

Towards Healthy African Cities: Utilising Nature-Based and Hybrid Solutions to Achieve Sustainability

Kariuki Muigua

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Abstract

This paper critically examines how the ideal of sustainability can be achieved in African cities. The paper argues that Africa is witnessing a rapid pace of urbanisation with a huge percentage of the continent's population currently living in cities and urban areas. The paper notes that African cities have the potential to foster economic growth and human progress in the continent. However, the paper argues that the rapid growth of cities in Africa is fueling several environmental, social and economic concerns including climate change, pollution, poor waste management, inequalities, poverty, unemployment and inadequate access to basic services such as water, housing, infrastructure and healthcare. In light of these challenges, the paper posits that achieving sustainability is vital for healthy and prosperous African cities. The paper examines how nature-based and hybrid solutions can be utilised to foster healthy African cities for sustainability.

1.0 Introduction

Cities play an integral role in development and human progress. Urbanisation has been described as one of the most significant trends of the 21st Century with over half of the world's population currently living in cities and urban centres¹. It has been argued that the rapid trend in urbanization has brought with it increased wealth since cities generate nearly 80 percent of the world's Gross Domestic Product (GDP)². Cities have been identified as hubs for ideas, commerce, culture, science, productivity, social, human and

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¹ UN-Habitat., 'Sustainable Development Goals Cities' Available at <https://unhabitat.org/programme/sustainable-development-goals-cities#:~:text=However%2C%20if%20steered%20and%20deployed,and%20improve%20wellbeing%20for%20all>. (Accessed on 18/08/2025)

² Ibid

economic development³. It has been noted that cities have enabled people to advance socially and economically through creation of jobs among and access to modern products and services among other opportunities⁴. Cities act as engines of national economic development⁵. It has been argued that strong urban economies are necessary in poverty reduction and the provision of vital services including adequate housing, transport and infrastructure, water and sanitation, health, education and safety⁶.

Despite their crucial role in fostering human progress and development, many cities all over the world are struggling with environmental degradation, inadequate urban infrastructure, and inadequate access to basic services including water supply, sanitation, health and waste management⁷. According to the United Nations Environment Programme (UNEP), the environmental footprints of cities are quite alarming and can threaten the natural resources required to sustain economic development and poverty reduction⁸. For example, urbanization has been identified as a major source of greenhouse gases which fuel the climate crisis⁹. It is estimated that cities account for more than 70 percent of global energy-related carbon emissions and an estimated 50 percent of global waste thus threatening environmental sustainability¹⁰. Further, due to the high concentration of people, infrastructure, housing and economic activities, cities and urban

³ United Nations., 'Sustainable Cities and Human Settlements' Available at <https://sdgs.un.org/topics/sustainable-cities-and-human-settlements> (Accessed on 18/08/2025)

⁴ Ibid

⁵ United Nations-Habitat., 'The Economic Role of Cities' Available at <https://unhabitat.org/sites/default/files/download-manager-files/Economic%20Role%20of%20Cities.pdf> (Accessed on 18/08/2025)

⁶ Ibid

⁷ United Nations Environment Programme., 'Sustainable Cities' Available at <https://www.unep.org/regions/asia-and-pacific/regional-initiatives/supporting-resource-efficiency/sustainable-cities> (Accessed on 18/08/2025)

⁸ Ibid

⁹ United Nations-Habitat., 'World Cities Report 2024: Cities and Climate Action' Available at <https://unhabitat.org/wcr/> (Accessed on 18/08/2025)

¹⁰ Organisation for Economic Co-Operation and Development., 'Sustainable Urban Development' Available at <https://www.oecd.org/en/topics/sustainable-urban-development.html#:~:text=Sustainable%20urban%20development%20is%20essential,and%20waste%20and%20water%20services>. (Accessed on 18/08/2025)

areas are particularly vulnerable to climate change and natural disasters¹¹. Poorly planned and managed cities have also generated inequalities with millions of people living in slums with inadequate and often precarious living conditions¹².

In light of the foregoing challenges, it has become imperative to achieve sustainability in cities and human settlements. It has been argued that with a rising share of the global population expected to live in cities and urban areas in the coming decades, the impact of cities on the environment – and their vulnerability to adverse weather events and natural disasters – will continue to grow unless significant action is scaled up¹³. According to the United Nations, Sustainable Development cannot be achieved without significantly transforming the way cities and urban spaces are built and managed¹⁴. It has been argued that efforts must focus on implementing inclusive, resilient and sustainable urban development policies and practices that prioritize access to basic services, affordable housing, efficient transportation and green spaces for all in order to achieve sustainability in cities and human settlements¹⁵. The need to achieve sustainability in cities is set out under the United Nation's *2030 Agenda for Sustainable Development*¹⁶. The Agenda seeks to make cities and human settlements inclusive, safe, resilient and sustainable as envisioned under Sustainable Development Goal (SDG) 11¹⁷.

This paper critically examines how the ideal of sustainability can be achieved in African cities. The paper argues that Africa is witnessing a rapid pace of urbanisation with a huge

¹¹ United Nations Environment Programme., 'Goal 11: Sustainable Cities and Communities' Available at <https://www.unep.org/explore-topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-11> (Accessed on 18/08/2025)

¹² UN-Habitat., 'Sustainable Development Goals Cities' Op Cit

¹³ Organisation for Economic Co-Operation and Development., 'Sustainable Urban Development' Op Cit

¹⁴ United Nations., 'Goal 11: Make Cities Inclusive, Safe, Resilient and Sustainable' Available at <https://www.un.org/sustainabledevelopment/cities/> (Accessed on 18/08/2025)

¹⁵ Ibid

¹⁶ United Nations General Assembly., 'Transforming Our World: the 2030 Agenda for Sustainable Development.' 21 October 2015, A/RES/70/1., Available at <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf> (Accessed on 18/08/2025)

¹⁷ Ibid

percentage of the continent's population currently living in cities and urban areas. The paper notes that African cities have the potential to foster economic growth and human progress in the continent. However, the paper argues that the rapid growth of cities in Africa is fueling several environmental, social and economic concerns including climate change, pollution, poor waste management, inequalities, poverty, unemployment and inadequate access to basic services such as water, housing, infrastructure and healthcare. In light of these challenges, the paper posits that achieving sustainability is vital for healthy and prosperous African cities. The paper examines how nature-based and hybrid solutions can be utilised to foster healthy African cities for sustainability.

2.0 The Need for Sustainability in African Cities

Africa is witnessing a fast pace of urban growth. It is estimated that Africa's urban population will double, increasing from 700 million to 1.4 billion by 2050, making it the continent with the second largest urban population after Asia¹⁸. It is estimated that Africa currently has an average annual urban growth rate of 3.5 percent and is witnessing the largest urbanization in the developing world with this trend anticipated to continue until the year 2050¹⁹. Africa's urban population is expected to double and even triple in the coming decades transforming the continent's profile and challenging policy makers to harness urbanization for sustainable and inclusive growth and development²⁰.

African Union's *Agenda 2063*²¹ acknowledges the rapid growth of cities and urban centres in the continent. The Agenda estimates that more than two thirds of the African

¹⁸ Organisation for Economic Co-Operation and Development., 'Africa's Urbanisation Dynamics 2025' Available at https://www.oecd.org/en/publications/africa-s-urbanisation-dynamics-2025_2a47845c-en.html#:~:text=Over%20the%20next%20three%20decades,urban%20planning%2C%20governance%20and%20financing. (Accessed on 18/08/2025)

¹⁹ United Nations Economic Commission for Africa., 'Spotlight on urbanization in Africa' Available at <https://www.uneca.org/eca-events/africa-urban-forum-2024/spotlight-urbanization-africa> (Accessed on 18/08/2025)

²⁰ UN-Habitat., 'Africa Urban Agenda Programme' Available at <https://unhabitat.org/africa-urban-agenda-programme#:~:text=Urbanization%20in%20Africa%20is%20progressing,a%20deterrent%20for%20future%20development>. (Accessed on 18/08/2025)

²¹ Africa Union., 'Agenda 2063: The Africa we Want' Available at https://au.int/sites/default/files/documents/33126-doc-framework_document_book.pdf (Accessed on 18/08/2025)

population will be living in cities and urban centres by 2063²². Agenda 2063 notes that the growth in urban population has many implications including spatial planning; access to housing; provision of basic services; job creation; economic and social development²³. Agenda 2063 seeks to realize modern, affordable and liveable habitats in Africa²⁴. According to Agenda 2063, African cities will be well planned with modern mass transit systems, while rural communities will be connected to the rest of the economy through road, energy, mobile communication networks, water, sanitation and hygiene systems²⁵. Agenda 2063 also seeks to ensure that every citizen residing in cities and urban areas has affordable and sustainable access to quality basic services such as decent affordable housing, access to adequate and clean water and sanitation, transport and other services²⁶.

The growth of cities and urban areas in Africa therefore offers immense opportunities to unlock Sustainable Development. African cities have the potential to create vibrant and resilient economic systems that can spur innovation and human progress²⁷. It has been argued that Africa's rapid urban growth presents demands for employment, services and infrastructure, but also creates numerous opportunities for structural transformation, economic diversification, increased productivity and economic growth²⁸. Well planned and managed cities can drive economic growth and transformation in Africa²⁹. It has been

²² Ibid

²³ Ibid

²⁴ Ibid

²⁵ Ibid

²⁶ Ibid

²⁷ Africa making strides in promoting sustainable and resilient cities., Available at <https://allianceforscience.org/blog/2023/10/africa-making-strides-in-promoting-sustainable-and-resilient-cities/> (Accessed on 18/08/2025)

²⁸ United Nations Economic Commission for Africa., 'Urbanization and Inclusive Economic Growth in Africa' Available at <https://www.uneca.org/sites/default/files/IDEP/Courses/Brochure-URBANIZATION-AND-INCLUSIVE-ECONOMIC-GROWTH-IN-AFRICA-ANG.pdf> (Accessed on 18/08/2025)

²⁹ Ibid

argued that with proactive planning, effective governance and innovative financing, African cities can become engines of inclusive economic growth³⁰.

Despite the potential role of urbanisation in unlocking growth and development opportunities in the continent, African cities face several challenges. For instance, it has been argued that urbanization in Africa has failed to bring about inclusive and equitable growth which, in turn, has resulted in the growth of slums, urban poverty and rising inequalities³¹. Most African cities have seen the growth of informal settlements, where people do not have reliable, safe or affordable access to essential everyday services including housing, clean water, sanitation services, healthcare, infrastructure and waste management services³².

African cities are also fueling significant environmental concerns. It has been argued that rapid urbanisation in Africa is putting on the environment and natural resources³³. For example, the expansion of cities in Africa is happening at the expense of destruction of crucial ecosystems such as forests and other natural resources³⁴. African cities are fueling the triple planetary crisis of climate change, biodiversity loss, pollution and waste. It has been argued that a combination of rapid urbanisation, urban sprawl and informality puts pressure on the surrounding environment in cities creating a negative feedback loop where urban growth exacerbates climate impacts, with climate change in turn influencing migration patterns and causing rural-urban migration³⁵. The destruction of ecosystems and habitats to support the growth of cities in Africa is also leading to biodiversity loss³⁶.

³⁰ Organisation for Economic Co-Operation and Development., 'Africa's Urbanisation Dynamics 2025' Op Cit

³¹ African Development Bank Group., 'Urbanization in Africa' Available at <https://blogs.afdb.org/fr/inclusive-growth/urbanization-africa-191> (Accessed on 18/08/2025)

³² World Resources Institute., 'Sustainable Cities: Building Urban Resilience and Inclusive Mobility' Available at <https://africa.wri.org/cities> (Accessed on 18/08/2025)

³³ African Development Bank Group., 'Urbanization in Africa' Op Cit

³⁴ Ibid

³⁵ Climate change hits African cities. Are they ready?., Available at <https://africanclimatewire.org/2025/05/climate-change-hits-african-cities-are-they-ready/> (Accessed on 18/08/2025)

³⁶ African Development Bank Group., 'Urbanization in Africa' Op Cit

In addition, poor urban planning including ineffective waste management practices is a major cause of pollution and waste in African cities with negative impacts on human and ecosystem health³⁷.

African cities are also highly vulnerable to adverse climatic events and natural disasters. For example, it has been observed that many cities in Africa are located along coasts and major rivers, exposing citizens to extreme flooding³⁸. Further, it has been observed that since they are home to major infrastructure and highly concentrated populations, cities are vulnerable to the impacts of climate change including rising sea levels, warmer temperatures and severe storms³⁹. Rising global temperatures due to climate change cause sea levels to rise, increases the number of extreme weather events such as floods, droughts and storms, and increases the spread of tropical diseases with adverse impacts on cities' basic services, infrastructure, housing, human livelihoods and health⁴⁰. African cities are contending with severe flooding, extreme heat, air pollution, environmental degradation and increased climate-related extreme weather events⁴¹. Further, it has been argued that more than half of city residents in sub-Saharan Africa live in places that exceed safe limits for air pollution⁴².

In light of the foregoing challenges, it is imperative to build health and resilient African cities. In order to achieve this goal, it has been argued that urban development in Africa should not only be low-carbon, resource efficient and climate-resilient, but should also

³⁷ Ibid

³⁸ World Resources Institute., 'Sustainable Cities: Building Urban Resilience and Inclusive Mobility' Op Cit

³⁹ Organisation for Economic Co-operation and Development., 'Cities and Climate Change' Available at https://www.oecd-ilibrary.org/governance/cities-and-climate-change_9789264091375-en (Accessed on 18/08/2025)

⁴⁰ United Nations Environment Programme., 'Cities and Climate Change' Available at [https://www.unep.org/explore-topics/resource-efficiency/what-we-do/cities-and-climate-change#:~:text=At%20the%20same%20time%2C%20cities,contributors%20\(IPCC%2C%202022\)](https://www.unep.org/explore-topics/resource-efficiency/what-we-do/cities-and-climate-change#:~:text=At%20the%20same%20time%2C%20cities,contributors%20(IPCC%2C%202022)) (Accessed on 18/08/2025)

⁴¹ Climate change hits African cities. Are they ready?., Op Cit

⁴² World Resources Institute., 'Sustainable Cities: Building Urban Resilience and Inclusive Mobility' Op Cit

enhance access to crucial basic urban services including water and sanitation, electricity, decent housing, transport and decent urban jobs⁴³.

3.0 Utilising Nature-Based and Hybrid Solutions for Healthy African Cities

It is imperative to build healthy African cities. It has been observed that African cities are rapidly growing but urban infrastructure and services are not meeting demand with cities also putting a lot of pressure on the environment⁴⁴. Consequently, it has been argued that there is need to transition Africa's cities and urban systems to provide a better quality of life and health through equitable access to jobs and basic urban services for all residents – especially the underserved⁴⁵. According to the United Nations, Sustainable Development depends on the successful management of urban growth to create sustainable cities and urban centres in both developed and developing countries⁴⁶. Fostering clean and healthy cities both globally and in Africa is therefore key towards Sustainable Development⁴⁷.

The *New Urban Agenda*⁴⁸ adopted by the United Nations Human Settlements Programme (UN-Habitat) sets out the need to create healthy cities for Sustainable Development. The Agenda lays out standards and principles for the planning, construction, development, management and improvement of urban areas towards sustainability⁴⁹. It highlights linkages between sustainable urbanization and job creation, livelihood opportunities and improved quality of life, and it insists on incorporation of all these sectors in every urban development for inclusive, safe, resilient and sustainable cities and human settlements⁵⁰. Actualising the New Urban Agenda is therefore key towards healthy cities both globally

⁴³ Ibid

⁴⁴ World Resources Institute., 'Sustainable Cities: Building Urban Resilience and Inclusive Mobility' Op Cit

⁴⁵ Ibid

⁴⁶ United Nations., 'Urbanization' Available at <https://www.un.org/development/desa/pd/content/urbanization-0> (Accessed on 18/08/2025)

⁴⁷ Ibid

⁴⁸ United Nations Human Settlements Programme (UN-Habitat)., 'The New Urban Agenda' Available at https://unhabitat.org/sites/default/files/2020/12/nua_handbook_14dec2020_2.pdf (Accessed on 18/08/2025)

⁴⁹ Ibid

⁵⁰ Ibid

and in Africa for sustainability. Agenda 2063 further sets out the ideal of clean, healthy, resilient, inclusive and sustainable cities and urban areas in Africa towards development and human progress⁵¹. Fostering healthy cities is therefore a vital agenda both globally and in Africa.

Nature-based and hybrid solutions provide effective approaches towards healthy cities in Africa and the rest of the world. Nature-based solutions refer to actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits⁵². At their core, nature-based solutions involve working with nature to address societal challenges, supporting human well-being and conserving biodiversity⁵³. It has been argued that nature-based solutions leverage nature and the power of healthy ecosystems to protect people, optimise infrastructure and safeguard a stable and biodiverse future⁵⁴. Hybrid solutions on the other hand involve integrating diverse approaches including collaborative approaches, science and technology and circular economy principles for healthy, resilient and sustainable cities⁵⁵.

Nature-based and hybrid solutions can foster healthy African cities. For example, it has been argued that harnessing nature-based solutions can enhance urban policies and help

⁵¹ Africa Union., 'Agenda 2063: The Africa we Want' Op Cit

⁵² United Nations Environment Programme., 'Nature-Based Solutions: Opportunities and Challenges for Scaling Up' Available at https://wedocs.unep.org/bitstream/handle/20.500.11822/40783/nature_based_solutions.pdf?sequence=3&isAllowed=y (Accessed on 18/08/2025)

⁵³ What is the Nature-based Solutions Initiative and what are nature-based solutions?., Available at <https://www.naturebasedsolutionsinitiative.org/what-are-nature-based-solutions#:~:text=Examples%20of%20Nature%2Dbased%20Solutions&text=Protecting%20or%20restoring%20forests%20and,floods%2C%20soil%20erosion%20and%20landslides> (Accessed on 18/08/2025)

⁵⁴ International Union for Conservation of Nature., 'Nature-Based Solutions' Available at <https://iucn.org/our-work/nature-based-solutions> (Accessed on 18/08/2025)

⁵⁵ Mirzayev. A., 'Hybrid Approaches in Urban Planning: Exchange of Experience Between Developed and Developing Countries' Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4822960 (Accessed on 18/08/2025)

cities and their communities become more resilient and stable⁵⁶. By utilising nature-based solutions in urban planning, both people and nature can benefit towards Sustainable Development⁵⁷. It has been argued that nature-based solutions can help cities become more livable by improving the quality of the environment, tackling climate change, supporting biodiversity, regulating temperatures, filtering water and improving the quality of air⁵⁸. It has been pointed out that nature-based solutions can address urban challenges caused and exacerbated by growing urban populations and the impacts of climate change⁵⁹. Nature-based solutions are multi-functional, cost-effective and provide a wide range of benefits, from improving public health to reducing energy costs and pollution to regenerating urban spaces⁶⁰.

Several nature-based solutions can be utilised to foster healthy African cities. For example, urban green infrastructure including urban forests, green roofs, green walls, urban parks and gardens, and engineered wetlands and storm water ponds are effective nature-based solutions that can be utilised towards healthy cities and urban areas⁶¹. These solutions provide critical ecosystem services including water purification, improving air quality, providing space for recreation, and climate mitigation and adaptation⁶². Urban green infrastructure is an effective nature-based solution that plays a key role in enhancing climate adaptation and mitigation capacities in cities and urban areas, and reducing negative impacts of climate change hazards such as heatwaves,

⁵⁶ Urban Nature-Based Solutions., Available at https://wwf.panda.org/projects/one_planet_cities/what_we_do/urban_naturebased_solutions/ (Accessed on 18/05/2025)

⁵⁷ Ibid

⁵⁸ Ibid

⁵⁹ How cities are using nature-based solutions for sustainable urban development., Available at <https://cbc.iclel.org/cities-using-nature-based-solutions-sustainable-urban-development/> (Accessed on 18/08/2025)

⁶⁰ Ibid

⁶¹ What is Green Infrastructure?., Available at <https://greeninfrastructureontario.org/what-is-green-infrastructure/> (Accessed on 18/08/2025)

⁶² European Commission., 'Green Infrastructure' Available at https://environment.ec.europa.eu/topics/nature-and-biodiversity/green-infrastructure_en (Accessed on 18/08/2025)

flooding and drought in cities⁶³. It has been suggested that cities can utilise green roofs and green infrastructure to help them become more healthy and resilient to extreme weather, support urban food security through urban gardens, increase green spaces, and improve the quality of life for residents including through creating popular recreation areas⁶⁴. Cities have been urged to adopt nature-based solutions for sustainable urban development including through planting trees to improve urban air quality, converting abandoned industrial sites into urban parks and gardens, greening roofs to reduce buildings' energy use, and restoring degraded wetlands to prevent floods⁶⁵.

Cities and urban areas in coastal areas which suffer from coastal flooding and erosion can also benefit from nature-based solutions through the restoration and management of saltmarshes, wetlands, mangroves and oyster reefs among other coastal/marine ecosystems⁶⁶. These ecosystems protect hundreds of millions of people worldwide by providing natural buffers against sea-level rise, storm surges and erosion⁶⁷. Utilising nature-based solutions is therefore necessary towards healthy African cities.

Hybrid solutions can also be effectively harnessed towards healthy African cities. For example, collaborative urban planning involving all stakeholders including city and urban residents and the private sector embrace can lead to healthy cities by taking into account diversity and complexity, drawing on a range of perspectives and experiences to inform effective decision-making processes⁶⁸. Further, utilising hybrid approaches to urban planning including the use of technologies such as Artificial Intelligence (AI) and

⁶³ Urban Green and Blue Infrastructure Planning., Available at <https://climate-adapt.eea.europa.eu/en/metadata/adaptation-options/green-spaces-and-corridors-in-urban-areas> (Accessed on 18/08/2025)

⁶⁴ How cities are using nature-based solutions for sustainable urban development., Op Cit

⁶⁵ Nature-based solutions for sustainable urban development., Available at https://unfccc.int/files/parties_observers/submissions_from_observers/application/pdf/777.pdf (Accessed on 18/08/2025)

⁶⁶ Ibid

⁶⁷ Conservation International., 'Our Blue Carbon Program' Available at <https://www.conservation.org/projects/our-blue-carbon-program> (Accessed on 18/08/2025)

⁶⁸ Mirzayev. A., 'Hybrid Approaches in Urban Planning: Exchange of Experience Between Developed and Developing Countries' Op Cit

big data solutions can optimize resource allocation, energy efficiency and infrastructure development⁶⁹. It has been argued that integrating advanced AI techniques to solve complex urban planning problems provides a scalable and adaptable solution for modern smart, clean and healthy cities⁷⁰. Further, employing hybrid solutions that foster resource efficiency including circular economy principles, energy-efficient buildings, sustainable transport and renewable sources of energy can also foster healthy cities while addressing the challenges of climate change, pollution and waste⁷¹. Hybrid solutions are therefore effective towards healthy African cities.

4.0 Conclusion

Africa is witnessing a rapid growth of cities and urban areas. If effectively planned and managed, cities can unlock development and human progress in Africa. However, African cities are not meeting demand for infrastructure and basic urban services while also putting a lot of pressure on the environment leading to climate change, pollution and waste and biodiversity loss⁷². It is therefore imperative to build inclusive, clean, healthy and resilient African cities for Sustainable Development. Africa has an opportunity to utilise nature-based and hybrid solutions in order to create safe, clean, resilient and inclusive cities towards achieving sustainability⁷³.

⁶⁹ Hybrid AI and Big Data Solutions for Dynamic Urban Planning and Smart City Optimization., Available at <https://ieeexplore.ieee.org/document/10794774> (Accessed on 18/08/2025)

⁷⁰ Ibid

⁷¹ Mirzayev. A., 'Hybrid Approaches in Urban Planning: Exchange of Experience Between Developed and Developing Countries' Op Cit

⁷² World Resources Institute., 'Sustainable Cities: Building Urban Resilience and Inclusive Mobility' Op Cit

⁷³ Mirzayev. A., 'Hybrid Approaches in Urban Planning: Exchange of Experience Between Developed and Developing Countries' Op Cit

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[en.html#:~:text=Over%20the%20next%20three%20decades,urban%20planning%2C%20governance%20and%20financing](#)

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