AT2030
Case Study: Full Report

Inclusive Design and Accessibility of the Built Environment in Nairobi, Kenya

Prepared by
GDI Hub

Cluster 4 Capacity & Participation
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Summary: Becoming a more inclusive city

"An inclusive Nairobi is somewhere that can be experienced by everybody in a fair and equal way. By creating safe and accessible environments for all members of the community the city can allow everyone to access and participate in the opportunities they would like."

Nairobi is a city with a population of 4,397,073 people and the capital of Kenya. Nairobi is experiencing rapid growth and investment in infrastructure which offers great potential to embed inclusion. The city has complex urban development challenges with roads and transportation commonly cited as major challenges. More than half of Nairobi's residents live in the informal settlements in the city which are areas of high-density, poor-quality accommodation and lack basic infrastructure such as roads, water and sanitation infrastructure and power. Many persons with disabilities live in these communities due to reinforcing cycles of disability and poverty. However, there is vision and ambition in Nairobi to generally improve urban conditions. There is also a good policy basis to make progress towards disability inclusion. It is important these two agendas are coordinated. Kenya enacted its first disability law, the 'Persons with Disabilities Act' in 2003 and ratified the UNCRPD in 2008. According to official statistics, around 1.1% of Nairobi's population are persons with disabilities, but it is recognised that this is likely an underestimation and the need for inclusive and accessible environments is much higher. Nairobi as the capital city of Kenya has a real opportunity to lead by example in terms of inclusive city design, not just for cities in Kenya but across the continent, as a key African commercial hub.

A woman is walking with her guide in the informal settlement.

Kenya has a strong legal framework to create inclusive cities and further disability inclusion and there is clear appetite from Government to take action represented through these legal frameworks. Further progress is imminent through the proposed new Building Code (2022) which is currently at draft stage. It more comprehensively addresses accessibility than the previous code which is 50 years old. A major barrier for inclusive design delivery in the city is around good implementation, for which accountability and knowledge of inclusive design across project teams is important. Policy and practice stakeholders must be collaborative for more effective delivery.

In terms of becoming a more inclusive city, Nairobi has some complex contextual factors that influence the state of the built environment. Nairobi's colonial era created segregated urban development planning approaches which generated conditions for exclusion that resulted in, among others, the birth and growth of informal settlements. These urban areas are characterised by high density and poor or lacking infrastructure and are some of the most inaccessible parts of the city. Due to high levels of poverty among persons with disabilities and high costs of housing, these are also areas where many disabled citizens live. Informal settlements in Nairobi are also high-risk areas for disasters such as flooding, fires and disease outbreak. These risks are due to, among others, poor or lacking infrastructure such as proper sewer and power systems, roads, and water and sanitation facilities.

A flooded road in downtown Nairobi. Street stalls and the road conditions also create pedestrian inaccessibility

"Inclusive and universal design to me means that the built environment (Infrastructure, transport and housing) are constructed in a way that anyone can access them without difficulty. It accommodates all type of people and their needs."

Example of accessible ramp at place of worship

The built environment sector could do more to support accessibility by also advocating for its implementation. The most inclusive environments are usually produced not just by regulations and standards for accessibility but robust inclusive design processes that include genuine participation of persons with disabilities. There are learnings from community-led approaches and co-design with other under-served communities. It would be helpful to do this to build more evidence on the co-benefits of inclusive design for social inclusion more broadly. There is shared responsibility to ensure participation among stakeholders and project finances must account for this. Training and education across the built environment sector on disability awareness would help as it is a collaborative effort from designers, engineers, planners and contractors to deliver on inclusive design. Quality control and material selection are key aspects to remember to ensure more seamless inclusion.

Inclusive infrastructure, urban planning and assistive technology must be complementary and the built environment is a vital part of creating access to AT and ensuring seamless use. In turn, AT must be designed to be fit for purpose for the environment and context of its use. Championing local production and local innovators in AT can help here, as there are working directly in the communities the AT is for.

"We need to be our own advocates."

Nairobi is a city of innovation - business opportunities and the start-up ecosystem is vibrant. Innovation must be inclusive and ensuring basic support and access to livelihoods must not be forgotten. Persons with disabilities should have choices in opportunities and the freedom to access education and work in whatever

employment they would like. Currently, there are limited perceptions that persons with disabilities can only work in certain sectors. Many persons with disabilities are entrepreneurial, which can be due to the exclusion they experience. They aspire to be independent, running successful businesses, and leading fulfilling lives but the built environment can be a barrier to this.

An inclusive city is an accessible, healthy, resilient, gender-inclusive, age-friendly, child-friendly, sustainable city. Inclusive city aspirations intersect with many other global goals as set out in the UN's 2030 Agenda and it is evident that disability and accessibility are cross-cutting issues across the SDGs. This is clearly seen in Nairobi where we see accessibility, health, climate-resilience and livelihood problems intersecting. The ideal solution is a unified and holistic approach but breaking down siloes is challenging. We would advocate inclusive design is a tool for participatory urban development that can support action across these diverse development targets and while delivering co-benefits through inclusive infrastructure that supports diverse disadvantaged groups, particularly due to the intersectionality of disability.

Example of poor drainage planning blocking routes to amenities

"Change the planning approach, look at design in a holistic manner so that in issues of access we have continuous access, safe spaces, protected spaces."

We also need to design for people and planet, otherwise the planet will continue to exacerbate conditions of exclusion. Resilience and inclusion cannot afford to be separate considerations. In Nairobi and other cities, the impact of climate-related disasters, changing weather patterns, pandemics and worsening inequality is felt by citizens and has a tremendous impact on city infrastructure and resources. Infrastructure design and urban development must

integrate inclusive design as well as resilience-led approaches and climate action – both of which are arguably further ahead in terms of implementation and progress. Our cities must be able to withstand shocks and inclusive design can help make sure all citizens are included and no one is left behind.

Key barriers:

Transportation and roads: public transport options are challenging for persons with disabilities to use. This includes not only the physical design of infrastructure but also attitudes and behaviour across service providers and passengers. Large parts of Nairobi have been designed to prioritise cars but still road infrastructure can be poor in certain areas. Traffic and congestion are major problems and it can be an unsafe and stressful environment for pedestrians. Infrastructure development would benefit greatly from inclusive design to ensure accessibility and suitability of design, including things like safety and sustainability.

Housing and basic infrastructure: needs to be more accessible, inclusive and affordable. There is a lack of accessible housing, with housing and land costs being high, creating insecurity. Poor quality or lacking essential infrastructure such as water and sanitation, electricity supplies, roads, and sewers are a barrier to a good quality of life for persons with disabilities and must be improved, particularly in informal settlements.

An inaccessible home entrance in an informal settlement in Nairobi

Recreation and culture: being able to participate in cultural and recreational activities such as practising religion or sports and visiting parks, restaurants, clubs is part of a fulfilling life and important to combat social isolation and participate in community life. In many cases, these types of spaces are not accessible. Inclusive

public spaces are an important enabler of social spaces and need inclusive and accessible furniture to create gathering and rest spaces.

Daily life activities and services: insecurity, a lack of independence and an inaccessible built environment and transport impact daily life. Being able to access essential services such as health and social care, banks and schools is important to access opportunities and is a fundamental human right. People also need to be able to run errands like going to the market but often these more informally managed spaces are inaccessible, limiting independence.

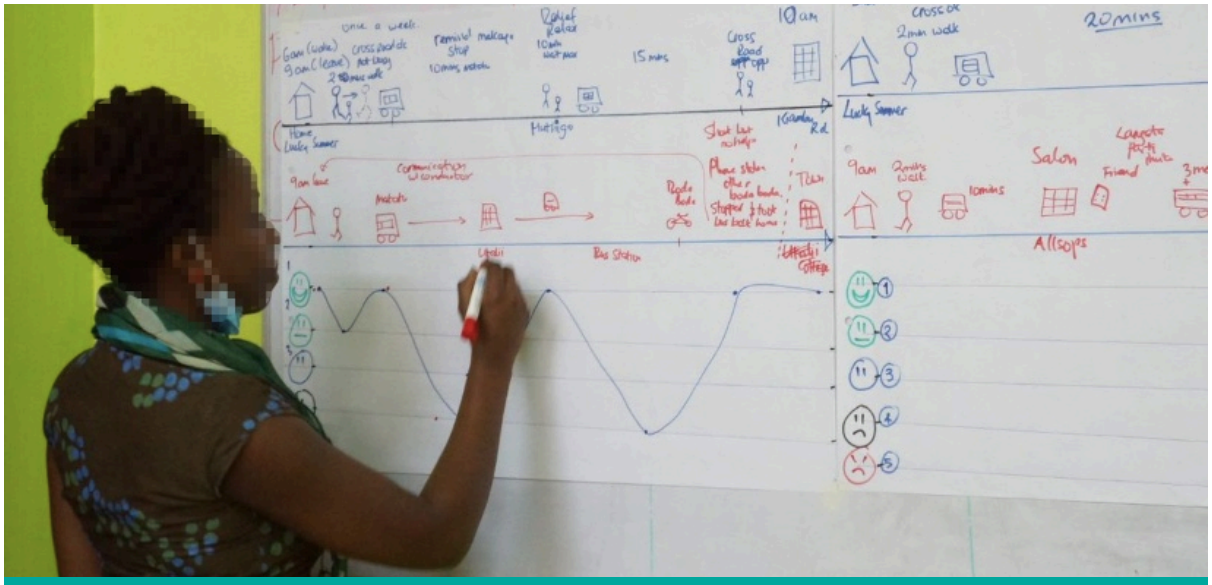
Photo diary image of woman with a visual impairment shopping at the market

Other particularly relevant thematic areas that represent opportunities to support inclusive cities include:

- Inclusive climate, water, sanitation and health as part of a cohesive approach to inclusive resilience
- Inclusive design processes to ensure seamless accessibility in rapidly developing cities with changing circumstances
- Innovation and entrepreneurship for fit for purpose, accessible, AT and livelihoods
- Participation of persons with disabilities across government and built environment sectors, in leadership, employment and participatory design processes.

Priority Recommendations:

- Action across key barriers: transport, roads, housing, recreation and culture and daily life activities and services. Prioritise these areas in urban development
- Consider an ecosystems approach to inclusion, a coordinating organisation or committee that can strategically align priorities, resources and opportunities across disability inclusion and inclusive urban development
- Use architecture, urban design, planning and infrastructure to enhance quality of life, supporting health, wellbeing, livelihoods
- Enjoyable urban life: don't underestimate the importance of access to recreation, culture and public spaces
- Let communities lead, facilitate, and resource community-driven development
- Champion inclusion, champion what works – we need to know what good looks like in the local context and good examples should be publicised
- Understand co-benefits of infrastructure, do more with less – housing supports health, access supports livelihoods
- Consider resourcefulness of design, make good use of materials and design sustainable and resilient solutions that will last
- Resilience, climate, risk and sustainability need to be a part of an inclusive design strategy
- Use inclusive design to enhance freedom, safety and security
- Work on inclusive mobility: accessible transport options and safe pedestrian environments
- Contextualise legislation and standards to local development plans through participation of local persons with disabilities to understand better what a good inclusive environment looks like in that context
- Work with communities to develop an inclusive design strategy for informal settlements, inclusive design that can work with minimal resources and supports addressing essential infrastructure needs
- Disability awareness and inclusive design training for all key urban stakeholders, including service providers
- Finance an inclusive built environment. Inclusive design should be an integral part of early project planning with ringfenced budget.



An example of a journey map being drawn during a workshop

Different stakeholders have different roles to play in shaping an inclusive environment and specific recommendations for policy, practice and people are found in the full report.

Creating an enabling environment

An enabling environment for persons with disabilities should integrate: a supportive legislative environment, an inclusive culture and mindset, participation in planning, design and decision-making, positive cultural change, an accessible and inclusive built environment and access to good quality and affordable assistive technology. Some of these aspects are already taking place in Nairobi but for an inclusive city to maintain an enabling environment it is necessary to ensure robust, sustainable, disability-inclusive urban development processes are implemented.

So what might an inclusive Nairobi look like?

- Inclusive mobility
- Enjoyable urban life: recreation, culture and safe inclusive public spaces
- Accessible and affordable housing for all
- Inclusive infrastructure, urban planning and services
- Thriving communities, security and a just city
- Access to opportunities: disability innovation and entrepreneurship

What's next?

This report outlines the key findings from a case study on the city of Nairobi, Kenya. As the fourth of six case studies on inclusive design and the built environment in lower-and-middle-income countries, it will go on to inform the subsequent 'Global Action Report' on inclusive city design. The remaining two case studies will take place in Freetown, Sierra Leone and Medellín, Colombia.

Local partners Kilimanjaro Blind Trust (KBTA) and Kounkuey Design Initiative (KDI) continue to champion inclusion through various work and will continue to disseminate and apply the research undertaken in this case study.

KBTA continue to support AT entrepreneurs through the InnovateNow programme and work across various aspects of disability inclusion in Nairobi.

KDI continue to deliver community-led infrastructure work across Nairobi including projects such as nature-based solutions. From 2020-2021, KDI led the first phase of a projecte called 3IF: Integrated Inclusive Infrastructure Framework for Kenya, which looks more broadly at inclusive infrastructure (www.3if.info). A second phase began in 2022. They are also part of the Urban Fabric Initiative which is looking at small-scale public space upgrading and community infrastructure projects co-designed and co-produced by residents and urban stakeholders.

The data collection that informed this case study took place just prior to the second wave of COVID-19 in Kenya, we recognise the impact it has had on partners and communities and hope this research on inclusive environments can support strategies for a more inclusive recovery.

To find out more:

The full case study is available at www.at2030.org/inclusive-infrastructure and you can contact the Inclusive Design Team at GDI Hub to find out more.

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Lastly, we'd also like to thank the GDI Hub team who have supported the work, including; Vicki Austin, Katherine Perry, Naomi Thompson, Prof. Cathy Holloway, and Louise Gebbett and finally, the members of our research advisory group who are; Luis Artieda, Prof. Richard Bibb, Rama Gheerawo, Chapal Khasnabis, Dr. Maria Kett, Sophie Morley and Julian Walker for their continued guidance and support.

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Global Disability Innovation Hub

www.disabilityinnovation.com

GDI Hub is a research and practice centre driving disability innovation for a fairer world. Our vision is of a world without barriers to participation and equitable opportunity for all. We believe disability innovation is part of a bigger movement for disability inclusion and social justice. GDI Hub works across 5 domains, research, innovation, programmes, teaching, and advocacy. We are solutions-focused experts in; Assistive & Accessible Technology; Inclusive Design; Inclusive Education Technology; Climate & Crisis Resilience and Cultural Participation. Based in East London and a legacy of London 2012 Paralympic Games, we deliver world-class research, ideas and inventions, creating new knowledge, solutions and products, and shaping policy through co-creation, participation and collaboration. An Academic Research Centre (ARC) and a not-for-profit Community Interest Company (CIC) we are guided by an Advisory Board of disabled people. We are operational in over 35 countries and have reached 12 million people since our launch in 2016.

Kilimanjaro Blind Trust Africa

www.kilimanjaroblindtrust.org

Kilimanjaro Blind Trust Africa (KBTA) is a charitable Trust based in Nairobi providing access to quality education for children and youth with visual impairments (VI) in Kenya, Tanzania, Uganda, Rwanda, Malawi & Ethiopia. KBTA uses innovation & technology to provide access to digital Braille literacy & skills. It serves over 3000 learners with visual impairment in 250 schools across the countries, by providing them with multi-functional, digital, Braille assistive devices called the Orbit Reader 20 which allows the VI learners to actively participate in their learning process. This digital Braille technology reduces the overall cost of educating a VI learner and allows them to transition to higher education. KBTA also supports the VI youth to have access to a wide range of subjects including science, math, coding etc. and ultimately provides employability skills support, that allows them to access mainstream employment.

Kounkuey Design Initiative

www.kounkuey.org

Kounkuey Design Initiative (KDI) is a non-profit design and community development organisation. With a team comprising landscape architects, urban planners, civil engineers, architects, community organisers and researchers, KDI partners with under-resourced communities to advance equity and activate the unrealised potential in neighbourhoods and cities. KDI works with residents to transform unsafe and under-used sites into productive public spaces. From permanent parks to temporary vacant lot activations, each space integrates key amenities such as community buildings, water and sanitation facilities, green infrastructure and open spaces for recreation and exercise.

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Glossary of Key Terms

Inclusive Design - can help all human beings experience the world around them in a fair and equal way by creating safe and accessible environments for all members of the community. Inclusive design is a mindset, a methodology that embraces diversity to create a world that is more intuitive, elegant and usable for all of us.

Infrastructure - is the physical and organisational structures, services and facilities that support society. Good infrastructure should contribute to inclusive prosperity, including health and wellbeing. The term often refers to; transport, water and waste-water systems, energy and telecommunications industries, and social welfare structures such as health, education and social support systems[1]. For the purpose of this report all structures (whether physical, institutional or digital) that contribute to the participation of people with disabilities in daily life and society fall under the remit of infrastructure.

Inclusive and Accessible Infrastructure and Environments - promote access, opportunity, participation and equity in society. Inclusive and accessible infrastructures and environments take into account the principles of inclusive design, embracing diversity and acknowledging that designing for people who experience the least equity in the built environment, such as persons with disabilities, has the potential to benefit all of us.

Persons with Disabilities – throughout this report the term 'persons with disabilities' is used as it is more commonly used internationally including in the UNCRPD. However, we acknowledge that in the UK the term 'disabled people' is preferred. At GDI Hub we prefer to use 'disabled people'.

[1] Anjlee Agarwal and Andre Steele, 'Disability Considerations for Infrastructure Programmes' (Evidence on Demand, 8 March 2016), https://doi.org/10.12774/eod_hd.march2016.agarwaletal.

Acronyms and Abbreviations

ADB: Asian Development Bank
AT: Assistive Technology
AT2030: UK Aid-funded programme, 'Testing what works to enable access to life-changing assistive technology for all'
DPO: Disabled Persons' Organisation
FCDO: UK Government's Foreign, Commonwealth and Development Office *(incorporating what was formally known as DFID)*
GDI Hub: Global Disability Innovation Hub
ILC: Independent Living Centre
LMICs: Lower-and-Middle-Income Countries
KBT: Kilimanjaro Blind Trust
KDI: Kounkuey Design Initiative
PwD: Persons with Disabilities
SDGs: the UN's Sustainable Development Goals
WASH: Water, Sanitation and Hygiene
WHO: World Health Organisation
UN: United Nations
UNCRPD: United Nations Convention on the Rights of Persons with Disabilities

AT2030 and Inclusive Infrastructure Programme Background

About AT2030

This case study is part of the FCDO UK Aid-funded 'AT2030: Life-changing assistive technology for all' programme. The AT2030 programme aims to explore 'what works' to increase access to life changing assistive technology (AT) for all. The World Health Organisation (WHO) estimates that there are currently 1 billion people around the world who need assistive technologies, but 90% of them do not have access, and this figure is project to rise to 2 billion by 2050. The programme has reached 21 million people so far through activities that cut across the domains of data and evidence, innovation, country implementation and capacity and participation. The programme is currently operational in over 35 countries and works with more than 70 delivery partners[2].

About Inclusive Infrastructure

The Inclusive Infrastructure sub-programme of AT2030 responds to the idea that successfully reaching people that need assistive technology is also dependent on having accessible and inclusive environments and infrastructure.

GDI Hub believe that 'Inclusive Design' has an important role in facilitating enabling environments for persons with disabilities[3]. Research on the current state of accessibility in different cities around the world and the capacity and appetite for inclusive design in policy and industry in those places is needed both to enable better access to assistive technology and contribute to the inclusion and participation of all assistive technology users in society.

Current knowledge around disability inclusion and inclusive design is largely limited to high income settings[4]. This research aims to counter that by building local and specific knowledge of what constitutes an inclusive environment in diverse, lower-and-middle-income countries (LMICs) by engaging directly with communities,

[2] For further information on the AT2030 programme please visit http://www.at2030.org

[3] For more information on GDI Hub's approach to inclusive design please visit: http://www.disabilityinnovation.com/inclusive-design

[4] Infrastructure and Cities for Economic Development (ICED), 'Delivering Disability Inclusive Infrastructure in Low Income Countries', Inception Report: Summary, 2019, http://icedfacility.org/resource/delivering-disability-inclusive-infrastructure-low-income-countries/.

industry and policy makers. This will build knowledge and generate actions around inclusive design that is adaptive to these diverse contexts. Research will take place in three main areas:

1. **People** - the community experience of disability and the built environment;
2. **Practice** - industry focused research on the awareness and application of inclusive design in practice; and
3. **Policy** - focused research on the governance, guidelines and protocols of accessibility and inclusive design at local, regional and national levels of government.

Through qualitative and participatory research, the project will engage diverse stakeholders interested in and influencing the built environment such as; decision-makers, urban planners, architects and persons with disabilities. It will generate new insights on the challenges and opportunities for an inclusive built environment and build a picture of what good inclusive designs looks like in different settings and cultures.

Inclusive Infrastructure summary:

- Three-year research programme
- 6 cities in 6 different countries, in low-and-middle-income settings
- Engaging local partners and diverse stakeholders
- Conducting research and engagement across the domains of policy, practice and people

Why does 'inclusive infrastructure' matter?

'Access', in its various forms, is a primary factor in the connection between disability and poverty. Where there is a lack of access, such as access to employment, access to essential infrastructure such as water or electricity, or access to safe spaces for women, inequality and social exclusion will increase. This can be both a cause or effect of either disability or poverty and is described as a 'vicious cycle'[5], reinforcing the relationship between disability and poverty[6]. For example, in Mongolia, (where

[5] Department for International Development, UK Government, 'Disability, Poverty and Development' (Department for International Development, 2000).

[6] Christoffel J. Venter, Thomas E. Rickert, and David A. C. Maunder, 'From Basic Rights to Full Access: Elements of Current Accessibility Practice in Developing Countries', *Transportation Research Record:*

we undertook our first case study) households with at least one person with a disability have double the poverty incidence of other households[7]. Research on the multi-dimensional nature of poverty has also shown higher incidences of poverty in households with disabilities in middle-income settings compared to low-income settings, indicating a 'disability development gap'[8] and making clear the importance of disability inclusive development programmes.

People have a right to access the spaces, services and activities they would like. It is a basic human right as set out in the UNCRPD[9]. Access can be either enabled or disabled by the built environment and infrastructure and this is understood best by those who experience inaccessibility in the built environment most profoundly, persons with disabilities[10]. To break cycles of disability and inequality, it is necessary to design accessible and inclusive environments. To do that there must be consensus on what barriers to accessibility exist in the built environment and what the barriers to designing, building, implementing and regulating accessible environments are. Justice-based approaches to disability and the built environment propose that, 'the distribution of space is an important aspect of realising justice for disabled persons'[11] highlighting the importance of designing and building inclusive infrastructure to create more equitable societies.

Infrastructure, transport and the built environment represent one of the largest areas of investment for any country and 'good' infrastructure can be a driving force for positive change and achieving development goals. Infrastructure should be designed to support society. However, if it is inaccessible, it can exclude individuals or groups, diminish quality of life and infringe on human rights.

In lower-resourced settings, where basic infrastructure needs are great, accessibility is often considered as an extra and is rarely integrated as part of mainstream

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Journal of the Transportation Research Board 1848, no. 1 (January 2003): 79–85, https://doi.org/10.3141/1848-11.

[7] Asian Development Bank, 'Living with Disability In Mongolia: Progress Toward Inclusion' (Manila, Philippines: Asian Development Bank, December 2019), https://doi.org/10.22617/TCS190596-2.

[8] Monica Pinilla-Roncancio and Sabina Alkire, 'How Poor Are People With Disabilities? Evidence Based on the Global Multidimensional Poverty Index', *Journal of Disability Policy Studies*, 17 May 2020, 104420732091994, https://doi.org/10.1177/1044207320919942.

[9] Disability Inclusive and Accessible Urban Development Network (DIAUD), World Enabled, and CBM, 'The Inclusion Imperative: Towards Disability-Inclusive and Accessible Urban Development. Key Recommendations for an Inclusive Urban Agenda', 2016, 40.

[10] Aimi Hamraie, 'Designing Collective Access: A Feminist Disability Theory of Universal Design', *Disability Studies Quarterly* 33, no. 4 (5 September 2013), https://doi.org/10.18061/dsq.v33i4.3871.

[11] Victor Santiago Pineda, 'Enabling Justice: Spatializing Disability in the Built Environment', n.d., 14.

infrastructure development[12]. Yet inaccessible infrastructure profoundly impacts the freedom, independence and rights of persons with disabilities and their ability to access opportunities. Some of the factors contributing to inaccessible infrastructure include lack of knowledge or understanding among decision-makers around the implications of design choices, lack of user consultation and consideration of diverse needs and 'missed opportunities' to integrate added value through promoting equal access[13].
Previous research led by the iBuild centre at Newcastle University on inclusive infrastructure has emphasised the importance of a more integrated and holistic understanding of infrastructure, including the wider and longer-term benefits to infrastructure spending and multi-scalar systems-based approaches[14].

The World Report on Disability[15] highlights the importance of 'enabling environments' for persons with disabilities and defines these environments as physical, social and attitudinal environments. The implementation of policy, compliance and the suitability of existing standards on accessible environments in relation to low-resource settings, informal settlements and rural areas are all discussed as barriers to enabling environments. The report also suggests that the pace at which technologies to support persons with disabilities are developing is 'out-pacing' the rate at which standards and regulations in the built environment can be developed calling for a more integrated and adaptive approach to regulating the build environment[16].

A comprehensive understanding and application of inclusive design practices to infrastructure programmes would address some of these barriers. As one of the largest areas of investment in any country, infrastructure development has the opportunity to lead the way in terms of creating an enabling environment for persons with disabilities[17].

[12] The World Health Organisation, 'World Report on Disability' (The World Health Organisation, 2011).
[13] Agarwal and Steele, 'Disability Considerations for Infrastructure Programmes'.
[14] Richard Dawson, 'Delivering Effective and Inclusive Infrastructure', ESRC Evidence Briefings (Economic and Social Research Council, March 2018), https://esrc.ukri.org/news-events-and-publications/evidence-briefings/delivering-effective-and-inclusive-infrastructure/.
[15] The World Health Organisation, 'World Report on Disability'.
[16] The World Health Organisation.
[17] Hamraie, 'Designing Collective Access'.

Why focus on cities in low-resource settings?

The world is rapidly becoming more urban and more than half the world's population live in urban settlements[18]. This growth is not always accompanied by equivalent infrastructure development, leading to wide gaps in urban equality or an 'urban divide'[19]. Urbanisation is most widespread in low-and-middle-income settings, leading to the suggestion that 'poverty is urbanising'[20]. By 2050, 66% of the world's population will live in cities; 90% of which will be in low-middle-income settings[21]. UN-Habitat estimates that in 75% of cities people have less access to basic services, quality public spaces, affordable housing and livelihood opportunities than two decades ago and spatial inequality like this exacerbates social exclusion[22]. The capability to connect to urban infrastructure, services and opportunities such as work and education are vital to building social inclusion.

According to the World Bank, urban inclusion is multi-dimensional and expressed through three domains: spatial inclusion, social inclusion and economic inclusion[23]. These three domains are driven by principles of access (such as access to housing, land and essential services), opportunity (such as access to education and employment or access to increasing prosperity in the place they live) and the right to participation (the ability to participate in society). These principles offer a foundation for planning inclusive infrastructure.

Research on, 'what works' for disability inclusive infrastructure has shown the importance of taking city-wide or holistic approaches, to avoid siloed solutions within one type of infrastructure. Additionally, in low-resource settings, large components of infrastructure still need to be built and so there is an opportunity to 'get it right the

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[18] Bharat Dahiya and Ashok Das, 'New Urban Agenda in Asia-Pacific: Governance for Sustainable and Inclusive Cities', in *New Urban Agenda in Asia-Pacific*, ed. Bharat Dahiya and Ashok Das, Advances in 21st Century Human Settlements (Singapore: Springer Singapore, 2020), 3–36, https://doi.org/10.1007/978-981-13-6709-0_1.

[19] Dahiya and Das.

[20] The World Bank, 'World Inclusive Cities Approach Paper' (The World Bank, May 2015), https://documents.worldbank.org/en/publication/documents-reports/documentdetail/402451468169453117/world-inclusive-cities-approach-paper.

[21] 'The New Urban Agenda', Habitat III, accessed 4 October 2022, https://habitat3.org/the-new-urban-agenda/.

[22] UN-Habitat, 'Flagship Programme 1: Inclusive, Vibrant Neighbourhoods and Communities' (UN-Habitat), accessed 19 September 2020, https://unhabitat.org/programme/inclusive-vibrant-neighbourhoods-and-communities.

[23] The World Bank, 'World Inclusive Cities Approach Paper'.

first time' highlighting the relevance of focusing on inclusive infrastructure in lower-and-middle-income cities.[24]

Meeting global goals?

Cities, and particularly cities in low-resource settings, are central to the UN 2030 Agenda and the Sustainable Development Goals, most clearly marked through SDG 11: 'Make cities and human settlements inclusive, safe, resilient and sustainable'. Habitat III and the New Urban Agenda represent a shift in thinking around cities and urbanisation as a cause of poverty and exclusion to thinking about cities as sites of opportunity and marked an important moment of centring inclusion in development processes through participatory approaches to sustainable development. These global agendas have generated a vast amount of discussion on the topic of 'inclusive cities' [25] [26] [27]. However, inclusive cities are often discussed in its broadest meaning and explicit attention to *disability-inclusive cities* and the design and construction of accessible and inclusive environments and infrastructure in high level policy agendas remains limited.

The UN2030 Agenda recognises that disability inclusion must be at the heart of poverty eradication[28] and the UNCRPD Article 9 and Target 3 of the Incheon Strategy to 'Make the Right Real for People with Disabilities in Asia' in 2012 explicitly connects access to the physical environment and an inclusive society: "*Access to the physical environment, public transportation, knowledge, information and communication is a precondition for persons with disabilities to fulfil their rights in an inclusive society*." The Global Disability Summit in 2018 was a pivotal event in which inclusive infrastructure was highlighted as one of six spotlight issues where commitments to embedding disability inclusion in the infrastructure sector were made[29]. To realise these policies, knowledge and guidance on disability inclusive design for cities in low-resource settings is necessary and so our research and these six case studies will help support making these policy goals a reality.

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[24] Infrastructure and Cities for Economic Development (ICED), 'Delivering Disability Inclusive Infrastructure in Low Income Countries'.

[25] Asian Development Bank, 'Enabling Inclusive Cities: Tool Kit for Inclusive Urban Development' (Manila, Philippines: Asian Development Bank, 1 December 2016), https://doi.org/10.22617/TIM157428.

[26] The World Bank, 'World Inclusive Cities Approach Paper'.

[27] Diana Mitlin and David Satterthwaite, 'On the Engagement of Excluded Groups in Inclusive Cities: Highlighting Good Practices and Key Challenges in the Global South', Urban Development Series Knowledge Papers (The World Bank, 2016).

[28] The World Health Organisation, 'World Report on Disability'.

[29] Infrastructure and Cities for Economic Development (ICED), 'Delivering Disability Inclusive Infrastructure in Low Income Countries'.

Why inclusive design?

"Inclusive Design can help all human beings experience the world around them in a fair and equal way by creating safe and accessible environments for all members of the community." [30]

Inclusive design was highlighted by the former UK Department for International Development (now FCDO) as one of six key opportunity areas for 'delivering disability inclusive infrastructure'[31].

An accessible environment is often considered to be one that offers step-free level access whereas an inclusive environment goes further, looking at equality of experience in the built environment and infrastructure. Inclusive environments embrace diversity and flexibility, understanding that everyone has different needs and those needs are constantly changing[32].

Inclusive design is about genuine engagement and innovation, listening and making space for people. It is a practice that embeds participation and embraces diversity in solving design problems. It differs from universal design in how it embraces difference and recognises that 'one size fits one person' and 'universal solutions' are not always feasible or optimal to promote inclusion for everyone[33]. Inclusive design can help to minimise social exclusion[34] and the inclusive design of the built environment has the potential to embed the principles of access, opportunity, participation and equity in the lived experience of cities, contributing to spatial, economic and social inclusion for persons with disabilities.

In a world where 1 billion people need access to assistive technology, a world that is ageing and experiencing worsening inequality, designing and building a world that limits access or is unnecessarily challenging for persons with disabilities is not an option. Inclusion benefits everyone.

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[30] Global Disability Innovation Hub, Queen Elizabeth Olympic Park, and London Legacy Development Corporation, 'Inclusive Design Standards', May 2019.

[31] Infrastructure and Cities for Economic Development (ICED), 'Delivering Disability Inclusive Infrastructure in Low Income Countries'.

[32] Global Disability Innovation Hub, Queen Elizabeth Olympic Park, and London Legacy Development Corporation, 'Inclusive Design Standards'.

[33] World Economic Forum: Strategic Intelligence, 'Global Issue: Inclusive Design. Curated by the Smithsonian Institution', World Economic Forum: Strategic Intelligence, accessed 12 September 2020, https://intelligence.weforum.org/topics/a1G0X0000057IniUAE?tab=publications.

[34] Dr Ellie Cosgrave, 'The Role of the Engineer in Creating Inclusive Cities', n.d., 16.

The application of inclusive design principles, methods and practices to the holistic design of urban development and inclusion - be that policies, a city masterplan, road infrastructure, a building or a service – is an area that is under-investigated and requires research and engagement to understand what inclusive design looks like in resource-constrained contexts.

The holistic approach and practice of inclusive design can be applied to more than physically accessible designs. It can be used to build cohesion across sectors by placing disabled voices at the heart of problem solving. Inclusive design can also contribute to achieving the World Health Organisation's Disability Action Plan by offering methods to develop 'culturally appropriate person-centred approaches'[35].

Evidence shows that isolated interventions for urban development have limited success. To improve quality of life in cities, interventions and urban programmes need to be holistic and sustained over long periods of time[36]. This calls for a deep understanding of context-based planning and design, where inclusive design can help, by bringing together the people with the most intimate knowledge of the challenges to be solved. The opportunity for inclusive design in disability inclusive infrastructure does not just lie in technical design solutions but in how its practice could mediate multi-sectoral and cross-thematic approaches to pressing urban development challenges for persons with disabilities.

What do we want to find out?

The over-arching research question for this sub-programme is, 'What is the current state of inclusive and accessible environments and infrastructure in LMICs and what is the role of inclusive design in creating an enabling environment for disabled people?'.

1. What legislation, policy, regulation and guidance currently exists to protect the rights of disabled people in the built environment in each case study city?

[35] F Khan et al., 'World Health Organization Global Disability Action Plan: The Mongolian Perspective', *Journal of Rehabilitation Medicine* 50, no. 4 (2018): 388–366, https://doi.org/10.2340/16501977-2207.
[36] Dahiya and Das, 'New Urban Agenda in Asia-Pacific'. Pg.23

2. What is the current awareness, understanding, acceptance and application of inclusive design in built environment policy, planning, design and construction among key stakeholders in each case study city?

3. What are the current barriers to and opportunities for inclusion in the built environment for people living with disabilities in each case study city?

4. How can inclusive design contribute to creating enabling environments for AT and AT users?

Introduction to the Case Study in Kenya

The purpose of this case study is to explore the state of inclusive and accessible environments for persons with disabilities in Nairobi, Kenya, through engagement with policy, industry and community stakeholders (policy, practice and people). Through this engagement, the case study is developing evidence on the challenges and opportunities for implementing inclusive and accessible design in Nairobi and makes recommendations on local actions towards becoming a more inclusive city.

This is the fourth of six case studies analysing the state of accessibility and inclusive design in low-resource contexts around the world. The six independent case studies will then be analysed to develop a comparison report and finally a global action report that will offer evidence and recommendations that support making infrastructure, the built environment and urban development in low-resource settings more accessible and inclusive.

Across the African region, urban economic growth has not been equal and the urban poor carry this burden. The region has the fastest urban growth in the world, which is set to double between now and 2050. [37] Major inequalities in access to housing, infrastructure and services, and affordable transportation are found across cities in Africa. These inequalities in urban development, disproportionately affect persons with disabilities and these case studies will contextualise the lives of persons with disabilities across Asia, Africa and South America through research on inclusion and accessibility of the built environment. According to the UN, there are an estimated 80 million persons with disabilities in the African region.[38] This figure may however be conservative as the World Health Organisation consider forty percent of African citizens to be persons with a disability, this would equate to about 300 million people[39].

[37] OECD / SWAC, 'Africa's Urbanisation Dynamics 2020: Africapolis, Mapping a New Urban Geography', accessed 31 August 2022, https://read.oecd-ilibrary.org/development/africa-s-urbanisation-dynamics-2020_b6bccb81-en.

[38] UNESCAP, 'Incheon Strategy to "Make the Right Real" for Persons with Disabilities in Asia and the Pacific' (UNESCAP, 2012).

[39] African Studies Centre Leiden, 'Disability in Africa', Disability Africa, accessed 24 October 2022, https://www.ascleiden.nl/content/webdossiers/disability-africa.

Kenya has a population of 48 million people and Nairobi is the capital city is home to about 4.4 million people. Nairobi has a complex development history and there is large inequality in the city, most pronounced in the informal settlements that make up around 50-60% of the city's population and 5.2% of its land, indicating areas of high density and high levels of poverty. Official statistics suggest 1.1% of the population of Nairobi are persons with disabilities but this is likely to be an underestimate.

This case study will build a picture of the current state of inclusion and accessibility in the built environment and infrastructure in Nairobi through engaging local stakeholders and communities and exploring the understanding of and potential for inclusive design to address some of the current barriers to inclusion.

The case study will first describe the background research and contextual factors that influence questions of access and inclusion in the built environment in Nairobi. It will then describe the activities that took place before discussing insights, lessons learned, and actions towards inclusion for the city of Nairobi.

Background and Contextual Factors

This section provides some background information that supports and contextualises the primary data collection undertaken in this case study on Nairobi.

Statistics on Disability in Kenya[40]			
Population of Kenya	47,564,296 million people		
Population of Nairobi City	4,397,073 million people		
Population of Persons with Disabilities in Kenya	918,270 people (2.2% of the total population of Kenya)	523,883 female	394,330 male
Population of Persons with Disabilities in Nairobi City	42,703 people (1.1% of the total population of Nairobi)	23,332 female	19,372 male

The statistics above give an indication of the population demographics and prevalence of disability in Kenya and Nairobi.

Disability and Accessibility in Kenya

The Population of Kenya is projected to rise to 77 million by 2030, this would lead to an expected increase of the prevalence of persons with disabilities to 1.54 million people at the current low and likely underreported prevalence rate of 2.2%. The common types of disability were mobility (385,417) followed by visual (333,520). A total of 9,729 persons had albinism.[41]

The statistics above state that around 2.2% of Kenya's population is registered as disabled. These figures are taken from the 2019 census, which was the first Kenyan

[40] Kenya National Bureau of Statistics, 'The 2019 Kenya Population and Housing Census (KPHC)', 16 April 2021, https://web.archive.org/web/20210416222406/https://kenya.opendataforafrica.org/msdpnbc/2019-kenya-population-and-housing-census-population-by-county-and-sub-county?county=1001880-limuru.

[41] Krystle Kabare, 'Social Protection and Disability in Kenya', October 2018, https://www.developmentpathways.co.uk/wp-content/uploads/2018/10/Disability-Report-Kenya.pdf.

census to adopt the Washington Group Short set of questions which are designed to identify people who experience difficulties in doing six basic universal actions such as seeing, hearing, mobility, cognition, self-care, and communication. This change in data collection was adopted due to studies showings the use of the term “disability” can lead to unreliable data as respondents were reluctant to reveal their functional limitations due to stigma.[42]

This alteration in collection methods makes the direct comparison of disability statistics between the 2019 and 2009 census results problematic. The results appear to show a large drop in disability figures, from 3.5% to 2.2%. In comparison to the World Health Organisation’s estimate of a global disability prevalence rate of 15%, this prevalence rate of 2.2% is very low. This comparison suggests the figures may be underreported. There are several factors that may have led to this including:

- Stigma associated with the use of International standard terminology such as ‘disability’ and ‘impairment’
- Inaccuracies due to translation – While translating the census contents into local languages, there may have been a loss of the intended sensitive phrasing, leading to a reluctance to provide accurate responses
- The position of the questions on Albinism preceding functional impairments may have prejudiced responses to it as it is not a functional disability and is a disability that is associated with significant stigma in Kenya.
- The non-standard inclusion of the answer option ‘Don’t know’, may have lessened the number of answered responses.[43]

The underrepresentation of persons with disabilities in official statistics can have a devastating impact on the level of focus given to their issues within political agendas.[44] However, thanks to the work of Organisations of Persons with Disabilities (OPDs) in Kenya highlighting this underrepresentation, the government are now planning to undertake a National Disability Census to enable the country to have more accurate data on persons with disabilities. It is intended that this data will then be used by government ministries and agencies and non-government bodies for planning, designing and decision making on programmes and projects relating to

[42] The Washington Group on Disability Statistics, ‘Washington Group Questions | CBM HHoT’, accessed 8 April 2022, https://hhot.cbm.org/en/card/washington-group-questions.
[43] Eastone Owino, ‘Status of Disability in Kenya: Statistics from the 2019 Census’, Development Initiatives, accessed 6 April 2022, https://devinit.org/resources/status-disability-kenya-statistics-2019-census/.
[44] Eastone Owino.

persons with disabilities.[45] This census will be undertaken alongside the Kenya National Bureau of Statistics and be known as 'Kenya's Inclusive Data Charter Action Plan'. It is hoped that this plan will enable the government to empower and include persons with disabilities in their country's development on an equal basis to other citizens.[46]

This positive action is not new to Kenya. Since the early 1980s, Kenya has been making progress towards disability inclusion. In 1980, the government declared the National Year of Persons with Disabilities to promote awareness and reduce stigmatisation. This was followed by educational reforms in 1984, when educational assessments and resource services were introduced by the Minister for Education to improve access to education for students with disabilities. Towards the end of the 1980s, the organisation of United Disabled Persons of Kenya (UDPK) was formed from a coalition of organisations of persons with disabilities including; Kenya Union of the Blind, Kenya National Association of the Deaf and Kenya Society of the Physically Handicapped.

While the Attorney General of Kenya appointed a taskforce in 1993 to review laws related to persons with disabilities and to survey the views of the public, it wasn't until the early 2000's that progress was made. The first and very significant of these was the passing of the National Disability Law entitled 'Persons with Disabilities Act 2003'. This Act established a National Council for Persons with Disabilities who are responsible for the implementation of the Act. The Act was put in place to ensure persons with disabilities have access to a disability friendly, barrier free environment to enable them to access buildings, roads, social and cultural activities, and assistive technology.[47] Seven years after this act was introduced, the National Kenyan Constitution was altered to recognise the rights of persons with disabilities.[48] The Ministry of Gender, Children and Social Development is responsible for promoting and protecting the rights of persons with disabilities.

[45] Kenya News Agency, 'Gov't Plans to Undertake PWDs Census', accessed 8 April 2022, https://www.kenyanews.go.ke/govt-plans-to-undertake-pwds-census/.
[46] Moses Kamau, 'Kenya Commits to Ambitious Action on Disability Data through New IDC Action Plan', accessed 8 April 2022, https://www.data4sdgs.org/news/kenya-commits-ambitious-action-disability-data-through-new-idc-action-plan.
[47] The National Council for Persons with disabilities, 'Persons with Disabilities Act No.14 of 2013' (NCPWD, January 2004), https://www.treasury.go.ke/wp-content/uploads/2020/11/Persons-with-Disabilities-Act.pdf.
[48] Global Disability RightsNow!, 'Disability in Kenya', accessed 8 April 2022, https://www.globaldisabilityrightsnow.org/infographics/disability-kenya.

Other policies to impact the lives of persons with disabilities include:

Employment – Namely, The Employment Act of 2007, which ensures persons with disabilities do not face discrimination when entering the workforce in both private and public sectors. Employment equality for persons with disabilities is also featured in other legislation such as The 2016 National Employment Authority Act and via quotas outlined in the Persons with Disabilities Act 2003.

Education: Inclusive education in Kenya is supported by two main policies, the Basic Education Act 2013 which outlines the needs of students with disabilities to meet their constitutional equal right to education, and the Sector Policy for Learners and Trainees with Disabilities 2018 which promotes the provision of education for persons with disabilities.

Health: The 2014-2030 Kenya Health Policy outlines the right of access to healthcare for persons with disabilities and aims to ensure this is provided. [49]

Construction: The Draft National Building Code 2020, developed by the Ministry of Transport, Housing and Public Works, includes a section on requirements for persons with disabilities stating: "A building shall be designed in a manner that facilitates access to the building, and to the use of its facilities, by a person living with a disability in accordance with KS ISO 21542:2011 (Building Construction—Accessibility and Usability of the Built Environment)".[50]

Life for persons with disabilities in Kenya today

Despite the wide range of progressive policies, the Institute of Development Studies in 2020, highlighted the issues that are ongoing for people with disabilities in Kenya. These included Poverty, Stigma, Covid-19 and its aftermath, difficulty accessing livelihoods, healthcare and education and climate change. [51] According to the 2009 census, 67% of persons with disabilities live in poverty in comparison to 57% of

[49] The Institute of Development Studies (IDS), 'Disability Inclusive Development Kenya Situational Analysis June 2020 Update', accessed 16 September 2022, https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/15508/DID%20Kenya%20SITAN_June%202020.pdf?sequence=1&isAllowed=y.

[50] Sylvie, 'Accessibility and Inclusivity in the Built Environment', *My Building Code* (blog), 21 July 2021, https://www.buildingcode.co.ke/building-regulations/accessibility-and-inclusivity-in-the-built-environment/.

[51] The Institute of Development Studies (IDS), 'Disability Inclusive Development Kenya Situational Analysis June 2020 Update'.

persons without disabilities.[52] This increased poverty is contributed to by difficulty in accessing education and livelihoods.

Despite the creation of the Basic Education Act 2013, the 2014 National Special Needs Education Survey (NSNES) found that more children with disabilities were not attending school than children without disabilities.[53] The dropout rates for students with disabilities were also high, with ministry figures indicating a drop from 2% attending at primary level to 0.4% at secondary level.[54] These dropout and poor attendance rates can be attributed to issues arising from inadequate assessment of the needs of the child and incorrect school placements.[55] Children are often placed in special needs schools which can be located far from their homes and difficult to access, while also creating further segregation and stigma.[56]

Difficulty accessing education is a barrier to employment. However, even persons with disabilities who do complete education can still face livelihood challenges. According to the 2015/16 Kenya Integrated Household Budget Survey (KIHBS), more than half of persons with disabilities reported difficulties accessing economic opportunities.[57] A study by ADDA Kenya and EmployAble suggest reasons for this difficulty may include 'a lack of suitable employment; little or no access or adaptations; limited expectations of families and employers; lack of networks, contacts or social and inter-personal skills'.[58]

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[52] Kenya National Bureau of Statistics, 'Census, Kenya, 2009, Volume 2 - Population and Household', accessed 11 April 2022, https://dc.sourceafrica.net/documents/21196-Census-2009.html.
[53] DFID Kenya Office, 'Kenya National Special Needs Education Survey Report', accessed 16 September 2022, https://www.vsointernational.org/sites/default/files/SNE%20Report_Full%20-2.pdf.
[54] Asayo Ohba & Francis Likoye Malenya, 'Addressing Inclusive Education for Learners with Disabilities in the Integrated Education System: The Dilemma of Public Primary Schools in Kenya: Compare: A Journal of Comparative and International Education: Vol 52, No 1', accessed 5 April 2022, https://www.tandfonline.com/doi/abs/10.1080/03057925.2020.1726727?journalCode=ccom20.
[55] George Odongo, 'Barriers to Parental/Family Participation in the Education of a Child with Disabilities in Kenya', *INTERNATIONAL JOURNAL OF SPECIAL EDUCATION*, 2018, 13.
[56] Asayo Ohba & Francis Likoye Malenya, 'Addressing Inclusive Education for Learners with Disabilities in the Integrated Education System: The Dilemma of Public Primary Schools in Kenya: Compare: A Journal of Comparative and International Education: Vol 52, No 1'.
[57] Super User, '2015/16 Kenya Integrated Household Budget Survey (KIHBS) Progress Report October 2015', *Kenya National Bureau of Statistics* (blog), 16 October 2015, https://www.knbs.or.ke/2015-16-kenya-integrated-household-budget-survey-kihbs-progress-report-october-2015/.
[58] Rina Mueke, 'A BASELINE STUDY ON AREAS OF SUCCESSES AND BARRIERS IN SKILLS DEVELOPMENT AND EMPLOYMENT OF GRADUATES WITH DISABILITIES', n.d., 60.

Such barriers to economic gain have a knock-on effect, with the cost of healthcare too high for many persons with disabilities. The distance to healthcare facilities can also be an economic barrier that free healthcare does not solve. For example, high transport costs prevent pregnant women from accessing Kenya's free maternity programme.[59] To prevent economic obstacles as outlined, the government introduced The Persons with Severe Disabilities Cash Transfer (PWSD-CT) Programme in 2011, targeting adults and children with severe disabilities, who require full time support. However, the criteria for this support is strict, with only 2.3% of persons with disabilities currently eligible, leaving a large portion of the population unsupported. Such issues stem from gaps in the effective implementation of policies already in place.

The government are now working to improve implementation. For example, in April 2022, a new draft code was published to improve the accessibility of the built environment. The code states that all residential buildings with two floors or more must be fitted with lifts, ramps, accessible toilets, and parking spaces reserved for persons with disabilities. The code also outlines that all new public buildings must be designed so that persons with disabilities can easily access the building and use its facilities. This draft code is promising as should it be passed and become law it will support implementation by ensuring that non-compliant buildings are not issued with a certificate of completion and so cannot be occupied. This comes at the same time as tighter restrictions on transport. If another proposed Bill is passed, public transport vehicles will have to be retrofitted to make them suitable for persons with disabilities. This proposed Bill also comes with penalties for those who do not follow the law. If it goes ahead, transport providers who deny access to persons with disabilities will be fined KSh200,000 or even sentenced to jail time.[60]

In Nairobi, infrastructural improvements are being undertaken to improve the lives of people living in poverty in the city. Nairobi Metropolitan Services has constructed 19 new level two and three hospitals in the informal settlements. This closer proximity is improving access to healthcare for persons with and without disabilities in these areas. Sanitation improvements have also been made in informal settlements with

[59] Evelyn Kabia et al., 'How Do Gender and Disability Influence the Ability of the Poor to Benefit from Pro-Poor Health Financing Policies in Kenya? An Intersectional Analysis', *International Journal for Equity in Health* 17, no. 1 (19 September 2018): 149, https://doi.org/10.1186/s12939-018-0853-6.

[60] GAATES, 'Kenya: Residential Buildings to Have Lifts for Persons with Disabilities', Collection, *GAATES Global Accessibility News* (blog), 3 April 2022, https://globalaccessibilitynews.com/2022/04/03/kenya-residential-buildings-to-have-lifts-for-persons-with-disabilities/.

additional boreholes drilled to provide access to safe drinking water and the construction of a sewer line. These ongoing improvements are reducing the cost of living and the risk of contracting water borne illnesses for people living in informal settlements.[61]

Similarly, Kenya Urban Roads Authority is working to complete 408 kilometres of access roads in a number of informal settlements in Nairobi by the end of 2022 including, 'Kibera, Mukuru kwa Njenga, Mathare, Dagoretti, Dandora, Githurai, Korogocho/Ngomongo, Kasarani and Roysambu'. This will give these settlements better access to critical services from the city centre and also includes improvements to walkways, cycle lanes and drainage. [62]

For persons with disabilities in Kenya, issues such as access to Assistive Technology (AT) and stigma impact daily life. Evidence collected from the wider AT2030 programme also considers life for persons with disabilities in Kenya today through stigma in relation to disability and assistive technology use, particularly for young people and people living in informal settlements.

Stigma and attitudes towards disability have been addressed by AT2030 in projects such as "When they see a Wheelchair, They've not even seen me" [63]. This is project undertaken through a series of focus groups with Kenyans with and without disabilities, looking at disability stigma. The study looks at the effects stigma has on people with disabilities accessing equal rights and opportunities, as well as how it discourages the use of assistive technologies.[64] Another project that tackled this was a 12 month partnership with 'Shujaaz Inc' multimedia platform which looked at issues relating to disability inclusion and in particular attitudes and perceptions of young people towards disability.[65] Both studies highlighted the importance of creating awareness and knowledge around disability in order to remove stigma.

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[61] Kenya News Agency, 'Projects to Upgrade Informal Settlements on Top Gear – Kenya News Agency', accessed 11 April 2022, https://www.kenyanews.go.ke/projects-to-upgrade-informal-settlements-on-top-gear/.
[62] Wednesday September 22 2021, 'Kura to Complete 410km of Roads in Nairobi Slums by 2022', Business Daily, 22 September 2021, https://www.businessdailyafrica.com/bd/news/counties/kura-to-complete-410km-of-roads-in-nairobi-slums-by-2022-3559106.
[63] 'Experience of Disability Stigma | AT2030 Programme', accessed 25 October 2022, https://at2030.org/experience-of-disability-stigma/.
[64] Ibid.
[65] 'Final Narrative Report | AT2030 Programme', accessed 25 October 2022, https://at2030.org/final-narrative-report/.

Assistive Technology can be a useful for tool for assisting people with disabilities in their daily lives. However, the uptake can be lower due to contextual factors. In AT2030's case study 'The Social Network' [66] contextual interviews, ethnographic observations, and co-design workshops were used to investigate how people with visual impairments in Kenya use mobile phones and how this use influences their social interactions. Findings included positive social impacts, such as allowing people with visual impairments to keep in touch with friends and family, and the negative impacts such as reduced financial security. The study also highlights issues in access to this form of assistive technology due to cost of device, lack of digital literacy and limited functionality of available devices.[67] Another AT2030 project that looks at the potential of mobile phones as assistive technology in Kenya is 'Understand the mobile disability gap' which looks at the topic with a broader spectrum of disabilities.[68] Furthermore, AT2030 has also looked at the use of mobile phones for people with mobility impairments in informal settlements showing how they can, "act as an accessibility bridge when physical accessibility becomes too challenging".[69] From this research it is evident that while AT use can be beneficial there can be societal stigma, security risks and knowledge based barriers to using it.

Historical Development of Nairobi

Nairobi has a long history of commerce, with its trade roots spanning back pre 20th century, when it lay on the caravan route which linked the East African interior to the Indian Ocean.[70] Coming from the Maasai phrase 'Enkare Nyrobi', the name 'Nairobi' translates to 'cool water'. The city and its surrounding area, which forms Nairobi County, occupy a space which was once the place of an uninhabited swamp.[71] Nairobi was not originally an African village, but rather an area with watering and pasture resources that could support the Kikuyu and Maasai tribes as they harnessed natural resources in the region. The area was also used for small-scale exchanges of products between tribes such as grain, copper (jewellery), pottery and iron products. Despite these interactions, no permanent settlements existed in the

[66] 'The Social Network | AT2030 Programme', accessed 25 October 2022, https://at2030.org/the-social-network/.
[67] Ibid.
[68] 'Understanding the Mobile Disability Gap | AT2030 Programme', accessed 25 October 2022, https://at2030.org/understanding-the-mobile-disability-gap/.
[69] 'Bridging the Divide | AT2030 Programme', accessed 25 October 2022, https://at2030.org/bridging-the-divide/.
[70] Samuel Owuor and Teresa Mbatia, 'Nairobi', in *Capital Cities in Africa: Power and Powerlessness*, 2012, https://profiles.uonbi.ac.ke/samowuor/files/2012_capital_cities_in_africa_chapter.pdf.
[71] Nairobi City County, 'History of Nairobi', 25 April 2019, https://nairobi.go.ke/history/.

region. Instead, the region's pre-colonial urbanism took shape in the form of semi-temporary nomadic structures for economic and sociocultural functions, such as the manyatta (cow-dung huts) of the Maasai tribe, which are typically reconstructed on a yearly basis.[72] Manyattas are built from locally available natural resources, and typically built by women in the tribe.

The development and growth of Nairobi as a formal settlement came about through the extensions of the Kenya Uganda Railway (KUR). The railway reached the city in May of 1899, with a supply depot built by the British to link Mombasa to Uganda. Referring back to its nomadic roots, the area was once again chosen for its natural resources. Its network of rivers supplied the camp at the depot with water, while its natural elevation made the climate cool enough not only for Indian laborers but also British settlers. Its ideal location led to large growth, leading it to become the Railway Headquarters.[73] The development of the headquarters led to Nairobi evolving into a commercial and business hub of the British East Africa protectorate.

By 1907, Nairobi had become the booming capital of Kenya with railway buildings, banks, trading centres and residential buildings. There were separate areas defined for European settlers and Indian labourers, and practically no African settlements. The township of Nairobi formally became known as Nairobi Municipality in 1919, with its boundary extended to include surrounding semi-urban settlements. By 1923, the chief of the municipality became officially known as the mayor. Soon after in 1926, a Town Planning Consultant was appointed to tackle the previously uncoordinated development of the area.[74]

By this time, there had also been a rapid growth in the number of African settlers working in the area having returned from war. As a now governmental centre, Nairobi also attracted a stream of migrants from rural Kenya. However, due to Colonial-era plans and policies which restricted Kenyans to living in rural areas, only Kenyans registered as labourers could live in the city. Unregistered labourers who managed to get to the city were reliant on informal settlements where people squatted on unused land.[75]

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[72] Samuel Owuor and Teresa Mbatia, 'Nairobi'.

[73] Nairobi City County, 'History of Nairobi'.

[74] Kounkuey Design Initiative, 'Integrated & Inclusive Infrastructure Framework' (Kounkuey Design Initiative, 2022), https://www.3if.info/_files/ugd/cb463e_6216d8c20442435a813332f7e1e01a91.pdf.

[75]

There was racial segregation within the town planning, with membership in the Town Council dominated by Europeans and Asians.[76] Despite the abolition of racial zones in 1923, the 1927 masterplan explicitly defined residential areas on the basis of race. The 1927 plan allocated an eighth of residential districts to be set apart for Africans, a quarter for Indians and the rest for Europeans. This allocation did not reflect the distribution of each group, as by 1944 60% of the population were Africans, 30% Asians and 10% European. This allocation made the population density in African areas much higher. This 1927 plan remained the basis of city planning until 1973, despite the Masterplan of 1948 aiming to remove social and racial segregation.[77] This shortage of accommodation, coupled with the laws surrounding city access led to the emergence of large informal settlements on the outskirts for people coming to Nairobi in search of employment. [78]

In July 1946, the first African Councillors, Muchohi Gikonyo and Khamisi were appointed to join the Town Council. Soon after in March 1950, Nairobi became a city.[79] After a period of unrest, in 1963, Kenya gained independence with Nairobi remaining as its capital city. In 1964, the city elected its first indigenous Mayor and the first female Mayor in 1975. The Nairobi City Council was dissolved in 1984 and replaced by the Nairobi City Commission which had a structure devoid of a mayor position. This was then changed once more in 1992, when the City County was put back in place, and a multi-party Mayor elected.[80]

Independence had huge positives for the African people, giving them the right to live anywhere in the country, including city areas which were previously restricted. As result there was once again an influx of people coming to the city in search of employment. The population of Nairobi grew from 342,000 to 827,000 people in the 16 years following 1963.[81] However this rapid urbanisation and growing population was not matched with development of sufficient housing. The limited capacity of municipalities to meet the demand, coupled with the ineffective urban planning, led

[76] Nairobi City County, 'History of Nairobi'.
[77] Claire Médard, 'City Planning in Nairobi: The Stakes, the People, the Sidetracking', in *Nairobi Today*, ed. HÉLÈNE CHARTON-BIGOT and DEYSSI RODRIGUEZ-TORRES, The Paradox of a Fragmented City (Mkuki na Nyota Publishers, 2010), 25–60, https://doi.org/10.2307/j.ctvk3gmfc.6.
[78] Emmanuel Mutisya and Masaru Yarime, 'Understanding the Grassroots Dynamics of Slums in Nairobi: The Dilemma of Kibera Informal Settlements', . . *E* 2 (n.d.): 17.
[79]
[80] Nairobi City County.
[81] Winnie Mitullah, 'The Case of Nairobi, Kenya' (Nairobi, Kenya: University of Nairobi, 2002), https://www.ucl.ac.uk/dpu-projects/Global_Report/pdfs/Nairobi.pdf.

to the expansion of existing informal settlements and worsened class segregation and social exclusion. Settlements which originally formed in worker's camps, on undeveloped land near farms and idle government land; now began to emerge in riparian reserves, dump sites, refilled quarries and under high voltage power cables.[82]

Today Nairobi City County replaces the defunct city council and functions under the County Governments Act. The county is made up "of 17 Administrative Sub-Counties consisting of 85 Wards. The Sub-Counties are Westlands, Dagoretti North, Dagoretti South, Langata, Kibra, Roysambu, Kasarani, Ruaraka, Embakasi South, Embakasi North, Embakasi Central, Embakasi East, Embakasi West, Makadara, Kamukunji, Starehe and Mathare. The County has a total of 123 Members of County Assembly (MCAs) – 85 elected and 38 nominated in accordance with Article 177 (b) of the Constitution" [83] The Nairobi City County is split into three arms comprising of The Executive led by the Governor, The Legislative Arm/County Assembly headed by the Speaker, and the County Public Service Board. Nairobi City County is responsible for the provision of a range of services to residents of the jurisdictions such as "Physical Planning, Public Health, Social Services and Housing, Primary Education Infrastructure, Inspectorate Services, Public Works, Environment Management, Agriculture, Livestock Development and Fisheries, Trade, Industrialization, Corporate Development, Tourism and Wildlife, and Public Service Management".[84]

The Growth of Informal Settlements in Nairobi

The rapid population growth following independence and a lack of housing led to the expansion of the informal settlements at the peripheries of the city. These settlements developed in vulnerable areas (such as flood risks) and until recently, the government was reluctant to upgrade the settlements fearing it would encourage further expansion. The informal settlements currently comprise 5.2% of the total residential area of Nairobi and are estimated to house 55-60% of the city's population, making them densely populated with approximately 50,000 people per square kilometre.[85] The population of these areas are mostly people with low incomes and resources. Large, well-known settlements include Kibera, Kayole-

[82] Kounkuey Design Initiative, 'Integrated & Inclusive Infrastructure Framework'.
[83] 'Who We Are – Nairobi City County Assembly', accessed 25 October 2022, https://nairobiassembly.go.ke/who-we-are/.
[84] 'About Nairobi City County | Nairobi City County', 25 April 2019, https://nairobi.go.ke/about-nairobi/.
[85] Haruka Ono and Tetsuo Kidokoro, 'Understanding the Development Patterns of Informal Settlements in Nairobi', *JAPAN ARCHITECTURAL REVIEW* 3, no. 3 (2020): 384–93, https://doi.org/10.1002/2475-8876.12161.

Soweto, Mukuru, Kawangware, Mathare, Kangemi, Korogocho, and Majengo, though there are many smaller neighbourhoods. While the conditions vary from settlement to settlement, housing is often high density and of poor quality with insecure tenure and inadequate infrastructure. These factors create a high-risk environment that disproportionately impacts women, the youth and persons with disabilities.

The largest of the settlements is Kibera, Kenya's largest informal settlement. Kibera is extremely densely populated with a population ranging from 170,000 to 1 million people depending on what areas you include. Kibera, like the other settlements, suffers from poor infrastructure, with residents spending 30% of their already low income on water alone. Due to the unofficial status of dwelling, forced eviction is a constant driver of instability, violence, and panic. [86]

Nevertheless, improvements are being made, such as the Makuru Special Planning Area,a citizen-led initiative using community driven data to make a case for a legal declaration of the settlement as a special planning area to the government. As a Special Planning Area, the government is required to co-create a plan for upgrading the settlement clearing bureaucratic and political obstacles.[87] As a result, the government has cancelled private leases on land in the area and intends to use the land to provide affordable homes. Presently, Makuru has seen the construction of stormwater drains, 50km of improved roads, a sewerage network, and the provision of clean drinking water. This success paves the way for the upgrading of other informal settlements in the city through similar methods.[88]

Kenya Vision 2030

The Kenyan Government development strategy 2008 to 2030 aims to transform Kenya into a "middle-income country providing a high-quality life to all its citizens by the year 2030". The Strategy is based on three pillars; economic, social, and political. The economic pillar aims to raise the Gross Domestic Product (GDP) by 10% per year. The social pillar aims to "build a just and cohesive society with social

[86] Jason Patinkin, 'Nairobi – The Informal City Dialogues', Next City, accessed 12 April 2022, https://nextcity.org/informalcity/city/nairobi.
[87] 'A Special Approach to Slum Upgrading: The Special Planning Area in Mukuru, Nairobi – Urban Transformations', accessed 27 May 2021, https://www.urbantransformations.ox.ac.uk/blog/2017/a-special-approach-to-slum-upgrading-the-special-planning-area-in-mukuru-nairobi/.
[88] Thomson Reuters Foundation, 'Slum Upgrading in Kenya: What Are the Conditions for Success?', news.trust.org, accessed 24 October 2022, https://news.trust.org/item/20210225133836-td97u/.

equity in a clean and secure environment" and the final Political pillar intends to ensure a fully democratic issue-based political system. The Social Pillar is the most inclusive as it makes provisions for people with disabilities, aiming to improve access to business opportunities, health and education, housing and justice for all, while also upscaling training for people with disabilities.[89]

Environment and Health

Although Kenya lies along the equator, Nairobi and the surrounding areas experience a temperate tropical climate throughout the year. Nairobi is an area of high altitude, sitting at approximately 1700 meters above sea level. The climate can be categorised by Nairobi's cool evenings and mornings becoming distinctly colder during the rainy season. The city experiences long rains between the months of April and June, and shorter rains between November and early December. Temperatures experienced are steady at an average of 24 ºC, rising to 29 ºC in the dry season.[90]

The city is highest in the west, with rugged topography, while the east is lower with flatter topography. Three main rivers run through the city, the Nairobi, Ngong and the Mathare, and the indigenous Karura forest transverses parts of the north of the city. The city and county are bordered by three mountainous regions, The Ngong hills to the west, Mount Kenya to the north and the well-known Tanzanian Mount Kilimanjaro to the south-east. Nairobi is also next to the Rift Valley, and occasionally experiences minor earthquakes and tremors.[91]

Nairobi was historically known as the "Green City in the Sun" as it was a healthy place to live, with natural forests, beautiful riverine ecosystems, abundant wildlife, open plains and marshy wetlands. This natural landscape was devastated by the growth of the city. The remaining natural resources and wildlife are still under threat of rapid urbanisation and population growth, with the city continuing to sprawl outwards into forests and agricultural land. As well as being densely populated, Nairobi also has half a million commuters entering the city to work or deliver goods. Together this has led to an explosion in the number of cars and other vehicles causing traffic jams and high levels of air pollution. The urbanisation has also put

[89] Government of the Republic of Kenya, 'Kenya Vision 2030' (Kenya, 2007), https://nairobi.aics.gov.it/wp-content/uploads/2019/01/Kenya-Vision-2030.pdf.
[90] Winnie Mitullah, 'The Case of Nairobi, Kenya'.
[91] Betty Keya, Urbanus Ndolo, and Johnson Dr, 'INFLUENCE OF SOCIO-ECONOMIC INFRASTRUCTURE ON ECONOMIC GROWTH IN DANDORA II VILLAGE; NAIROBI, KENYA', 26 November 2018.

strain on the city's infrastructure with many areas having inadequate sanitation and water waste management which during the rainy seasons pollutes the city's waterways. Alongside this the 'Dandora Municipal Dumping' site for solid waste is within 8km of the city centre and close to informal settlements. This proximity puts the residents at health risk from airborne contaminants and waterborne diseases.[92]

People living in the informal settlements are also worst hit during periods of extreme weather such as flooding. As the rent is often cheaper along riverbanks, it is often the most marginalised residents who are at the highest risk.[93] In 2015, over 50% of Kibera's households were flooded, while in 2021, five people lost their lives due to flash flooding. The flooding is also another driver of waterborne diseases, with 60% of Kibera's residents reporting outbreaks of cholera in their community in 2015.[94] This issue is also worsening as rainfall rates are projected to increase by one third.[95] One encouraging project that is looking to combat these issues is the Kibera Public Space Project. The project, a partnership between Kounkuey Design Initiative (KDI) and Kibera residents, aims to co-develop built environment strategies to tackle the issues of flooding and other issues. It achieves this by developing a series of eleven community designed and managed public spaces that reduce flood risk, provide access to core services and create new income generating opportunities. The project was a finalist in the 2020-21 Prize for Cities competition and there are plans for the project to be replicated throughout the city. [96]

One of the city's environmental successes is the protected green spaces it has retained within and close to the city. These include Nairobi National Park, Karura Forest, Ng'ong Forest, Ololua Forest, The Nairobi Arboretum and Nairobi City Park. These areas are important for various reasons, as recreational areas for residents

[92] Keya, Ndolo, and Dr.

[93] Joe Mulligan et al., 'Community-Responsive Adaptation to Flooding in Kibera, Kenya', *Proceedings of the Institution of Civil Engineers - Engineering Sustainability* 170, no. 5 (1 October 2017): 268–80, https://doi.org/10.1680/jensu.15.00060.

[94] Joe Mulligan et al., 'Community-Responsive Adaptation to Flooding in Kibera, Kenya', *Proceedings of the Institution of Civil Engineers - Engineering Sustainability* 170, no. 5 (1 October 2017): 268–80, https://doi.org/10.1680/jensu.15.00060.

[95] Madeleine Galvin and Anne Maassen, 'In Nairobi, Residents Redesign Public Spaces to Build Flood Resilience', 27 May 2021, https://www.wri.org/nairobi-public-spaces-build-flood-resilience.

[96] Kounkuey Design Initiative, 'Kibera Public Space Project', Projects, accessed 28 October 2022, https://www.kounkuey.org/projects/kibera_public_space_project_network.

and visitors, wildlife sanctuaries, maintenance of biodiversity, air pollution filtration, carbon sequestering and natural water drainage. [97]

Healthcare Services and Systems

Since independence in 1963, the Kenyan government has aimed to prioritise good quality healthcare for Kenyans, seeing it as a prerequisite to positive socio-economic development. The strategy implemented by the government has been to provide health services in close proximity to people, focusing on preventive and rehabilitative services as well as curative ones. The Healthcare facilities in Kenya can be broken down into 6 tiers; Level 1 – Community Units, Level 2 – Dispensaries, Level 3 – Health Centres, Level 4 – District Hospitals, Level 5 – Provincial Hospitals and Level 6- National Hospitals.[98] In disadvantaged areas where poverty levels are high, the first three tiers, which are mostly staffed without doctors, are heavily relied on due to cost implications of travelling to further away services. There may also be difficulty accessing these facilities due to overcrowding as poorer areas are more densely populated and hence centres have a much larger catchment area.[99]

In Kenya, there are both public and private healthcare facilities. In a 2020 report it was found that 48% were public facilities, 41% were private, 8% were faith based and 3% were run by non-government organisations. In the public facilities there is some free services such as maternity care and free inpatient care for those with national health insurance. However, in private, faith and non-government organisations healthcare is provided at a cost, with charges varying between providers. Thus, over half of healthcare provision in Kenya comes at a cost. In Nairobi 41% of residents have health insurance cover, however this figure is lower in areas of marginalisation such as in informal settlements where the most vulnerable groups of society live. This divide creates a mismatch in services between available care and needs, with those uninsured or financially disadvantaged pushed further into poverty by huge bills after accessing healthcare.[100]

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[97] Keya, Ndolo, and Dr, 'INFLUENCE OF SOCIO-ECONOMIC INFRASTRUCTURE ON ECONOMIC GROWTH IN DANDORA II VILLAGE; NAIROBI, KENYA'.

[98] 'Hospitals in Kenya', International Citizens Insurance, accessed 25 October 2022, https://www.internationalinsurance.com/hospitals/kenya/.

[99] Paul Kieti Kimalu and Kenya Institute for Public Policy Research and Analysis, eds., *A Review of the Health Sector in Kenya*, KIPPRA Working Paper, no. 11 (Nairobi, Kenya: Kenya Institute for Public Policy Research and Analysis, 2004).

[100] Abdu Mohiddin and Marleen Temmerman, 'COVID-19 Exposes Weaknesses in Kenya's Healthcare System. And What Can Be Done', The Conversation, accessed 25 October 2022, http://theconversation.com/covid-19-exposes-weaknesses-in-kenyas-healthcare-system-and-what-can-be-done-143356.

Disability and Humanitarian issues in Nairobi

Nairobi faces many humanitarian challenges including environmental crisis such as flooding, healthcare emergencies such as COVID-19 and Malaria, as well as a lack of basic services and access to nutrition for certain groups. Additionally, these challenges are exacerbated by the large humanitarian challenge of refugee influx that the city faces. While Kenya has an encampment policy, only allowing refugees to reside in camps, Nairobi has been home to refugees for many years. As of 2020, there were 81,000 refugees residing in Nairobi with this number growing daily. These refugees come to the city to gain better access to economic and social opportunities. However, if they break the encampment policy, then their decision to live in the city loses them access to humanitarian assistance. These refugees find it difficult to earn a living as they cannot attain work permits to gain formal employment and must rely on informal economies such as street vending.[101] This influx of people further exacerbates the existing humanitarian challenges in Nairobi as more resources are required.

Kenya has begun to address humanitarian issues with policies relating to climate change adaption and disaster risk reduction. An early implementor in this area, Kenya put in place the National Climate Change Action Plan (2013-2017), updating this plan with a new version from 2018-2022. The new plan includes priority areas such as disaster risk management, food and nutrition security, water and the blue economy, forestry, wildlife and tourism, health, sanitation and human settlements and manufacturing. The new plan is more inclusive as it consulted 1,000 stakeholders including marginalised and minority groups, including persons with disabilities. In its mission statement it also makes climate resilience for vulnerable groups, including persons with disabilities, a priority, acknowledging that these groups are often worse effected by humanitarian crisis.

Unfortunately, the plan is not currently available in accessible formats and there is little information on how strategies can specifically support persons with disabilities. Studies from 2018 show that focus groups with persons with disabilities felt they needed more information on issues relating to climate and environmental issues and

[101] 'Many Refugees Living in Nairobi Struggle to Survive Because of COVID-19 — Refugee Studies Centre', accessed 25 October 2022, https://www.rsc.ox.ac.uk/covid-19-resources/covid-19-blog/many-refugees-living-in-nairobi-struggle-to-survive-because-of-covid-19.

how to prepare. Persons with disabilities also highlighted physical barriers in accessing funds or resources provided by the government post disaster. [102]

The COVID-19 pandemic outbreaks in Nairobi have had a devastating impact on persons with disabilities living in the city. Physical barriers to aid and communication barriers to information were at their peak during the outbreaks. Lockdown periods put additional financial stress on persons with disabilities, "a majority of persons with disabilities are casual workers, hawkers or people who do small street jobs" [103]. Consequently, with stay-at-home procedures in place, many persons with disabilities lost their incomes. This resulted in basic needs such as food becoming a priority and also meant that most persons with disabilities were unable to access preventative measures such as face masks or hand sanitiser. [104]

Persons with disabilities are often in the most at-risk groups for contracting COVID-19. Due to the enacted curfews, this led to persons with disabilities not being able to access necessary therapy or medication. There were also increased risks in travelling outside the home. Over half of Kenya's persons with disabilities experience mobility problems, meaning they are reliant on supporting themselves on walls, surfaces or on caregivers when they do not have access to their own assistive technology, such as walking aids or wheelchairs. This puts persons with physical disabilities at increased risk of contracting COVID-19.[105] The COVID-19 pandemic also redirected resources, leading to further vulnerability from existing ongoing health challenges such as malaria or pre-existing conditions that require ongoing treatment.

Technology and Innovation

To relieve overcrowding and traffic issues in Nairobi, Kenya launched a project to construct a new city 60 kilometres outside of the country's capital. The city, 'Konza Technopolis', is a flagship project of the Kenya Vision 2030 development plan. It is designed as a smart technology city and as well as alleviating congestion in Nairobi

[102] Dr Maria Kett and Ellie Cole, 'Disability and Climate Resilience Research Project' (Leonard Chesire Research Centre, April 2018), https://assets.publishing.service.gov.uk/media/5af94ae4e5274a25e78bbe03/FINAL_Climate_research_report_100518.pdf.

[103] 'Shadowing Joseph', *Arise* (blog), accessed 13 April 2022, https://www.ariseconsortium.org/kenya-disabilities-during-covid-19/.

[104] 'Shadowing Joseph'.

[105] 'Shadowing Joseph'.

aims to support the growing technology sector.[106] Designed sustainably, the world-class technology hub aims to be a major economic driver for Kenya. Hosting data centres, technology and life science facilities, commercial office space, hotels, convention centres, educational institutions and community support services, the city plans to have a diverse mix of residents. The new city will be walkable supported by urban densities and the collection of data from its residents. Konza Technopolis will collect data from smart devices and sensors located around the city and use this to improve amenities, for example, monitoring numbers of pedestrians, cyclists and vehicular traffic in order to adjust traffic lights accordingly.[107] This new city provides a great opportunity to develop strategies for inclusive smart cities embedding the involvement persons with disabilities.

Kenya and Nairobi are home to a vibrant start-up ecosystem, including Africa's first Assistive Technology accelerator, InnovateNow, which has been developed under the AT2030 programme. Innovations supported through the programme include Vision Vijana (a start-up training young people to make vision testing, eyeglasses fitting and acquisitions accessible at scale in Kenya) and Linccell Technology (a start-up that aims to put user led electric personal mobility at the lead in Kenya) as well as inclusive WASH innovations (Sylvia Nyaga and Syna Consultancy) which have built environment applications.[108] GDI Hub have also worked in Kenya on Innovate Action projects as part of AT2030 including scoping reports and the development of an East Africa Innovation Ecosystem[109] plus data collection and mapping of stakeholders working in areas relevant to innovation, disability and assistive technology in Kenya.[110]

Summary

[106] Amina Johari and Director Athman Lali Omar, 'KENYA'S KONZA TECHNO CITY: UTOPIAN VISION MEETS SOCIAL REALITY', n.d., 68.
[107] Tetratech, 'Konza Technopolis—the New Silicon Savannah', accessed 3 May 2022, https://www.tetratech.com/en/projects/konza-techno-city-the-new-silicon-savannah.
[108] 'Innovate Now Accelerator Programme Seeks Mobile Solutions to Assist Persons with Disabilities | AT2030 Programme', accessed 25 October 2022, https://at2030.org/innovate-now-accelerator-programme-seeks-mobile-solutions-to-assist-persons-with-disabilities/.
[109] 'Assistive Technology Innovation Ecosystem Design | AT2030 Programme', accessed 25 October 2022, https://at2030.org/assistive-technology-innovation-ecosystem-design/.
[110] 'Kenyan AT Ecosystem | Innovation Action', accessed 25 October 2022, https://www.innovationaction.org/AT-ecosystem-kenya/.

This overview of Nairobi city, its past and its current context, is relevant to understand how the city can become more inclusive. The development of any city is influenced by historical, cultural, political, economic, social and environmental factors.

For persons with disabilities living in Nairobi city, life can be challenging,[111] the COVID-19 pandemic and ongoing crises have only exacerbated existing inequalities.[112] [113] Most face difficulty accessing employment and education opportunities due to physical barriers, stigma and misinformation. These barriers to economic opportunities place persons with disabilities at a financial disadvantage that prevents them from accessing healthcare and appropriate housing.[114] The government is moving to improve these aspects with polices such as the 2016 National Employment Authority Act, The Basic Education Act 2013, the 2014-2030 Kenya Health Policy and The Draft National Building Code. However, implementation of these policies is crucial to ensure their success.

The city of Nairobi, from its colonial roots, has always been a commercial and business hub and the Kenyan Government's 'Kenya Vision 2030' strategy plan provides an opportunity to build on this and create a, " just and cohesive society with social equity in a clean and secure environment"[115] The planned 'Konza Technopolis' will help alleviate problems of overcrowding and congestion in the existing capital while also being a tremendous economic driver and is a fantastic opportunity to develop an inclusive smart city with input from persons with disabilities. [116] Nairobi is an innovative city with opportunities for inclusive product development as seen through our AT2030 innovate now start-ups. Therefore, while the city of Nairobi has many challenges, it also provides many areas of opportunities to foster a more inclusive city.

[111] Kenya National Bureau of Statistics, 'The 2019 Kenya Population and Housing Census (KPHC)'.
[112] 'Many Refugees Living in Nairobi Struggle to Survive Because of COVID-19 — Refugee Studies Centre'.
[113] 'Shadowing Joseph'.
[114] Mohiddin and Temmerman, 'COVID-19 Exposes Weaknesses in Kenya's Healthcare System. And What Can Be Done'.
[115] Government of the Republic of Kenya, 'Kenya Vision 2030'.
[116] Tetratech, 'Konza Technopolis—the New Silicon Savannah'.

Pathway to Inclusion

1980
Government declares National Year for Persons with Disabilities

1984
Minister for Education makes reforms to improve access to education for persons with disabilities

1989
Organisation of United Disabled Persons of Kenya is formed

1993
Attorney General of Kenya appointed a taskforce in 1993 to review laws related to persons with disabilities

2003
Persons with Disabilities Act 2003 passed

2007
The Employment Act of 2007
- ensures people with disabilities do not face discrimination when entering the workforce

2008
Kenya 2030 Vision
Strategy developed to transform Kenya into a " middle-income country providing a high-quality life to all its citizens by the year 2030 "

2011
The Persons with Severe Disabilities Cash Transfer (PWSD-CT) Programme
- financial assistance for persons with severe disabilities

2013
The Basic Education Act 2013
- which outlines the needs of students with disabilities

2014
The 2014-2030 Kenya Health Policy
- outlines the right of access to healthcare for persons with disabilities, and aims to ensure this is provided

2018
Sector Policy for Learners and Trainees with Disabilities
- which promotes the provision of education for people with disabilities.

2020
Draft Building Code 2020
- states the requirement to comply with international accessible design standards

2022
Draft Building Code Published
- ensuring residential buildings are fully accessible , with non compliant buildings not allowed to be occupied.
Transport Bill put forward
- imposing laws on public transport providers to ensure their vehicles are accessible, and fining non-compliant vehicle owners.

2030
End of Kenyan Vision 2030

Summary of activities

Research activities took place from July 2021 – January 2022 in three phases. The research combined virtual and face to face research activities and followed local protocols around the COVID-19 pandemic.

Phase 1 focused on understanding the current state of accessibility in the built environment in Nairobi through desk research, document reviews, working sessions and stakeholder mapping. Interviews took place with key stakeholders including; government officials, architects, urban planners, project managers, academics, entrepreneurs and representatives of NGOs and OPDs.

Phase 2 focused on capturing the lived experience of persons with disabilities in Nairobi and in particular, their experience of the built environment and infrastructure. Interviews, photo diaries and co-design activities were employed to understand; the challenges and barriers persons with disabilities face in the city, areas where good practice can be found and aspirations for a more inclusive city.

Phase 3 focused on synthesising the findings of the previous two phases by holding workshops to discuss and validate the initial findings. The aim of these sessions was to identify, 'actions towards inclusive environments' by identifying shared challenges and opportunities across the diverse stakeholders involved. The workshops employed participatory inclusive design techniques to elicit insights and prioritise areas for action while allowing participants to gain experience of inclusive design methods that could be applied to their own work.

Example of a workshop with people with hearing impairment

The research engaged three key stakeholder groups;

- **Policy**: government leaders and policy-makers;
- **Practice**: industry professionals such as architects, urban planners;
- **People**: persons with disabilities, community groups, other citizens.

15 stakeholder interviews were undertaken with government and industry professionals operating in the domains of inclusion, accessibility and/or the built environment. The gender balance of stakeholders was 9 male to 6 female participants. 4 stakeholders have mobility impairments and 4 stakeholders have visual impairments. Age ranges were not collected for stakeholders in this instance.

Stakeholder workshops were used to discuss and validate findings.

15 interviews and 5 photo diaries with interviews were conducted with persons with disabilities. The gender balance among our disabled participants was 12 male to 8 female participants. 9 participants have mobility impairments, 7 have visual impairments and 4 have hearing impairments. Age groups ranged from 18-29 to 60+ with the majority of participants with disabilities between the ages of 18-29 (7) and 30-39 (8).

Limitations of the research include the lower representation of female participants and a limited representation of different disabilities, with hearing and cognitive impairments and neurodiversity underrepresented. Further research in these areas and intersectional approaches to research would benefit future studies. Arguably there is a need for both targeted and generalised studies that explore the diversity of disability.

Multiple workshops with disabled participants and stakeholders took place where exploratory co-design activities were used to discuss the findings from the primary data collected. Activities included journey mapping, participatory mapping and priority setting. An additional workshop took place with the immediate research team to validate the research findings.

Who has a stake in inclusive design and an accessible built environment in Nairobi, Kenya?

To identify who has a stake in a more inclusive and accessible built environment, the team conducted a stakeholder analysis with local partners and local government experts. The initial insights were synthesised with the findings from the primary data collection to build a picture of all the key stakeholders, including those who benefit most from a more inclusive environment, and those that shape it, resulting in the diagram below.

Insights

Thematic analysis was used to analyse the research data, identifying key themes across the three different stakeholder groups; policy, practice and people. In depth insights from the research are described through these themes and relay the different stakeholder perspectives throughout. The themes are:

Daily life for Persons with Disabilities in Nairobi

Daily life for persons with disabilities is greatly impacted by the lack of an inclusive built environment and services, the quote below describes the complex relationship between independence, mobility, family dynamics and support to children and aspirations for recreation and entertainment:

"I do not go to town because I do not have a helper or a way to help myself. The children are my support so when they are in school, I am immobile. On Wednesdays I have church fellowship, but I cannot attend since I do not have someone to assist me get there. I only went to my children's school once when they were being enrolled and I was in the company of my sister. I used to go out for New Year's Eve concerts before I lost sight. I do not shop even groceries; I send my kids."

Inadequate infrastructure makes activities of daily living more challenging, adding chores such as fetching water due to a lack of water infrastructure within homes.

Multiple participants discussed the time needed to adapt to acquiring a disability and learning to use new tools such as AT:

"However, life has been moving slow for me and it's not as smooth running as before because I depend on people and assistive technologies. However, I have learned to be comfortable in my condition."

Diversity of impairments is also an important factor in understanding daily life for persons with disabilities. Some participants are managing multiple impairments including chronic health conditions and energy impairments which can make daily life challenging:

"I started with diabetes which led to my loss of sight, then I started getting dizzy to date. Many things changed negatively. I am not able to do many things."

Disability and poverty

Disability and poverty are interlinked and some participants had real challenges access employment and generating income due to the inaccessibility of the environment.

"It is a very challenging… In Africa and in Kenya. You will do your best but it's difficult to succeed as a person living with disabilities. I am a businessperson, community mobilizer and many things. I go an extra mile to make end meet. Unemployment is rampant and worse for persons with disabilities. The main challenge is access to resources, Persons with Disabilities do not have resources. They also lack access to information and communication. This causes poverty since opportunities cannot be accessed. Acceptance is also a challenge: most people do not accept their disability status."

Example of inaccessible poor housing conditions

"There needs to be an understanding of inclusive development so that the development bridges the gap between the rich and poor."

Persons with disabilities can face higher costs of living due to resources needed to overcome accessibility barriers.

"I need financial resources to move, hire a guide and do things. I also need resources for business and to run business."

Access to housing and basic infrastructure

Housing standards are frequently not adequate for the occupants. Homes for persons with disabilities are often not accessible and do not have lifts, restricting people with disabilities to the ground floors in high-rise buildings.

"There's one thing about Nairobi that I don't like is you can't live in the ground floor. As in, the ground floor in most buildings is not the best place to live. So I think compared to Eldoret, as in Eldoret most houses the ground floor is better and because of my disability the ground floor is like the best option. The easily… the most reliable option."

Most persons with disabilities who live in informal settlements do not have access to proper sanitation in their homes leading to poor hygiene, ill health and rodent issues. Where sanitation infrastructure is available it is often in the form of open drains making these areas less accessible to persons with disabilities.

Density is a factor in poor accessibility in residential areas such as informal settlements:

"Houses are so congested so even walking is difficult"

Land ownership is also a factor in housing challenges and housing and employment opportunities are closely linked.

"We have a plot, but we are unable to build a good house. I live in a simple shelter."

"It depends with where you are in Kibera. It can be cheap to live in Kibera but I stay in Kibera but have no job."

Participants highlighted the cost of housing as one of their greatest challenges. One participant had relocated from Eldoret to Nairobi and was much less independent now due to less accessible housing, with their new home being much smaller due to higher costs of living.

"I do not pay rent, but the house is affordable where I stay with my family. Sometimes I am so dizzy until I fall. That is my life."

Some participants had a better quality of housing with more accessible housing appearing to be more expensive.

"For me, the house is accessible and affordable. No matter how late I get home, I am able to get to my house."

"It is expensive. The house I live in is very good. It is accessible. I do the work and live independently without need for help accessing and doing chores."

Access to services

There are mixed reports about the accessibility of government services with some participants having good experiences and others not. Issues spoken about included inaccessibility of government buildings, transport access to reach services and information and communication barriers.

Some participants said that the infrastructure, such as roads, was typically of a better quality surrounding government buildings.

Services available to persons with disabilities could be better integrated as one participant explained they had been granted a disability identification card but this had not enabled access to certain services such as tax exemptions.

Access to AT is mixed with one participant suggesting that government employees are given better quality AT. There needs to be better awareness and outreach about what AT is available and to help ensure that AT being provided is fit for purpose.

Awareness, Attitudes and Stigma

A lot of participants felt there was awareness around disability issues, but that more work was needed to improve understanding and attitudes to help reduce stigma. Persons with disabilities are often perceived to be, "illiterate and lack skills". It is important that this attitude is changed and awareness through education can help.

Public service workers such as police, security guards, transport drivers and government officials should be educated and receive disability equality and awareness training.

Awareness of invisible or hidden disabilities is also needed as the focus of attention can still be directed only at people with mobility impairments.

Many participants spoke of the difficulty they had coming to grips with their own disability status due to the increased challenges in daily life and the associated stigma. However, they also mentioned that once they accepted their disability, they found life easier. There was a mixed reaction from participant families.

A woman is walking with her guide in the informal settlement.

"Substantial awareness. Could be improved through social media advertising, mass media, special and public places. Talk to them, inform the masses."

Perceptions of disability, such as a perceived lack of independence, can impact social relationships. A lack of understanding and education around disability, especially by key decision makers, can lead to decisions being taken and designs being produced that are not fit for purpose, not just for persons with disabilities, but for all citizens.

"About socialising, there is a mentality that people have that one will sit and expect to be done for things. Then they embraced me when I joined campus after realising, I like to get things done myself and am independent."

OPDs suggested that participatory activities can help raise awareness and support better understanding of the issues.

"Participation in a walk to demonstrate the importance of good roads and infrastructure."

Independence

Most of our disabled participants had an aspiration for better independence. In many cases, disabled participants faced significant challenges when it came to undertaking day-to-day tasks such as leaving the home, childcare duties, religious worship and cooking. These issues were most often caused by barriers in their environment, a lack of adequate assistive technology or a lack of additional guidance and support.

Example of woman with a visual impairment shopping independently

"I would like to conduct errands on my own and pay my bills."

Many participants expressed a desire to be as independent in their daily lives as possible. Some ran businesses, while others expressed that they could achieve a good level of independence through assistive technology use with minimal assistance. Many participants used guides to help with daily activities, but this has a cost and can be a financial barrier for some.

"I am able to do most of the things I want to do. This is because I believe in myself."

Independence is strongly linked to wellbeing and mental health. While this participant was able to overcome challenges and feel independent, it is important to recognise the structural factors that limit independence such as an inaccessible built environment.

One participant also mentioned how support such as guide dogs which are really helpful for persons with visual impairments would be challenging to have in Kenya due to the chaotic state of the road environment.

"In Kenya, the dog will be confused because there are reckless drivers and people don't respect traffic rules nor pedestrians."

Resilience

“Disability made me look at life from a different angle. That I don’t have to give up in life. I lost almost all my friends after I lost my sight, I made better ones after sight loss.”

An inclusive built environment should support persons with disabilities to be more resilient. Resilience is sometimes look at from an individual perspective, putting the burden on the individual to ‘overcome’ challenges when inclusive environments, services and cultures can support people to be more resilient. These systems should also be resilient themselves, to enable the city, communities and all citizens to thrive.

“We need to build a more resilient social protection model and harmonise inclusive design across board not just in the environment but also in health.”

Resilience also considers climate and crisis resilience and sustainability. For example, if infrastructure is not designed inclusively to begin with, then it will need to be retrofitted, or at worst replaced, which brings significant additional costs and is wasteful in terms of both resources and carbon footprint. Historically, disaster risk reduction, disaster resilience and climate resilience have been treated as separate sectors, but increasingly there is recognition of how interlinked these aspects are.

“Our foot bridges for instance need to be demolished and re-done because these standards were not included in the design.”

Environmental assessments should consider the need for inclusive design helping ensure it is delivered as to mitigate any need for potential future construction work and associated costs.

“Environmental impact assessment is not adequately done.”

Families and relationships

Participants highlighted difficulties providing for their children, in particular providing their children with a good quality education. Parents of children with disabilities should also be able to access training and support services to empower them to support their children.

Example of people with disabilities coming together to socialise

"Since I acquired visual impairment, I am unable to take my kids to school, they lack clothing and a livelihood because I can no longer fend for them and so we are devastated."

Families can be an important support system for persons with disabilities, with both children and parents often taking on support roles when necessary. Adapting to changing circumstances can be a challenge for both individuals and families. Support is needed when someone acquires a disability to help understand what barriers they may face and how they can adapt to them. Many participants reported stress around caring responsibilities and adaptation being a health challenges in itself, citing an example of a mother developing high blood pressure due to stress. However, this experience varied between families.

"My children help me with chores. My mum cooks and leaves food ready for the day."

"I was in denial; they didn't know about how to handle me. It took them a while for my family to come to terms with my disability and the things we could do together and those we could not do together."

A lack of inclusive environments can be a barrier to accessing vital support systems, impacting wellbeing and mental health:

"My daughter stays in a nearby village, I can only visit on Sunday because I have people I go with to church. When I visit my daughter, I am able to vent out and I regain peace so I would have loved to do that more often but I am unable."

Livelihoods and employment opportunities

The majority of participants showed a desire to work, with many running their own business or freelancing online. Self-employment and online work are currently considered the most inclusive employment types as they allow persons with disabilities to work flexibly in a way that suits them. Online work in particular is considered a way to put many people persons with disabilities on a level playing field.

Example of an informal workplace

Freelancing or running businesses are desirable roles as people may encounter less discrimination:

"I have a side hustle whereby I do web design using my laptop and I'm able to make extra cash. Since it is online freelancing job discrimination is avoided. It is more of selling skills."

People need access to basic resources to enable them to access opportunities and work. This includes capital to invest in starting a business which can be hard to create if someone is unable to access employment.

"I need financial resources to move, hire a guide and do things. I also need resources for business and to run business."

If persons with disabilities could all gain employment it would be a huge boost to the economy and participants believed that support was need to achieve this. This support could include grants to open businesses and accessible resources and information on how to find employment. Due to limited awareness of disability,

participants found there were perceptions that persons with disabilities could only work in certain sectors.

"Anyone who loses sight is subjected to become a teacher or a lawyer or stay at home. And that is not right, you still have an opportunity to become more. You can venture into music, communication and much more. I was limited to radio journalism because there weren't software to help me. Even awareness is very important. Ensure the rights of persons with disabilities are granted and implement policies for inclusion. All those policies are there, implementation is the problem."

Persons with disabilities also aspire to run businesses and be able to do so independently and free from harassment, which was found to be a problem when it came to things like selling goods. Another participant was running a successful business and even employing others, they reported feeling completely independent.

"I would like to run my supplies business from one building to another especially those in town due to inaccessibility. I sell clothes, I would like to sell them in a friendly environment, freely without fear of harassment."

"Meeting with other visually impaired persons. I meet other VI friends in town and also in the estate conducting bee keeping (through an apiary in Meru County), branding and selling the honey and are interested in doing farming."

Participants had business activities that they worked on with other persons with disabilities, creating community through livelihood generation, highlighting how access to employment can also be a part of community.

"Friends visit me in my business area because I spend most of my day there. No one helps me with anything, I do everything for myself."

Some participants also ran business that supported others in their community, but then had challenges as they were not charging for labour, leading to limited income:

"I do gigs for my own portfolio and clients. Most are for my Community-Based-Organisation (CBO) which I prefer not to charge. I also assist other visually-impaired persons with editing – those who can voice but not edit. We meet up

at some common places to hang out to catch up – during the weekends most times."

Cash currency is also inaccessible for persons with visual impairments, often leading to a lack of independence and a high risk of theft or fraud.

Access to healthcare

Participants highlighted gaps in the healthcare quality that is causing further health issues and, in some cases, leading to an increase in disability. Examples given included losing vision due to surgery complications or the impact of health conditions, such as diabetes, being left untreated. Overall improvements to healthcare services and the health system would benefit the whole population and reduce avoidable impairments and conditions.

It is vitally important that improvements to the healthcare system are inclusive of persons with disabilities. This includes improvements to the physical access and service provision. The wider built environment is a part of creating an accessible health ecosystem. The image provided below demonstrates how the route to a primary health facility is not accessible for a wheelchair user, leaving them with no choice but to seek assistance from others.

Example of inaccessible route to healthcare facility

"There should be inclusion in public services such as health whereby you find accessibility is a challenge and even communication between a deaf person and the doctor is not efficient. Discrimination and ignorance by the doctors when they call the next patient and the deaf cannot hear so we end up delaying to be served."

For persons with visual and hearing impairments, interpreters or other assistance should be available to allow the patient to receive their treatment without difficulty communicating. Disability equality and awareness training for all healthcare staff would be beneficial to support quality service delivery. Persons with disabilities have healthcare needs that are not directly linked to their disability and staff need to be aware of this and be supportive. Social support services such as counselling should also be readily available for persons with disabilities and their families.

Water, sanitation and a healthy city

"But in Nairobi I noticed if you live on the ground floor there's problems with water, network."

Better water and sanitation infrastructure (WASH) such as sewers, drains and public washrooms were a high priority for persons with disabilities.

"The physical environment sometimes makes it difficult to be able to manoeuvre for instance when my place sometimes floods and poses risks of infections."

Example of the impact poor drainage and sanitation has on roads in informal settlements

"I stay at home most of the time. My kids prepare my water and take it to the bathroom for me. My mother is mostly outside fending for us. I stay at home and sometimes I even urinate on myself out of too much sleep or weakness."

"The fact that one toilet is used by so many people – over 30 people is uncomfortable."

"The roads are rocky, sewers break and drain in the same roads and people also drain water into the roads when they wash clothes."

“We live in the slums, there are live electric wires passing on the roads, a lot of water poured by those washing clothes and sewer breaks are the order of the day.”

A lack of accessible WASH also contributes to hygiene standards across the city, with overall health and quality of life impacts.

“The town is very dirty. Most areas are very dirty.”

Social lives and recreation

“The cost of living is high, transport is high, even sometimes if you want guide, they want to charge you, even accessing recreational services are not accessible. Social media sites are not accessible and entertainment as well – in Kenya we don’t have audio movies. Most of the electronic accessories are not visually impaired friendly. Most of the home appliances are not accessible including the television.”

Due to physical barriers in the built environment persons with disabilities are often left out of social, religious and day-to-day activities. This can be upsetting as these barriers prevent people with disabilities from interacting on an equal basis with friends and family. Participants had different experiences of social lives, some felt accepted and respected whereas others experienced limited social interaction due to stigma and were left feeling excluded.

“There should be recreational relaxing spaces for persons with disabilities”

Places such as churches, barbershops, public parks, restaurants, clubs and neighbourhoods are important recreational spaces. A lack of accessible transport options and poor road infrastructure is a barrier to accessing these spaces.

"I would like to go to public parks, clubs and restaurants but I cannot access them because of the difficulty in crossing highways."

Example of person with disability engaging in a social activity

"I have a pretty good social life. I have accepted myself and even made people to respect me and interact with me."

Sport is an important recreational activity for many participants, such as mountain climbing, swimming, football and ziplining. However, they often missed out on opportunities due to inaccessible roads and routes to facilities. Persons with disabilities are often not considered when it comes to sports teams, facilities and equipment. Having accessible sporting activities is important not just for recreation but for health and wellbeing:

"Exercising to stay fit and reduce boredom. I would be glad to stay outside and stay busy and productive."

Recreational activities are often part of people's aspirations and therefore an important part of improving wellbeing:

"I would like to adventure such as in Mountain Climbing. I would like to one day go to the peak of a mountain. I want to do it this year. I used to do it but stopped when I lost sight."

The importance of access to education and opportunities for children with disabilities

Most disabled participants had received some level of education. However, most had left education earlier than desired due to a lack of access and inclusion. Some participants had also explored alternate education and training paths due to the stigma they had experienced in school:

"I went to an integrated boarding school and I got bullied a lot. That discouraged me from continuing school, so I had to quit at primary level. I then went to tailoring school in 1998 then discovered my passion in beauty. I pursued beauty college in 2007, started my beauty business in 2016 and I shut it down in 2020 when Covid-19 hit."

In further education, physical barriers caused some participants issues, with one participant unable to pursue his ambitions as a result:

"I wanted to go to Multimedia University to pursue journalism but I had to do the course in a different university because the built environment was not friendly for me."

However, some support is available. For example, Kenya's National Council for Persons with Disabilities, can provide persons with disabilities bursaries to support business ventures and assistive technology (AT) provision.
Geographic challenges and accessibility barriers

Living in certain areas such as Kibera is more affordable but there are limited employment opportunities, creating a challenging balance between living affordably and creating livelihoods.

"The place is hilly, so I am not able to walk around, houses are so congested so even walking is difficult. I would propose tarmacking or cementing of the road so that we are able to walk around."

The terrain in parts of the city is steep and rocky with a high density of buildings in many areas. In the informal settlements there are increased environmental challenges such as broken sewers, unofficial drainage from private homes and

exposed electrical wiring. In the business district there are also accessibility issues with most commercial buildings lacking basic access.

"Sometimes the terrain changes and mobility become a bit challenging. Open manholes, kiosk setup along the paths which causes barriers to movement."

Urban planning, neighbourhoods and development

Where people live has a huge impact on their experience of daily life, with some neighbourhoods considered more accessible than others. The informal settlements pose many accessibility challenges and are where many persons with disabilities are living in poverty, compounding challenges and leading to further exclusion.

"I lived in Kibera before moving to Makongeni. At least the roads are accessible in Makongeni. I use a TukTuk (3 wheeler bike). The roads in Kibera are quite inaccessible; they are so narrow and also muddy when it is rainy. The houses there are not accessible."

Accessing the city centre can be challenging for many due to the longer journey times, a lack of accessible public transport and poor road infrastructure. This demonstrates the need to think about city planning from a neighbourhood lens and ensure easy access to essential services without necessitating long and complex journeys.

"I have no challenges accessing Eastleigh but I have challenges accessing town. The time spent to access the city town and also communication barriers during my interaction with the public."

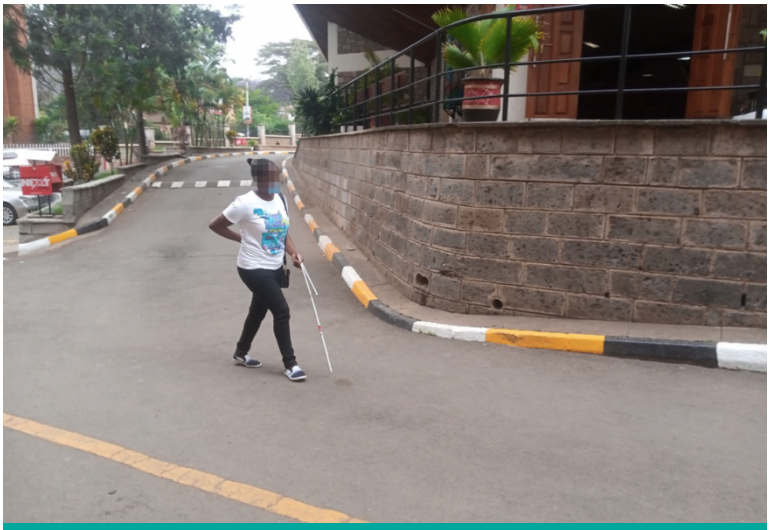
"Church, schools are accessible since they are within the estate and the fact the estate is more accessible than other places makes it easier to access."

Urban planning should take into consideration user preferences and behaviour, for example planning crossing and pedestrian flows according to where people want to move.

Public spaces are an important part of the urban environment. However, they must be inclusive and, for example, provide street furniture that is accessible and positioned as not to become an obstacle for pedestrians.

Wayfinding

Wayfinding is a crucial aspect of inclusive mobility. Participants described how communicating with conductors on public transport is often a challenge for persons with disabilities. Deaf people face extreme challenges getting directions and communicating with the public as few know sign language. There is a need for better wayfinding strategies, including signage, to make the city more inclusive to navigate.



Example of difficult wayfinding with narrow paths presenting hazards

Drivers need to respect the rules of the road as currently many do not which makes using AT and service dogs dangerous when crossing the road.

“Being familiar with the environment which makes it easy to move around. Mostly the terrain is simple and easy to manoeuvre independently.”

Roads

“Roads are not disability friendly. Uneven roads, open manholes expose to risk of falling and obstruction. Traffic lights should have some sound signals which is lacking in most traffic lights in Nairobi.”

Road infrastructure is challenging as many roads are uneven, with potholes, open manholes and business kiosks set up on pathways blocking movement. It can

therefore be difficult to use assistive technology, such as canes, crutches and wheelchairs, due to congestion.

Vehicles move chaotically on roads and pathways are often missing or they are uneven, dirty, narrow and not continuous. There is also an issue with parking spaces for persons with disabilities as they are often sold to people without disabilities.

Example of a footpath obstruction

Stakeholders mentioned that better cycling infrastructure was desired and both cycle ways and pavements would benefit from being wider. Material selection was critical for pedestrians as certain materials are slippery. Clear differentiation between pedestrian, cycling and vehicular routes is needed. Stakeholders also suggested the persons with disabilities were currently underrepresented in road developments leading to continued accessibility issues.

“There is an underrepresentation for persons with disabilities working with road agencies to voice their concerns and raise opinions on things that work best with them.”

An example of good practice is found in organised housing estates which have better accessibility as roads and pathways have been systematically planned out and built to standards. Roads were also more accessible near government buildings, suggesting these areas have been prioritised. Where roads are well planned, designed and executed they support persons with disabilities, AT users and better wayfinding:

“In terms of walking, the road can guide you as a visually impaired.”

The general environment feels unsafe and can be a source of fear for people navigating the city, further limiting people’s mobility.

"When going to town, I get scared because there are rowdy motorists, motorbikes and those pulling trolleys in town. There are portholes, bumps, uneven pavements and rough public transport touts."

Overall, roads need improvement and significant works are already underway by the government. However, consideration of the pedestrian experience is a crucial priority for all citizens as it is generally regarded as an unsafe environment, "the roads are made for motorists". Motorbikes, 'boda bodas', are often parked on pedestrian spaces forcing pedestrians on to the road. Bridges and underpasses are frequently used as a solution for pedestrians to cross roads. However, these aren't always accessible and are also considered a safety risk due to crime and so people often chose to risk the danger of crossing the road. All pedestrians should be able to navigate roads and streetscapes with confidence and in safety.

Transportation

Public transport is not accessible for persons with disabilities due to a lack of designated spaces for persons with disabilities on vehicles, inaccessible boarding announcements, vehicles stopping at places that are not planned and not accessible, driver attitudes towards persons with disabilities and lack of inclusive infrastructure. Matatus (small public transport vehicles) are supposed to have dedicated spaces for persons with disabilities and bus terminals are meant to be accessible but often this isn't the case. Taxis can be expensive. Due to such inaccessible public transport options, there is an understanding that the car is not a luxury item for persons with disabilities, but essential for travel and so persons with disabilities can apply for tax exemptions on car ownership.

Example of people waiting on matutu

"I end up falling and being hurt a lot because they move before I settle in."

Drivers and touts lack experience and training on how to communicate and best support persons with disabilities. There exists a prevalent stigma around disability

with many public transport drivers refusing to pick up persons with disabilities. Many consider that persons with disabilities take longer to board and may require assistance with their assistive technology, such as folding wheelchairs, adding to their reluctance to stop.

Persons with disabilities who do board public transport often do not get sufficient time to board the vehicle and sit down before it drives away, which can lead to further injury or impairment. There is also an issue with how the general public see persons with disabilities on public transport. Many have negative attitudes, assuming persons with disabilities will delay their journey. Most transport options are not step-free and where there are ramps they are typically too steep to be used safely and effectively.

"Public transport vehicles stop at places that are not designated. It is easy to get lost in Nairobi when using public transport. At times you ask a conductor if they will pass through a certain route or stop at a certain stage, and they say yes only to drop you somewhere else."

Assistive technology devices can help persons with disabilities navigate public transport options. However, things like traffic congestion, unpredictable routes, crowding and the use of informal stops limit their effectiveness. Participants with a visual impairment also suggested stronger white canes with a good grip and vibrations would be extremely helpful in the public transport environment.

"I would get some assistance especially if it is out of town. At least someone to get me to the bus stop. I know my way around town but manoeuvring in between is the difficult part. The assistive technology tool (The 4th Eye helps) sometimes even when using public transport."

It is clear than that using public transport with AT such as a wheelchair is difficult with many service providers reluctant to pick up persons with disabilities in the first place. Legal mandates are important to ensure compliance and prevent discrimination from occurring. A more inclusive and accessible public transport system is also needed, that takes into consideration the needs of a wide variety of users, including persons with disabilities and AT users.

"Bad experience with public transport. You have to have an aide to help with the manual wheelchair and most matatus don't like the whole process of removing batteries and folding of the wheelchairs."

Safety and violence

Persons with disabilities experience a lot of theft in Nairobi as there are perceptions that persons with disabilities can easily be taken advantage of. This can make persons with disabilities uncomfortable when paying fares on public transport and using AT that requires carrying a smartphone.

"Insecurity cases are high in Nairobi making it difficult to use my smartphone in public spaces"

"I face a lot of communication barriers, lack of bus fare and sometimes when the conductor tells you to wait for the fare balance, they run away with it, and you are stranded or lose money."

Safety is also a greater concern at night with many disabled participants reporting not feeling comfortable doing certain activities like going to the market. This is a significant limitation for people with multiple responsibilities, such as work or school who may not be able to do errands during daylight hours. People also mentioned more specific concerns at night such as alcohol and drug use. Driving while under the influence of alcohol or drugs takes place and there can be links to more aggressive behaviour.

"I dislike drunkenness that is rampant here. Illicit brewing and consumption is so rampant. I used to drink with my husband but I stopped when he passed on."

Familiarity is an important part of safety and some participants mentioned not just familiarity of routes but of getting to know some touts who have become an aid in safe and accessible mobility.

Police officers and traffic police should be provided with appropriate disability equality and awareness training to be supportive to persons with disabilities, as many participants described a lack of empathy from the authorities.

“I have also been stolen from many times.”

Injuries and Hazards

Unfinished, unsafe and underdeveloped infrastructure can lead to injury for persons with disabilities. Alighting from and boarding public transport is often too fast for persons with disabilities, which can again lead to further injury.

“I Was once hit by a public transport van side mirror in town (Nairobi CBD). The risk of accident and falling in the estate is reduced greatly.”

Chaotic traffic can lead to persons with disabilities being involved in accidents with vehicles.

Example of homemade stairs support bars

“Once I fell into an open electric power unit in the Nairobi Central Business District with live electric cables, while in the rain where there was short circuiting and sparks.”

The need for inclusive emergency responses and disaster risk reduction (DRR)

Buildings in the city do not have plans in place for the evacuation of persons with disabilities in emergency situations. Lifts do not have back-up generators and will not work during power outages. Emergency buttons are too high up emergency exit doors are too narrow and alarms are not inclusive (don’t emit both a visual and audible warning).

"Most of our buildings have not put into consideration of the PWD when it comes to emergency and risks. The emergency buttons are high up. The emergency exit doors are to narrow. The switches and knobs are out of reach to PWDs"

Fire safety and evacuation is particularly critical in informal settlements and markets where fires are common.

"In Nairobi where there are rampant fires on the markets and informal sectors."

Impact of weather and changing climate

"Warm weather is comfortable. Rainy seasons are uncomfortable and hectic – you may fall more."

The rainy season is a particularly difficult time for persons with disabilities living in Nairobi. Wet weather makes traveling around the area "uncomfortable and hectic" due to the added mobility risks. Heavy rain can also impact orientation for people with visual or hearing impairments. Inadequate drainage and sanitation are worsened during the rainy season as flooding causes drainage and sewer systems to block up and flow into housing which creates health risks such as water borne infections and general damage to property, impacting livelihoods.

Example of flooded road

"I have to tread muddy waters and chances of getting splash with water are very high. Getting someone to assist you during the rainy season is very rare."

There is an impact of weather on people with chronic conditions:

"When it rains, I freeze and shiver a lot. When I try walking, I will stagger or fall as I walk."

While the rainy season is very problematic, heat and sun can also be a risk factor. With increasing global temperatures, this will only worsen.

"During very sunny days, I feel dizzy and I must buy or get cold water."

Weather also affects AT use. If AT is not water resistant, it cannot be used when there is flooding or heavy rain. Flooding impacts mobility as it can worsen existing inaccessible conditions further limiting people's mobility. Some participants mentioned that during the rainy season they would be stuck at home, highlighting the need for AT that can adapt to changing conditions. AT that could help navigate challenging weather and warnings in case of incoming disasters would be an asset.

"There isn't much that we can do about the environment unless the assistive devices can be improved for instance have a voice element."

Implementation of laws and policies

"Ensure the rights of persons with disabilities are granted and implement policies for inclusion. All those policies are there, implementation is the problem."

Laws and policies to uphold the rights of persons with disabilities in Kenya are well developed. However, there is a strong perception that implementation is a challenge and, in some cases, there is a lack of awareness of what laws and policies exist. There are standards for accessibility and even a checklist for compliance, but it is unclear how well known these are.

"The building codes need to be interrogated as to whether they work and who should make sure they work. Part of the problem is enforcement i.e. is the government ensuring that contractors are sued for lack of accessibility in buildings."

Implementation was also felt to be below standard due to a lack of participation of persons with disabilities.

Legislation on accessibility

"The building codes also mention guides on how to build ramps for instance but does not explicitly mention that the ramps are meant for persons with disabilities."

There is legislation on accessibility but education on training on how to use it would be beneficial. There's also a need for it to be relevant for the local context and particular resolve how accessibility standards could support accessibility within informal settlements.

"The law should apply but do not apply in informal settlements."

"We need to contextualize universal guidelines. Designers and practitioners to apply designs that are context appropriate. Need to provide a local guideline."

Inclusive leadership: government services

Disabled participants were eager to engage in conversation about government provisions. Most felt that government buildings are accessible for people with mobility impairments, but less so for people with visual or hearing impairments. Participants with visual or hearing impairments suggested improvements such as better lighting levels and having trained staff available who are better able to provide assistance. However, some other participants mentioned that there is already a designated desk at some government offices for persons with disabilities.

Online government services such as 'eCitizen' were not considered to be accessible. While some participants were registered as disabled, they did not feel it was beneficial as they did not get benefits such as tax exemptions. As for assistive technology, the government does provide AT to persons with disabilities. However, many persons with disabilities are not even aware of this offer and the wheelchairs provided have been reported to be unfit for use.

One participant expressed an interest in political work to advocate for change:

"I am looking to vie for a political position so that I can serve different people well."

Decision-making and leadership

Leadership has an important role in influencing an inclusive environment. Having a President with a disability drove progress in country including the passing of the disability act and is also considered to be why central government buildings, such as State House, are quite accessible. However, more diverse leadership is needed and leadership and political will is necessary to ensure action.

“Yes, Nairobi has the capacity. It has amenities and resources, what we need is the positive political will.”

Stakeholders are aware that persons with disabilities are not sufficiently consulted on built environment decision-making, and it is understood that this needs to change to ensure persons with disabilities are consulted through the planning, design and construction stages.

More collaboration and cohesion is needed across organisations and across departments. While some organisations or groups may feel they are experts in a specific sector, this can sometimes be a limitation for a more holistic approach to disability inclusion.

“A lot of organizations assume they are experts and hence don’t collaborate leaving out more stakeholders who would have brought different approaches to tackle persons with disabilities’ issues.”

Knowledge and understanding of inclusive design

“Inclusive and universal design to me means that the built environment (Infrastructure, transport and housing) are constructed in a way that anyone can access them without difficulty. It accommodates all type of people and their needs.”

Stakeholders generally did not have good knowledge of inclusive design and broadly agreed that government agencies and developers do not know how to genuinely and effectively engage and involve persons with disabilities in the planning process.

"The aspect of inclusive design for persons with disabilities does not come out very strongly during the engineers training."

Example of accessible ramp at place of worship

Stakeholders recognised the importance of educating built environment professionals on the topic of inclusive design and ensuring it is implemented. Some stakeholders had inclusive design education as part of formal training but others had not.

"I think Nairobi has the inadequate capacity to accommodate inclusive design. We need to build capacity and have more engineers, urban planners and architects trained in the area of inclusive design."

There is understanding that inclusive design is about creating a better and more inclusive environment for all. Understanding that inclusive design goes beyond accessibility to create spaces that everyone can access on an equal basis.

"In my opinion, we don't need an exclusive chapter to ensure universal access. We simply need inclusive provisions. For instance, a building through the ground floor, to the upper floors, the lifts must be accessible by all from the very beginning as opposed to adding all that later after construction. The building will need redesigning to cater for the vulnerable, pregnant women and persons with disabilities. Designing for persons with disabilities shouldn't be an exclusive design but rather inclusive."

Community-led solutions and empowerment

Community-led solutions for an inclusive built environment and access to AT are a vital part of creating an enabling environment for persons with disabilities. Examples

of community-led solutions for inclusive design include interventions such as a local church installing a ramp to ensure access for its users, as documented by one participant in their photo diary. However, access barriers remain given the broadly inaccessible environment of the informal settlement, where wider planning and built environment interventions are required.

Participants also shared how some churches have programmes to support persons with disabilities.

"Something similar to an awareness program I could say the one offered by the church, because our church they've included a special needs section for the church. I think the church is… but I haven't seen any from the government."

Other examples of community-led solutions include individually adapted AT such as wheelchairs, to try and enabling navigating the challenging terrain found in informal settlements. One participant talked about having multiple wheelchairs for different needs, but that frequent damage due to difficult terrains made maintenance challenging.

Evidence of inclusive built environments

Specific places mentioned that are considered inclusive included:

- Mama Ngina Street
- Luthuli Street
- Kenyatta Avenue Road
- KICC building
- Huduma center GPO
- The Aga Khan walk

Makongeni estate is considered a well-planned environment with wide, well-designated pavements and roads. It also has a well-placed and maintained sewer system. The main accessibility issue here is that only ground floor accommodation is accessible for persons with mobility impairments as there are no lifts to access upper levels.

"Since Nairobi Metropolitan Services took charge there have been results on accessibility in Nairobi in terms of the pavements, the sidewalks which make easy movements for PWDs in town."

Successful types of inclusive design interventions raised by disabled participants included:

- Church with ramp
- Shopping centres
- Roads that are tarmacked
- Gym at the university
- Student accommodation – hostels provided the KU students
- Local police station
- Government offices
- Kenyatta hospitals
- At the university there are three vehicles dedicated to supporting mobility for persons with disabilities

"In Kibera there's project urban 95 where there is public space in Buma that is accessible but we did graphics of how to improve neighbourhood around the space to make it accessible."

"Nairobi is not accessible but there are some advancements made by accident or design. For instance, the new buildings' contractors and architects are following a global standard hence including some accessibility points."

Examples of inaccessibility

Places raised by disabled participants where access was considered to be very difficult and in need of improvements, sometimes also due to surrounding infrastructure, included:

- Tom Mboya
- Hilton square
- Archives
- Nyayo House
- Treasury Building
- Ronald Ngala Street
- Umoja 3 Disability Centre

"Umoja 3 Disability Centre – the road is not paved or tarmacked, from the stage where you alight to the location itself, unless you have a guide, getting there is a challenge."

Commercial spaces such as shops and malls can also be inaccessible with participants often finding obstacles along their routes. Markets can be multi-level without step-free access to the upper levels.

Noise regulation is another cause of inaccessibility. Many disabled participants cited loud music and loud noises as being particularly problematic in the city.

“I need assistance to access buildings because I am unable to identify them by myself.”

People often need help to identify buildings due to a lack of signage. Where signage does exist, it is often poorly designed and located, making it hard to find and read. There is also a need for better information on where accessible routes are available as sometimes there is a ramp but it is not visible or signposted.

“Some, or say, most of the buildings in Eastleigh look the same which makes it difficult to access. Some places in Mombasa are inaccessible because they all look the same.

Perceived Barriers to Inclusive Design - Cost, Corruption, Complaints

“The concept of universal design has been existing for so many years but we the issue of cost comes in the way.”

Cost: Stakeholders and designers in the city believe that cost implications prevent them from integrating inclusive design features in their designs. It was also mentioned that specific provision in budgets would be needed.

Corruption is also a problem, and stakeholders cited the example of disabled parking spaces being sold off for profit.

“The council that approves the building designs and do investigations on the buildings is responsible. Developers are cheating by providing misleading plans for approval but do not implement on site. They also show on the design that they will put up ramps but don’t do it.”

There is a role for built environment professionals to uphold standards and deliver best practice where possible.

"It is also a moral responsibility of consultants i.e. architects, engineers to ensure that the approved work is implemented."

A complaints mechanism to register issues would be a helpful tool to log challenges in the built environment.

AT, technology and innovation

Participants expressed a desire for better quality AT. For example, one participant wanted an electric wheelchair (rather than a manual one) to allow them to be more independent while another found that their hearing aid was unsuitable causing ear infections and pain.

"Even with the white cane you can detect things on the ground but not above such as a hanging object, technology should be improved to make it more effective."

To enable comfortable use of hearing aids and better support people with hearing impairments more broadly, the acoustic design of the built environment is important.

"I experience shock with high sound, when I enter a lift and also high public transport noise makes my heart beat faster."

Technology can be an enabling tool to access employment opportunities through mobiles phones and computers. Many participants used devices like screen-readers to make use of these tools.

"I also want to show that disability can be addressed through innovations at whatever level. We need to explore ventures that can holistically bring change to the sector."

Entrepreneurs are working to design better AT. They require support from an AT ecosystem to develop, test and scale good innovations to support better access to AT for all.

"In Kenyatta University, we have conceptualized and designed a wheelchair that is portable and can be packed in a suitcase. Very light (17kgs). These wheelchairs will be suitable for PWDs with spinal injuries."

Gender and other dimensions of inclusion

Intersectionality and diversity was particularly highlighted in the workshops where participants shared the importance of considering different types of disabilities and the experiences of people who may be disadvantaged in multiple ways, such as women with disabilities or people who live in informal settlements. These intersections would benefit from being researched further.

Safety and insecurity is a major theme that creates a barrier to mobility and is something that is more commonly experienced by women and is frequently a focus in gender-inclusive design.

"I dropped out of school. I tried acquiring some skills training under GOAL Project to learn cooking and such but I became expectant and could not continue thereafter."

An example of this is seen in the importance of details in inclusive design. One participant spoke about the example of inaccessible locks in a washroom – limiting privacy and creating insecurity for persons with disabilities. This can also have specific implications for women who may feel unsafe if they are unable to lock the bathroom or that their privacy could be violated.

Responsibility for an inclusive environment

Participants felt it was the government's responsibility to improve roads and in some situations persons with disabilities would benefit from dedicated support. Various government ministries and departments are responsible for different aspects of the built environment and infrastructure and this can be a limitation as it can be challenging to coordinate.

Government has the responsibility of signing off on building construction and so has the opportunity to ensure standards are upheld. However, the reality is that this does not always take place. This is an important point.

"In our organization we hold ourselves accountable, we've applied standards that are used globally for PWDs on access, provision of services and improvement of amenities."

All stakeholders and citizens have a role to play in creating an inclusive environment but some participants suggested having dedicated responsible officers in government departments and for each county would be helpful.

Built environment stakeholders should advocate for education during formal training.

Rapid development and changing urban landscapes

"Sometimes the terrain changes and mobility become a bit challenging. Open manholes, kiosk setup along the paths which causes barriers to movement (encroachment blocks the way)."

Ongoing management and maintenance of the built environment requires monitoring to ensure no negative impact on inclusive design and should be a part of project planning.

A lack of ongoing maintenance and construction generally create further accessibility barriers. The continuity of accessibility during construction, particularly for large-scale projects, is important. Inclusive design training for contractors and an inclusive design plan for construction planning would be helpful. Participants also mentioned that rubbish and rubble from construction is often not cleared away, leaving hazards and obstacles in the urban environment.

One stakeholder who is also a person with a disability felt Nairobi transport had changed to become less accessible:

"In the earlier years of 2004, I would go to Nairobi on my own, matatus would stop at designated stages, but nowadays I need a guide because the matatus just pick up and drop people anywhere."

What's needed? What does inclusive design look like?

"We should tackle the issue of design and stop assuming PWDs are not many i.e they usually have just one dedicated parking slot or none because of the assumption that persons with disabilities don't own vehicles."

Inclusive design is both a process and an outcome. In order to achieve inclusive environments, an inclusive design process should be integrated across all project stages. It is necessary to challenge assumptions and develop co-design tools that respond to genuine needs and aspirations.

"Aspects involved are Design, accessibility, adopting, implementation and then monitoring and evaluation the ones that are already working"

Persons with disabilities should be able to pursue careers in built environment professions to enable genuinely inclusive participation in urban development. While public participation and consultation of citizen is crucial, persons with disabilities should also be able to be part of project teams and be paid for their knowledge and expertise.

"A lot of encouragement is needed to ensure that people with disabilities are empowered to take up the technical jobs as urban planners, architectures and engineers so that they can be able to sit in the decision-making boards and represent the minority groups."

Some specific suggestions made to improve the built environment and make it more inclusive include:

- Improve road infrastructure
- Improve sanitation and sewer systems
- All public buildings must have lifts, accessible washrooms and inclusive information services
- Add CCTV cameras for security
- Involve persons with disabilities in the design process
- Improve accessible wayfinding – signs with contrasting colours and braille
- Accessible fire and emergency alarms
- Hospitals and government offices should have sign language interpreters
- Improve awareness
- Adherence to standards and codes

"In estates and flats, lights with different colours could be used to guide deaf persons. Trains should have information screens where they display important information such as departure times. Conductors to have sign language skills or have an interpreter to assist. There should be people to guide or assist persons with disabilities. There should be ramps for wheelchair users in most of the estates. Smoke sensor/detectors should be in place in case of a fire. The government can improve hearing aids but not at most."

Disabled participants also made the point that digital services need to be more accessible for persons with disabilities as well as the physical built environment and services.

"We do Participatory co-design process by working with people on the ground to be design spaces for them to use them."

Inclusive design thinking is needed holistically across city development and wider national disability inclusion efforts.

"At apex level we need an alliance or organization whose work is not to address a specific DPO need but looks at the ecosystem wholistically, brings people together and identify gaps."

Participation of persons with disabilities

"There should be regular consultations and dialogue to address the needs of PWD in accessing inclusive design."

Stakeholders suggested participation of persons with disabilities in infrastructure projects should be legally mandated to ensure participation. It was also recognised that if participation isn't enabled at the budgetary stage that it is difficult to access resources for it. Public participation activities for citizens must be inclusive of persons with disabilities.

"There is no law that directs that PWDs must be directly involved in planning."

Overall, there is a strong community of Organisations of Persons with Disabilities (OPDs) and committees such as the National Council of Persons with Disabilities that support government activities. However, implementation on the ground is still

an issue. Participants also felt it was important OPDs were able to coordinate priorities and speak with one voice.

"It is a high-time organizations dealing with persons with disabilities can speak in one voice."

OPDs need funding to do their work and need effective systems to demonstrate how donor funds are being used, ensuring accountability and supporting advocacy for further funding.

"DPOs should also be keen on using donor funds efficiently so that they get more funding: accountability and suitable reporting systems."

People are also frustrated and disempowered by long term inaccessibility. People can become apathetic due to the lack of progress or lack of accountability for participation processes. It is therefore vital that were participation takes place it is actioned and participants are informed on progress.

"They have a role, but they are blocked. Being excluded for a long time has also disempowered them such that they have gotten used to the status quo."

“We need to be our own advocates.”

Example of a co-design workshop with people with hearing impairments

It’s important that participation considers diversity and where possible an intersectional approach, ensuring people with different types of impairments can participate fully and recognising the compounding ways people can be disadvantaged due to gender, age, socio-economic status, faith and culture.

“We do not really prioritize the needs of the blind, the deaf and other invisible disabilities. I would say we have not really included them fully.”

Skills training and inclusive education opportunities for persons with disabilities in the built environment professions would also enable better participation and implementation.

"Most persons with disabilities don't have the skills to be part of design process due to lack of education. There are architects and engineers who are persons with disabilities and therefore they need to be more involved to make implementation easier."

In this workshop, image prompts were used to discuss what inclusive environments look like.

Seamless accessibility – journeys, routes, and maintenance

A more holistic planning approach would contribute to more seamless accessibility:

"Change in the planning approach, looking at design in a holistic manner so that in issues of access we have continuous access, safe spaces, protected spaces, i.e. protection from rain in the infrastructure."

People often experience barriers in their journeys due to a lack of continuity of accessibility interventions, for example, footpaths not being continuous, or a lack of regular maintenance.

"Not quite, because most footpaths are not fully accessible to allow PWDs to move without assistance. The available footpaths are not continuous and are not well kept."

"The Kenya Society for the Blind – the challenge is getting there: public transport to the venue is tough but inside the compound is well accessible. Outside the gate is full of manholes."

Participants need to plan routes carefully, including prior research to understand the potential accessibility barriers during their journey. This can be a burden and a limitation or barrier to activities.

"Living in Nairobi is also a challenge because you can't go anywhere without planning. You have to strategize how you'll get there. Is there ramp, is there lift, is there elevator."

Seamless accessibility is also the sustainable choice, economically and environmentally, building things right the first time avoids later costs.

"For instance, the bridges we are building currently have not met standards for accessibility as they don't even have a ramp route. Essentially, we are at a place where we need to do everything right so that we do them once and for all other than to wait to include accessible infrastructure in already existing structures which will be more costly."

Seamless accessibility also means accounting for unexpected challenges such as power cuts. Having back-up generators in buildings to ensure continued accessibility should be employed where reasonably possible.

"Have backup generators and power backup for lifts so that wheelchair users are covered against power loss when accessing buildings."

An inclusive city

"The houses and roads are inaccessible which is a major challenge for me."

Stakeholders described how Nairobi is not an accessible city for all citizens, but that this is acutely felt by persons with disabilities who live in the city. Inaccessibility is experienced across all major infrastructure and built environment domains, leading to large barriers in day-to-day life. There are however, some good examples of progress, indicating the opportunities available.

"The Nairobi environment is risky when you have a disability – its unfriendly and I won't take that risk."

Other cities such as Eldoret were also mentioned as having accessibility challenges. The lessons learned from this study could also be useful for other cities in Kenya.

Summary:

From the thematic analysis and workshops, six overarching themes were identified which are as follows:

- Transportation and Roads
- Level of Independence
- Insecurity
- Livelihood Opportunities
- Social and Sporting opportunities
- Housing & Basic Infrastructure
- Resilience and climate
- Inclusive design processes and seamless accessibility
- Innovation and Entrepreneurship

From the workshops the following related themes were highlighted:

- Policy/Government Program
- Equitable Transport
- Infrastructure Development & Universal Design
- Freedom to move safely and independently in the city
- Awareness of people with disabilities
- Intersectionality and diversity

What works now?

““Yes, Nairobi has the capacity. It has amenities and resources, what we need is the positive political will.”

Persons with disabilities face numerous, complex and often compounding challenges in their daily lives in Nairobi. One part of this is the barriers presented in the built environment which are interlinked with other contextual factors such as poverty, social protection, enabling opportunities, access to services, access to AT, stigma, and awareness. Inclusive design of the built environment is essential to also support these wider contextual factors – for example, access to health services for persons with disabilities.

Many of the insights provided focus on barriers rather than opportunities. However, there are examples of good practice and there is a trajectory of progress towards a more inclusive environment in Nairobi. It is important to identify examples of good practice that can be replicated across the city to spread awareness on why inclusive cities are a good thing and how it can be achieved.

Understanding what works and who is driving inclusion can unlock opportunities for good inclusive design. Inclusive design champions can advocate for change and tell the stories of what works. Identifying what matters through participation and co-creation with persons with disabilities and stakeholders can support an incremental approach that addresses people’s priorities first. It’s also important to have awareness of what is working now and where there is momentum that can be built on. Often one good success story can be a catalyst for more comprehensive progress.

Legislation and policy will always play a significant role in creating inclusive environments. Developing better inclusive implementation processes will ensure the vision and ambition of policies is realised.

“Sometimes even though I have an assistive technology to get me to a sink to wash my hands, the sink has been built too high. The built environment must be designed inclusively to complement assistive technology. Inclusive design is an enabler for assistive technology.”

AT and the built environment must also work harmoniously together, and it is clear in Nairobi that a more accessible built environment is needed to support AT use. Examples cited include unsuitable or damaged wheelchairs from poor road infrastructure, white canes not being sufficient protection from potholes and other hazards and poor quality hearing aids making a noisy, chaotic urban environment more stressful and even painful.

So what works?

Inclusive leadership drives progress. Having persons with disabilities in leadership roles is highly effective to drive progress. This has been seen in national legislation, creating more accessible government buildings and in government programmes.

Community-driven planning and development in the informal settlements, such as the Makuru Special Planning Area, highlight how processes of co-creation can be effective.

Urban planning is essential for inclusive environments, creating space for inclusive design. Newer developments demonstrate good examples of inclusive design, with wider roads and pavements that are clearer and safer to use.

Supporting community-led interventions. Examples include a church that has built a ramp for its visitors with disabilities.

Co-designing community infrastructure in informal settlements, building trust, creating a sense of ownership.

Pairing social and essential infrastructure to create public spaces that work for people, such as the Kibera Public Space project by Kounkuey Design Initiative.

Building inclusive design interventions to correct standards and ensuring quality materials and implementation.

Support structures help. Families, friends and community are important. Good awareness, support and resources to ensure persons with disabilities can be supported more would help, for example if a family member needs to take time off work to help them.

Good working relationships drive progress. Inclusive design is a collaborative process and often needs to involve multiple sectors and organisations. Good and consistent education and training is needed to support a shared vision of success.

Having services nearby that can serve local communities. Proximity is an important factor in inclusive cities, having services and activities within shorter distances helps mitigate existing and significant mobility barriers.

Inclusive recreation and culture support wellbeing and quality of life.

Enabling socialisation through inclusive infrastructure.

Collaboration and synergy, working across the built environment, infrastructure, service delivery, digital solutions and AT:

"Through collaborations and synergy especially the Disability Persons Organization, private and public sectors. We need to instil advocacy by bringing all stakeholders to address this matter."

Enabling innovation and entrepreneurship. Support persons with disabilities to develop and scale businesses that may allow for more flexible and adaptive livelihoods.

Technology and innovation in AT helps develop more suitable, adaptive, sustainable and resilient solutions. Such as a white cane that integrate sensors to provide more feedback to the user, is stronger and has a better grip so it is more comfortable and durable.

Awareness helps - there is still work to do.

Lessons learned

This case study has allowed a deeper understanding of the lived experience of disability in Nairobi, building a picture of the whole 'system' of accessibility and inclusion needs in the city. It has also facilitated conversations between diverse stakeholders and participants.

There are many factors that constrain the ability to deliver good inclusive design. The following lessons learned help us understand the challenges around delivering inclusive environments in order to support proposed actions and recommendations.

"Assistive technology has to go hand in hand with inclusive infrastructure."

Disability and poverty are interlinked. Some of the least accessible environments are informal settlements where many people are also living in poverty. The accessibility of the built environment greatly influences livelihood opportunities contributing the cycle of disability and poverty.

Housing and basic livelihood support, infrastructure and services are the first step. When people are experiencing significant barriers in their essential day-to-day activities it has a huge impact on quality of life.

Housing must be accessible, but also affordable. Cost of housing can be significant for persons with disabilities and more accessible housing can be more expensive. It is vital to consider affordability as part of delivering accessible housing.

Inclusive neighbourhoods and public spaces facilitate community and social interaction. This includes street furniture which should support gathering and rest and not create further obstacles.

Inclusive water and sanitation is part of an inclusive built environment. Problems arising from poor WASH infrastructure greatly influence accessibility and impact quality of life, including health risks. Many people do not have access to water and sanitation in their home which is a barrier, particularly for persons with mobility impairments.

Adapting to changing climates is essential for resilience, infrastructure must be inclusively-designed with changing climates and seasons in mind.

Inclusive infrastructure should provide shelter from the impacts of weather. Heavy rain and other weather can damage AT and infrastructure and have a significant adverse effect on many persons with disabilities. Public spaces should also provide shelter.

Adapting to the changing urban landscape: Urban development, maintenance and repair are a part of city resilience and inclusion.

Urban planning is needed to coordinate different infrastructure needs and demands, including issues around density which make implementing inclusive design more challenging. While space can be limited, building **'up'** is not always the best solution, particularly when power supplies can be erratic or resources are limited for adding lifts and ensuring good maintenance.

Disaster risk reduction: fires, flooding, climate is a necessary reality for cities and built environment planning.

Heat stress is an increasing risk in cities that persons with disabilities can be particularly vulnerable to. Building design should account for urban heat island effects.

Inclusive environments support better health for all, public health and infrastructure are connected and more inclusive health services and infrastructure that supports good health and wellbeing is good for quality of life. Attention also needs to be paid to invisible disabilities and chronic conditions which can also have functional impairments.

"We need to build a more resilient social protection model and harmonise inclusive design across board not just in the built environment but also in health."

Robust inclusive design processes are as vital as standards and regulations, they must factor in accountability and recognise the rapidly development context of the city.

Understand that inclusive design is a continual process and be able to learn from mistakes and criticism and continue to work to improve the environment.

Technical standards and good practice guidance should be **contextualised.** Standards are important but they must work with the local context and consider sustainability.

Role of legislation and standards in unregulated contexts like informal settlements, there is still a need for contextualised guidance and support, which can be co-developed with the local communities affected.

Resource-constrained inclusive design. Can inclusive design interventions be implemented with limited resources and space available in informal settlements?

Trust, patience, empathy and good communication are needed for inclusive participation and design processes.

"There Is need for patience to listen to everyone on the ground. It is time consuming but there's need to listen to everyone. Need to build trust with the minority as they are not too trusting."

Participation must be diverse – work with people with different types of disabilities to include a spectrum of accessibility needs and aspirations. Also consider intersection and the specific experiences of women with disabilities, children with disabilities and older people with disabilities.

Community trust and buy-in is vital, highlighting the important of community-led inclusive design which was evident during research activities.

Employ persons with disabilities in the built environment sector. Persons with disabilities are not passive recipients of inclusive design but should be active participants, not just as users but as designers and experts.

Build more capacity for inclusive design, this includes education, training dedicating resources and strategies.

Processes of inclusion and participation are complex, integrate reflective processes to continually learn from what works and what doesn't. Mistakes can happen, the important thing is to learn from them.

Mediation approaches are important for collaboration to navigate conflicts.

Quality, suitable materials are necessary. Contractors must be compliant with material specification

Do things right from the start, advanced planning and strategy is highly effective for better and more financially efficient implementation.

"We should also prioritise issues of disability and not tackle it as an afterthought."

Consider geographic challenges and wider engineering works such as levelling terrain in city development projects.

Education on how inclusive design features work is needed to support diverse users and ensure good maintenance and limit damage, misuse or vandalism.

Seamless inclusive design: work from the perspective of enabling mobility and continuity of transport journeys.

Consider safety aspects of infrastructure. For example, safety of enclosed and unobserved underpasses.

Consider how the built environment is used throughout the day, time of day can change accessibility through things like lighting and availability of assistance.

Remember accessibility during construction – training contractors, planning inclusive design of construction sites/construction site safety plans.

Sensory design and understanding sensory inaccessibility in a busy city.

Perceptions of disability can be limited; assumptions are made about need rather than focusing on a designing with persons with disabilities.

Consider lessons learned for other cities. Context of smaller cities as well as the connections between cities.

Limitations and areas for further exploration

The following limitations were identified during this study:

- The research team had to adapt to the ongoing COVID-19 pandemic, which meant adapting and limiting some fieldwork activities. Overall, the team was able to establish an effective working relationship with all partners remotely. While online collaboration was effective, it is important to remain mindful of the limitations it can have regarding engaging participants and building consensus among a team.
- Reliable internet and electricity connections could be a challenge when connecting remotely, and particularly during workshops could present challenges
- Accessing and engaging city government stakeholders and people with disabilities was challenging at times. City government stakeholders were very busy and as such could be non-responsive to communications or cancel appointments at the last minute. Reaching persons with disabilities was also more difficult if they had limited access to technology, particularly due to the restrictions in place due to the pandemic.
- Capturing a genuine account of participants' perspective was sometimes a challenge, some stakeholders were hesitant to share negative experiences with language and cultural differences also a factor. On the other hand some participants were angry and it was important to be sensitive to people's emotions
- Most of our participants identified as having either a mobility or visual impairment, so further research that captures a more diverse group of persons with disabilities would be valuable, such as neurodiverse people, people with hearing impairment and people with multiple disabilities or chronic illnesses
- The gender balance of participants was not equal, it was much more difficult to reach female participants to interview which may indicate that women with disabilities are excluded to a greater extent. Among city government stakeholders there were also fewer female participants, indicating that among key stakeholder groups there is a need for better gender diversity
- The research team was unable to conduct site visits and some collaborative live projects were delayed due to the pandemic, limiting the amount of live project work featured in this report

- The research deliberately focused on accessibility and inclusion from a disability perspective. It is important to note that inclusive design also considers groups that may be excluded from participation for other reasons such as race, class, age, religion, gender, or socio-economic status
- Safety is critical during research activities, and it is important to consider the impact of research on underserved communities who may feel their privacy is being invaded.

Areas for further research, which would assist some of the actions suggested throughout this report include:

- Quantitative research - mapping accessibility in the city
- Monitor and evaluation of inclusion projects that are being implemented would be useful, including measuring impact
- Research on socio-cultural factors associated with disability inclusion or research on socio-cultural factors in inclusive design approaches
- To drive policy agendas, it would be useful to develop more robust data on how different aspects of exclusion intersect, such as gender and disability, class and disability and race and disability
- Research on accessibility and inclusion of the built environment in peri-urban/rural areas, as statistics show more persons with disabilities are living in rural areas and may be harder to reach
- Further research on inclusive design with persons with disabilities of all genders
- Research on the role of inclusive design in sustainable development priorities such as the relationship between climate adaptation measures and inclusive design and accessibility would be useful
- Research on humanitarian contexts or inclusive design and disaster risk reduction is also needed as city design must be resilient to disasters and crises, as seen through the COVID-19 pandemic and previous flooding
- Pandemic resilient urban plans which are inclusive, sustainable and resilient for all.
- Research on key urban sectors such as inclusive and green public spaces, pedestrian mobility, and accessible public transport systems.
- There is an urgent need for national data on disability. While the last census was in 2019 and was the first to use the Washington Group Short set of questions, this data may still be unreliable due to respondents' reluctance to reveal their functional limitations due to issues including stigma.

Conclusion: Actions toward inclusion

"An inclusive Nairobi is somewhere that can be experienced by everybody in a fair and equal way. By creating safe and accessible environments for all members of the community the city can allow everyone to access and participate in the opportunities they would like."

Kenya has a strong legal framework to create inclusive cities and further disability inclusion and there is clear appetite from Government to take action represented through these legal frameworks. Further progress is imminent through the proposed new Building Code (2022) which is currently at draft stage and more comprehensively addresses accessibility than the previous code which is 50 years old. Nairobi, as the capital city of Kenya, has a real opportunity to lead by example, not just for cities in Kenya but across the continent, as a commercial hub for the African region. A major barrier for inclusive design delivery in the city is around good implementation, for which accountability and knowledge of inclusive design across project teams is important. Policy and practice stakeholders must be collaborative for more effective delivery.

In terms of becoming a more inclusive city, Nairobi has some complex contextual factors that influence the state of the built environment. Nairobi's urban development history generated conditions for exclusion through the development of informal settlements during the colonial era. These urban areas are characterised by high density and poor or lacking infrastructure and are some of the most inaccessible parts of the city. Due to high levels of poverty among persons with disabilities and high costs of housing, these are also areas where many disabled citizens live. They are also high-risk areas for disasters such as flooding, fires and health risks, reasons for which include poor infrastructure that cannot cope with the demands of the high-density population and generally lacking infrastructure such as proper sewer systems and access to water and sanitation facilities.

The built environment sector could do more to support accessibility by also advocating for its implementation. The most inclusive environments are usually produced not just by regulations and standards for accessibility but robust inclusive design processes that include genuine participation of persons with disabilities. There are learnings from community-led approaches and co-design with other under-served communities which should be shared and it would be helpful to do this to

build more evidence on the co-benefits of inclusive design for social inclusion more broadly. There is shared responsibility to ensure participation among stakeholders and project finances must account for this. Training and education across the sector on disability awareness would help as it is a collaborative effort from designers, engineers, planners and contractors to deliver on inclusive design. Quality control and material selection are key aspects to remember to ensure more seamless inclusion.

Inclusive infrastructure, urban planning and assistive technology must be complementary and the built environment is a vital part of creating access to AT and ensuring seamless use. In turn, AT must be designed to be fit for purpose for the environment and context of its use. Championing local production and local innovators in AT can help here, as there are working directly in the communities the AT is for.

Nairobi is a city of innovation, business opportunities and the start-up ecosystem is vibrant but innovation must be inclusive and ensuring basic support and access to livelihoods must not be forgotten. Persons with disabilities should have choices in opportunities and the freedom to access education and work in whatever employment they would like. Currently, there are limited expectations that persons with disabilities can only work in certain sectors. Many persons with disabilities are entrepreneurial, which can be due to the exclusion they experience, and aspire to be independent, running successful businesses, and leading fulfilling lives but the built environment can be a barrier to this.

“We need to be our own advocates.”

An inclusive city is an accessible, healthy, resilient, gender-inclusive, age-friendly, child-friendly, sustainable city. Inclusive city aspirations intersect with many other global goals as set out in the UN’s 2030 Agenda and it is evident that disability and accessibility are cross-cutting issues across the SDGs. This is clearly seen in Nairobi where we see accessibility, health, climate-resilience and livelihood problems intersecting. The ideal solution is a unified and holistic approach but breaking down siloes is challenging. We would advocate inclusive design is a tool for participatory urban development that can support action across these diverse development targets and deliver co-benefits through inclusive infrastructure that

supports diverse disadvantaged groups, particularly due to the intersectionality of disability.

We also need to design for people and planet, otherwise the planet will continue to exacerbate conditions of exclusion. Resilience and inclusion cannot afford to be separate considerations. In Nairobi and other cities, the impact of climate-related disasters, changing weather patterns, pandemics and worsening inequality is felt by citizens and has a tremendous impact on city infrastructure and resources. Infrastructure design and urban development must integrate inclusive design as well as resilience-led approaches and climate action – both of which are arguably further ahead in terms of implementation and progress. Our cities must be able to withstand shocks and inclusive design can help make sure all citizens are included and no one is left behind.

Key barriers:

Transportation and roads: public transport options are challenging for persons with disabilities to use and this includes the physical design of infrastructure but also attitudes and behaviour across service providers and passengers. Nairobi is a city that has been designed to prioritise cars but still road infrastructure can be poor in certain areas. Traffic and congestion are major problems and it can be an unsafe and stressful environment for pedestrians. Infrastructure development would benefit greatly from inclusive design to ensure accessibility and suitability of design, including things like safety and sustainability.

Housing and basic infrastructure: needs to be more accessible, inclusive and affordable. There is a lack of accessible housing, with housing and land costs being high, creating insecurity. Poor quality or lacking essential infrastructure such as water and sanitation, electricity supplies, roads, and sewers are a barrier to a good quality of life for persons with disabilities and must be improved, particularly in informal settlements.

Recreation and culture: being able to participate in cultural and recreational activities such as practising religion or sports and visiting parks, restaurants, clubs is part of a fulfilling life and important to combat social isolation and participate in community life. In many cases, these types of spaces are not accessible. Inclusive

public spaces are an important enabler of social spaces and need inclusive and accessible furniture to create gathering and rest spaces.

Daily live activities and services: insecurity, a lack of independence and an inaccessible built environment and transport impact daily life. Being able to access essential services such as health and social care, banks and schools is important to access opportunities and is a fundamental human right. People also need to be able to run errands like going to the market but often these more informally managed spaces are inaccessible, limiting independence.

Other particularly relevant thematic areas that represents opportunities to support inclusive cities included:

- Inclusive climate, WASH and health as part of a cohesive approach to inclusive resilience
- Inclusive design processes to ensure seamless accessibility in rapidly developing cities with changing circumstances
- Innovation and entrepreneurship for fit for purpose, accessible, AT and livelihoods
- Participation of persons with disabilities across government and built environment sectors, in leadership, employment and participatory design processes.

Priority Recommendations:

- Action across key barriers: transport, roads, housing, recreation and culture and daily life activities and services. Prioritise these areas in urban development
- Consider an ecosystems approach to inclusion, a coordinating organisation or committee that can strategically align priorities, resources and opportunities across disability inclusion and inclusive urban development
- Use architecture, urban design, planning and infrastructure to enhance quality of life, supporting health, wellbeing, livelihoods
- Enjoyable urban life: don’t underestimate the importance of access to recreation, culture and public spaces
- Let communities lead, facilitate, and resource community-driven development
- Champion inclusion, champion what works – we need to know what good looks like in the local context and good examples should be publicised

- Understand co-benefits of infrastructure, do more with less – housing supports health, access supports livelihoods
- Consider resourcefulness of design, make good use of materials and design sustainable and resilient solutions that will last
- Resilience, climate, risk and sustainability need to be a part of an inclusive design strategy
- Use inclusive design to enhance freedom, safety and security
- Work on inclusive mobility: accessible transport options and safe pedestrian environments
- Contextualise legislation and standards to local development plans through participation of local persons with disabilities to understand better what a good inclusive environment looks like in that context
- Work with communities to develop an inclusive design strategy for informal settlements, inclusive design that can work with minimal resources and supports addressing essential infrastructure needs
- Disability awareness and inclusive design training for all key urban stakeholders, including service providers
- Finance an inclusive built environment. Inclusive design should be an integral part of early project planning with ringfenced budget.

Different stakeholders have different roles to play in shaping an inclusive environment. Sector specific recommendations are as follows:

Recommendations for policy and decision-makers:

Policy-makers should have a plan for inclusive design, act on it and be accountable for its implementation.

While national policy frameworks are strong, more needs to be done to ensure policy priorities are delivery in reality.

- Work on good implementation for existing legislation, monitoring and evaluation can help with accountability
- Mandate targets to meet legislation
- Inclusive leadership at different levels, enable persons with disabilities to take on leadership roles and lead by example through championing inclusion
- Consider the role of city level legislation and masterplans to complement national laws and codes

- Explore how institutional and the private sector can support disability inclusion, can larger organisations lead by example in supporting employment and demonstrating inclusive work environments
- Consider how strategy and policy can be implemented across formal and informal settlements. How is infrastructure and city planning taking place in informal settlements?
- Champion good practice and publicise it so people can see what good looks like
- Encourage and facilitate community-led development by dedicating resources and mandating participation to encourage stakeholders to implement inclusive processes
- Take a collaborative and multi-faceted approach to urban development to understand better the co-benefits of infrastructure. A systems-led approach could help with this
- Facilitate training and awareness on disability
- Action city planning in priority areas such as transport, making sure it aligns with a wider strategic vision for inclusion and doesn't work against other aspects
- Enhance support to families with disabilities through social protection
- Work with the private sector and private providers of infrastructure
- Make maintenance and repair a priority, monitoring and evaluation of past developments and programmes is needed. This could include accessibility audits.

Recommendations for industry (Practice):

Practitioners should understand that inclusive design will deliver better results, should be motivated to design and deliver good inclusive design, and work collaboratively.

- Education and training should incorporate accessibility and inclusive design where it does not already
- Ensure knowledge of laws and regulation and good implementation
- Celebrate diversity in design and champion inclusive design as more than a set of technical standards
- Advocate for integrating inclusive design from the start of all projects
- Enable participation of persons with disabilities, let persons with disabilities lead and involve diverse users in design processes
- Urban planning needs to consider density and how accessibility requires space as well as coordination between different infrastructure demands and risks

- Built environment practitioners have a responsibility to consider long-term sustainability, resource use and the planetary impacts of construction. This goes hand-in-hand with inclusion
- Resilient design and construction is a priority due to increasing risks and vulnerability
- Consider the whole picture of a site during project development including things like topography and connectivity
- Challenge assumptions, use co-design to understand genuine needs and desires to design elegant solutions
- Material selection and quality control is essential to deliver good and sustainable inclusive design
- Remember maintenance, repair and local, resourceful production of infrastructure, buildings and products

Recommendations for the community (People):

People should feel empowered, be advocates, be involved and affect demonstrable change.

- Making voices heard and participate in design opportunities when made available and feasible
- Advocate for community needs and aspirations
- OPDs should have robust programme management, monitoring and evaluation to be able to report on effective use of funding and make the case for further funding needs.
- Awareness should be strengthened for all citizens which OPDs have a role in supporting
- Coordinate advocacy aims so OPDs can work collaboratively and strategically, there is a need for some unified vision but also for sharing responsibility across different priorities
- Complaints and reporting mechanisms are helpful to evidence where barriers still exist
- Engage media to spread awareness and celebrate success stories of inclusion, changing perceptions of disability is important
- Participate and encourage participation of those who may be less inclined to. Ensure participation in activities is inclusive for all and quieter voices are respected and heard
- Innovate, create change, whether that is a campaign, designing AT, reporting accessibility barriers, it is all part of the same goal: a more inclusive world.

Creating enabling environments

An enabling environment for persons with disabilities should integrate: a supportive legislative environment, an inclusive culture and mindset, participation in planning, design and decision-making, positive cultural change, an accessible and inclusive built environment and access to good quality and affordable assistive technology.

Some of these aspects are already taking place in Nairobi but for an inclusive city to maintain an enabling environment it is necessary to ensure robust, sustainable, disability-inclusive urban development processes are implemented.

So what might an inclusive Nairobi look like?

- Inclusive mobility
- Enjoyable urban life: recreation, culture and safe inclusive public spaces
- Accessible and affordable housing for all
- Inclusive infrastructure, urban planning and services
- Thriving communities, security and a just city
- Access to opportunities: disability innovation and entrepreneurship

What's next?

This report outlines the key findings from a case study on the city of Nairobi, Kenya. As the fourth of six case studies on inclusive design and the built environment in lower-and-middle-income countries, it will go on to inform the subsequent 'Global Action Report' on inclusive city design. The remaining two case studies will take place in Freetown, Sierra Leone and Medellín, Colombia.

Local partners Kilimanjaro Blind Trust (KBTA) and Kounkuey Design Initiative (KDI) continue to champion inclusion through various work and will continue to disseminate and apply the research undertaken in this case study.

KBTA continue to support AT entrepreneurs through the InnovateNow programme and work across various aspects of disability inclusion in Nairobi.

KDI continue to deliver community-led infrastructure work across Nairobi including projects such as nature-based solutions. KDI are also leading a projected called 3IF:

Inclusive Infrastructure which looks more broadly at inclusive infrastructure and is entering its second phase. They are also part of the Urban Fabric Initiative.

The data collection that informed this case study took place just prior to the second wave of COVID-19 in Kenya, we recognise the impact it has had on partners and communities and hope this research on inclusive environments can support strategies for a more inclusive recovery.

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