGY: BUILDING RESILIENCE

### 7.1 Risk, Resilience, Environmental Management And Assets, and Climate Change

In this chapter, we assess the resilience of the JKM Corridor and propose conceptual approaches and specific interventions that can mitigate climate and disaster risks to the region's human settlements and natural assets and improve its overall environmental management through building resilience.

Environmental management is an emerging and dynamic concept. It refers to the practice of protecting and conserving the natural environment in order to maintain the health and well-being of both humans and the natural world. This can involve a wide range of activities, including protecting natural habitats, managing natural resources, and reducing pollution. As climate change is a significant environmental issue that has significant impacts on the natural world and human communities, environmental management is crucial in building resilience. Effective environmental management can help mitigate the impacts of climate change and adapt to the changes that are already occurring or expected in the future.

In the JKM, as well as in the rest of Uganda and the world, climate change shows its face in the recorded changes in both the frequency and severity of extreme climate events, such as droughts, floods and storms. These events pose risks to city residents and the urban sectors and threaten to destroy local livelihoods, property, and lives. These risks arise from both 'normal' day-to-day, seasonal, and year-to-year variability in climate as well as regional climate differences.

In the JKM the impacts of climate change are explicitly manifested in the following forms:

- > **Floods:** Frequent floods during the rainy season in the JKM region, particularly in flood plains and reclaimed wetlands, disproportionately impacts the poor and lead to loss of lives and property. Poor city planning, including the lack of drainage systems in vulnerable neighbourhoods, exacerbates the impacts of floods. It is anticipated that the frequency and intensity of floods will increase with climate change.
- > **Decreased Water Availability:** The lack of access to running water among slum dwellers in Kampala often results in reliance on natural springs as a main source of water. However, flooding can contaminate these water sources due to poor sanitary conditions, posing a risk to the health and well-being of these vulnerable communities.
- > **Sanitation:** The use of pit latrines by slum dwellers in the JKM Corridor is problematic due to the shallow depth of these facilities in flood plains. During the rainy season, these latrines can become flooded and inaccessible, leading to contamination of water sources as well as posing health risks to the communities.
- > **Health and hygiene:** Floods cause frequent outbreaks of waterborne diseases like cholera. The urban poor is affected most by these waterborne diseases and the frequency of the outbreaks is expected to increase with climate change.

The above exemplifies and showcases the importance of addressing urban poverty, especially by improving and strengthening Water, Sanitation, and Hygiene (WASH) infrastructures, as it will enhance the (urban) resilience of communities by mitigating and adapting to the risks and disasters brought on by climate change.

The concept of resilience has been useful in addressing and adapting to climate risk and disaster events, and in improving efforts to survive and thrive in the context of climate change. Resilience is broadly defined as the quality and capability of being able to recover quickly or easily from, or resist being affected by, a misfortune, [or a] shock, with this definition including the notion of robustness and adaptability.

The approach adopted in the present initiative to building resilience is informed by the Urban Africa Risk Knowledge (Urban ARK) project, a three-year (2015-2018) research and capacity-building programme funded by the British government. The critical insight of Urban ARK is that resilience must be viewed holistically and addressed with an integrative approach.<sup>1</sup>

Applying this focus to the JKM Corridor development means exploring three questions:

- > What are the risks faced in the JKM Corridor?
- > What opportunities exist to build resilience, and specifically urban resilience, in the face of the JKM Corridor's profile of risks?
- > What specific interventions can be undertaken to integrate risk mitigation and adaptation, and to integrate resilience-building into development strategies?

It is proposed here that due to the serious risks climate change and extreme events pose to human health and the environment, integrating risk reduction into the JKM Corridor's development requires:

- > Comprehensive and interdisciplinary investigations to increase understanding of what shapes vulnerability, resilience and adaptation;
- > Action at the levels of corridor risk planning and decisionmaking for risk policy and practice.

This chapter draws on existing qualitative and quantitative studies of urban risk and resilience in the JKM Corridor, alongside consultations with key actors, as the basis for identifying links and synergies between the conceptualisation and operationalisation of vulnerability, resilience, and adaptation.

### 7.1.1 Urban ARK and risk

The Urban ARK project defines risk as:

*“all the potential and likely causes of events resulting in premature death, illness or injury and impoverishment.”<sup>2</sup>*

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<sup>1</sup> See: [Urban Africa Risk Knowledge \(Urban ARK\) | Breaking cycles of risk accumulation in sub-Saharan Africa](#)

<sup>2</sup> Applying Multiple Methods to Understand and Address Risk; UN-Habitat (2020). Breaking Cycles of Accumulated risks in African Cities.

Given this broad definition, Urban ARK acknowledges that the risks experienced by most people are not large disasters, but rather common risks that involve small, 'everyday' experiences such as fires, violent crime, traffic accidents, illness, and so forth. Two types of risks are therefore outlined:

- > **Extensive risks:** Small, 'everyday' risks experienced by individuals and households;
- > **Intensive Risks:** Large-scale disaster events that affect many people simultaneously such as floods, earthquakes, and bushfires.

At the same time, it is argued that **risks are interconnected and cumulative**, as opposed to one-off events – indeed, the accumulation of risks determines the preparedness for and the impacts of disaster events. For example, the experience of violent crime might reduce a household's resources, which in turn will reduce their capacity to prepare for flooding, in turn again meaning that a flood will more severely impact the household, and so forth.

In other words, JKM region residents experience risk in different ways, depending on their location, income, gender, age and (dis)ability. It is critical to address the full spectrum of the JKM Corridor risks, encompassing 'extensive risk' as well as 'intensive risk.'<sup>3 4</sup> Given that risks are cumulative, and include both extensive and intensive risks, risk should therefore not be analysed exclusively with quantitative studies, but also with qualitative understandings of how households and individuals perceive and experience risks in their lives.

In this light, the concept of resilience is useful in addressing climate risk and unexpected events, and in enhancing efforts to survive and thrive in the context of climate change. However, many of the concepts used to discuss resilience are contested. We refer specifically here to **"the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow, no matter what kinds of chronic stresses and acute shocks they experience."**<sup>5</sup>

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<sup>3</sup> H. Leck et al. (2018). 'Towards Risk-Sensitive and Transformative Urban Development in Sub Saharan Africa', in Sustainability 10.

<sup>4</sup> Urban ARK (2017); Bull-Kamanga et al. (2003). 'From everyday hazards to disasters: The accumulation of risk in urban areas.' Environment and Urbanisation 15 pp.193–204

<sup>5</sup> Definition utilised by a range of institutions and organisations, including UN-HABITAT, the Rockefeller Foundation, and C40 Cities. See e.g. 100 Resilient Cities Press Release (21st Nov. 2016): 100 Resilient Cities & C40 Cities Announce Partnership To Jointly Advance Climate Change And Resilience Efforts In Member Cities. Available online at: [https://c40-production-images.s3.amazonaws.com/press\\_releases/images/134\\_100RC\\_-\\_C40\\_Press\\_Release.original.pdf?1479736949](https://c40-production-images.s3.amazonaws.com/press_releases/images/134_100RC_-_C40_Press_Release.original.pdf?1479736949)

In common with many regions of sub-Saharan Africa, there is presently limited data providing a clear picture of risks faced in the JKM Corridor. While there have been recent efforts aimed at enhancing risk knowledge, decision-makers face the following gaps in baseline information: <sup>6 7</sup>

- > Detailed assessment of risks posed on the corridor;
- > Comprehensive risk profiles with organised information on each hazard;
- > Vulnerability and coping capacity, as well as other related information.

The data that is available tends to be inaccessible to all relevant stakeholders, including at-risk communities. This in turn hinders the relevant authorities within the JKM Corridor from undertaking informed adaptation measures. and disaster preparedness, response, and recovery.

Despite this limitation, every effort has been made here to draw on a wide variety of secondary data, bringing together studies that have utilised both quantitative data assessing intensive risks and qualitative studies identifying extensive risks.

## 7.2 Environmental assets at risk

Before a consideration and assessment of risks, it is necessary to sketch out the environmental assets that are at risk.

**Lithosphere;** The JKM Corridor area is the most strongly urbanised region in Uganda. However, despite the growing urbanisation taking place across the Corridor, **agricultural land** still provides by far the most common land use. It constitutes 62 percent of the total area while the built-up area is approximately 600 sq. km corresponding to 8.5 percent.

a) soils which support agriculture; the soils are left bare as a result of increasing urbanization and over-cultivation and clearing of vegetation, thus increasing soil erosion; the soil getting contaminated/ polluted by poorly managed chemicals from farmlands as well as oils from the increasing number of gasoline locomotives; in addition, the soils are getting choked by polyethene bags (Kaveera) and other plastics being disposed of everywhere along the corridor; hence the soil has become increasingly unproductive for agriculture.

b) The corridor was well endowed with hills, and they play a significant role in moderating the local climate; however, this landscape is over-exploited by increasing settlements and bush clearing.

**Hydrosphere;** the sphere that encompasses all the water both open (lakes and rivers) and underground (largely, wetlands). The sphere being the habitat for aquatic assets to include fish contributes greatly to the livelihoods of many communities along the corridor, but also contains other resources like water which is used for many purposes; sand is yet another important resource/ asset associated with this sphere very import for the construction industry, among others. The quality of water on the Lake (L. Victoria) and rivers and wetlands along the JKM corridor have been greatly compromised due to poor

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<sup>6</sup> See e.g. E.N. Sabiiti et al.(2014). Building Urban Resilience: Assessing Urban and Peri-urban Agriculture in Kampala, Uganda. United Nations Environment Programme (UNEP), Nairobi, Kenya

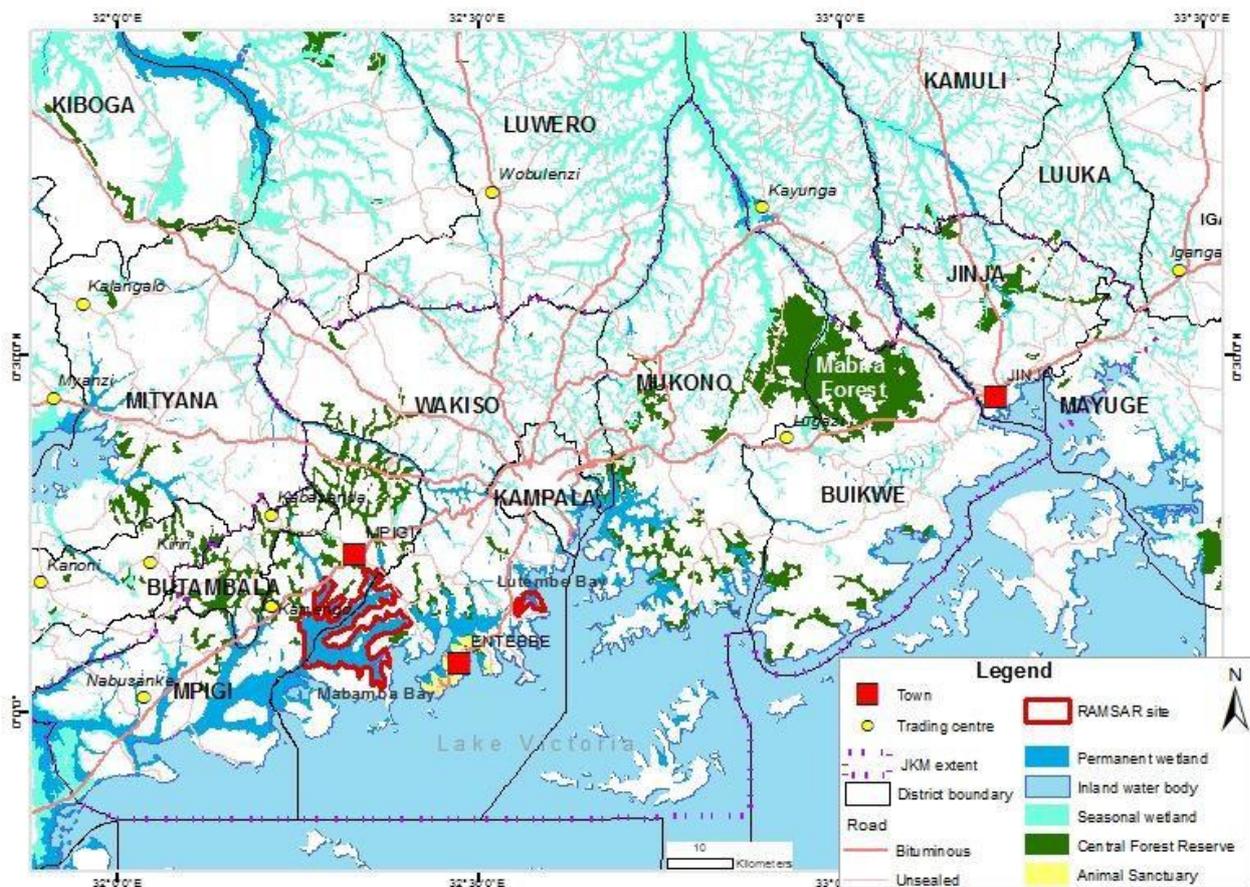
<sup>7</sup> This is not to say that there is no understanding of some categories of risks for Uganda as a whole. A profile of the national picture for natural disasters, for example, can be found in World Bank, 2019, Disaster Risk Profile: Uganda. World Bank, Washington DC.

waste management practices of the urban dwellers where the asset has been turned into waste disposal sites.

Biosphere; the sphere of animals and plants along the JKM corridor is also at risk. A variety of species whose habitat is forested are disappearing due to deforestation, urbanisation/settlements (built-up), industrialisation, and infrastructural establishment.

The JKM Corridor is thus also particularly rich in *aquatic environmental assets*. These aquatic ecosystems provide floodwater attenuation, sewage treatment, water purification, and food and building materials, while areas such as Mabamba and Lutembe Bay as RAMSAR sites are designated an “important bird area” by Birdlife International, and provide critical habitats for biodiversity. Aquatic habitats present include wetlands, small streams and larger rivers that cross the alignment such as the River Nile in Jinja, Ssezibwa River in Buikwe and River Mubeya in Mukono and several other streams such as Lumbuye, Kyakazi, Kiko and Walumbe found in Jinja. Figure 1 shows a map of environmentally valued assets within the JKM Corridor.

Figure 1: Environmentally valued assets within the JKM Corridor



Source: COWI A/S

Most of the JKM land uses that contribute to environmental quality provide much smaller areas of land to be mobilised. Expansion of the built-up area is likely to come from land that is currently under agricultural use. Agriculture represents livelihoods and food supply and is a pillar of Ugandan national development. Other land uses can therefore also be a partial source of additional built-up land so that the necessary trade-offs can be made between different future land use combinations in order to arrive at an optimum that can work in the long term.

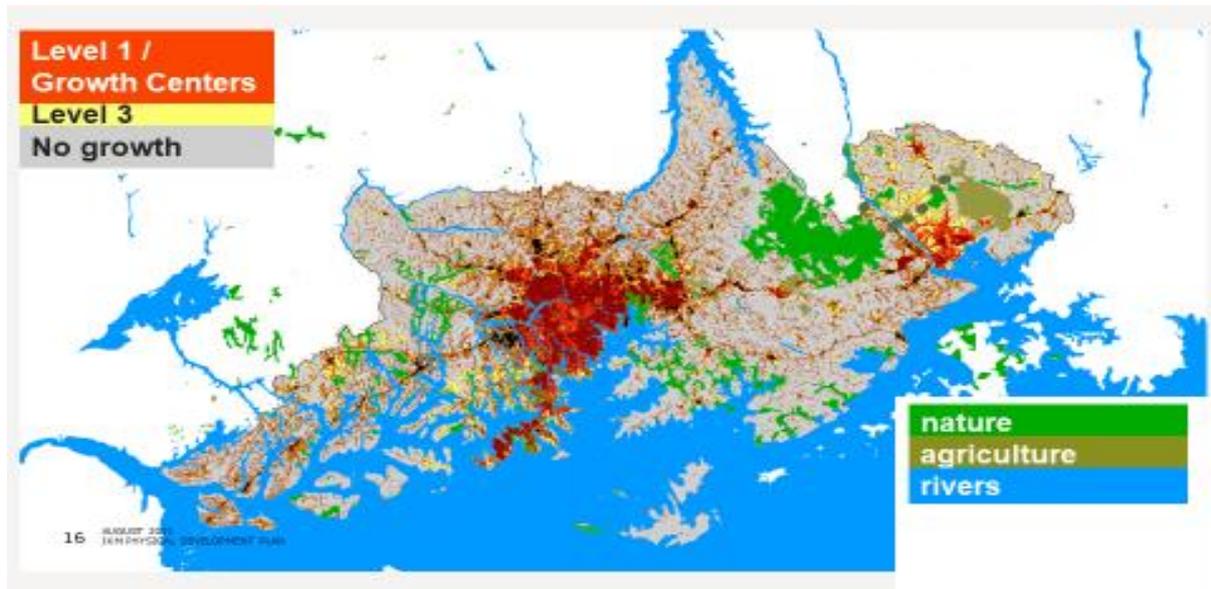
Lake Victoria is the JKM region's largest inland fishing sanctuary; an inland water transport link; a source of water for domestic, industrial, and commercial purposes; a major reservoir for hydroelectric power generation; a major climate modulator; and a rich biodiversity sanctuary. The basin has also been declared a Regional Economic Growth Zone and an Area of Common Economic Interest to optimise its economic and social benefits while addressing any environmental concerns and issues. Climate change has been identified as a serious threat to the basin's economic prosperity and livelihoods.

In recent years, the Lake Victoria Basin (LVB) has been characterised by frequent episodes of either excessive or deficient rainfall, which has harmed the economy. In general, results indicate average annual rainfall variability of between 6 percent and 50 percent across the LVB countries for the 1981–2010 period. Annual precipitation trends for 1981–2016 for the basin show significant areas with declining rainfall. Drier periods are getting longer and more pronounced during the March–June (MAMJ) rains.

Lake Victoria serves as the lynchpin of the JKM Corridor's ecosystem and has a rich but at the same time fragile ecosystem, including hilly and mountainous areas, riverbanks, lake shores and rangelands that are facing encroachment and degradation. The impacts of combined anthropogenic drivers, such as human population growth and land use changes, may have more far-reaching impacts on terrestrial ecosystems than climate change.

All the corridor districts share a borderline with Lake Victoria. The urban fabric has been shaped by the wetlands and the waters that flow into Murchison Bay on Lake Victoria. Together with natural precipitation, the lake provides an unlimited source of water to urban centres, its inhabitants, its industry and its agricultural hinterland. Its role extends into assorted fields (fishing, recreation, agriculture and much more). However, the nature of Lake Victoria's shorefront (mostly wetlands without natural beaches), the lake's pollution and the prevalence of malaria and bilharzia severely restrict its effective utilisation for direct shorefront water-related recreation and tourism.

Figure 2: Environmental Natural Assets



Source: COWI A/S

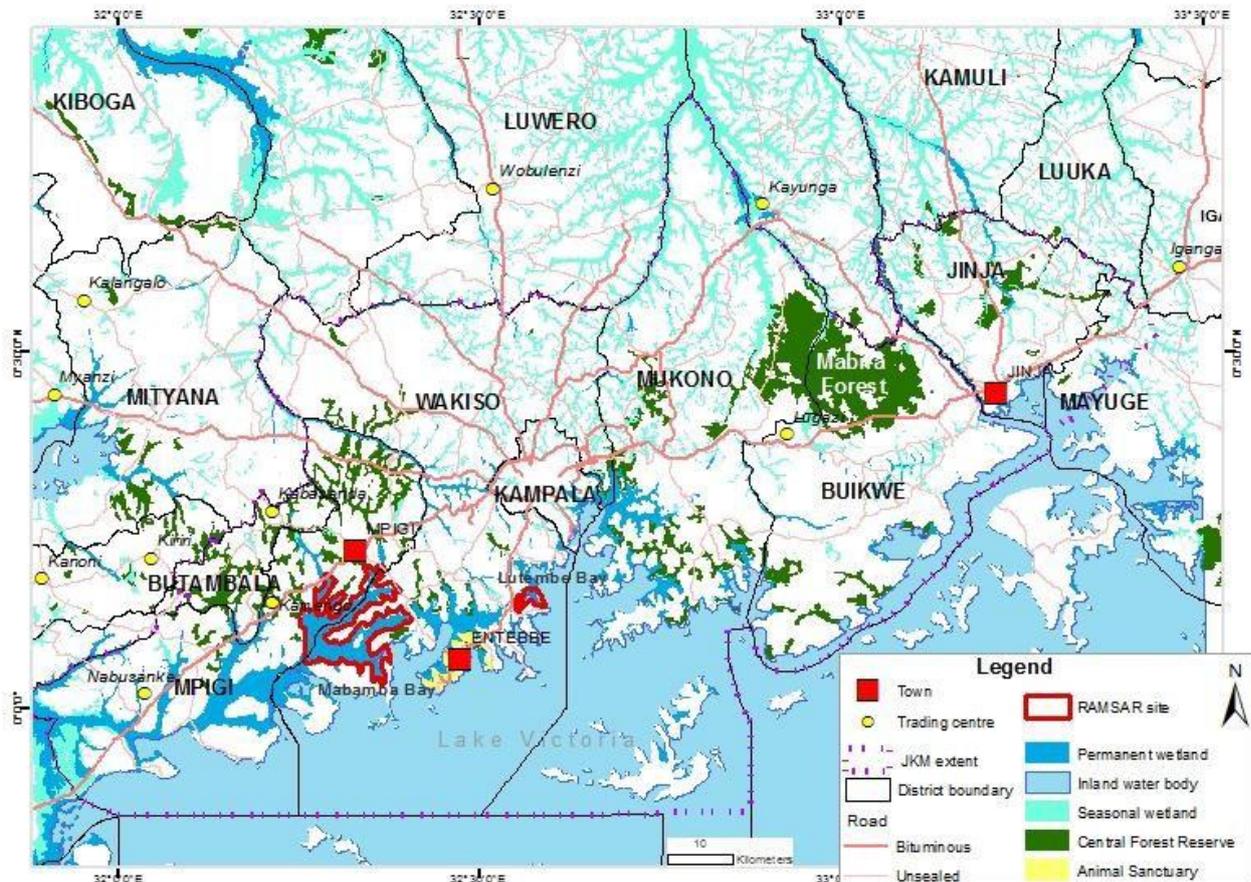
The wetlands along the JKM Corridor and more especially in the built-up areas have been encroached upon and have been turned into various land uses such as agriculture, residential, industrial and infrastructure services. In addition, around the lake basin, there is a lot of sand and quarrying for the booming construction industry which has had negative environmental impacts on the landscape, hills, forests, wetlands and the lake itself. Sand mines are more pronounced as an economic activity on the Kampala-Entebbe and Kampala-Masaka corridors.

The JKM Corridor also has abundant and diverse flora and fauna. Although no National Parks, Wildlife Reserves or Wildlife Sanctuaries occur within the Corridor, several Central Forest Reserves (CFRs) occur within the corridor such as Mabira (Buikwe District) and Mpanga (Mpigi District) forests which give refuge to a wide variety of wildlife.

However, habitat quality and species diversity in the corridor and surrounding environment has been significantly impacted by human activity, such as clearance of natural habitats for the development of agricultural land, bush burning, over-exploitation of non-timber products, the development of large industrial projects (Namaave industry park, Mbalala, around Matugga areas along Bombo Road), and the accidental or intentional introduction of alien invasive species (e.g. *Mimosa pigra*, *Imperata cylindrical*, *Bidens pilosa*, *Eichhornia crassipes*) and population increase. Mpanga is one of the few forests in the Mpigi District that is still intact and less encroached.

The wetlands “enjoy” legislative protection (see Figure 3) and are of significant environmental awareness and concern, but in practice, they are not well protected. There is weak and uncoordinated law enforcement and a “lack of political will.” The destruction of these wetlands would bring about severe social and economic damage.

Figure 3: Protected areas in the JKM Conservation Areas



### 7.3 The JKM Corridor's risk profile

In order to construct a risk profile for the corridor, the following question needs to be answered:

***What are the risks faced on the regional, community and household levels in the Jinja Kampala Mpigi (JKM) Corridor?***

The risk profile captures intensive and extensive risks in the Corridor, demonstrating their interconnectivity by attaching them to underpinning drivers of these risks. This section proceeds by first outlining the key intensive risks faced in the Corridor, most notably flooding. It then considers intensive risks. Finally, it looks at three drivers of risk that underpin or exacerbate these conditions.

#### 7.3.1 Intensive Risks

##### *Flooding*

The convective rain pattern and the topographic and hydrological characteristics of the JKM Corridor induce flooding, which is very common in the urban areas of Kampala city (Bwaise, Kampala fire police /Clock tower, Kinawataka/Kyambogo along Kampala Jinja area).<sup>8</sup> The shallowness and low topographic

<sup>8</sup> F.W.N. Nsubuga (et al.) (2014). 'The nature of rainfall in the main drainage sub-basins of Uganda.', in *Hydrological Sciences Journal*, 59 (2), pp. 278–299

gradients of Lake Victoria make the lake particularly sensitive to changes in water levels, and temperatures favour vectorborne diseases.<sup>9</sup> Current impacts are driven not only by these threats but also by exposure and vulnerability. Impacts from flooding are exacerbated by the location of human settlements in low-lying valleys and wetlands. This is due to the lack of appropriate policies and their inadequate implementation and enforcement. These stem from critical institutional and administrative deficits and, some argue, the political economy of the city.

The development of hilltops (Bunga, Entebbe Road, Masaka Mpigi road etc) and low-lying areas has also increased vulnerability.<sup>10</sup> While the clearing of vegetation in the hills has increased water runoff and the encroachment of human settlements onto wetlands has also reduced the capacity of these ecosystems to capture, store and dissipate surface water runoff. Insufficient, poorly designed and poorly maintained urban infrastructure, and wastewater and solid waste management deficits are also crucial.

*Figure 4: A Business Owner Contends with Flood Waters in Kampala.*



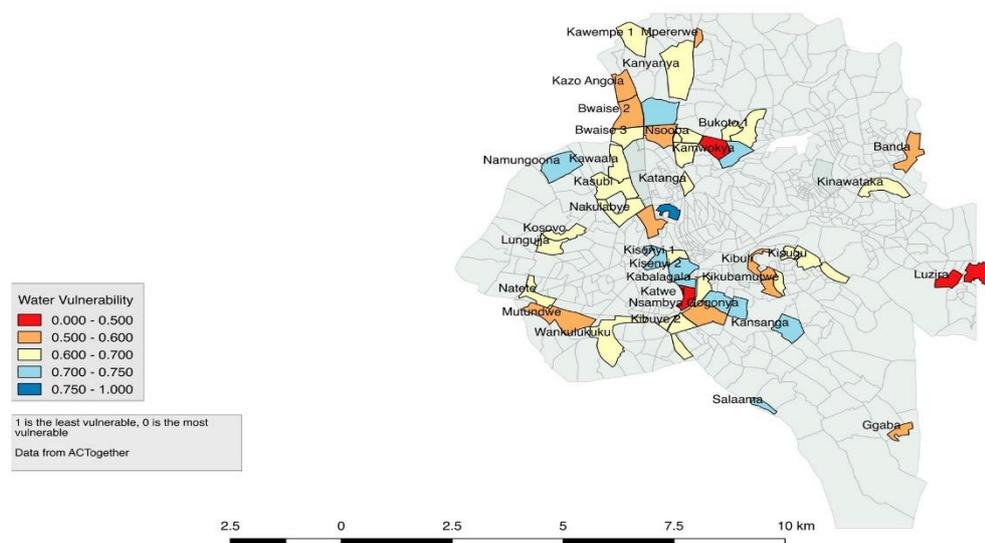
*Source: Xinhua News*

The impacts of the floods are exacerbated by poor city planning as these neighbourhoods have no drainage systems. The frequency and intensity of floods are expected to increase with climate change. The increase in water levels which started in October 2019 has consistently continued to rise from 12.00 meters to the current 13.32 meters, the second-highest increase recorded since 1964, when the water level rose to 13.46 meters.

<sup>9</sup> Lake Victoria Basin Commission and GRID-Arendal (2017). *Lake Victoria Basin: Atlas of Our Changing Environment*. Lake Victoria Basin Commission and GRID-Arendal, Kisumu and Arendal.

<sup>10</sup> J. B. Nyakaana, H. Sengendo, and S. Lwasa (2007). *Population, Urban Development and the Environment in Uganda: The Case of Kampala City and its Environs*. IHSN Working Paper.

Figure 5: Vulnerability of Municipalities in Kampala to Decreased Availability of Clean, Piped Water.



### Pollution and emissions

The JKM relies mostly on Lake Victoria and water pollution is having a high cost on the fishery industry and on the treatment costs for NWSC hence increasing prices to the consumers. Many industries in the JKM Corridor are found along Lake Victoria, especially in Jinja and where there is evidence that they do not have treatment facilities and discharge directly into the lake.<sup>11</sup> There are also many upcoming industries along the Kampala-Jinja road towards the east and also towards the north along the Bombo-Gulu road which is not in an organised industrial park.

### Heatwaves and Drought

The consequences of climate change mean exposure to severe climate change shocks and stresses that will impact the livelihoods of residents, particularly the vulnerable urban poor. There is evidence of impervious surfaces that magnify the urban heat island effect, especially in Kampala and Jinja cities. The heat will further be affected by increased construction and reduction of green spaces thereby increasing the temperature further.

Uganda has not been affected as severely by drought as its neighbouring countries. That said, the JKM Corridor has somewhat susceptible to hydrological and agricultural drought, particularly in the suburbs of the Greater Kampala Metropolitan Area. A drought in the region of the Nalubaale Power Station threatens the supply of electricity for not only the region but the entire country. Modelling conducted by the Africa Disaster Financing Initiative found that on average 100,000 people would be affected by hydrological drought in the event of such a disaster, though a lack of data on drought conditions means that such analysis cannot be verified.<sup>12</sup>

Rising temperatures, heatwaves and droughts as a result of climate change also have a significant influence on the occurrence of fires in Uganda and the JKM Corridor. Every month, at least 45 incidents in

<sup>11</sup> R. Ruffins (2015). 'The Industrial Impact on Westlands in Jinja and the Nexus of Industry, Wetlands, and Community', in *Independent Study Project Collection*, 2051. See also, T. Omara, S. Ssebulime (2019). 'Characterisation and Prognostication of Wastes Generated by Industries in Kampala Industrial and Business Park-Namanve', in *Open Access Library Journal*.

<sup>12</sup> World Bank (2019).

Kampala are reported to the fire brigade station. Though few lives are lost, Kampala fires have become rampant. But most Kampala fire outbreaks are common in institutions of higher learning, restaurants, hotels, warehouses, stores, factories, workshops, automobiles, wooden and grass-thatched houses, bushes and farms. Other affected places are markets, rubbish heaps and electrical installations. Between 2015 and 2019, there were 3, 214 fire incidents in various places in Kampala. There are also fire outbreaks within other parts of the JKM region which raise worries about the safety of the people, especially in institutions, and commercial and residential areas which are not planned.<sup>13</sup>

Firefighting services, like the army and the police, form an integral part of the national security system. The causes of fire are that few places of business are situated near open water sources like ponds and rivers; the majority have a limited water supply. There is a need for public institutions, business premises and offices to provide fire hydrants to be used in cases of emergency.

### *Epidemic Diseases*

The COVID-19 pandemic starkly illustrated the risk that epidemic outbreaks pose to Uganda, with the JKM Corridor being particularly vulnerable owing to its high population density relative to the rest of the country. Relative to much of the world, the country has weathered the pandemic well, at least in terms of mortality. While it is still too early to conclude what factors and actions contributed to a relatively low loss of life, early analyses suggest the government's rapid imposition of a national lockdown may have been decisive.<sup>14</sup>

That said, the broader picture of risks posed to the JKM Corridor by epidemic outbreaks is murkier. Indeed, without decisive intervention, the conditions exist for widespread loss of life owing to the country's strained public health service; dense and poorly serviced informal settlements; and high rates of poverty. Further, Uganda's geography exposes it to diseases with an exceptionally high risk for epidemic spread, including Ebola, cholera, and malaria – indeed, settlements such as Jinja that are prone to flooding are at particularly acute risk.

COVID-19 has further illustrated the destructive capacity of epidemics beyond their immediate threat to life. Uganda's lockdown in conjunction with the closure of the economies of key trading partners, led to a 2.9 percent fall in GDP in FY20, compared to a 6.8 percent growth in FY19.<sup>15</sup> Uganda's population, particularly the urban poor many of whom rely on informal work and hence have limited labour rights, have experienced major falls in household revenues. As such, if rates of poverty climb rapidly, escalating government expenditure and falling tax revenues limit the medium- to long-term capacity of the government to assist. Ugandans that rely on the government's public healthcare system also report reduced access to primary healthcare, leading to increased rates of preventable deaths including from malaria and childbirth.<sup>16</sup>

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<sup>13</sup> I. Mbiggo and K. Ssemwogerere (2018). "An Investigation into Fire Safety Measures in Kampala Slums." A Case of Katanga-Wandegeya', in *Civil and Environmental Research* 10(3)

<sup>14</sup> Reuters (2021).

<sup>15</sup> World Bank (2021). *Uganda Covid-19 Crisis Response and Recovery Budget Support to Mitigate COVID-19 Pandemic*.

<sup>16</sup> Development Initiatives (2021). *Socioeconomic impact of Covid-19 in Uganda: How has the government allocated public expenditure for FY 2020/21?*

### 7.3.2 Extensive Risks

#### *Food Insecurity*

Food insecurity is a prevalent issue for many households in the JKM Corridor. Subsistence farming is commonplace in Uganda, and while households engaged in subsistence farming are vulnerable to poor harvests and economic poverty, the immediacy of their food supply affords them a degree of protection from shocks to the food supply.<sup>17</sup> Subsistence farming is, however, less common in peri-urban areas, and almost non-existent in urban areas. Consequently, residents of urban centres in Kampala, Jinja, and Entebbe are at acute risk of shocks to the food supply, particularly the urban poor. A sharp increase, for example, in the price of *matake* and a drop in its availability led to thousands of families reducing their diet to a single meal a day.<sup>18</sup> The risks posed by food insecurity were seen most recently during the COVID-19 pandemic, which has caused dramatic reductions in household incomes; shuttered urban food suppliers such as markets and street vendors; and caused sharp increases in household staples.<sup>19</sup>

#### *Violent Crime*

Muggings, assault, theft, and sexual crimes are more commonplace in the JKM Corridor relative to the rest of Uganda. The pattern of Uganda's urbanisation means that the JKM Corridor features extremely high youth unemployment, with the urban poor often clustered in dense neighbourhoods far from sources of either formal or informal employment. A study of 500 young people living in Kampala's informal settlements showed some 36 percent had experienced violent crime involving a weapon.<sup>20</sup>

#### *Economic Shocks*

High levels of unemployment limit the ability of individuals and communities to cope with the impacts of climate change. It should therefore be noted that if urban poverty is reduced, the disasters brought on by climate change will be greatly offset. Studies and assessments done by the KCCA and other key stakeholders reveal that the stresses have had various impacts on economic growth which have reduced the resilience of unemployed communities, families and households to cope, thus increasing vulnerability risk much higher.

#### *Vehicular Accidents*

Uganda has one of the highest rates of road traffic incidents of all low and middle-income countries and is one of the top-ten causes of death in the country.<sup>21</sup> People living in the JKM Corridor, containing the majority of urbanised areas in the country, are particularly at risk. As discussed in Chapter 6, the JKM Corridor's urbanisation over the past 20 years has far outpaced the capacity of its road and transit systems. This, in conjunction with a dramatic uptake in private vehicle ownership, as well as the pattern

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<sup>17</sup> This should not, however, be overstated – an overestimation of the capacity of rural households to produce their own food has left thousands of rural Ugandans in poverty, excluded from aid distribution which has favoured urban households.

<sup>18</sup> J. Pottier (2015). 'Coping with urban food insecurity: findings from Kampala, Uganda', in *Modern African Studies* 53(2): 217-241.

<sup>19</sup> IIED (2021). *To address food insecurity in Uganda, the government must act now* Available online: <https://www.iied.org/address-food-insecurity-uganda-post-Covid-19-government-must-act-now>

<sup>20</sup> Monica H. Swahn et al (2012). 'Serious Violence Victimization and Perpetration among Youth living in the Slums of Kampala, Uganda', in *West J. Emergency Medicine*. 13(3).

<sup>21</sup> J. Balikuddembe et al. (2017). 'Road Traffic Incidents in Uganda: A Systematic Review of a Five-Year Trend', in *Injury and Violence* 9(1): 17-25

of the region's urban development which tends towards unplanned, informal road networks, has created an environment where vehicular accidents are commonplace, at 28.9 deaths per 100,000 population.<sup>22</sup>

### *Contaminated Waters*

Most of the slum dwellers use pit latrines which are shallow due to the height of the water table in the flood plains where they live. These sanitary facilities get flooded and become inaccessible during the rainy season, leading to contamination of water sources. Floods, to emphasise again, cause frequent outbreaks of waterborne diseases like cholera. The urban poor are affected most by these water-borne diseases and the frequency of the outbreaks is expected to increase with climate change.<sup>23</sup>

## 7.4 Contextual factors underlying intensive and extensive risks

Understanding intensive and extensive risks in the JKM Corridor requires a robust understanding of the connecting drivers of said risks. We can identify three main drivers of risk as follows: the drivers of urbanisation and urban change; the weaknesses and incapacities of governments; and the development and expansion of cities and urban centres in high-risk sites.

### 7.4.1 Rapid, uncontrolled urbanisation and risk

Global evidence demonstrates that a national urban transition can support better urban growth through compact urban growth, connected urban infrastructure and coordinated urban governance.<sup>24</sup> The concepts and discussions about the direction and dynamics of urbanisation, such as growth or shrinkage, have one issue in common: They deal with the relationship between built-up areas in urban areas and the population concentrated in them. Or, in other words: about urban population density.

There is also literature that indicates that density usually not associated with compactness can compound certain risks such as flood, contagion (disease), fire etc.<sup>25</sup> Urbanisation in the JKM Corridor, as discussed in detail in Chapter 3, is characterised by rapidly expanding, sprawling spatial expansion, much of which is informal. The effects of this form of urbanisation on the JKM Corridor's risk profile are well understood.

This pattern of urbanisation is destructive of ecological resources including forests, waterbodies, floodplains, and riverbanks. As well as causing environmental degradation through habitat loss and subsequent reduction in biodiversity, it further increases the risks of flooding. This is driven by increased impervious surfaces for roads and parking; improper land use in respect of buildings in hilltops and

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<sup>22</sup> Ibid.

<sup>23</sup> J, Kwiringira et al. (2016). 'Seasonal Variations and Shared Latrine Cleaning Practices in the Slums of Kampala City, Uganda', in *BMC Public Health* 16(361).

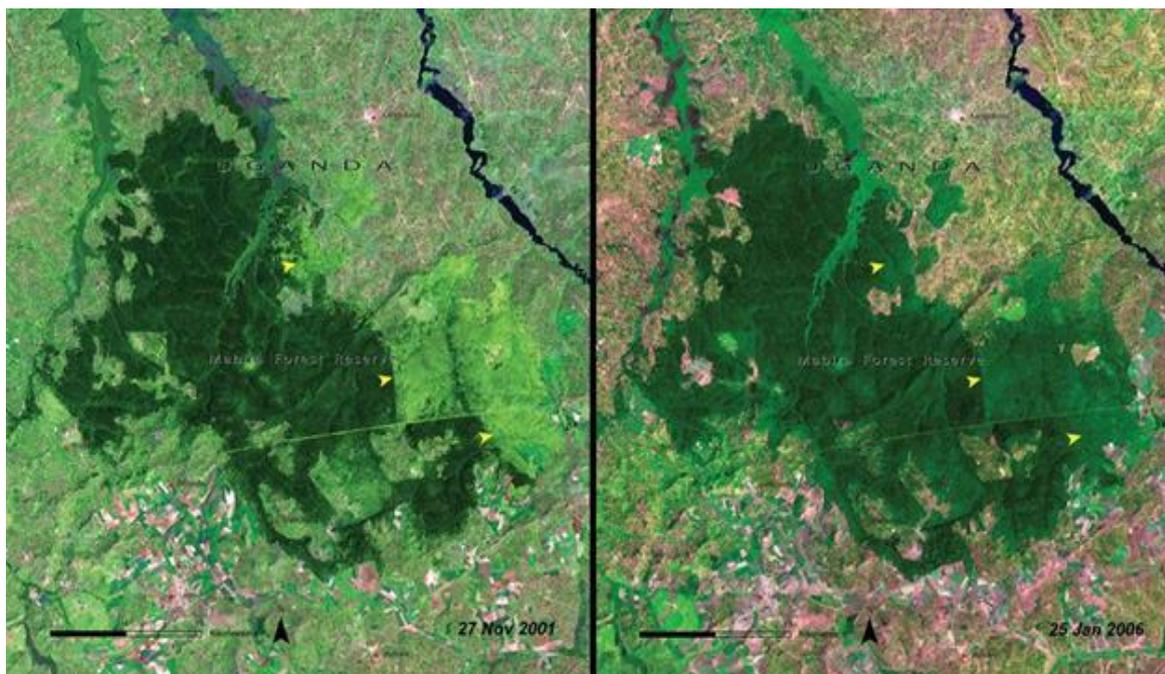
<sup>24</sup> This is part of the basis for Uganda's development priorities. See e.g., Uganda Ministry of Finance (2016). *Better Growth, Better Cities: Achieving Uganda's Development Ambition*. Ministry of Finance, Uganda. See also, DFID (2017). *Coalition for Urban Transitions: A New Climate Economy Special Initiative*

<sup>25</sup> See for example, G. Atukundu (2018). 'Dynamics of Urban and Rural Linkages in Uganda: Exploring the Effects, Challenges, and Opportunities for Sustainable Rural Development', in *Journal of African Interdisciplinary Studies* 2:9 pp. 4-19.

wetlands leaving no room for water to drain; insufficient drains; poor maintenance of drainage channels; and ineffective solid waste management systems.<sup>26</sup>

The JKM corridor is, as a result, experiencing rapid deforestation for various pressures ranging from settlements and agricultural development, see **Error! Reference source not found.**. The forest land uses, especially within the Buyikwe and Mukono districts including forest reserves, are under high pressure for unsustainable harvesting for commercial activities such as timber and also for settlements.<sup>27</sup>

Figure 6: Five years of deforestation in Mabira Forest, Uganda



Source: <https://www.businessinsider.com/why-paris-agreement-photos-human-activity-earth-trump-withdraw-2017-6?r=US&IR=T>

Within the JKM Corridor, urban development in peri-urban areas is exerting significant development pressures on agricultural land. The recent emergence of an informal land market in the face of an inefficient formal one has resulted in the exclusion of some social groups, particularly the poor, and has increased competition for land between agricultural and non-agricultural users.<sup>28</sup>

Of particular pertinence to the JKM Corridor is the increase in road vehicle usage, directly resulting from both urban sprawl (particularly in Kampala) and a lack of viable mass-transportation options such as rail and high-capacity busses. This leads to vehicle emissions that contribute to air pollution and its attendant negative impacts on human health.<sup>29</sup>

<sup>26</sup> A. Richmond et al. (2018). 'Urban Informality and Vulnerability: A Case Study in Kampala, Uganda', in *Urban Science* 2(1):22

<sup>27</sup> M. Josephat (2018). 'Deforestation in Uganda: population increase, forests loss and climate change.', in *Environ Risk Assess Remediat* 2018 2(2)

<sup>28</sup> E.N. Sabiiti et al.(2014).

<sup>29</sup> Ibid.

#### 7.4.2 Climate Change and Greenhouse Emissions

The JKM Corridor is experiencing climate changes mostly with increased temperatures and more intense rainy seasons which are less predictable and more erratic leading to flooding and food insecurity. The IPCC's fourth assessment report climate change models project an increase in average temperatures in Uganda of up to 1.5°C in the next 20 years and up to 4.30 by 2080.<sup>30 31</sup>

In the business-as-usual scenario emissions at the GKMA level are projected from 6.9 million tons in 2014 to 9.1 million tonnes in 2020 and 14.6 million in 2030. The overall emissions will increase by 55 percent from 2020-030. The main contributing sectors include transport, household, freight, waste, and tertiary and industrial sectors. The other source of pollution is from the industries within the JKM Corridor.<sup>32</sup>

The major sources of pollution are industries, vehicles (transport) and cooking using firewood and charcoal. Industries generate volumetric wastes which are discharged without treatment into nearby water bodies, potentially degrading their water quality. Most industries in Uganda use outdated manufacturing technologies and do not have functional effluent treatment plants. Therefore, raw and harmful wastes are discharged into the surrounding water bodies.<sup>33</sup>

Changes in rainfall patterns and annual totals are also expected. Prediction models indicate an increase in rainfall of 10-20 percent. From the predictions, it is estimated that runoff will increase in the magnitude of 10-20 percent<sup>34</sup>. The recorded temperature has increased by 1.5 centigrade over the last 50 years. Although the precipitation levels have not changed significantly, the patterns have become more erratic.<sup>35</sup>

The major economic sectors that are subjected to the first-order impact of climatic change are water resources, ecosystems and fishery, agriculture, energy, transportation, infrastructure and communications, and public health and labour productivity.<sup>36</sup> The second-order economic impact of climatic change is lingering food shortages, energy poverty, malnutrition and impaired learning ability, and gradual loss of ecosystems that previously supported the economic and social life of inhabitants. The 1997/1998 El Niño floods caused damage to buildings, roads, communications systems, crops, and in addition to the costs of treating diseases.<sup>37</sup> This type of damage has immediate and lingering future costs. Taking the costs of replacement of infrastructure, we can assess immediate costs for all damaged

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<sup>30</sup> N. Hepworth and M. Goulden (2008). *Climate Change in Uganda: Understanding The Implications And Appraising The Response*. DFID Uganda, Kampala.

<sup>31</sup>McSweeney, C. et al. (2010). 'The UNDP Climate Change Country Profiles: Improving the accessibility of observed and projected climate information for studies of climate change in developing countries.', in *Bulletin of the American Meteorological Society*, 91(2), 157-166.

<sup>32</sup> UCSD (2017). *Promoting the Implementation of the Paris Agreement in Africa: Uganda National Baseline Study*. UCSD, Kampala.

<sup>33</sup> C. Angrio, P. Abila, T. Omara (2020). 'Effects of Industrial Effluents on the Quality of Water in Namanve Stream, Kampala Industrial and Business Park, Uganda', in *BMC Research Notes* 13(220).

<sup>34</sup>UN-Habitat (2009). *Climate change assessment for Kampala, Uganda: a summary*. United Nations Human Settlements Programme.

<sup>35</sup> Ibid.

<sup>36</sup> Republic of Uganda (2015) (a). *Economic Assessment of the Impacts of Climate Change in Uganda*. Ministry of Water and Environment, Uganda.

<sup>37</sup> Mogaka, H. et al. (2005), *Climate variability and water resources degradation in Kenya: Improving water resources development and management*, World Bank Working Pap. 69, World Bank Group, Washington, D. C

structures, in addition to lost value due to impaired infrastructure, cost of treating diseases, and lost productivity due to diseases and inability to move and communicate freely.

The risk profile outlined above is therefore exacerbated on all accounts by climate change – yet the JKM Corridor is the main source of emissions that contribute to climate change. For example, a qualitative study examining narratives of climate and livelihood changes in Jinja city emphasized how Jinja’s residents make sense of climate change through their own narrative framework rather than through the lens of global climate change discourses.<sup>38</sup> They demonstrated how the onset of climate change in Jinja is widely attributed to perceived moral and environmental failings on the part of present generations being unable to preserve land, trees and other resources for the future. This form of analysis situates changing climates and environments within the context of everyday urban struggles and emphasises the need for civic participation in developing climate change strategies.<sup>39</sup>

#### 7.4.3 Limited household and institutional capacities for managing and mitigating risk in the JKM Corridor

The literature reviewed and discussions with stakeholders show that there is limited public understanding of the impacts of climate change at the national level and within the JKM Corridor. Uncertainty about the extent of climate change impacts, as data are insufficient to drive a detailed specification of adequate adaptation measures. Known costs of adaptation raise more objections than the unquantifiable costs of inaction. Climate change is reducing the capacity of district and urban institutions and associated security and governance systems to deal with climatic extremes and variability.<sup>40</sup> Generally and specifically there is an absence of research on the adaptation capacities of citizens - individuals and households.

Smaller municipalities and towns, in contrast to institutions at the national level, are primarily dealing with day-to-day issues or extensive risks of providing basic services and do not have the capacity to get ahead of new challenges like climate change adaptation, which requires long-term planning as climate change adaptation. The climate change function is often placed within a municipality’s environmental department, which can be a barrier to broader integration and acceptance of climate change action within municipal/town council planning and implementation. Climate change is often seen as an “unfunded mandate” in Uganda; all levels of government are mandated through national policy to act on climate change, yet funding allocations thus far do not seem to reflect this imperative.<sup>41</sup>

#### 7.4.4 The risk profile for the JKM Corridor.

The overall picture of risk in the JKM Corridor suggests acute vulnerability to intensive and extensive risks. Uncontrolled urbanisation, climate change, and limited institutional and household capacities exacerbate these risks. In particular:

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<sup>38</sup> McQuaid, K et al. (2018). ‘Urban climate change, livelihood vulnerability and narratives of generational responsibility in Jinja, Uganda’, in *Africa* (88).

<sup>39</sup> Ibid

<sup>40</sup> D. Satterthwaite et al. (2007). *Adapting to Climate Change in Urban Areas: The Possibilities and Constraints of low- and middle-income nations*. IIED.

<sup>41</sup> G. Tumushabe et al. (2013). *Uganda National Climate Change Finance Analysis*. ODI, London.

- > The region experiences regular flooding yet has extremely limited infrastructure to mitigate the damage inflicted by floods. Uncontrolled urban expansion has seen encroachment on floodplains, while climate change is driving the severity of floods upwards;
- > The region is at acute risk of wildfires, with climate change and unregulated construction, deforestation, and agriculture increasing these risks. Further, as most urban expansion has been unplanned, fires spread more easily and with greater destructive potency;
- > Informal settlements are dense, sprawling, and in many cases at risk of disease outbreaks – this is

Driver of Risk	Resultant Extensive Risks	Resultant Intensive Risks
Urbanisation patterns: dispersed, informal, and uncontrolled	<ul style="list-style-type: none"> <li>• Poor access to clean/piped water.</li> <li>• Worsened health outcomes.</li> <li>• Use of environmentally damaging fuel sources (e.g., charcoal, produces emissions, encourages deforestation).</li> <li>• High frequency of negative life outcomes, e.g., violent crime, food insecurity, vehicular accidents.</li> </ul>	<ul style="list-style-type: none"> <li>• Major fire outbreaks.</li> <li>• Epidemics and disease outbreaks.</li> <li>• Environmental Degradation.</li> </ul>
Climactic and Environmental Change	<ul style="list-style-type: none"> <li>• Loss of businesses, and homes (flooding, fire).</li> <li>• Heatwaves posing a significant risk to life, especially for the urban poor.</li> </ul>	<ul style="list-style-type: none"> <li>• Flooding, esp. Jinja and settlements along the Nile.</li> <li>• Heatwaves causing fire outbreaks.</li> <li>• Soil degradation.</li> </ul>
Household and Institutional Preparedness	<ul style="list-style-type: none"> <li>• Unemployment, poverty.</li> <li>• Inadequate service provision.</li> <li>• Heavy reliance on resources susceptible to supply-side shocks, e.g., oil.</li> </ul>	<ul style="list-style-type: none"> <li>• Weak general preparedness for major disasters.</li> </ul>

Figure 7: Risk Profile for the JKM Corridor

exacerbated by regular flooding, which increases the spread of malaria and cholera among other waterborne diseases;

- > Poor service provision for the urban poor means that many people in the JKM Corridor are at high risk of life-altering events including the experience of violent crime, traffic accidents, and ill health. Most households lack the resources to absorb the shock of intensive risks, particularly flooding;
- > Households in the corridor are dependent on sources of fuel that both contribute to climate change (i.e., charcoal), and leave them susceptible to economic and supply-side shocks (i.e., oil).

A summary of risks is provided above in Figure 7, which further illustrates the overlapping nature of risks in the Corridor.

## 7.5 From risk to resilience: governance of and approaches to building resilience in the JKM Corridor

This section reviews the structures of governance, legislation, and spatial planning that can facilitate the mitigation of risk and the building of resilience. It answers the following research question outlined in the introduction:

### **What opportunities exist to build resilience in the face of the JKM Corridor’s profile of risks?**

There have been various studies and research conducted on climate change-related issues in Uganda as well as globally that provide information mitigation and adaptation measures to climate change, which

the JKM Corridor can utilise. However, as previously stated, there has not yet been a comprehensive study specifically focused on the impacts of climate change on the JKM Corridor.

Good governance is fundamental for building urban resilience in the face of risks. No single aspect of governance dictates the level of resilience of a given spatial or territorial urban area – a well-financed and effective government might be highly functional in many respects, but this does not necessarily imply that it oversees effective resilience planning. Governance factors that feed into resilience include accountability; sufficient disaster risk planning and preparedness; clear and well-communicated directives and responsibilities; and an integrative understanding of risk and resilience.<sup>42</sup>

In the case of the JKM Corridor, the most obvious shortcoming exists in that the corridor is not a unified governed entity, rather it is multiple regional and municipal governance units with varying priorities and capacities. In Uganda more broadly, there is no single department responsible for risk management, nor is there a single over-arching strategy for integrating risk management into development strategies.

That said, Uganda has a wide array of instruments and departments that are tangentially or indirectly responsible for areas of risk management as outlined in the risk profile, particularly in terms of environmental protection and management. It further looks at existing programmes and projects intended to mitigate risk and environmental destruction.

It should be noted that this section considers these governance frameworks and practices in terms of their *de jure* principles and functions – there is frequently a discrepancy between how land, buildings, ecological zones, and so forth *should* be managed, and how those areas *are* managed. This is most commonly due to a lack of institutional capacity, which must be addressed in any recommendations for integrating risk mitigation and resilience building into development priorities.

#### 7.5.1 Institutional Management of Risk and Urban Resilience

Two main ministries – the Ministry of Lands, Housing & Urban Development, and the Ministry of Water & Environment - and their respective departments play a critical role in the environmental management of the JKM regional corridor. Their institutional structure, relevant mandates and capacity are briefly described here.

##### *Office of the Prime Minister (OPM)*

The Ministry of Disaster Preparedness and Refugees is a cabinet-level government ministry of Uganda. The ministry is responsible for the coordination of all refugee matters in the country. It is also responsible for national preparedness for disasters, including floods, landslides, earthquakes, droughts, and famine.

The programme “Strengthening Community resilience to climate change and disaster risks project in Uganda” is implemented by the Office of the Prime Minister (OPM) in conjunction with seven other Ministries, Departments, Agencies and civil society organizations participating as Responsible Parties (RPs). The RPs include the Ministry of Water and Environment (MWE), Ministry of Lands, Housing and Urban Development (MLHUD), Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Ministry of Finance, Planning and Economic Development (MFPED), Uganda National Meteorological Authority (UNMA) and National Planning Authority (NPA).

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<sup>42</sup> Betolli et al. (2016).

*The National Physical Planning Board (NPPB)*

Mandated to provide guidance and recommendations to government and local government on matters relating to physical planning, but also ensure integration of physical planning with social and economic planning at the national and local government.

*Ministry of Lands, Housing & Urban Development (MoLHUD)*

MoLHUD is responsible for providing policy direction, national standards and coordination of all matters concerning lands, housing and urban development for the country. It guides and directs policy, and legal aspects and sets the regulatory agenda on land, housing, and urban development to ensure sustainable land management, promotion of sustainable housing for all, and the fostering of orderly urban development in the country. Politically, the ministry structure has one Minister who gives the overall political guidance and direction with the support of three Ministers of State for Lands, Housing and Urban Development respectively. Within the ministry, there are three directorates and multiple departments.

Departments within MoLHUD that are relevant and related to the environmental issues of JKM Corridor include:

- > **Department of Land Administration:** responsible for the supervision of land administration institutions and valuation of land and other properties.
- > **Department of Land Use regulation and compliance:** responsible for formulation of land use-related policies, plans and regulations. It also provides technical support and guidance to Local Governments in the field of land use regulation, monitoring and evaluation, and systematization of the land use compliance monitoring function and practice.
- > **Department of Land Registration:** responsible for issuance of certificates of title, general conveyance, keeping custody of the national land register, coordination, and inspection, monitoring and backup technical support relating to land registration and acquisition processes to local governments.

*Ministry of Water & Environment (MWE)*

MWE is responsible for setting national policies and standards, managing and regulating water resources and determining priorities for water development and management. It also monitors and evaluates sector development programs to keep track of their performance, efficiency, and effectiveness in service delivery. The Ministry of Water and Environment (MWE) is the national focal climate change institution through the Climate Change Department (CCD). The MWE is also the National Implementing Entity (NIE) for the Adaptation Fund.

Relevant departments within MWE include:

- > **National Environmental Management Authority (NEMA):** A semi-autonomous parastatal agency (officially under the Ministry of Water and Environment) established in 1995 under the National Environment Act. It is responsible for coordinating, monitoring, regulating and supervising environmental management in the country. Its regulatory functions and activities focus on compliance and enforcement of the existing legal and institutional frameworks, covering both green and brown issues of environmental management. It oversees the implementation of all environment conservation programs and activities of the relevant agencies both at the national and local Government levels.

One key regulatory function of NEMA is the review and approval of Environmental Impact Assessments and Environmental Impact Statements as well as Environmental Audits. Further on the management of wetlands, NEMA is empowered as the authority, in consultation with the lead agencies, District Environment Committees and local environment committees, to establish guidelines for the sustainable management of wetlands, to identify wetlands of local, national, and international importance and to declare wetlands to be protected wetlands.

The draft National Environment Management Policy 2014 identifies some of the ecosystem services that could have a financial value, including forests (carbon storage and sequestration), wetlands conservation, watershed protection and species, habitat and biodiversity conservation. NEMA is the principal agency for environmental management which includes climate change. The draft policy provides for some of the strategies for building a system for payment for ecosystem services, including:

- › Establishing policy, legislative and regulatory frameworks responsive to the needs of the communities;
  - › Establishing guidelines and enterprise support centres for advisory and capacity-building services;
  - › Engaging and training prospective sellers, as well as financial institutions up to the community level for efficient delivery of payments;
  - › Providing a conducive environment for a public-private partnership for the system to flourish
  - › Establishing effective governance and securing tenure to local ecosystem managers to ensure the right and authority to manage ecosystems and benefit from the payments; and
  - › Creating mechanisms for valuing or measuring services that are not currently valued in the market.
  
- › **Directorate of Wetlands Management:** Directly in charge of monitoring, supervision, enforcement and compliance of wetlands and ensures the conservation of wetland resources for sustained utilization. Within the department, there are two divisions: (i) Policy, planning and enforcement – for M&E (e.g., encroachment), EIA report review, auditing and standards; and (ii) awareness-raising, information and management – for R&D, assessment and inventory (coverage and info), district supervision (training and technical support).

The following table summarises key legislative provisions.

*Table 1: JKM Legal Provision Frameworks*

Legislation Provision	Relevance to JKM
1 The Constitution of the Republic of Uganda, 1995	The 1995 Uganda Constitution is the supreme law and has provisions for environmental protection and natural resource conservation such as Article XIII regarding: “the protection of important natural resources on behalf of the people of Uganda” and Article XXVII regarding: “the need for sustainable management of land, air and water resources.
2 The National Environment Management Policy (NEMP) (1994).	Aims to promote sustainable economic and social development. Among the provisions of the policy is a requirement for an Environmental Impact Assessment (EIA) to be conducted for any policy or project that is likely to have adverse impacts on the environment
3 The National Policy for the Conservation and	This policy establishes the principles by which wetland resources can be optimally used now and in future. It calls for the application of EIA to all activities to be carried out in a wetland and aims at ensuring that the

Management of Wetland Resources (1995).	environmental goods and services provided by wetlands are safeguarded and integrated into development considerations
4 The National Water Policy (1999).	This policy's objective is the management and development of the water resources of Uganda in an integrated and sustainable manner. The policy requires EIA for all water-related projects and integration of water and hydrological cycle concerns in all development programs. It covers water quality, water use, discharge of effluents and international cooperation on transboundary water resources
5 Disaster Management and Preparedness Policy.	This policy aims to promote the implementation of prevention, preparedness, and mitigation and response measures for disasters, in a manner that integrates disaster management with development planning.
6 The National Land Policy, 2013	The land policy addresses the contemporary land issues and conflicts facing the Country. The vision of the policy is: "Sustainable and optimal use of land and land-based resources for transformation of Ugandan society and the economy" while the goal of the policy is: "to ensure efficient, equitable and sustainable utilization and management of Uganda's land and land-based resources for poverty reduction, wealth creation and overall socio-economic development.
7 National Climate Change Act 2021	The Climate Change Act governs Uganda's national response to climate change. The Act mandates the creation of a Framework Strategy on Climate Change, as well as a National Climate Action Plan and District Climate Action Plans.

#### 7.5.2 A Green Uganda – National commitments to environmental protection

Uganda is an exceptionally forward-thinking country in terms of its climate change mitigation ambitions, recognising both the ecological and economic opportunities presented by a green growth strategy. The national strategy and local tactics used to implement this approach follow.

Uganda was the first country in Africa to develop and endorse its Nationally Determined Contribution Partnership Plan (NDC-PP) in June 2018. It made key commitments in this regard, including, reducing national greenhouse gas emissions by 22 percent by 2030, reducing climate vulnerability of climate-sensitive sectors since the economy is natural resource-based, and building the climate resilience of key sectors and managing disaster risks (UNDP, 2018).

At the national level, the government is committed to addressing climate change as outlined in the NDP III, the national climate change policy and strategy, second national communication and INDC. Uganda also signed the Paris Agreement joining other countries to commit to fighting climate change. Uganda is also a signatory to the East Africa community climate change policy and East Africa climate change strategy and master plan.

Uganda has a low greenhouse gas emissions profile. This allows the country to pursue a clean, green-growth, development pathway as opposed to the conventional approach of "develop first and clean up later". Uganda has recently developed the Green Growth Development Strategy (2017/18 – 2030/31) that identifies key interventions for achieving green growth in the five high green impact sectors of agriculture, energy, forestry, transport and planned green cities.<sup>43</sup> The Government of Uganda is currently preparing the Climate Change Bill (expected to be approved by Cabinet). The Bill and eventual

<sup>43</sup> *Greening Uganda's Economy as the Sustainable Pathway to Middle Income Status*, Kampala. Kaggwa, R, Namanya, B (2018). ACODE Policy Research Series, No. 85, March 2018.

Law aim to provide a legal framework for strengthening the implementation and coordination of climate change actions, and support monitoring and implementation enforcement by various actors.

Major changes in environmental policy and the water sector took place around the 1990s with the adoption of a National Environment Management Policy and the National Environment Statute in 1994 and 1995 respectively, and the adoption of the Water Action Plan (WAP), a water policy and two new laws: the Water Statute 1995 and the National Water and Sewerage Corporation Statute 1996. However, the national-level guidance on urban development and land management evolved only in recent years (e.g., the National Land Policy was approved in 2013).

### 7.5.3 Specific interventions under the Green Growth Strategy

The Lake Victoria Management Project (LVEP), implemented by the Ministry of Water and Environment, has improved the management of transboundary natural resources of the Lake Victoria basin for shared benefits of the East African Community through the reduction of pollution and enhanced climate resilience in selected hotspot areas. The project is funded by a \$90 million International Development Association credit.

To support the Government of Uganda in implementing the National Climate Policy (NCCP), Climate and Development Knowledge Network (CDKN) supported a study on the Economic Assessment of the Impacts of Climate Change, which provides information about the current adaptation deficit present in Uganda and the extent of the negative consequences that climate variability has on the Ugandan economy.

Climate change damage estimates in the agriculture, water, infrastructure and energy sectors collectively amount to 2-4 percent of the GDP between 2010 and 2050. The national-level studies show that if no adaptive action is taken, annual costs could be in the range of US\$3.2 - 5.9 billion within a decade, with the biggest impacts being on the water, followed by energy, agriculture, and infrastructure. Over the 40 years from 2010-2050, the costs of inaction are estimated at between US\$273 - 437 billion. Even if there were no further increases in climate impacts, the cost of inaction would rise over time because of an increase in population

The Strategic Program for Climate Resilience (SPCR) has been aligned with Uganda's long-term development Vision (Vision 2040) which aims to move the country from its current low-income status that relies highly on agriculture to a competitive upper middle-income country with a per capita income of US\$ 9,500 by 2040. The Vision recognizes that climate change affects all sectors of Uganda's economy. It underscores the need to develop and implement appropriate strategies, policy, institutional and legal frameworks to build climate resilience in all sectors.

The SPCR is a plan of action for addressing the effects of climate change and variability. The Government of Uganda has prepared the SPCR as a strategic framework for addressing the challenges of climate change that impact the national economy including the development of resilience by vulnerable communities. The overall objective of the SPCR is to ensure that all stakeholders address climate change impacts and their causes in a coordinated manner through appropriate measures while promoting sustainable development and a green economy.

Kampala Capital City Authority has had a Kampala Climate Change Action strategy for 5 years 2014-2019 (Climate Change Action Plan Strategy, 2016), in terms of natural hazards (e.g., energy efficiency, renewable energy waste and wastewater, mobility, buildings and land use, biodiversity green procurement and investments, research and communications, financing and project support. The

Kampala Climate Change Action strategy is a plan aimed at mainstreaming climate change response in all the city services in order to put the city on a low-carbon development path. The strategy addresses three issues: the short- and long-term adaptation of the city to climate change impacts, charting a low emissions development path for the city and transforming the threat of climate change into an opportunity for residents.

The local government and urban councils within the JKM Corridor do not have specific action programmes but are guided by the nation's climate change strategy, district development plans and physical development plans. However, in 2018, the World Bank and the Uganda Country Office supported local government officials in a training workshop, in collaboration with the Climate Change Department in the Ministry of Water and Environment, Ministry of Finance and National Planning Authority (NPA). The workshop brought together more than 30 planners, policymakers and key stakeholders for hands-on training that introduced them to the climate change and disaster risk screening tool.

There have been various initiatives on valuing natural resources such as forest and wetland resources. However, Uganda is set to develop an elaborate system for evaluating or attaching financial value to ecosystem services. The National Environment Management Policy, 2014 identifies some ecosystem services that could have a financial value, including forest (carbon storage and sequestration) wetland conservation, watershed protection and species, habitat and biodiversity conservation. The policy provides for some of the strategies for building a system for payment for ecosystem services, including the creation of mechanisms for valuing or measuring services that are not currently valued in the market.

Carbon markets, which are an important instrument of green growth, and one of the mechanisms for payment for ecosystem services, have registered remarkable growth in Uganda over recent years. A number of projects - both stand-alone CDM projects and programmatic CDM projects - have been registered by the UNFCCC CDM Executive Board. Although there is uncertainty regarding the continued operation of the CDM as currently constituted due to the possible failure of the Doha Amendment to the Kyoto Protocol to enter into force. There is hope that similar emissions trading mechanisms will be established under the Paris Agreement, 2015, thus enabling the continued operation of carbon markets.

Payments for ecosystem services are provided for in the National Environment Act, 2019. Section 65 of the Act stipulates that a provider of a well-defined ecosystem service may enter into a voluntary transaction with a person who wishes to buy that environmental service or a form of land use likely to secure the environmental service, for the purpose of securing a continuous supply or availability of the environmental service. For Kampala, it is estimated that the cost of adaptation to climate change will increase significantly from about US 7.3 million in 2013 to between Us 33-102 million by 2050.

There are a number of ongoing climate change response initiatives that are related to green growth including the creation of an updated inventory of greenhouse gas emissions by sector; preparation of various Nationally Appropriate Mitigation Actions (NAMAs); the community tree planting project which entails distribution of free tree seedlings; development of a national REDD+ strategy; environmental tax on the high green-gas emitting old vehicles; addressing the fiduciary requirements to make Uganda qualify for climate finance from the various international climate finance windows; distribution of efficient charcoal saving cookstoves; and undertaking studies that quantify the economic cost of climate change responses coupled with the cost of inaction.

However, most of these green growth initiatives are small in scope, donor-driven, use inefficient technologies, have limited potential for replication and project approval processes are lengthy. Other equally important research and knowledge management strategies have not been adequately attempted. For instance, little is known about the cost of congestion in and around Kampala in terms of the number

of man hours wasted per day in traffic; amounts of greenhouse gas emitted by motor vehicles stuck in traffic per day/week/month/annum; fuel costs incurred by motorists who keep engines running for hours in traffic jams; wear and tear of/on roads due to traffic jams; health costs of sitting for long hours in jam or breathing in of emitted motor vehicle fumes; and the psychological and coefficient of efficiency costs at individual and collective levels.

#### 7.5.4 Summary of institutional arrangements

Institutional analysis and assessment of policy and implementation mechanisms within the JKM Corridor reveal ineffective functioning in terms of addressing climate change, building resilience and overall environmental management. The following are the major challenges:

- > Institutional fragmentation – overlapping mandates, weak integration and coordination. As described earlier, both national-level (MoLHUD, MWE, NEMA, Wetlands Department) and city-level agencies (KCCA, JCC local and Urban local authorities are directly involved in different aspects of land and urban environment management and their regulatory scope and responsibilities overlap. Current coordination and integration vertically between the national and city-level agencies are weak, especially with regard to the issuance and enforcement of related permits and approvals for development (EIA certification, land title, user permit, planning permit); this is exemplified by developments in wetland areas;
- > Weak development guidance at the national and local/city/municipal town/town council level and overall weak regulatory environment around wetlands conservation and management;
- > Constraints in current capacity and resources; and competing priorities for resource allocation;
- > The lack of both financial and staff capacity and resources is a common challenge highlighted by all institutions as is loose adherence to the development approval process.

## 7.6 Policy recommendations for building resilience

Based on the preceding analysis, this section outlines strategic policy recommendations to address resilience in the JKM Corridor. Specifically, it answers the following question as outlined in the introduction:

### ***What specific interventions can be undertaken to integrate risk mitigation and resilience building into urban development strategies?***

At the national level, there is a need for legislation that specifically guides regional-level planning such as the JKM Corridor. These legislations should support interventions or initiatives in the climate change and resilience areas of awareness-raising, in-depth analysis for dynamics and impacts, monitoring, as well as prioritising and mainstreaming climate change adaptation and mitigation into national and local level plans. Such legislation would enable the JKM Corridor to respond to climate change in a holistic, systemic and sustainable manner, and build the resilience of communities and households.

#### 7.6.1 Analysis: Addressing the Drivers of Risk in the JKM Corridor

Developing a holistic understanding of risks and vulnerabilities is an important first step towards building resilience in any city. This means addressing the most significant shocks and stresses and those

anticipated in the future, with stakeholders engaged through focus group discussions, interviews, and surveys to identify and prioritise actions based on likelihood and impact.

### *Urbanisation Patterns*

Given that the bulk of urbanisation within the JKM Corridor is occurring in both smaller and larger settlements where urban governance capacities are typically weak, these towns will need to become the priority areas for risk-reduction interventions. Adaptation to climate change requires local knowledge, local competence and local capacity within local governments. It needs households and community organisations with the knowledge and capacity to act. It also requires a willingness among local governments to work with lower-income groups.

### *Environmental Protection and Urban Growth*

Much of the degradation of the environmental asset base is coming from the lack of adequate sanitation and drainage infrastructure. However, from a fiscal perspective, the JKM Corridor communities will have limited resources to invest in the grey infrastructure that is required to offset the degradation of the environmental asset base. There is an opportunity to integrate green infrastructure within the JKM Corridor to mitigate some of the impacts, particularly within the urban landscape to capture and attenuate stormwater runoff. However, even green infrastructure approaches will require a balance of grey infrastructure to address the magnitude of the drainage issues in the JKM Corridor.

### *Institutional and Household Capacities*

Development in Kampala, Jinja, Wakiso, and Entebbe towns and its environmental impacts needs to be considered at the metropolitan scale and within the JKM Corridor. KCCA's strategic planning framework should look beyond its boundaries to the broader metropolitan region and evaluate the impacts of urban development on regional environmental assets. The JKM corridor still has critical natural assets, such as the large area of wetlands east of Murchison Bay, that should be protected and conserved as the city continues to expand. The strategic framework will assist the city in giving proper consideration of proposals for development in the context of the remaining assets. A broader view of environmental assets can allow the city to avoid making the same types of mistakes that have been made in the past.

There is an urgent need to improve the availability and accessibility of climate information tailored to the specific and priority needs of the JKM Corridor (Cities municipalities/town councils) and assist these urban areas and lower local governments to use climate information to undertake risk and vulnerability assessments that produce an actionable strategy and planning documents. Of critical importance to work in this area is framing climate information in ways that resonate with elected political leaders in municipalities, making those leaders advocates for long-term adaptation planning and action.

The JKM Corridor managers should work with the informal sector to improve safety in relation to climate extremes. Informal economic activities are often highly vulnerable to climate impacts, yet they are crucial to economies in low- and middle-income cities. Therefore, costs to the urban poor and their communities—both direct and indirect—should be included in loss and damage assessments to accurately reflect the full range of impacts on the most vulnerable urban residents and the city as a whole. Widespread implementation of flood and property insurance in informal settlements can help reduce their high reliance on third-party subsidies and, hence, enhance their climate change resilience. This requires efforts to overcome the lack of insurance organisation and limited demand for insurance within these communities.

### 7.6.2 Financing an Integrative Approach to Urban Resilience

Support should also be given to JKM corridor development to identify and access finance that can be used for climate action. Entry points for assisting the JKM corridor to access finance will differ depending on the level of local government hierarchy's (City, Municipality, Town Council, Sub County and Parish) size, in-house technical capacity, and financial readiness. In all cases, the long-term challenge of improving the evidence base of climate risk and vulnerability and linking identified risks and vulnerabilities to budgeting (and ultimately, integration into the normal planning and budgeting process), must be a core objective to make adaptation sustainable. In addition, among larger, better-capacitated urban areas, assistance might take the form of supporting a bond issuance or developing proposals aimed at accessing international climate financing.

Mid-size urban areas might not have enough capacity to put together a proposal for debt or grant funding from international sources but could aim for funding from the proposed Uganda National Climate Fund or support from bilateral donors. Smaller urban centres have fewer options for accessing external funding, but with support from external stakeholders with greater capacity, they can build their own capacity incrementally. One possibility is twinning smaller municipalities located in the JKM Corridor to create a mentoring relationship that includes the provision of technical expertise, taking the form of formal and informal training and occasional advisory services.

## 7.7 Measures for addressing risk and building resilience in the JKM Corridor

### 7.7.1 Towards an integrated approach to risk and resilience

As discussed above, an integrated approach to risk and resilience is fundamental for ensuring that the full spectrum of intensive and extensive risks is addressed in strategic planning priorities. Yet, as the analysis in this report has indicated, the JKM Corridor at present lacks a cohesive, integrated, approach to mitigating risk and building resilience.

Authorities in the corridor and stakeholders lack the capacity for the appropriate data collection on risk and resilience matters and do not have a strategy from which such data can be used to make coherent, integrative proposals to address these shortcomings. This must be the starting point for any recommendations made, as without a robust approach to data collection and resilience planning proposals run the risk of being implemented piecemeal at best, and in an ineffective 'siload' manner at worst.

As resilience rises in international and national development priorities, several toolkits have emerged to help bridge the gap between data collection and strategic planning. Box 1 below provides a detailed overview of the Urban Resilience and Fragility Assessment and Response (URFA) Matrix and Toolkit, one such tool that has been designed specifically with low-income countries in mind, particularly those that presently lack a full range of data that might support such planning.

Regional and municipal governments of the JKM Corridor should adopt data collection and analytical tools such as the URFA Matrix and Toolkit, so as to provide a means of better understanding the needs, capacities, and way forward for integrative resilience planning.

A secondary key element of mainstreaming adaptation into infrastructure is the integration of climate risks into the decision-support tools used in standard policy and project appraisals. A Strategic

Environmental Assessment (SEA) designed to account for climate risk can serve as a tool for mainstreaming adaptation into infrastructure-related policies, plans and programmes

Risk reduction policy is required to: a) inform on risks and their reduction; b) provide for inclusive decision-making processes; and c) mediate between hazard outcomes, dynamic risk governance processes and planning procedures to assure, among others, access to safe water and sanitation, and solid waste collection, as well as safe and secure land for housing as key mechanisms for building resilience and reducing risk.

To this end, the JKM Corridor should follow a long-term systems approach to ecosystem-based climate adaptation. Such an approach explicitly recognises the role of critical urban and peri-urban ecosystem assets and services and manages them in order to provide a sustained supply over time horizons of twenty, fifty, and one hundred years. Ecosystem-based planning strengthens the linkages between urban, peri-urban, and rural ecosystems through planning and management at both urban and regional scales. The economic benefits of urban biodiversity and ecosystem services should be quantified so that they can be integrated into climate-related urban planning and decision-making. These benefits should incorporate both monetary and non-monetary values of biodiversity and ecosystem services, such as improvements to public health and social equity.

### **Box 1: Urban Resilience and Fragility Assessment & Response Tool (URFA)**

The URFA fills a significant gap in the arsenal available to municipalities for understanding and expanding resilience in urban contexts. As indicated by literature reviews on the subject, most notably by Bosetti, Ivanovic, and Munshey (2016), frameworks for assessing risk, resilience, and fragility tend to be 'siloed': few offer a means of, for example, assessing both risk *and* resilience, despite their clear connectivity. The issue is not so much a lack of frameworks, but for a lack of *integrative* frameworks and tools. This in turn reflects a broader failure to connect risk, resilience, and fragility assessments into broader international development agendas.

This gap becomes more pronounced when one considers that most existing integrative tools are devised based upon the experience of middle-to-high-income countries which assume strong capacities for data collection and implementation at the national and municipal levels. Indeed, these toolkits are also often intended for *national* risk and resilience assessment, which are further not designed with an urban-specific context in mind.

URFA has therefore been devised by the African Development Bank to:

- Provide a clearly structured framework for undertaking fragility, risk (or, as is referred to by the framework, 'vulnerability'), and resilience analysis in an integrative manner at the city scale.
- Facilitate analysis in low-income and fragile country contexts, with inbuilt flexibility to account for significant data collection capacity shortages.
- Offer a means of constructing context-sensitive recommendations and solutions to risk and resilience needs.

URFA consists of two components:

- The URFA Matrix, a Microsoft Excel based statistical tool covering 87 indicators of urban resilience.
- The supplementary URFA Toolkit, a framework through which the Matrix can be understood, including clear conceptual and explanatory notes of the indices; guidelines for data collection; and a step-by-step process through which assessment should be undertaken (with adjustments for the given context).

#### 7.7.2 Thematic Areas of Intervention

The following figure details specific interventions to be undertaken.

*Figure 8: Thematic Recommendations for an Integrated Approach to Building Urban Resilience in the JKM Corridor*

Driver of Risk	Institutional/Strategic Area	Interventions for Development Strategy
<b>Urbanisation Patterns</b>	Management of agricultural and ecological lands/protection areas	<ul style="list-style-type: none"> <li>• Enhanced protections for forests and other ecologically important areas.</li> <li>• Integrated and Sustainable Management of Landscapes and Catchments for Improved Livelihoods, Ecosystems and Community Resilience in the JKM Corridor area of influence.</li> <li>• Enhanced resilience of ecosystem services and status of biodiversity in the JKM project landscapes. Enhanced livelihoods of the households in the JKM Corridor.</li> <li>• Reduced GHG emissions from deforestation and forest degradation in the corridor and undertaken greening and preservation of the natural green spaces.</li> <li>• Conserve and manage urban natural resources for biodiversity and undertake urban greening and preservation of the hilltops.</li> </ul>
	Urban Planning and Regulatory Enforcement	<ul style="list-style-type: none"> <li>• Support climate change responsive planning and development approval as well as planning policy.</li> <li>• Integration of resilience/climate change considerations into</li> </ul>

		<p>structure plans/masterplans.</p> <ul style="list-style-type: none"> <li>• The preparation of structure plans at various levels developed and implemented for enhancing integrated with resilience and mitigation to climate change.</li> <li>• Support climate change responsive planning and development approval as well as planning policy</li> <li>• Adapt urban land use planning and housing for energy efficiency.</li> <li>• Climate-proof key infrastructure.</li> <li>• Improve urban transport through compact city development for energy efficiency and reduction of emissions.</li> <li>• Improve the existing housing stock towards low-carbon designs and urban development.</li> </ul>
<p><b>Climactic and Environmental Change</b></p>	<p>Business and industrial strategy</p>	<ul style="list-style-type: none"> <li>• Plan for an equitable change to a low-carbon economy including spatial planning that takes into account 'green' technology and buildings.</li> <li>• Increased adoption of alternative energy-efficient technologies (e.g., LPG and solar).</li> <li>• Climate Resilient Landscapes, Integrated Catchment Management</li> </ul>

		<p>and Nature-Based Tourism in the JKM development corridor.</p> <ul style="list-style-type: none"> <li>• Integrate the informal sector into the urban economy as a way of coupling poverty and climate change effects through innovative solutions to local problems such as waste recycling.</li> </ul>
	<p>Agricultural practices and protection of biodiversity</p>	<ul style="list-style-type: none"> <li>• Scaled-up adoption of climate-smart agricultural practices in key agricultural value chains and the corridor.</li> <li>• Improved rangeland management and livestock productivity.</li> </ul>
<p><b>Institutional/Household Preparedness</b></p>	<p>Institutional Capacities</p>	<ul style="list-style-type: none"> <li>• Enhanced coordination and networking on climate action among state and non-state actors, including women, NGOs &amp; CSOs, youth organizations, the private sector and academia.</li> <li>• Initiate and stimulate local Urban Knowledge Arenas (IUKAs) through the development of a toolkit.</li> <li>• Develop tools for awareness raising and capacity building in the city and at the national level for secondary towns.</li> <li>• Strengthened capacity to collect and analyse data,</li> </ul>

	<p>and provide quality and timely climate/weather services Effective mainstreaming of climate variability and climate change into development programs.</p>
<p>Human Security</p>	<ul style="list-style-type: none"> <li>• Promote urban and peri-urban local production and distribution networks for food and fuel.</li> <li>• Invest in community projects that help build community resilience to climate change risks and impacts such as tree planting and alternative energy sources.</li> </ul>

## 7.8 Conclusion

The JKM Corridor’s growth is expected to continue, so planning is necessary to accommodate this growth; however, planning must address the drivers of vulnerability and reduce risk. Protection for the JKM regional corridor’s environmental assets has to be realized and an essential first step in environmental protection is the enforcement of existing environmental regulations.

Ecosystem services provide considerable development opportunities, including the incorporation of land use planning and enhancing climate change resilience in peri-urban communities. Succinctly put, the potential for climate change of well-managed peri-urban ecosystem services includes reducing the physical exposure of peri-urban areas to floods and droughts and minimizing climate change risks through increased socio-economic resilience to hazard impacts and provision of the carbon sequestration function. However, specific peri-urban studies describing ecosystem service types and how they can be synchronized into mainstream urban planning and climate change resilience strategies are lacking in Uganda and specifically in relation to the JKM Corridor’s urban/regional landscapes.

The following has to be undertaken urgently: The development of a profile of natural assets at the JKM scale and a broad strategy to address pressures on these assets; The identification of specific opportunities for Green Urban Development interventions supported by well-analysed actions to progress these opportunities; Institutional actions taken to regulate, enforce and protect consistent with what is already in current policy and law; and the development of more sophisticated measures to address ecosystem loss. Appendix A below contains further proposals to these ends.

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## Appendix A Strategies, objectives, and actions

### Sustainable use of biodiversity

Strategic objective: to reduce and manage negative impacts while enhancing positive impacts on biodiversity

Strategy	Actions	Activity
Existing major towns in the JKM Corridor (Kampala, Jinja, Entebbe, Mukono, Wakiso, Nansana, Kiira)	<p>The actors of various entities within the JKM should develop and utilize improve green spaces and habitat</p> <p>Protect trees and enhance tree canopy cover</p> <p>Encourage the development of community gardens and public recreation spaces</p>	<p>Promote the use of native, drought-tolerant plants in city/town/urban landscaping, public streets and outdoor open spaces</p> <p>Promote the creation of community gardens</p> <p>Encourage retention of trees outside of the development footprint immediately prior to and during development and redevelopment</p> <p>Ensure redevelopment includes riparian area enhancement and native species planting to enhance previously impacted watercourses within or immediately adjacent to property boundaries (i.e., streams, creeks, wetlands or lakes which form part of the property boundary of a given property)</p>

Strategic Objective: Integrating biodiversity economy into the plans

Strategy	Actions	Activity
Mainstreaming biodiversity issues in the NDP 111, Sectoral and District Development Plans.	<p>The actors of various entities within the JKM should develop and utilize biodiversity and ecosystem services valuation tools to quantify and monitor the environmental, economic and social value of biodiversity</p>	<p>Promote protected areas within the JKM (Mabira forests, Mpanga Mambaba, Lutembe etc) as core drivers for nature-based ecological tourism development in the local economy.</p> <p>Strengthen partnerships with adjacent communities to PAs for mutual benefits (Supporting REDD+)</p> <p>Establish/maintain viable wildlife/biodiversity corridors with respect to community safeguards</p>

		Establish/maintain viable wildlife/biodiversity corridors with respect to community safeguards
		Strengthen partnerships with adjacent communities to PAs for mutual benefits (Supporting REDD+)

### Introducing incentives for conservation and sustainable use of biodiversity

Strategic objective: By 2040, JKM appropriate incentives for biodiversity conservation and sustainable use are in place and applied.

Strategy	Actions	Activity
Enabling incentives for JKM actors to improve economic incomes through biodiversity for tourism	Action: Phase out incentives harmful to biodiversity	<p>Develop economic instruments to encourage activities that enhance biodiversity conservation and discourage activities that impact negatively biodiversity</p> <p>Promote and support Green Procurement through purchasing of environmentally preferable products or services, taking into consideration the necessity, not only for quality and price but also for biodiversity conservation conscious business</p> <p>Undertake Strategic Environmental Assessments (SEA) of all policies, programmes or projects which have the potential for negative—or positive—impacts on biodiversity</p> <p>Encourage public/private green space creation during redevelopments.</p>

### JKM Corridor Plan Awareness on Ecosystem services

*Strategic Objective:* Promote awareness of the JKM Corridor plan among key stakeholders, policymakers, professionals, the private sector, general public and develop stakeholder/public awareness programmes on biodiversity and its values

Strategy	Actions	Activity
Promote awareness of the JKM corridor plan among key stakeholders Policy makers,	Action: Conduct continuous public	1. Undertake intensive awareness raising on the

professionals, the private sector, general public and Develop stakeholder /public awareness programmes on biodiversity and its values	awareness on biodiversity within the JKM	content of the JKM plan at all levels  2. Develop and disseminate user-friendly and gender-responsive Information Education and Communication materials (IECs) for popular campaigns targeting women as agents of change for conservation  3. Develop and disseminate gender-responsive biodiversity public awareness materials
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### **Institute and implement measures to stop further loss of natural habitats**

*Strategic Objective:* By 2040, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero to reduce degradation.

Strategy	Actions	Activity
Institute and implement measures to stop further loss of natural habitats	<p>Identify, map and prioritize degraded habitats including forests and wetlands</p> <p>Assess the rate of conversion of the degraded/ threatened habitats by human activities</p> <p>Promote awareness of regulations that protect fragile ecosystems</p> <p>Restore and safeguard ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and wellbeing</p> <p>Develop mechanisms for fair and equitable sharing of costs and benefits of using wetlands</p>	<p>1. Undertake restoration of the degraded ecosystems within JKM</p> <p>2. Develop District Ordinances and by-laws in each of the various JKM entities.</p> <p>3. Intergation of implementation instruments to ensure zero degradation.</p>

### **Monitor and support management of pollution levels and waste in vulnerable ecosystems**

*Strategic Objective:* to ensure that pollution levels in the JKM critical urban ecosystems have been brought to levels that are not detrimental to ecosystem function and biodiversity

Strategy	Actions	Activity
Improve environmental management systems on pollution (air, noise and water)	Reduce pollution levels that are detrimental to biodiversity	<p>1. Monitor and enforce compliance to effluent standards requirements</p> <p>2. Monitor the impact of</p>

		<p>agrochemicals on selected pollinators</p> <p>3. Manage all forms of waste in an effective and efficient manner to reduce its negative impact on the environment, including through local-level waste management and recycling initiatives.</p>
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**Blue-green network planning in the JKM entities**

*Strategic Objective:* planning strategies based on blue water-based elements, green vegetation-based elements, green technologies and low carbon and climate-resilient infrastructure

Strategy	Actions	Activity
<p>The overall aim of the strategy is to develop an inclusive and integrated network of blue and green infrastructure across the JKM</p>	<p>Ensure that blue-green elements contribute to the JKM economy.</p> <p>Combine infrastructure, ecological restoration and urban design to connect people and nature across the JKM corridor.</p> <p>Managing trees sustainably, planting trees appropriately, protecting trees strongly and involving communities</p>	<ol style="list-style-type: none"> <li>1. Technological improvement streams, storm water drains, irrigation channels, wetlands, freshwater, sanitation and public spaces that can temporarily accommodate water overflow and are reused as part of viable economic activity.</li> <li>2. Encourage green elements by planting trees along streets, recreation zones, playgrounds, parks, forests, greenways and riparian strips.</li> <li>3. Utilize forests, RAMSAR Sites, waterfalls, hills, scenic, renewable resources, outdoor recreation, wetlands, rivers, green spaces/ parks, open spaces, routes and attractions for tourism activities</li> </ol>

**Implement climate change mitigation and adaptation for disaster risk reduction from climate change impacts**

*Strategic Objective:* The main objective of this would be to be able to attain the nation's target of ecosystem resilience and the contribution of biodiversity to carbon stocks to be enhanced, through conservation and restoration, including restoration of at least 15 percent of degraded ecosystems within the JKM region.

Strategy	Actions	Activity
JKM corridor to implement climate change mitigation and adaptation for biodiversity conservation including disaster risk reduction from climate change impacts	1. Enhance ecosystem resilience, including community resilience, to climate change	<p>Enhance carbon stocks and storage by mainstreaming climate change into the REDD+Strategy as well as in-sector policies, plans and projects.</p> <ol style="list-style-type: none"> <li>1. Support afforestation, tree planting and reforestation activities at all levels within the JKM</li> <li>2. Promote and support the restoration of degraded wetlands</li> <li>3. Enhance biodiversity and ecosystems' resilience to climate change, especially in biodiversity hotspots</li> <li>4. Establish buffer zones for the protection of critical conservation areas with high biodiversity within JKM</li> </ol>

### Urban Resilience in the JKM Corridor

*Strategic Objective:* Provide climate change benefits for little additional cost or risk, Win-win or Co benefit Strategies

Strategy	Actions	Activity
JKM corridor to implement climate change mitigation disaster risk reduction from climate change impacts	<ol style="list-style-type: none"> <li>1. Disaster profiling</li> <li>2. Integration of disaster resilience mechanism in the various JKM entities</li> </ol>	<ol style="list-style-type: none"> <li>1. Develop a disaster response mechanism</li> <li>2. Prepare a disaster risk management plan to establish joint coordinating and working protocols with the MDAs and at lower local levels</li> </ol>

### Green tourism

*Strategic objective:* Conserve rare, threatened or endangered ecosystems and species and connect them with green and blue ways in the JKM Corridor.

Strategy	Actions	Activity
Develop the designated Tourism Development Areas (TDA) within the JKM	<p>Have tourism sites incorporated into the JKM entities</p> <p>Encourage public-private partnerships to promote tourism</p>	<p>1. The Central TDA, (the 'Cultural Heartland'), comprised of Kampala, Kalangala, Mpigi, Wakiso, Mukono, Buikwe, and the South-Eastern TDA, (the 'Nile and Adventure'), Jinja</p> <p>2. The TDA focuses on Kampala as the capital city and main tourism service hub as well as Entebbe as the air gateway to Uganda. In addition, this TDA incorporates the Ssesse Islands and the Mabira Forest.</p>

### Development of Meetings, Incentives, Conferences and Exhibitions (MICE)

*Strategic Objective:* Development of the MICE industry in order to improve the performance of the MICE sector, the Master Plan recommendation into the JKM corridor plan

Strategy	Actions	Activity
Develop the designated Tourism Development Areas (TDA) within the JKM	1. Attract funding for the development and operationalisation of the strategy	<p>1. JKM Corridor puts in place a MICE Development Plan, which would include establishing Convention Visitor Bureaus or Destination Marketing Organisations at the city, municipal and regional levels, supported by tourist information centres.</p> <p>2. Creating a MICE development fund in partnership with the private sector.</p> <p>3. Recognised trade associations and lobby groups for MICE should be set up and strengthened to promote the interests of the sector and to create a forum for discussion, incubation and sharing of creative ideas.</p>