

# Charting Sustainable Paths: Balancing Urban Green Dilemmas in East Africa

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**Abstract:** Urban green spaces are important for sustainable development and sustainable, liveable cities. They provide many critical ecological, social, and economic services that improve quality of life. However, many urban green spaces are rapidly diminishing with the growing human demands. Even though numerous studies have been done in developed countries on the challenges facing green spaces, information on the key challenges affecting the sustainability of urban green spaces in many developing countries is scarce. To address this challenge, this study aimed to explore the cases of six East African states—Kenya, Uganda, Tanzania, Rwanda, Burundi, and South Sudan—to contribute to a better understanding of the strategies needed to promote sustainable urban green spaces. The study utilized the case study research design to explore the context of the six cases. Moreover, a literature review that focussed on socio-cultural, economic, and environmental challenges threatening urban green spaces was used to gather critical information. The study reviewed key information obtained from desktop searches using Google and official documents from other online sources. The collected information was later analysed and synthesized qualitatively to establish the insights presented in this study. The results showed that there were pervasive sociocultural, economic, and ecological challenges affecting urban green spaces. The key challenges included encroachment, insufficient funding for maintenance, rapid urbanization, climate change impacts, population growth, and historical conflicts that threaten the continued presence of urban green spaces. However, common patterns and differences exist among the six states, highlighting the need for proactive and integrated urban green space management approaches. Emphasizing community involvement, international partnerships, and awareness campaigns as noteworthy strategies being pursued to address the challenges. Moreover, the findings underscore the importance and role of government support in protecting urban green spaces. These efforts showcase potential models for protecting urban green spaces in other regions with similar contextual characteristics as East Africa. These results implied the need for governments to adopt and support comprehensive strategies for urban green space management, ensuring the well-being of growing populations while preserving the ecological integrity of these vital areas.

**Keywords:** Urban Green Spaces, Sustainability, Equity, Policies, Strategies, Future Generations

## 1. Introduction

Urban green spaces are critical components of urban ecosystems and provide a wide range of environmental, social, and economic benefits to cities and their residents. These spaces are essential for

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fostering biodiversity, promoting physical and mental well-being, mitigating climate change, providing recreational havens, and contributing to healthier, more vibrant cities. As such, both Sustainable Development Goal 15 and the UN Decade for Ecosystem Restoration call for land conservation for ecosystem preservation while integrating green spaces in urban areas to promote ecological benefits such as biodiversity. Other initiatives for promoting green spaces include the Green Cities Initiative, aimed at improving the livelihoods and well-being of urban and peri-urban populations, and the Cities with Nature Initiative[1]. However, with a growing urban population currently estimated at 4.4 billion people and expected to double by 2050, there is bound to be increased pressure on land resources, including urban green spaces worldwide, resulting in catastrophic global environmental challenges leading to reduced quality of life. Existing literature shows that by 2030, up to 60% of the expected global population growth will occur in urban areas, with developing countries constituting approximately 90% of this increase. While developed nations appear to be well prepared to tackle the impending development challenges, including environmental challenges, with efficiently established and more effectively managed urban green spaces, there are limited studies on the green spaces in less-developed countries. The few existing studies show that most urban green spaces are declining in some less-developed countries, with most urban green spaces being less appreciated due to a lack of context-specific studies on the challenges facing these areas[2-4]. However, existing literature also shows that Africa could be the most affected in the developing world, with far-reaching implications for the quality of life in most urban areas. The continent has experienced the highest urban growth during the last two decades at 3.5% per year, and this growth rate is expected to hold into 2050. In an ideal scenario, given the impending urban environmental challenges and the numerous advantages of having urban green spaces, there should be an increasing trend in allocating spaces for their expansion in Africa. However, this is not the case in many megacities of Africa. If the status quo remains, there is a risk of promoting unsustainable urban development with far-reaching implications[5]. This state of affairs calls for a thorough evaluation of the context-specific challenges of urban green spaces in Africa in order to devise strategies for ensuring sustainable and liveable cities.

In East African states (Kenya, Uganda, Tanzania, South Sudan, Rwanda, and Burundi), urban green spaces encompass a diverse range of parks, gardens, and natural areas that play a significant role in enhancing the quality of urban life. However, with changing socioeconomic development matrices, the limitation of studies on the challenges facing urban green spaces predisposes many urban green spaces to the constant threats of degradation, fragmentation, and loss, with significant risks of compromising sustainable urban planning and development in the region.

This study aimed to explore the challenges facing urban green spaces in East African states using a literature review in order to devise robust strategies for enhancing sustainability. The East African region has been chosen for this study due to several factors. Rapid urbanization in East Africa strains urban green spaces, raising worries about preservation and access. These areas crucially combat environmental problems like air pollution and urban heat, prevalent in the region. Recognizing these challenges is vital for stakeholders to devise sustainable strategies, ensuring a harmonious balance between urban development and green space conservation for the well-being of East African communities. To holistically address the research objective of this study, the following research question was asked: What are the challenges of sustainable urban green space management in East Africa? To respond to this question, the global concept of sustainability of urban green spaces, including opportunities and challenges, was reviewed, and the findings were applied to the East African context, and examples of cities, and green spaces are reviewed in order to prescribe the policy implications of this study.

## 2. Literature Review

### 2.1 Urban Green Spaces and Sustainable Urban Development: A Theoretical Analysis and Implications

The principles of sustainable development guide the research on how urban green spaces contribute to the creation of environmentally, economically, and socially habitable cities. Sustainable and liveable cities are characterized by a harmonious blend of environmental responsibility, economic prosperity, and social well-being. These cities prioritize the ecological balance through green infrastructure, renewable energy sources, and efficient waste management, thereby reducing their ecological footprints. Economically, they foster innovation, entrepreneurship, and inclusive growth, creating opportunities for residents. However, their strengths lie in their commitment to social equity and cohesion. Sustainable and liveable cities ensure access to quality education, healthcare, affordable housing, and safe public spaces for everyone, regardless of their background. These cities not only prioritize clean air, green spaces, and efficient transportation but also nurture a sense of community, belonging, and cultural diversity. They offer a high quality of life without compromising the well-being of future generations, making them exemplars of urban development in an increasingly urbanized world[6].

## **2.2 History of the Concept of Urban Planning and Green Apaces**

The history of sustainable urban development has evolved over the centuries, reflecting societal and environmental dynamics changes. Ancient civilizations' early practices of compact, walkable designs and sustainability principles have deep roots in history. However, rapid industrialization and urbanization in the 18th and 19th centuries led to overcrowding and environmental degradation in many cities. Consequently, sustainable urban planning concepts and green spaces emerged in the 20th century following the Earth Summit of 1992 and continue to adapt and evolve in response to modern development challenges[7].

Urban green spaces can assume various forms, such as green corridors, gardens, parks, natural reserves, wetlands, and children's play areas. These spaces are not only designed to enhance the quality of life in urban areas but also play a crucial role in fostering biodiversity, mitigating environmental risks, and addressing the impacts of extreme events[8]. When properly maintained, green spaces function as the lungs of a city. From an environmental perspective, urban green spaces and forests play a vital role in mitigating air pollution from industries and motor vehicles in large cities. They also help regulate the urban climate by providing a cooling effect, whereas tree vegetation serves as a windbreak and helps manage urban flooding. From an economic perspective, green spaces contribute to an increase in property value, particularly in residential areas situated near urban green spaces. They also generate employment opportunities for those engaged in parks, gardens, and other businesses. Urban green spaces such as parks and gardens promote mental and physical well-being by reducing stress, fostering mental relaxation, enhancing social cohesion, and reducing exposure to extreme urban heat and air pollution.

## **2.3 Empirical Analysis of Urban Green Spaces and Livable Cities: Implications for Sustainable Urban Planning and Development**

The current availability of Urban Green Spaces (UGS) can be understood in terms of historical events, activities, and decisions that have unfolded over the past few centuries. Historically, the complexities of urban life have underscored several important factors that have driven enhancements in human health, well-being, and socio-ecological interactions within urban areas. For instance, urban centers have established per capita UGS benchmarks or introduced minimum distances to ensure access to green spaces. Research suggests that a minimum of 9 m<sup>2</sup> of green space per person is essential, with an ideal target of 50 m<sup>2</sup> per capita for urban green spaces (UGS)[9]. There are many empirical studies on urban green spaces in many developed countries, albeit with mixed results and trends geared to their sustainability. Existing literature suggests the first-ever established urban green space in the world was the "Gardens of Ur," located in the ancient Sumerian city of Ur in Mesopotamia, now modern-day Iraq.

These gardens date back to approximately 2100 BC and are believed to have been built during the reign of King Ur-Nammu. The Gardens of Ur represent a remarkable feature of urban planning in antiquity, with lush greenery and trees within the city's walls. They were designed as places of relaxation, reflection, and social gatherings for the residents of Ur. While the precise layout and extent of these gardens remain the subject of archaeological inquiry, their historical significance lies in their pioneering role as early examples of urban green spaces, setting a precedent for the integration of nature and beauty into urban environments throughout human history[10].

In modern times, one iconic urban green space often celebrated for its exceptional qualities is Central Park in New York City. Spanning 843 acres at the heart of Manhattan, Central Park combines natural beauty with diverse recreational and cultural amenities. Its vast meadows, scenic water bodies, and woodlands provide a respite from urban hustle and bustle. The park has a rich history, featuring architectural landmarks, art installations, and numerous recreational opportunities ranging from boating to cycling. Its accessibility and role as a sanctuary for both residents and visitors make it a global model for urban green spaces, embodying the concept of a "central park" within a metropolis where nature and city life harmoniously coexist[11].

Other models of urban green spaces worldwide showcase the possibility of sustainable, inclusive, and environmentally conscious urban planning. Singapore's Gardens by Bay combines innovative architecture with lush greenery and sustainable technologies. Copenhagen's King's Garden, known for its historical significance and well-manicured landscapes, seamlessly blends history with contemporary urban life. The High Line in New York City is celebrated for its adaptive reuse of a disused railway, transforming it into a thriving urban oasis with native plants and art installations. Vancouver's Stanley Park offers a lush escape within the city, featuring seawall cycling paths and vibrant biodiversity. The Jardin des Tuileries in Paris is a classical European urban green space renowned for its elegant design and cultural significance[12]. The highlighted case examples demonstrate that green spaces have the potential to incorporate nature in urban areas, promote well-being, and enhance the quality of urban life while retaining unique reflections of their respective cities' identities and histories. African cities can glean valuable lessons from these sustainably managed urban green spaces worldwide. Models such as Singapore's Gardens by the Bay showcase the potential of innovative architecture and sustainable technologies, inspiring environmentally conscious urban planning. Copenhagen's King's Garden seamlessly integrates historical significance with modern urban life. The adaptive reuse of disused spaces, exemplified by the High Line in New York, can inspire African cities to repurpose unused areas creatively into thriving urban oases. Vancouver's Stanley Park and Paris's Jardin des Tuileries underscore the importance of preserving biodiversity within urban green spaces.

## **2.4 The Challenges Facing the Management of Green Spaces**

Existing literature shows that for both developed and developing countries, sustainable urban green spaces present myriad opportunities and challenges. On the opportunity side, these green spaces offer a host of environmental benefits. They act as natural air filters, absorb pollutants, and improve air quality while providing cooling effects, which are becoming increasingly crucial in the face of rising urban temperatures. Furthermore, these spaces contribute to urban biodiversity by offering refuge for wildlife and native plant species, promoting an ecological balance, and fostering a greater connection to nature within cities. Sustainable urban green spaces offer numerous social advantages. Accessible and well-designed green areas serve as hubs for physical activity and recreation and support active and healthy lifestyles among urban residents. They also act as invaluable mental health sanctuaries, offering moments of respite from the stress of urban life and enhancing overall well-being. Culturally and socially, they can host community events, promote local art, serve as spaces for gatherings, and contribute to community cohesion and shared identities[13].

However, many challenges continue to threaten the existence of urban green spaces globally. As cities around the world expand due to growing human needs, land becomes a finite resource, and allocating sufficient space for green areas becomes increasingly difficult. This struggle for space can result in the prioritization of construction over conservation. Additionally, ensuring equitable access to these spaces is a persistent challenge as marginalized communities often face barriers to entry, leading to social disparities in urban green space utilization[14]. However, systematic reviews examining empirical studies on equitable access to urban green spaces and comprehensive syntheses of their findings are scarce. Maintenance and funding represent other hurdles affecting urban green spaces. Green spaces require ongoing care and investment to remain attractive and functional. If not adequately addressed, issues such as vandalism, litter, and deterioration can undermine the quality of these spaces. Furthermore, designing green spaces that are resilient to the effects of climate change, such as flooding and extreme weather events, poses a formidable challenge that necessitates the need for innovative solutions and context-based strategies for sustainable urban development[15].

## 2.5 Strategies for Enhancing the Management of Green Spaces

There are various strategies for enhancing sustainable urban green space development and management. First, prioritizing biodiversity by planting native flora and creating habitats for wildlife contributes to the ecological balance. Sustainable design practices, such as using permeable surfaces, help conserve water and reduce environmental impacts. Engaging local communities in the planning and maintenance of green spaces fosters a sense of ownership and ensures that these areas meet resident needs. Well-lit paths and inclusive design features should be incorporated to ensure safety and accessibility. Integrating green spaces into broader urban planning, such as green corridors and transit-oriented development, enhances connectivity and promotes walkability. Finally, climate-resilient designs, including flood mitigation and drought-resistant landscaping, ensure that these spaces adapt to the changing environmental conditions. By employing these strategies, cities can create sustainable urban green spaces that contribute to residents' environmental health and well-being[16].

The highlighted theoretical and empirical literature demonstrates that the concept of urban green spaces is evolving as cities around the world emerge and transform. However, this evolution is context-specific, and whereas developed countries have made significant progress, developing countries have a lot to learn from them in order to promote urban sustainability. Moreover, while the opportunities for growth of urban green spaces are immense, they coexist with significant challenges. The key to realizing the full potential of these spaces lies in thoughtful and inclusive planning, management, and investment strategies adopted by cities. By addressing these challenges, urban areas can harness the numerous benefits of green spaces, promoting healthier, happier, and more sustainable communities; hence, the need for this study.

## 2.6 Urban Green Spaces in East African States

In East Africa, urban green spaces hold immense significance, as they contribute to the region's sustainable development, environmental health, and the well-being of its growing urban population. These green spaces serve as essential lungs for cities by providing oxygen, mitigating air pollution, and offering a respite from the concrete jungle[17]. In addition to their ecological benefits, urban green spaces play a crucial role in fostering social cohesion by providing communal areas for recreation and cultural events. They contribute to the physical and mental well-being of residents by offering spaces for exercise, relaxation, and connection with nature. In most East African states, policies emphasize the need for integrated urban planning that allocates space to parks, green belts, and recreational areas within burgeoning cities[17]. Legal instruments enforce these policies and regulate land use and development

to ensure the protection of existing green spaces and the incorporation of new ones. Local authorities collaborate with environmental agencies to implement strategies that balance urbanization demands with the imperative of preserving natural habitats[17].

Nevertheless, the status of green spaces in these countries differs and reflects the diversity of contextual factors. In Kenya, urban greenspaces reflect complex and evolving landscapes. Over the years, rapid urbanization and population growth have placed significant pressure on these vital areas. While major cities such as Nairobi have made efforts to establish and maintain urban parks and green belts, many urban areas still face challenges in providing adequate green space for their residents. Issues such as land encroachment, inadequate funding for maintenance, and competing land use demands pose significant threats to the sustainability of green areas[17]. However, there is growing recognition of the importance of urban green spaces in enhancing the quality of life, promoting biodiversity, and mitigating the effects of climate change[18]. Consequently, various initiatives and partnerships have emerged to protect and expand urban green spaces in Kenya, highlighting a positive trajectory towards a greener and more sustainable urban future. Kenya has recently witnessed several noteworthy initiatives and partnerships aimed at promoting urban green space. The Nairobi Greenline Project, a collaborative effort between the government and various stakeholders, aims to create a continuous green belt around cities to enhance biodiversity, create recreational spaces, and mitigate the effects of urbanization. Additionally, the Kenya Forest Service has been involved in tree-planting campaigns in urban areas to increase green cover[18]. Partnerships between local authorities, non-governmental organizations, and international agencies have also played pivotal roles. For example, the United Nations Sustainable Cities Program has supported initiatives to improve green infrastructure in Kenyan cities. Community-based organizations have been actively involved in greening projects, fostering a sense of ownership and engagement among residents. These initiatives and partnerships collectively reflect Kenya's commitment to fostering a greener and more sustainable urban environment and enhancing the overall well-being of its urban population[19].

The status of urban green spaces in Uganda is mixed. While there is growing awareness of the importance of these areas for environmental sustainability and the well-being of urban residents, numerous challenges persist. Rapid urbanization and land pressure have led to the encroachment and degradation of green spaces in many cities, including Kampala. Limited funding, insufficient planning, and competing land use demands further strain efforts to establish and maintain urban green areas[20]. Nevertheless, there have been commendable initiatives by both the government and non-governmental organizations to preserve and expand these spaces. Parks, such as the Uganda National Museum Gardens and Kololo Independence Grounds in Kampala, as well as regional botanical gardens, demonstrate a commitment to the creation and conservation of urban green oases. Continued advocacy for green urban planning, community involvement, and environmental education offers hope for a more vibrant and sustainable urban green space network. Other initiatives in Uganda include the Greening Uganda Cities (GUC) program, a collaboration between the government and various stakeholders seeking to increase green cover in urban areas by planting trees and creating parks and green corridors[20].

Additionally, organizations such as the Uganda Green Cities Coalition have played a pivotal role in advocating sustainable urban development and green infrastructure. Partnerships with international organizations such as UN-Habitat have provided technical and financial support for green urban planning projects. Local communities have actively participated in tree-planting campaigns and beautification projects, fostering a sense of ownership and stewardship of urban green spaces. These initiatives and partnerships underscore Uganda's commitment to creating healthier, more environmentally sustainable, and vibrant urban spaces for its growing urban population[21].

In Tanzania, the status of urban green spaces reflects a growing awareness of their importance in the face of rapid urbanization. Major cities such as Dar es Salaam and Arusha have strived to establish and maintain urban parks and green areas, providing residents with spaces for recreation and relaxation.

However, challenges persist, including encroachment of green spaces, inadequate funding for maintenance, and the need for comprehensive urban planning[22]. Tanzania boasts of natural beauty and biodiversity, and efforts to protect these assets in urban environments are crucial for a sustainable future. Initiatives such as the restoration of the Botanical Gardens in Dar es Salaam and community-driven greening projects are positive steps towards preserving and expanding urban green spaces. With a continued commitment to green urban planning and environmental conservation, Tanzania can nurture its urban green spaces to enhance the quality of life of its growing urban population[22].

The status of urban green spaces in Rwanda is characterized by a commitment to sustainability and environmental preservation. In recent years, Rwanda has made significant strides in the development and maintenance of urban green areas in cities such as Kigali. Seburanga et al.[23].found that exotic species accounted for 75% of urban settlements in Kigali, Rwanda. The government's strong emphasis on green urban planning has led to the creation of sustainable parks and public gardens, such as Kigali Genocide Memorial Park and Nyarutarama Park, which provide residents with spaces for recreation and relaxation. These green spaces not only enhance the quality of life of urban dwellers but also contribute to the conservation of biodiversity and mitigation of the effects of climate change[23]. Rwanda's efforts to promote green infrastructure and tree-planting campaigns, coupled with community involvement, signify a positive trajectory towards a more sustainable and greener urban environment. Rwanda has demonstrated exemplary commitment to promoting urban green spaces through various initiatives and partnerships. The "Green, Clean, and Healthy Cities" Program, led by the government, is at the forefront of creating and maintaining green spaces within urban areas. Kigali, the capital city, has established numerous urban parks and gardens, making it more livable and environmentally friendly. Partnerships with organizations such as the United Nations Development Programme (UNDP) have furthered the country's green urban agenda by providing technical expertise and funding for projects[24]. Community involvement is a significant component, with residents actively participating in tree planting and beautification efforts. Rwanda's holistic approach to urban green planning, coupled with strong government commitment and collaboration, serves as a model for sustainable urban development across the African continent[25].

The status of urban green spaces in Burundi reflects their limited availability and access compared to neighboring countries[26]. As a small, densely populated nation, Burundi faces the challenge of accommodating its urban population while preserving green areas within cities such as Bujumbura. Although some urban parks and gardens exist, there is a need for greater investment in the creation and maintenance of urban green spaces. Factors such as land scarcity, competing land use demands, and limited resources have contributed to the challenges faced in this regard[27]. Nevertheless, there is emerging recognition of the importance of green spaces for the well-being and environmental sustainability of urban residents. With growing awareness and continued efforts to integrate green urban planning into urban development strategies, Burundi can work towards enhancing the availability and quality of urban green spaces for its urban population in the future. In Burundi, initiatives and partnerships for promoting urban green spaces face challenges owing to the country's limited resources and pressing development priorities. However, efforts are underway to enhance green spaces in urban areas. The "Green Bujumbura" project, supported by local authorities and non-governmental organizations, aimed to create and maintain green areas in the capital city. Additionally, partnerships with international organizations such as UN-Habitat have provided technical assistance for urban planning and green infrastructure development. While progress may be slower than in some neighboring countries, these initiatives and partnerships demonstrate a growing awareness of the importance of urban green spaces for improving the quality of life in Burundi's cities and for sustainable urban development in the long term[27].

The status of urban green spaces in South Sudan faces significant challenges owing to its tumultuous history, ongoing conflicts, and limited urban development. Urban areas in South Sudan, such as the

capital, Juba, have primarily focused on addressing basic infrastructure needs, leaving little room for the creation and maintenance of green spaces. Persistent instability, displacement of communities, and resource constraints have further hindered efforts in this regard[28]. However, the importance of green spaces for environmental sustainability and urban well-being is gradually gaining recognition. As South Sudan stabilizes and begins to focus on long-term development, there is potential for the establishment of urban green spaces to enhance the quality of life of urban residents and contribute to the conservation of natural resources. Nevertheless, significant investment, planning, and community engagement are required to make this vision realistic in the country's urban areas. Promoting urban green spaces in South Sudan faces significant challenges owing to the country's ongoing conflict, limited urban development, and resource constraints. The focus in urban areas has been primarily on addressing basic infrastructure needs and providing humanitarian assistance, leaving little room for dedicated green space initiatives. However, there is potential for future progress[28]. Humanitarian organizations and development partners have increasingly recognized the importance of green spaces for the well-being of urban populations and are beginning to incorporate green infrastructure into their projects. As South Sudan stabilizes and urban development becomes a greater priority, there may be opportunities for initiatives and partnerships to emerge, focusing on the creation and preservation of urban green spaces to enhance the quality of life of urban residents and contribute to environmental sustainability[28].

Based on the above review, we conclude that the status of urban green spaces in East Africa reflects a diverse landscape of opportunities and challenges. Although the region boasts a wealth of natural beauty and biodiversity, rapid urbanization and population growth have placed immense pressure on green spaces. Many East African cities have struggled to balance the need for urban expansion with the preservation of these vital ecological and recreational assets. Consequently, some urban green spaces have experienced degradation, encroachment, and insufficient maintenance. However, promising initiatives across the region aim to bolster green infrastructure and sustainable urban development. Cities in East Africa are increasingly recognizing the benefits of well-planned green spaces, from enhancing residents' quality of life and mental well-being to contributing to environmental resilience and biodiversity conservation. Efforts to create and maintain accessible, inclusive, and environmentally sustainable urban green spaces are crucial to address the complex urban challenges faced by East African cities and ensure that green spaces continue to thrive in the region.

### **3. Research Methodology**

#### **3.1 Research Design**

The case study research design was used in the study. It focuses on understanding the specific contexts, processes, and outcomes of urban green spaces, highlighting the opportunities and challenges. The case study design was chosen because it allows for an in-depth examination of a specific case and provides a comprehensive understanding of its complexities and contextual factors[29].

#### **3.2. Research Locale**

East Africa, composed of Kenya, Uganda, Tanzania, Rwanda, Burundi, and South Sudan, is known for its geographical and cultural diversity. It features stunning landscapes, including Mount Kilimanjaro, the Great Rift Valley, and Serengeti, as well as rich biodiversity. Diverse ethnic groups and languages shape the cultural tapestry of the region. East Africa's history, marked by ancient civilizations, colonial legacies, and independence struggles, has influenced its dynamic societies. The other development parameters for East African states are listed in [Table 1].



[Table 1] Development Parameters for East African States

Country	Geographical Size	Population (2021)	GDP (2021)	Forest Cover (%)	Urbanization rate (%)
Kenya	580,370 km <sup>2</sup>	53.01 million	110.3 billion USD	8.83	29 %
Uganda	241,551 Km <sup>2</sup>	45.85 million	40.53 billion USD	11.45	26.2 %
Tanzania	947,300 km <sup>2</sup>	63.59 million	67.84 billion USD	51.11	36.7 %
Rwanda	26,338 km <sup>2</sup>	13.46 million	11.07 billion USD	11.23	17.7 %
Burundi	25,680 km <sup>2</sup>	12.55 million	2.78 billion USD	10.89	5.18 %
South Sudan	644,330 km <sup>2</sup>	10.75 million	12 billion USD	11.33	24.4 %

Source: Author's compilation from Multiple sources

### 3.3 Data Sources and Collection Process

This study used secondary qualitative data to evaluate sustainable urban green space management challenges in East African urban areas using document content analysis. Besides the main research question, the following sub-research questions were asked during the data collection process: How do cultural practices impact the preservation of urban green spaces? What role does funding play in maintaining and developing urban green spaces? How does climate change affect the sustainability of urban green areas? In what ways does rapid urbanization contribute to the decline of urban green spaces? How does population growth strain the availability and accessibility of urban green spaces? To what extent do historical conflicts influence the current state of urban green areas? What models of community involvement have proven effective in preserving urban green spaces? How do international partnerships contribute to the resilience of urban green areas?

The process of document content analysis involved identifying relevant documents, selecting a sample for analysis, developing coding schemes or categories to organize the data, and systematically analyzing the document content to draw conclusions regarding the research question. This search was extended to academic databases, journals, reports, and books using carefully selected keywords and phrases relevant to the topic. The data collection processes, including document review, research location, and administration, were executed between February and September 2023 for strategic reasons aligned with convenience on the part of the researchers.

Data on challenges facing urban green spaces in East Africa were obtained from existing literature using desktop search engines, especially Google and official records. During the desktop search, appropriate keywords related to the topic, such as "urban green spaces," "urban sustainability," "urban greening," "challenges in liveable cities," and any other relevant terms. In some cases, advanced search techniques using quotation marks ("") were used to search for exact phrases, or the minus sign (-) was used to exclude certain keywords. Notes were taken to keep track of the reference sources. The collected information was later synthesized and used to develop insights and support the arguments presented in this study. Additional secondary data were gathered by reviewing official online documents that provided more context for this study.

The selection of key documents and secondary data sources in this research involved a systematic review of relevant literature, consultation with experts, and prioritizing sources with comprehensive insights and empirical relevance. In selecting key documents and secondary data, the inclusion criteria focused on relevance, recency, and empirical depth, whereas exclusion criteria considered outdated or non-peer-reviewed sources. These documents provided the context of urban green spaces in East African urban areas.

This study relied solely on document reviews as the source of data, largely because documents are reliable, easily accessible, and abundant, providing comprehensive insights and enabling researchers to analyze historical, scientific, and social phenomena efficiently. Moreover, document content analysis is

the preferred research method because it is less expensive than other research techniques, such as surveys or experiments, as the data are readily available and do not require researchers to collect new data. Unlike surveys or experiments, document analysis does not require direct contact with participants, which can be useful when studying sensitive topics or when the researcher wants to avoid influencing participants' behavior. In addition, document content analysis is more objective than other research approaches because it relies on the content of documents rather than the researcher's interpretation of the data. Even though the study relied on document content analysis, the absence of quantitative data is acknowledged as a limitation for this method. Quantitative data could enhance statistical insights, but limitations in document availability led to exclusion. This absence restricts statistical analyses, impacting the study's depth.

### 3.4 Data Analysis

This study sought to investigate the challenges facing the sustainable management of urban green spaces in East Africa and the design strategies to address them. In order to analyze the challenges, a conceptual framework was developed by integrating the findings of the literature review. The conceptual framework served as a structural guide for subsequent research and analysis, ensuring that the study remains aligned with the insights gained. Theoretical and empirical reviews showed that urban green spaces are crucial for sustainable development by providing many environmental, social, and economic benefits, such as conserving biodiversity, ensuring accessibility, enhancing environmental quality, employing sustainable design, engaging communities, ensuring safety, and providing recreation. Preserving cultural and historical values, promoting health, and effective management are essential for inclusive, eco-friendly, and resilient urban environments, prioritizing residents' well-being. Regrettably, the reviewed literature indicated that urban green spaces continue to grapple with many complex challenges, including encroachment amid rapid urbanization jeopardizing habitats for flora and fauna. Pollution compounds the challenge, disrupting the ecological balance. Insufficient funding further hinders maintenance and conservation, threatening the role of these spaces as vital biodiversity havens and recreational zones, as shown in [Fig. 1]. Therefore, striking a balance necessitates careful planning and sustainable practices. It will be interesting to apply these findings in the case of East African states and draw lessons.



[Fig. 1] Conceptual Diagram of Challenges for Urban Green Space

## 4. Results

### 4.1 The Current Status of Urban Green Spaces in East Africa

In Kenya, the status of urban green spaces is a complex and evolving landscape, with rapid urbanization and population growth exerting pressure on these spaces. Both state and non-state efforts have been made to expand these areas. In Kenya, Nairobi, the capital city, epitomizes the challenges faced by urban green spaces. The rapid pace of urbanization has led to encroachment on vital green areas, notably exemplified by the threat to Karura Forest, a crucial green lung for the city. Efforts to address this challenge involve community engagement and activism, with organizations such as the Friends of Karura Forest advocating for its preservation and showcasing the power of grassroots movements in urban conservation[18][19]. In Uganda, urban green spaces are mixed landscapes, with state and non-state initiatives for preserving and expanding green spaces. Local communities are actively involved in maintaining green spaces. Particularly, its capital, Kampala, grapples with the scarcity of green spaces amid relentless urban expansion. The Nakasero Green Belt, a historically significant green area, faces pressures from development[20][21]. In Tanzania, there is growing awareness of the importance of green spaces, especially in major cities. Community-driven initiatives represent major positive steps toward preserving and expanding green spaces. The largest city, Dar es Salaam, faces challenges in preserving urban green spaces against the backdrop of rapid population growth. Kijitonyama Park, once a haven of greenery, is now under threat[22]. Rwanda has a strong commitment to sustainable urban green spaces. Exotic tree species dominate urban greenspace landscapes. State and non-state actors collaborated to expand and maintain green spaces. Rwanda's capital, Kigali, is renowned for its commitment to environmental sustainability. However, the city encounters challenges in maintaining green spaces amidst development pressures. Nyarutarama Green Park, a recreational space, faces threats from urban expansion[23-25]. In Burundi, there are limited urban green spaces, and there is emerging recognition of the importance of green spaces. State and non-state initiatives have emerged to promote urban green spaces. Bujumbura, the capital city of Burundi confronts urbanization challenges impacting green areas such as the Independence Square[26][27]. There are few urban green spaces in South Sudan. In Juba, the capital city of South Sudan, urban green spaces, such as Dr. John Garang Mausoleum Park, encounter difficulties due to displacement and competing demands for land. However, the importance of green spaces is slowly emerging in the country[28].

### 4.2 Challenges of Urban Green Spaces in East Africa

The challenges faced by urban greenspaces in East Africa are presented in [Table 2], which shows a unique set of challenges affecting the sustainable development of urban green spaces.

[Table 2] Challenges of Urban Green Spaces in East Africa

No.	Country	Challenge
1.	Kenya	<ul style="list-style-type: none"> <li>▪ Urban green space encroachment, for example, green spaces in Nairobi are shrinking due to rapid urbanization[18].</li> <li>▪ Inadequate funding for maintenance of the existing green spaces, for instance, Uhuru park, whose renovation has stalled due to limited funding</li> <li>▪ Competing land use demands[19].</li> </ul>
2.	Uganda	<ul style="list-style-type: none"> <li>▪ Encroachment</li> <li>▪ Rapid urbanization</li> <li>▪ Degradation</li> <li>▪ Limited funding</li> <li>▪ Insufficient planning</li> </ul>

No.	Country	Challenge
		<ul style="list-style-type: none"> <li>Competing land uses, for instance, the Nakasero Green Belt is under immense pressure from rapid urbanization[20].</li> </ul>
3.	Tanzania	<ul style="list-style-type: none"> <li>Encroachment for example, in Dar es Salaam, urban green spaces are affected by rapid population growth. Kijitonyama Park, once a haven of greenery, is now under threat[22].</li> <li>Inadequate funding for maintenance</li> </ul>
4.	Rwanda	<ul style="list-style-type: none"> <li>Climate change</li> <li>Rapid population, for instance, in Kigali, development pressures are threatening the well-being of green spaces. Moreover, Nyarutarama Green Park is under the threat of urbanization[23-25].</li> </ul>
5.	Burundi	<ul style="list-style-type: none"> <li>Growth of urban population, for example, in Bujumbura, is affecting green spaces, especially the Independence square.</li> <li>Land scarcity</li> </ul>
6.	South Sudan	<ul style="list-style-type: none"> <li>Illegal logging</li> <li>Increased demand for agricultural land.</li> <li>Limited urban development</li> <li>History of civil war and displacement of communities, for example, Dr. John Garang Mausoleum Park, encountered difficulties due to displacement and competing demands for land[28].</li> <li>Resource constraints</li> </ul>

### 4.3 Strategies for Enhancing Sustainable Urban Green Spaces and Addressing Challenges in East Africa

The strategies employed vary from grassroots activism and community engagement to comprehensive urban planning and government-led initiatives. The common thread across these countries is the recognition of the intrinsic value of urban green spaces in fostering sustainable and resilient cities, promoting biodiversity, and enhancing the overall quality of life for urban residents. Balancing development needs with ecological preservation remains a central theme, emphasizing the importance of integrated, participatory approaches to urban planning in the region. However, partnerships with international organizations appeared to be the most prevalent strategy [Table 3].

[Table 3] Strategies for Enhancing Green Spaces

No.	Country	Strategy
1.	Kenya	<ul style="list-style-type: none"> <li>Development of urban development master plans to address challenges of competing land uses.</li> <li>Growing green belts around major cities in order to improve liveability</li> <li>Geospatial mapping of urban green spaces in order to minimize encroachment</li> <li>Public-private partnerships in order to address funding and maintenance challenges[19]</li> <li>Community engagement in urban tree planting by Kenya Forest Service in order to improve partnerships for managing green spaces</li> <li>Awareness creation on the importance of urban green spaces in order to improve appreciation</li> <li>Infrastructure greening by the United Nations' Sustainable Cities Program in order to address the funding gaps 21]</li> </ul>
2.	Uganda	<ul style="list-style-type: none"> <li>Continued advocacy for green urban planning in order to address competing land uses</li> <li>Community involvement in order to improve appreciation of green spaces</li> <li>Environmental education in order to improve appreciation of green spaces</li> <li>Planting trees and creating parks and green corridors by Greening Uganda Cities (GUC) program in order to prevent encroachment</li> <li>Advocating for sustainable urban development and green infrastructure by Uganda Green Cities Coalition in order to prevent encroachment</li> <li>Partnerships with UN-Habitat have provided technical and financial support for green urban planning projects to address funding challenges</li> </ul>

No.	Country	Strategy
		<ul style="list-style-type: none"> <li>Active participation of communities in campaigns and beautification projects for increased appreciation[21]</li> </ul>
3.	Tanzania	<ul style="list-style-type: none"> <li>Green urban planning and environmental conservation to address the challenge of competing land uses[22]</li> </ul>
4.	Rwanda	<ul style="list-style-type: none"> <li>Strong government commitment to urban planning. The "Green, Clean, and Healthy Cities" program, led by the government, seeks to improve appreciation of green spaces.</li> <li>Promotion of green infrastructure to improve appreciation of green spaces</li> <li>Tree planting campaigns to improve appreciation of green spaces</li> <li>Community involvement to improve appreciation of green spaces</li> <li>Partnerships with organizations such as the United Nations Development Programme (UNDP) to address funding problems[23-25]</li> </ul>
5.	Burundi	<ul style="list-style-type: none"> <li>The "Green Bujumbura" project, supported by local authorities and non-governmental organizations to improve ecosystem services</li> <li>Partnerships with international organizations such as UN-Habitat have provided technical assistance for urban planning and green infrastructure development to address funding challenges[27].</li> </ul>
6.	South Sudan	<ul style="list-style-type: none"> <li>Humanitarian organizations and development partners have increasingly recognized the importance of green spaces for the well-being of urban populations and are beginning to incorporate green infrastructure into their projects in order to expand the range of ecosystem services by addressing funding needs[28].</li> </ul>

In summary, results show that green spaces' key challenges are encroachment, funding shortages, urbanization, climate change, population growth, and historical conflicts. Moreover, even though context-specific, the key strategies for improving their management include community involvement, international partnerships, and awareness campaigns, showcasing potential models for other regions, and emphasizing government support.

## 5. Discussion

Urban green spaces play a pivotal role in enhancing the quality of urban life. These pockets of nature within the concrete jungle contribute significantly to the physical and mental well-being of city dwellers. Beyond their aesthetic appeal, green spaces act as lungs for the city, filtering and purifying the air by absorbing pollutants. They serve as recreational havens, offering a respite from the hustle and bustle of city life, and promoting physical activity and social interactions. Additionally, these green oases contribute to biodiversity conservation, providing habitats for various species and fostering an ecological balance. As cities continue to expand, recognizing and preserving urban green spaces becomes essential not only for environmental sustainability but also for fostering healthier, happier, and more sustainable communities[12][13]. Similarly, findings from East Africa demonstrate these benefits, and most states are formulating policies and legislation to improve their sustainability. For instance, in Kenya, Section 37(1) of the Forest Conservation and Management Act 2016 requires that every County Government establish and maintain arboretas, green zones, or recreational parks for use by persons residing within its area of jurisdiction. Every county shall require housing estate developers within its jurisdiction to make provisions for the establishment of green zones at a rate of at least 5% of the total land area of any housing estate intended for development[17-19].

However, in recent times, owing to the impact of growing human needs, many urban green spaces are under threat of depletion due to a range of causes, calling for an increased need for studies that explore the various dimensions of urban green spaces[1-4]. This challenge is significant for East African countries because the region is classified as a developing region that will face increased pressure for

urbanization in the near future. A literature review shows that up to 60% of population growth will occur in urban areas in developing countries, including East African states, which constitute up to 90% of this urbanization[5]. [Table 1] shows the development matrices for the East African states. Tanzania has the highest population, followed by Kenya and Uganda in third place. Tanzania had the highest urbanization rate, followed by Kenya and Uganda, indicating that the higher the population, the higher the urbanization rate [Table 1].

When the analytical framework for the challenges of urban green spaces [Fig. 1] was applied in the case of East Africa, the findings revealed a range of sociocultural, economic, and environmental challenges. Kenya, Uganda, and Tanzania face the issue of encroachment into urban green spaces, and the expansion of urban areas threatens the existence of these vital green areas [Table 2]. In addition, inadequate funding for maintenance is a common challenge in Kenya and Tanzania, which affects the maintenance and sustainability of these spaces. In Uganda, rapid urbanization exacerbates this problem, as it leads to increased pressure on available green areas. However, Rwanda grapples with the impacts of climate change that pose threats to urban greenspaces. Burundi faces difficulties because of the growth of its urban population and illegal logging activities. South Sudan's urban green spaces have been affected by the complex history of civil war and displacement, which have limited urban development and left communities with resource constraints [Table 2]. These findings are similar to those in the literature, which have shown that urban green spaces are affected by a number of challenges, including inequity in access to urban green spaces, limited studies on equity[14], limited funding, climate change, biodiversity loss, pollution, and mismanagement, including encroachment and theft of public land[15].

The study results also revealed that strategic planning, adequate funding, and sustainable management practices are important in addressing the challenges facing urban green spaces in the region [Table 2]. These findings agree with those from the reviewed literature, which has pointed out that sustainable urban planning is important for improving the quality of life in cities and sustainable, livable cities[16]. This study agrees with these findings and emphasizes that strategic planning for urban green spaces is a paramount endeavor that seeks to optimize the benefits and sustainability of vital urban assets. This involves a meticulous process of envisioning, designing, and managing green spaces to meet the evolving needs of urban communities. Strategic planning aims to strike a delicate balance between conservation and development, ensuring that green areas flourish while concurrently serving as functional, accessible, and inclusive spaces for residents. The key elements include defining the goals and objectives of greenspace management, identifying target populations, assessing existing resources and infrastructure, and devising comprehensive policies that foster ecological health, recreational opportunities, and community well-being. Such planning not only safeguards urban biodiversity and mitigates environmental challenges but also promotes social cohesion and contributes to the overall quality of urban life. In this era of rapid urbanization, strategic planning of urban green spaces has emerged as an indispensable tool for fostering sustainable and resilient cities that prioritize the harmonious coexistence of nature and human habitation.

Moreover, adequate funding for urban green spaces is essential for ensuring the vitality and longevity of these crucial urban assets. Green spaces such as parks, gardens, and recreational areas play multifaceted roles in urban environments, contribute to physical and mental well-being, foster biodiversity, and enhance the overall quality of life. Securing sufficient financial resources is paramount for maintaining and developing these spaces and covering expenses, such as landscaping, infrastructure maintenance, security, and community programs. Insufficient funding can lead to neglect, deterioration, and reduced accessibility, ultimately diminishing the benefits these spaces offer communities. Therefore, prioritizing and allocating adequate funding for urban green spaces is not merely an investment in the environment but also an investment in the health, happiness, and sustainability of cities and their residents.

There are indications from case studies that show progress towards addressing these urban green space sustainability challenges. The results show various strategies [Table 3], initiatives, and approaches for promoting green urban planning and environmental conservation practices in East African countries. In Kenya, there has been a significant focus on the development of urban development master plans and the establishment of green belts around major cities such as Nairobi. Through the Nairobi Greenline Project, the Kenya Forest Service and the United Nations' Sustainable Cities Program support the improvement of urban green spaces[19]. Uganda emphasizes community involvement and partnerships with international organizations such as UN-Habitat for technical assistance in urban planning and green infrastructure development. Tanzania's efforts involve geospatial mapping of urban green spaces and environmental education, while Rwanda demonstrates strong government commitment through programs such as "Green, Clean, and Healthy Cities." In Burundi, the "Green Bujumbura" Project, supported by local authorities and NGOs, showcases local initiatives. South Sudan is witnessing the recognition of humanitarian organizations and development partners regarding the importance of green spaces in urban well-being. Across these countries, public-private partnerships, community engagement, tree-planting campaigns, and awareness creation play essential roles in advancing green urban planning and environmental conservation. Additionally, partnerships with organizations like the United Nations Development Programme (UNDP) and UN-Habitat have provided technical and financial support for green infrastructure projects, underscoring the region's commitment to sustainable urban development. Furthermore, the active participation of communities in campaigns and beautification projects, as seen in the United Nations Sustainable Cities Programme, reflects the growing momentum for greener and more environmentally conscious urban spaces in East Africa[21].

However, Rwanda's initiatives stand out among the six East African countries and can be emulated in other regions with similar contextual development matrices. Rwanda has made significant strides toward preserving and expanding its urban green spaces. The country's commitment to sustainability and environmental protection is evident in its ambitious tree-planting initiatives, with citizens actively participating in nationwide tree-planting activities. Rwanda's proactive approach to green urban planning has not only improved the quality of life of its residents but has also contributed to biodiversity conservation and climate resilience. By prioritizing green spaces within cities and integrating them into urban planning, Rwanda demonstrates the potential for harmonious coexistence between urban development and nature. This approach can offer valuable lessons for other nations grappling with the challenges of urbanization, providing a roadmap for creating healthier, more sustainable, and resilient cities worldwide[23-25].

Although the initiatives described across East African countries showcase commendable efforts to overcome challenges and promote green urban planning and environmental conservation, several aspects warrant critical evaluation. First, despite the emphasis on master plans and green belts in Kenya, the implementation of these plans often faces challenges, including inadequate enforcement and rapid urbanization. Uganda's focus on community involvement is laudable, but the effectiveness of such initiatives may vary depending on the degree of community participation and availability of resources. Although Tanzania's geospatial mapping and environmental education efforts are essential, their impacts on green space preservation and public awareness need to be rigorously assessed. Rwanda's "Green, Clean, and Healthy Cities" program is promising, but the long-term sustainability of such initiatives should be a central concern. In Burundi, while the "Green Bujumbura" Project is a positive step, its scalability and impact beyond localized initiatives need consideration. South Sudan's acknowledgment of the importance of green spaces is significant; however, war-related challenges and resource constraints pose substantial barriers to their effective implementation. Lastly, while public-private partnerships, international collaborations, and community engagement are crucial components of green initiatives, their success ultimately hinges on comprehensive governance frameworks, robust monitoring

and evaluation, and a commitment to long-term sustainability, which may require increased investment and policy support[25].

However, caution needs to be exercised when implementing these strategies. Most strategies appear to rely heavily on partnerships with international organizations, introducing potential biases based on their priorities. External funding dependency makes initiatives vulnerable to changing priorities. Community engagement success is tied to biases as it could favor communities with more resources. Moreover, government commitment is crucial for the success of initiatives and may not be easily replicated in less stable regions. Technical capacity is essential for strategies involving mapping and infrastructure. In addition, urban-centric strategies may neglect rural areas, exacerbating disparities. Cultural sensitivity is needed to avoid biases in green space perceptions. Long-term maintenance through partnerships may lead to unequal resource distribution. Geospatial mapping accuracy is crucial, but biases may arise if certain areas are disproportionately emphasized, or data is unreliable [Table 3].

## 6. Conclusion and Recommendations

This study has explored the challenges faced by urban green spaces in East Africa from the perspective of sustainable urban development. The findings have significant policy implications for East African countries in their pursuit of sustainable urban development and the preservation of urban green spaces. First, the identified challenges, such as encroachment, inadequate funding, rapid urbanization, and climate change impacts, call for a holistic policy approach that comprehensively addresses these multifaceted issues. Stakeholders and policymakers should prioritize the development and enforcement of urban planning regulations that safeguard urban green spaces from encroachment and ensure their long-term viability. In response to funding challenges, this study calls upon East African governments to allocate sufficient financial resources for the maintenance and enhancement of urban green spaces, recognizing their pivotal role in urban well-being. Additionally, exploring innovative financing mechanisms such as public-private partnerships and eco-taxation can help ensure a sustainable funding stream for green space management. To effectively manage the pressures of rapid urbanization, policies should emphasize the importance of preserving green areas as an essential component of urban infrastructure. Strategies such as compact urban planning, land-use zoning, and the integration of green infrastructure into urban development plans can help mitigate the negative impacts of urbanization on green spaces. Given the climate change threats some East African countries face, policies should incorporate climate resilience strategies into urban green space management. This could include planting climate-adapted vegetation, implementing sustainable water management practices, and designing green spaces as climate-resilient buffers.

Furthermore, the successful initiatives highlighted, such as community involvement, international partnerships, and awareness campaigns, can serve as valuable models for other regions and should be encouraged and supported by government policies. Collaboration with international organizations, such as UN-Habitat and the United Nations Development Programme, can provide technical and financial assistance, fostering the implementation of best practices in green urban planning. In embracing the global sustainability goals such as the United Nations' Sustainable Development Goals (SDGs), East African stakeholders and policymakers must prioritize urban planning regulations and allocate funds for green space maintenance. The SDGs encompass diverse objectives, such as Goal 11, Sustainable Cities and Communities, emphasizing urban well-being. Successful models, such as community engagement and international partnerships, are crucial for inspiring global adherence to SDGs. Collaborating with organizations for instance the UN-Habitat aligns with Goal 17, Partnerships for the Goals, ensuring technical and financial support for adopting best practices in green urban planning. This synergistic approach advances sustainable development, contributing to a resilient and environmentally conscious future. Future studies should explore the quantitative aspects of challenges related to the management



of urban green spaces and compare findings with this study. The research limitation of this study is that it relied solely on a bibliographic review and did not include a direct analysis of public opinion through interviews with stakeholders involved in urban green space development. This omission resulted in a lack of qualitative and quantitative data, which could have enhanced the discussion and allowed for a more direct response to the research objectives. This could be addressed by cross-referencing and using diverse data-collection methods in future studies.

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