Urban river degradation in Nairobi is often addressed through technical or enforcement-led interventions that overlook the complex social and institutional dynamics shaping environmental outcomes. Drawing on systems thinking, degrowth, climate justice, pluriversal and insurgent planning perspectives, this research examines the Nairobi River Basin as a "three-body problem," in which ecological systems, governance institutions, and marginalized urban communities interact in unstable and often conflicting ways. Based on qualitative fieldwork, interviews with government agencies, NGOs, and community-based organizations, alongside participatory mapping and field observations in Mathare, Kibera, Dandora and Korogocho, the study reveals how fragmented governance, infrastructural deficits, and social inequality mutually reinforce environmental degradation. While informal settlements are frequently blamed for pollution and riparian encroachment, the findings demonstrate that environmental vulnerability is structurally produced through exclusionary planning practices, selective enforcement, and chronic underinvestment in sanitation and waste infrastructure.

These dynamics have contributed to displacement rather than resilience, undermining both social trust and long-term ecological solutions. At the same time, community-led initiatives and NGO partnerships emerge as important forms of environmental stewardship, grounded in local knowledge, trust-building, and co-creation, challenging narratives that frame riverine communities as obstacles rather than contributors to regeneration. The paper argues that sustainable river regeneration in Nairobi requires a fundamental shift in governance approaches, from control-oriented regulation toward collaborative and inclusive planning that acknowledges the interdependence of environmental systems, political decision-making, and urban livelihoods. By framing Nairobi's river crisis as a relational systems challenge rather than a singular technical failure, the study contributes to broader debates on urban environmental justice, participatory planning, displacement, and institutional reform in the Global South.

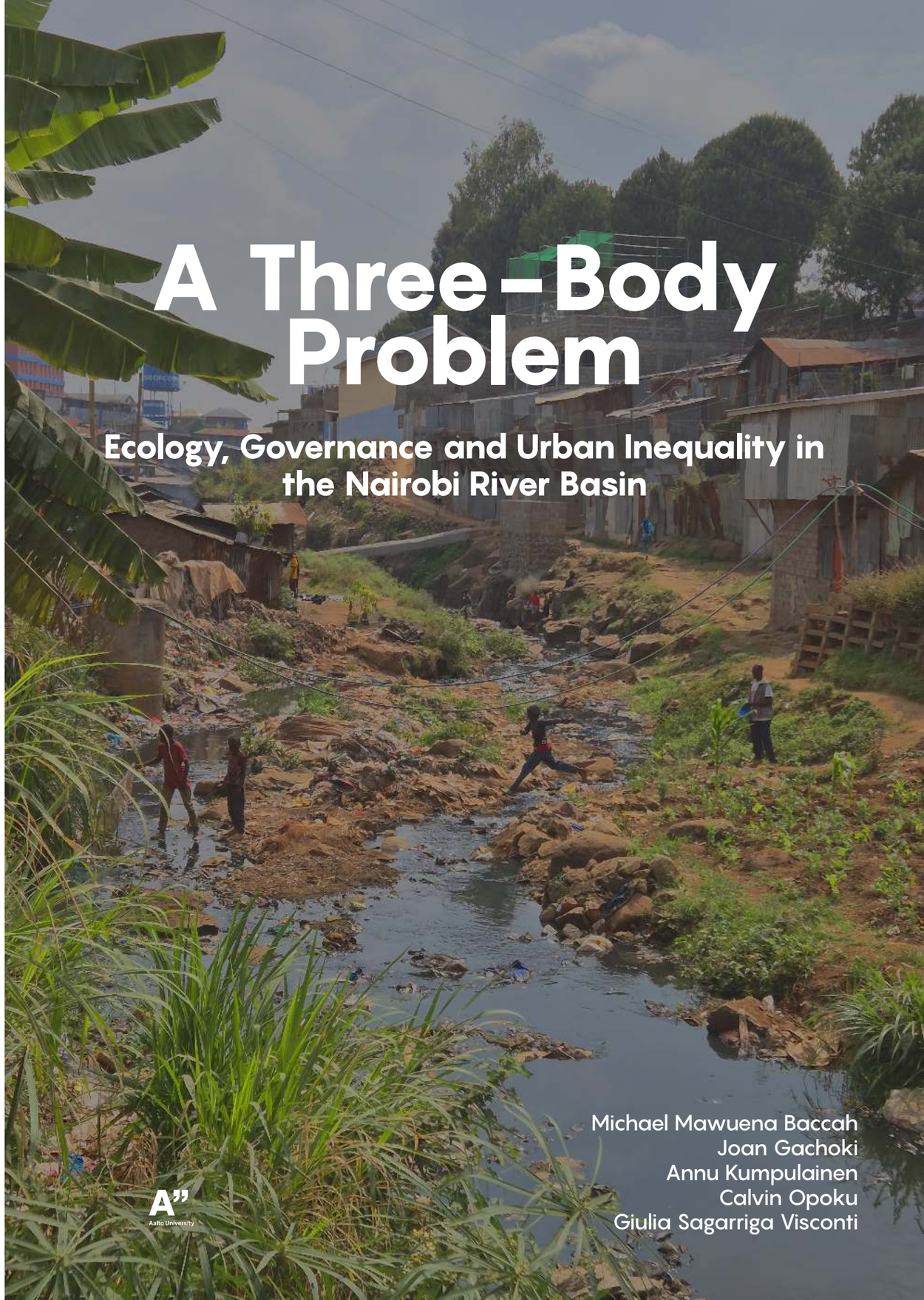
Keywords: Nairobi River Basin, Governance, Systems Thinking, Informal Settlements, Community-Led Planning.

Aalto University publication series
Art, Design, Architecture 2/2026

ISBN 978-952-64-3026-3 (pdf)
ISSN 1799-4861 (pdf)

A Three-Body Problem: Ecology, Governance and Urban Inequality in the Nairobi River Basin

Aalto University



A Three-Body Problem: Ecology, Governance and Urban Inequality in the Nairobi River Basin

Michael Mawuena Baccah, Joan Gachoki, Annu Kumpulainen, Calvin Opoku,
Giulia Sagarriga Visconti

This publication is produced during the Aalto WiT Programme 2025

Font: Pangram

ISBN 978-952-64-3026-3 (pdf)
ISSN 1799-4861 (pdf)

Aalto University publication series
Art, Design, Architecture 2/2026

Aalto WiT Programme
Aalto University School of Arts, Design and Architecture (Aalto ARTS)
Department of Architecture, Aalto WiTLAB
https://www.aalto.fi/en/wit-programme

© This work is licensed under CC BY-SA 4.0. To view a copy of this license, visit
https:// creativecommons.org/licenses/by-sa/4.0/

A Three-Body Problem: Ecology, Governance and Urban Inequality in the Nairobi River Basin

Michael Mawuena Baccah
Joan Gachoki
Annu Kumpulainen
Calvin Opoku
Giulia Sagarriga Visconti

Contents

Foreword 8

Team 10

Acknowledgements 12

Abstract 13

Introduction 14

1 Background 16

2 Problem Statement 20

3 Research Aims, Questions, and Objectives 21

Literature Review 22

4 Nairobi's Urban and River Context 24

5 Urban Rivers and Environmental Degardation 28

6 Social Inequality, Informality and Vulnerability 32

7 Governance and Planning Approaches 36

8 Community action and Collaboration 40

9 Theoretical Foundation 42

Process 44

10 Key Actors 46

11 Methods 50

Findings 60

12 Main Findings 62

13 Reflection 74

14 Nairobi Rivers' Degradation: Unveiling the Hidden Depths 76

15 How Governance and Politics Shape Nairobi River Regeneration 86

16 Why a Government Mindset Shift Is Essential in Planning for Nairobi's Informal Settlements 90

17 Community Participation and Sustainable Urban Development 96

18 Displacement of Communities 102

Conclusion 112

Ethical Considerations 116

Interactive Mapping Platform for Nairobi Rivers 120

19 Introduction 122

20 Analysis of Existing Digital Interactive Maps 124

21 Framework for the Nairobi Rivers Interactive Mapping Platform 128

References 138

Foreword

In a world shaped by increasing polarisation, environmental fragility, and uneven access to resources, the need to build meaningful connections across cultures, geographies, and knowledge systems has never been greater. Dominant global narratives continue to centre Western ways of knowing, leaving indigenous and local knowledge undervalued despite its deep relevance to resilience and community well-being. At this moment of profound transition, it is essential to create platforms where diverse epistemologies can meet, challenge one another, and co-create new possibilities for equitable futures.

For decades, collaboration between Finland and partners in the Global South has sought to address this need, with education playing a central role. Finnish universities have long built relationships that foster shared learning, respect, and innovation across borders. The interdisciplinary WiT Programme, hosted by the World in Transition Research LAB (WiTLAB) at Aalto University, continues this tradition with renewed purpose. Established in 2024, the WiT programme brings together emerging professionals from a range of fields, architecture and landscape architecture, engineering, design, business, and the social sciences, to explore resilience in the context of the Global Majority and to engage in practices grounded in cultural locality, humanitarian principles, and decolonial thinking.

More than an academic initiative, the WiT Programme is a space of mutual learning. Over 3.5 months, participants engage in intensive study, critical dialogue, and hands-on collaboration with international partners. They examine global development, systems thinking, cultural heritage, and the ethical dimensions of fieldwork. They work directly with organisations in the development and humanitarian sectors to co-design context-responsive proposals that address real challenges faced by communities today. Through this approach, the programme nurtures practical skills and transformative ways of seeing, encouraging participants to question assumptions, recognise complexity, and value the diverse forms of knowledge required to navigate an uncertain future.

In September 2025, 18 participants from 11 countries gathered in Otaniemi, Espoo, and embarked on four case studies that reflect some pressing issues affecting communities across the Global South:

— Endangered tangible and intangible cultural heritage in Zanzibar,
— Healing environments in Rwanda,
— Riverside and informal settlement upgrading in Nairobi, and
— Sanitation and WASH improvements in Tanzania.

Supported by partners including UN-Habitat, UNESCO, NGOs, and local universities, participants immersed themselves in complex social, cultural, and environmental contexts. Through fieldwork, dialogue, and interdisciplinary teamwork, they developed project proposals that bring together research depth, ethical engagement, and imaginative design thinking.

From this shared journey, we witnessed how difference becomes a strength when held in mutual respect, and how collaboration, carefully facilitated and genuinely open, can carry teams through uncertainty, challenge, and discovery. The ideas and proposals emerging from this cohort demonstrate not only technical competence but a commitment to humility, curiosity, and solidarity. These qualities, we believe, are essential in any effort to create more resilient and just societies.

This publication presents the outcomes of one of the four WiT cases. It is a testament to the participants' dedication, the generosity of partner organisations, and the possibilities that arise when diverse voices come together with a shared purpose.

We hope that the work documented here will inspire new thinking, invite further research, and contribute to broader conversations on equitable development and community resilience.

The world needs perspectives that connect rather than divide, approaches that empower rather than impose, and practices that make a tangible difference. We offer this book as a small but meaningful contribution to that collective endeavour, and as an invitation to continue imagining and building a more inclusive future.

Saija Hollmén, Anna Koskinen,
Taru Niskanen, and Hani Tarabichi

WiT Programme, Aalto University

Team



Image 1: Michael Mawuena Baccah (left), Annu Kumpulainen, Joan Gachoki, Calvin Opoku, Saija Hollmén, Giulia Sagarriga Visconti

Michael Mawuena Baccah is a Ghanaian architect and emerging urban planner focused on humanitarian architecture, urban resilience, sustainable design, and the socio-spatial challenges of rapidly urbanizing cities, particularly inequality, informal settlements, and climate vulnerability in sub-Saharan Africa, with a strong commitment to community-centered and innovative design and planning approaches.

Joan Gachoki is a Kenyan urban planner and sustainability consultant interested in shaping African cities through smart, well-planned, and sustainably governed urban futures. Her work engages with urban governance, planning practice, and innovation to improve everyday urban life. Outside her work, she enjoys traveling the world and drawing inspiration from cities across cultures

Annu Kumpulainen is a Finnish architect and urban planner interested in humanitarian architecture and peripheral urbanization as well as social justice in urban context. She has worked in Chile and now expanding her knowledge on designing in African context.

Calvin Opoku is a geographer and business developer from Ghana, guided by a commitment to inclusive innovation and sustainability in the Global South. His work spans academic and industrial research in urban agriculture, renewable energies and sustainable mobility. Calvin also enjoys exploring innovations in digital and scientific technologies and their adaptations to Global South contexts.

Giulia Gabriella Sagarriga Visconti is an architect who obtained her Master's degree in Architectural and Urban Design from the University of Florence. Her academic research addressed the revitalization of deteriorating small-scale industrial coastal areas in the Mediterranean region and examined themes of indigenous vernacular architecture and anthropology, with particular reference to Melanesia and Polynesia. Her work has also engaged with ecological construction materials, including earth-based building techniques and bamboo architecture

Acknowledgements

This publication was developed through the World in Transition (WiT) Programme, whose interdisciplinary structure enabled critical engagement with complex urban and environmental challenges. We sincerely thank our mentors Prof. Saija Hollmén, Taru Niskanen, Hani Tarabichi, and Anna Koskinen, together with the programme's other tutors and mentors, for their guidance and critical feedback throughout the research process.

We are grateful to Sharon Ogoti and Solomon Karani of UN-Habitat for their coordination and support during the Nairobi fieldwork. Special thanks are extended to our local academic mentors Caleb Toroitich and Prof. Mugwima Bernard Njuguna, Ph.D. of JKUAT, and Dr. Margaret Ngima Macharia Kedogo of the University of Nairobi, for their invaluable insights and institutional support.

We sincerely thank the NGOs and community-based organisations who shared their time, knowledge, and experiences with us, including Kounkuey Design Initiative (KDI), SDI Kenya, Muungano wa Wanavijiji, Public Space Network, Mathare Social Justice Centre, KombGreen Solutions, and Madoya Tumaini, as well as other grassroots groups working along the Nairobi River corridor. We also acknowledge the Nairobi Rivers Commission and other government institutions for their openness and engagement.

Finally, we extend our appreciation to everyone who supported us in any capacity during this research and fieldwork in Nairobi, Kenya.

Abstract

Urban river degradation in Nairobi is often addressed through technical or enforcement-led interventions that overlook the complex social and institutional dynamics shaping environmental outcomes. Drawing on systems thinking, degrowth, climate justice, pluriversal and insurgent planning perspectives, this research examines the Nairobi River Basin as a "three-body problem," in which ecological systems, governance institutions, and marginalized urban communities interact in unstable and often conflicting ways. Based on qualitative fieldwork, interviews with government agencies, NGOs, and community-based organizations, alongside participatory mapping and field observations in Mathare, Kibera, Dandora and Korogocho, the study reveals how fragmented governance, infrastructural deficits, and social inequality mutually reinforce environmental degradation. While informal settlements are frequently blamed for pollution and riparian encroachment, the findings demonstrate that environmental vulnerability is structurally produced through exclusionary planning practices, selective enforcement, and chronic underinvestment in sanitation and waste infrastructure.

These dynamics have contributed to displacement rather than resilience, undermining both social trust and long-term ecological solutions. At the same time, community-led initiatives and NGO partnerships emerge as important forms of environmental stewardship, grounded in local knowledge, trust-building, and co-creation, challenging narratives that frame riverine communities as obstacles rather than contributors to regeneration. The paper argues that sustainable river regeneration in Nairobi requires a fundamental shift in governance approaches, from control-oriented regulation toward collaborative and inclusive planning that acknowledges the interdependence of environmental systems, political decision-making, and urban livelihoods. By framing Nairobi's river crisis as a relational systems challenge rather than a singular technical failure, the study contributes to broader debates on urban environmental justice, participatory planning, displacement, and institutional reform in the Global South.

Keywords: Nairobi River Basin, Governance, Systems Thinking, Informal Settlements, Community-Led Planning.



Image 2: Giulia Sagarriga Visconti

1 Background

Kenya is located in East Africa in the equatorial region between the African interior and the Indian Ocean. It borders Ethiopia and South Sudan to the north, Somalia to the east, Tanzania to the south, Uganda to the west, and Lake Victoria to the southwest, while the Indian Ocean forms its southeastern boundary. Covering an area of 580,000 square kilometres, Kenya encompasses a wide range of landscapes, including coastal plains, arid and semi-arid lands, fertile highlands, lakes, and mountain ecosystems. This geographical diversity supports significant ecological richness but also contributes to pronounced regional inequalities in development and resource access.

Administratively, Kenya is a republic with a devolved system of governance established under the 2010 Constitution, which created 47 county governments alongside the national government. This governance structure assigns counties responsibility for key services such as local planning, water provision, sanitation, and environmental management, while national institutions retain authority over policy, legislation, and major infrastructure. Kenya's population is estimated at over 50 million people, with rapid urbanization reshaping settlement patterns, economic activity, and environmental pressures. While agriculture remains a central pillar of the economy, urban-based services, manufacturing, and the informal sector play an increasingly important role in livelihoods and national growth.

Nairobi is Kenya's capital and largest city, located in the country's south-central highlands at an elevation of 1,500—1,800 metres above sea level. Nairobi is a major hub for finance, trade, diplomacy, and international organizations, hosting the headquarters of UN-Habitat and the United Nations Environment Programme (UNEP), as well as numerous multinational corporations and regional institutions.

Nairobi's contemporary river crisis is rooted in the city's historical formation, rapid urbanization, and persistent socio-spatial inequality. Founded in 1899 as a colonial railway depot on wetland terrain, Nairobi developed through planning systems that prioritized spatial control and selective infrastructure provision. These legacies continue to shape the city's uneven urban form, where more than 60% of residents now live in informal settlements, many of which are located along environmentally vulnerable river corridors.

The Nairobi River Basin — comprising the Nairobi, Mathare, and Ngong Rivers and their tributaries — structures the city's ecology and settlement patterns. Historically central to water supply and livelihoods, these rivers have become heavily polluted due to limited sewer coverage, insufficient wastewater treatment, industrial discharge, and inadequate solid-waste management. Pollution intensifies downstream as rivers pass through industrial areas and dense informal settlements such as Mathare, Kibera, Korogocho, and Dandora, exposing residents to flooding, disease, and environmental risk while simultaneously positioning them as targets of blame.

Efforts to rehabilitate the rivers have involved government agencies, NGOs, and community-based organizations operating at different scales. While recent institutional reforms, including the establishment of the Nairobi River Commission, aim to improve coordination, river regeneration is shaped by fragmented governance, procedural public participation, and contested interventions. Community-led initiatives and NGO partnerships demonstrate alternative approaches grounded in local knowledge, stewardship, and co-creation, underscoring the need to reframe river regeneration as a relational systems challenge rather than a purely technical exercise.



Image 3: Kenya is located in East Africa on the equator. Kenya's capital Nairobi is located in the country's south-central highlands.

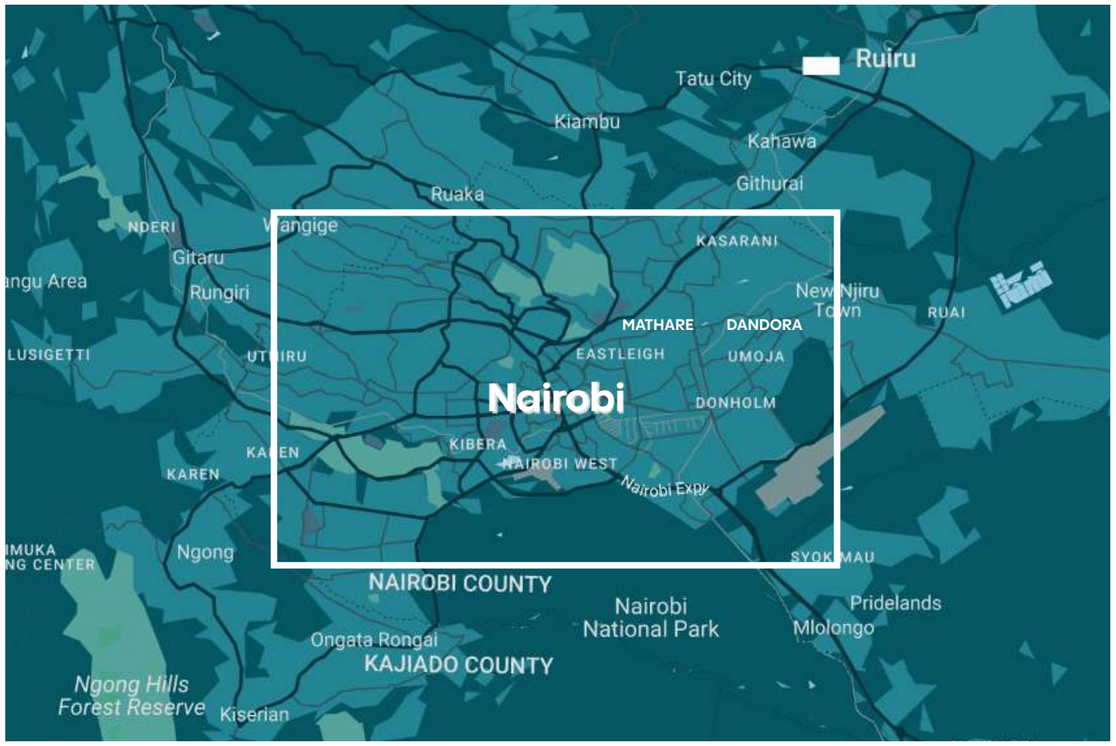
What Is "Riparian Land"?

In Kenya, the riparian land refers to the land along rivers and water bodies. According to the Constitution of Kenya (2010), the area between the lowest and highest water marks of a river is automatically public land. Beyond the high watermark, a buffer must be provided, which forms the riparian reserve. The exact width of this buffer varies across laws. According to Agricultural Act, the riparian land is 6 meters from the highest water mark, while Water Act and Environmental laws have different measurements. Newer guidelines commonly apply a 30-meter buffer zone that is widely used as precautionary standard. However, this width is not fixed universally. The appropriate riparian reserve depends on site-specific scientific assessment—considering factors like river bends, erosion patterns, floodplains, and cliffs. In the future, technical studies may adjust the buffer wider or narrower based on environmental risk. Currently, a 30m buffer is used until scientific assessment is completed. Land titles that fall within the 30-meter reserve can be contested in court. (Commission expert)

So, there is misalignment between different stakeholders on what the riparian zone means. When we interviewed a representative of The National Environment Management Authority (NEMA), which works under the Ministry of Environment, they talked about a 6 meter riparian zone. Nairobi River Commission acknowledged and explained to us the reason behind this. Nairobi County also confirmed the need to harmonize these laws. The issue, as Nairobi River Commission representative noted, is that there is still no comprehensive assessment done along the entire river.

The people in the affected areas, especially in the informal settlements, are not being explained well the definition of riparian zone, and how it is determined. The concept of riparian zone, riparian land or riparian reserve are widely used as justification for demolishing, but the term seems to vary when discussing the city upstream and downstream.

"*Riparian zone is different for different people*."
— Resident of Mathare



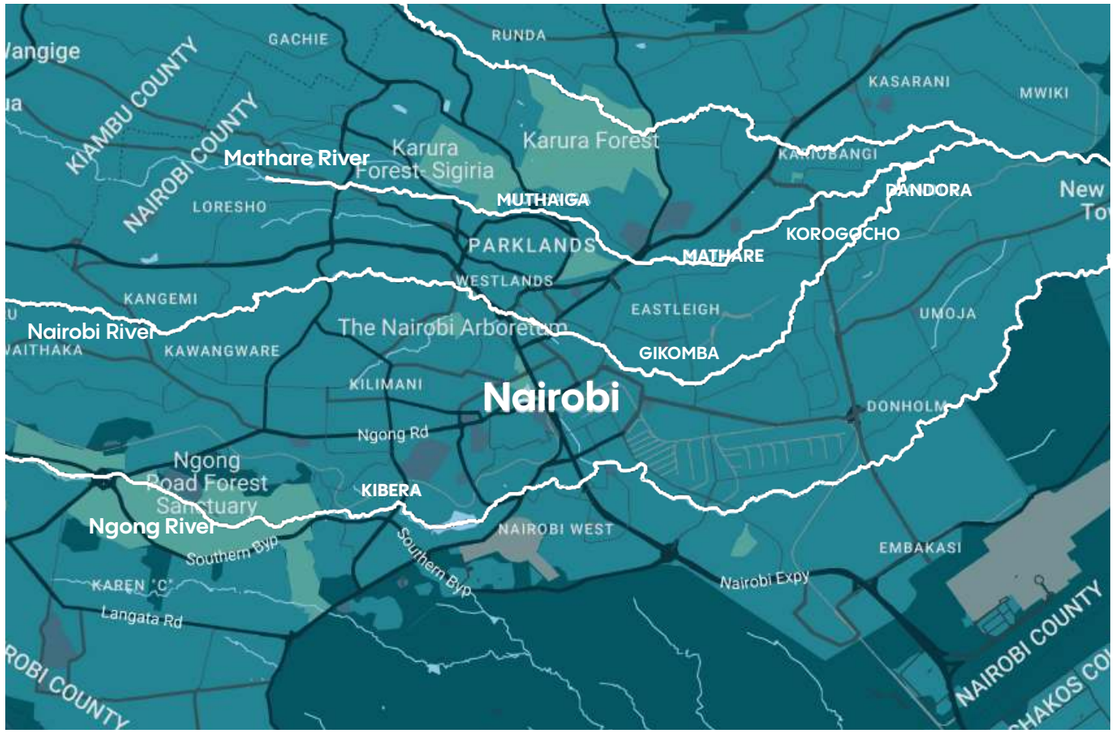


Image 4: Nairobi County with the Nairobi Rivers: Mathare, Nairobi and Ngong

2 Problem Statement

PROBLEM STATEMENT

Over the years, numerous initiatives have been undertaken to restore and rehabilitate the Nairobi River, including clean-up exercises, policy interventions, donor-funded projects, and community-based environmental actions (Muchiri & Opiyo, 2022; Poulman, 2022; Nyambura Ndichu et al., 2023; Odha, 2024). Despite these efforts, the ecological condition of the river has continued to deteriorate in many sections, characterised by persistent pollution, encroachment, weak enforcement of regulations, and loss of riparian ecosystems (Odha, 2024; Muketha, 2025; Opanga et al., 2025). This raises critical concerns regarding the effectiveness, sustainability, and coordination of the interventions implemented to date.

In response to the continued degradation of the river, the Nairobi River Commission (NRC) was recently established to provide institutional leadership and coordination for river regeneration efforts (UN-Habitat, 2023). However, prior to its formation, several non-governmental organisations (NGOs), community-based organisations (CBOs), and civil society actors had already been actively engaged in restoration initiatives along the river (Muchiri & Opiyo, 2022). The coexistence of multiple actors with overlapping mandates presents both an opportunity for collaboration and a risk of fragmentation, especially in the absence of a clear coordination framework (Murugi Muthungu, 2025).

Studies have uncovered that one of the key challenges observed in the regeneration process is inadequate coordination among stakeholders, coupled with weak integration of community perspectives through public participation (Ogega et al., n.d.; Mburu et al., 2024; Murugi Muthungu, 2025). While public participation is legally required, it is often



Image 5: Mathare Informal Settlement, 2025.
Annu Kumpulainen

conducted as a procedural formality rather than as a meaningful process for co-creating solutions with affected communities (Oriaso & Joshua, 2025b). This has resulted in mistrust, resistance, and in some cases, legal disputes between implementing institutions and local residents, undermining the effectiveness and legitimacy of regeneration efforts (African Development Fund, 2017; Fritz, 2021; Oriaso & Joshua, 2025a; The Eastleigh Voice, 2025).

This research therefore seeks to examine the institutional landscape of the Nairobi River regeneration process, with a focus on identifying key stakeholders, their respective roles, and the challenges and opportunities shaping their contributions. By analysing coordination mechanisms, stakeholder relationships, and public participation practices, the study aims to generate evidence-based insights to inform more inclusive, transparent, and effective governance structures for sustainable river restoration in Nairobi.

3 Research Aims, Questions and Objectives

RESEARCH AIM

To examine the institutional, governance, and participatory dynamics underpinning the Nairobi River regeneration initiative, assess stakeholder roles and coordination mechanisms, and evaluate the challenges and opportunities shaping the implementation of river regeneration initiatives, to inform evidence-based planning and governance for sustainable river restoration.



Image 6: Field visit in Kibera with KDI, 2025.
Michael Mawuena Baccah

RESEARCH QUESTIONS

1. What are the current environmental, social and infrastructural conditions of the Nairobi Rivers, and how do these dimensions interconnect?

2. Which regeneration projects related to the Nairobi Rivers are currently ongoing or have been completed, and what are their geographic distributions and focus areas?

3. How are stakeholder roles and coordination mechanisms defined when it comes to the planning and implementation of river regeneration initiatives?

4. What key challenges and opportunities shape the implementation of Nairobi Rivers Basin Regeneration Plans?



Image 7: Dandora Waterfall, 2025.
Giulia Sagarriga Visconti

RESEARCH OBJECTIVES

- To assess the current environmental, social, and infrastructural conditions of the Nairobi River Basin and analyse the interconnections among these dimensions.

- To identify and map ongoing and completed regeneration projects, including their geographic distribution, implementing actors, and thematic focus areas along the Nairobi Rivers.

- To examine stakeholder roles and coordination mechanisms in the planning and implementation of river regeneration initiatives.

- To analyse the key challenges and opportunities influencing the implementation of the Nairobi Rivers Basin Regeneration Plans.



Image 8: View of Nairobi River in Korogocho, 2025. Annu Kumpulainen

4 Nairobi's Urban and River Context

Brief history and growth of Nairobi

Nairobi's origins as a planned colonial settlement in 1899 fundamentally shaped its contemporary urban form and the environmental challenges it faces today. Established initially as a stopover point and headquarters for the Kenya-Uganda Railway workers, the city was built on what was primarily swampland traversed by multiple river systems (Wanjiru-Mwita & Giraut, 2020). The city's name, derived from the Maasai phrase Enkare Nairobi meaning "a place of cool waters", reflects the ecological reality that the site was selected precisely for its abundant freshwater resources (Kimari, 2021). Infrastructure development led to Nairobi being named the regional capital in 1907, reaching a population of 20,000 during the 1910s (The Brookings Institution, 2012).

The city's growth trajectory accelerated dramatically following Kenyan independence in 1963. At independence, Nairobi's population stood at approximately 350,000 residents; this grew to 3.1 millionin 2009 and 4.4 million by 2019 with current estimates suggest the metropolitan area now exceeds 5 million inhabitants (Kenya National Bureau of Statistics (KNBS), 2012; 2019). This represents exponential growth, with Nairobi experiencing annual urban growth rates of approximately 4% in recent decades, among the highest in Africa (UN DESA, 2022; World Bank, 2024). The city currently houses between 30% and 35% of Kenya's total urban population, far exceeding the 8-10% residing in Kenya's second-largest city, Mombasa (KNBS, 2019; UN-Habitat, 2022). This primacy reflects Nairobi's role not just as national capital but as one of East Africa's dominant economic and administrative hubs, hosting regional headquarters for numerous multinational corporations, UN agencies including UNEP and UN-Habitat, and serving as Kenya's primary gateway for international trade and investment (Onyango & Nganga, 2016).

However, this rapid urbanization has occurred without corresponding investment in infrastructure, spatial planning, or environmental management systems adequate to serve the growing population. The city's expansion has placed tremendous pressure on declining natural resources, limited utility services, and fragile environmental systems (KNBS, 2012).

Geographic location and the Nairobi, Mathare, and Ngong Rivers

Nairobi occupies a unique geographic position near the escarpment of the Great Rift Valley, situated at an elevation ranging between 1,500—1,800 metres above sea level. (Abuje et al., 2015; Nyika, 2017). This elevated location makes Nairobi's environs the source of numerous rivers and streams that flow eastward toward the Athi River system and ultimately to the Indian Ocean (Waturu et al., 2023). Unlike most global capital cities built along major rivers with landmark bridges, Nairobi is characterized by a maze of smaller rivers and streams collectively referred to as the Nairobi River Basin, a dendritic network of waterways that fundamentally structures the city's topography, ecology, and patterns of human settlement (Nyika, 2017; Kimari & Parish, 2020).

The Nairobi River Basin covers approximately 700 square kilometres, encompassing most of Nairobi City County and extending into adjacent peri-urban regions (Nyika, 2017). The basin comprises three main river systems, namely the Nairobi River, Ngong River, and Mathare River, along with multiple smaller tributaries including Gitathuru, Ruaraka, Mbagathi, Kamiti, Kasarani, Mutuari, and Riara (Nyika, 2017).



Image 9: View of Nairobi Central Business District, 2025. Annu Kumpulainen

These river systems flow generally eastward through varied topography from highland sources to flatter eastern plains, converging east of the city before meeting the Athi River, which forms part of the larger Athi-Galana-Sabaki system discharging into the Indian Ocean near Malindi (Muketha, 2025).

The Nairobi River, the basin's main stem, originates from Ondiri Swamp, a wetland that serves as the primary headwater, fed by streams from surrounding watersheds (Nyingi et al., 2013). From this source, the Nairobi River flows approximately 40 kilometres eastward, traversing peri-urban and densely urbanized landscapes including residential, commercial, and industrial zones within Nairobi City County before converging with the Athi River southeast of the city (Tana & Athi Rivers Development Authority, 2021).

The Mathare River, often considered interchangeably with its upper reach as the Gitathuru River, drains northern Nairobi's highlands and informal settlements. It emerges near Muthaiga in northern Nairobi, channelling through affluent residential areas and golf courses before descending into the densely populated Mathare Valley informal settlement (Mathare Social Justice Centre, 2024). The Mathare River system flows through areas with one of the highest densities recorded anywhere in Nairobi, reflecting the extreme concentration of human settlement in riparian zones (Thorn et al., 2015).

The Ngong River (also referred to as Motoine River in its upper reaches) originates from Motoine Swamp adjacent to Dagoretti Forest in southwestern Nairobi, flowing eastward for roughly 25 kilometres through peri-urban areas, Nairobi Dam and multiple informal settlements before converging with the Nairobi River on its southern bank near the city's industrial zones (Krhoda & Kwambuka, 2016; Ngatia et al., 2023). The river passes through Kibera, Africa's largest informal settlement, as well as the sprawling Mukuru settlements, carrying waste and pollutants from these densely populated areas (Krhoda & Kwambuka, 2016).

The basin's rivers flow through and connect all socioeconomic strata of the city, from highland forest sources through affluent suburbs, the commercial core, industrial zones, and dense informal settlements, making river health a shared concern that transcends administrative boundaries and social divisions. Yet the burden of river degradation falls disproportionately on informal settlement populations living in riparian zones, who experience direct exposure to pollution, recurrent flooding, waterborne diseases, and the threat of forced eviction justified by environmental restoration imperatives.

The major informal settlements in Nairobi

Kibera, the city's largest and most internationally recognized informal settlement, originated when Nubian soldiers returning from service with the King's African Rifles were allocated plots of land in 1904 as compensation for military service (Habitat International Coalition, n.d.; Pulitzer Centre, 2012). The British colonial government allowed the settlement to grow informally; the Nubians had no claim to land in "Native Reserves," and over time other ethnic groups moved into the area to rent from Nubian landlords. With Kenya's independence and the subsequent ruling that rendered Kibera an unauthorized settlement due to ambiguous land tenure, the population nevertheless continued to expand. By 1995, Kibera had transformed from a predominantly Nubian settlement into a predominantly Luo informal settlement as internal migration patterns shifted (Pulitzer Centre, 2012).

The 2009 Kenya Population and Housing Census reported Kibera's population as 170,070, though community organizations and academic studies have suggested substantially higher figures ranging from 200,000 to 400,000, reflecting contested boundaries and undercounting challenges inherent in informal settlement enumeration (Lüthi, 2016). Kibera occupies land adjacent to the Ngong River, with much of its southern border bounded by the river and Nairobi Dam. The settlement is divided into thirteen villages and two estates, including Kianda, Soweto East, Gatwekera, Kisumu Ndogo, Lindi, Laini Saba, Siranga, Makina, and Mashimoni, each reflecting distinct histories, ethnic compositions, and environmental conditions (Njeru et al., 2021; Ngatia et al., 2025).

Mathare, Nairobi's second-largest informal settlement, emerged from complex colonial and post-colonial dynamics (Njoroge et al., 2020). Before independence in 1963, Asian residents possessed an area known as Mathare where they had built a small village around 1921 (Mathare Slums Community Association, n.d.). When the State of Emergency was declared in 1952, British colonists razed the area, convinced it was a Mau Mau rebel stronghold. Subsequently, Mau Mau fighters, who were mostly Kikuyu, returned and settled permanently after the end of colonialism.

From local historical accounts of early settlements, a quarry discovered in the area attracted workers from surrounding regions who, prohibited from urban residence under colonial law, began building informal housing (Andvig et al., 2014). Following independence and the abolition of movement restrictions, massive rural-to-urban migration intensified Mathare's growth without any formal planning or infrastructure provision. Population estimates for Mathare range from 80,000 to 500,000 depending on boundary definitions, with the settlement covering 1.5 square kilometers and divided into villages including Bondeni, Kosovo, Mathare 4B, Mathare Number 10, Mathare 3A, Mathare 3C, Mabatini, and Mashimoni (KNBS, 2019; Muungano wa Wanavijiji et al., 2019).



Image 10: Mathare River, 2025. Annu Kumpulainen

5 Urban Rivers and Environmental Degradation

Urban rivers across the world have undergone profound transformations as cities have expanded, industrialized, and restructured their spatial and ecological systems. In much of the Global South, urban rivers continue to experience severe degradation. Rapid urbanization, insufficient wastewater networks, weak solid-waste systems, and unregulated industrial discharge have caused rivers to function less as ecological corridors and more as conduits for untreated waste (Chen et al., 2022; Omohwovo, 2024). This pattern is widely observed across Africa, Asia, and Latin America: in Lagos, the Ogun and Oshun rivers receive large volumes of domestic sewage and industrial waste due to the absence of comprehensive wastewater treatment facilities (Ikotun et al., 2012), while in Accra, the Odaw River Basin suffers from chronic pollution linked to inadequate drainage and plastic accumulation, contributing to frequent urban flooding (Ntajal et al., 2022). Parallel dynamics in Dhaka's Buriganga, Jakarta's Citarum, and Delhi's Yamuna Rivers reveal how industrial effluent and urban waste discharge have transformed major waterways into highly contaminated flows that undermine environmental health and urban liveability (UNEP, 2019).

However, in many industrialized Western contexts, urban rivers were historically central to economic development, serving as transport corridors, sources of drinking water, and focal points for urban identity (Wolf et al., 2021). Over the past several decades, however, these cities have invested heavily in wastewater treatment, solid-waste infrastructure, and ecological restoration according to Tella et al (2025). As a result, several well-known river systems, such as the Thames in London, the Hudson in New York, and the Rhine in Western Europe, have experienced significant ecological recovery following decades of pollution from industrial effluent and untreated sewage (Newton et al., 2023; Shubhankar et al., 2025). These rivers now serve as multifunctional assets, supporting recreation, tourism, biodiversity conservation, and high-value waterfront development. As Shubhankar et al. (2025) noted, these successes are strongly tied to strong regulatory frameworks, coordinated governance, and sustained investment in wastewater infrastructure.

Nairobi River Basin Within the Global and African Patterns

The Nairobi River Basin reflects many of these continent-wide and global dynamics. Like other African cities, Nairobi's rivers were historically central to its ecological and cultural landscapes. Yet the city's rapid expansion, coupled with limited wastewater and solid waste management infrastructure, much of which still dates back to colonial planning, has left the basin highly vulnerable to pollution (Owen, 2025; Rosetta W, 2022). Some studies show that less than 50% of Nairobi is connected to the city's formal sewage system with most informal settlements unserved, and that existing treatment facilities lack the capacity to handle the city's wastewater load (Lema, 2025; Ministry of Water Report, 2021; UN-Habitat, 2023). As a result, untreated sewage flows directly into urban streams, drains, and river channels according to Lema (2025).

Solid waste also contributes significantly to river degradation in Nairobi, mirroring the challenges seen globally in cities with inadequate waste-collection systems. According to Odha et al. (2024), plastic waste, organic refuse, and debris clog drainage systems and are carried into rivers during rainfall, creating blockages that exacerbate flooding during storm events. This challenge is worsened by the Dandora Dumpsite, the city's largest waste disposal site,



Image 11: Dandora Dumpsite, 2025. Giulia Sagarriga Visconti

which according to Munkholm (2025), receives over 2,000 tonnes of refuse daily and sits adjacent to river catchments where runoff and leachate infiltrate waterways, posing severe ecological and public-health risks (Munkholm, 2025; Omokaro et al., 2024).

As documented by Rosetta W. (2022), the upstream—downstream dynamic is evident in Nairobi. Cleaner headwaters near the Ondiri wetland progressively deteriorate as the river flows through densely populated and industrialized areas before entering polluted downstream sections near Dandora and Ruai.

Land-Use Pressures, Pollution and Flooding

Environmental degradation in urban rivers is closely intertwined with land-use change and hydrological stresses. Researchers argue that land scarcity and tenure insecurity push vulnerable populations onto riparian strips, steep slopes, or reclaimed wetlands that are inherently flood-prone (Balakrishnan et al., 2024; Rosetta W., 2022; Owuor et al., 2021). As land becomes further consolidated by formal settlements, informal expansion accelerates in environmentally sensitive areas lacking ecological buffers, creating a feedback loop where settlement patterns, pollution, and hydrological stress mutually reinforce risk. Riparian vegetations are cleared, wetlands are filled in, and impervious surfaces increase, accelerating stormwater runoff and increasing the velocity of river flows (Alshammari et al., 2023). As documented by UN-Habitat (2023), in cities where drainage and sewer networks are absent, solid waste is commonly disposed into waterways and informal drains not as a cultural preference, but as a systemic outcome of governance failure.

According to Owuor et al. (2021) in Nairobi, this pattern contributes to recurrent flooding in low-lying settlements such as Mathare, Korogocho, Madoya, Mukuru, and sections of Kibera. These areas absorb pollution from upstream while are also being blamed for contributing to environmental degradation. The rivers are mostly narrow and highly polluted, receiving untreated wastewater from both formal sewer overflows and informal settlements, solid waste from inadequate collection systems, industrial effluents, and agricultural runoff (Weru, 2012). Water quality monitoring reveals severe contamination: biochemical oxygen demand, chemical oxygen demand, total dissolved solids, total suspended solids, and conductivities consistently exceed safe standards, while dissolved oxygen levels fall below thresholds necessary to support aquatic life (Mbui et al., 2016). Heavy metal contamination, particularly lead and cadmium, has been detected at multiple sampling points, posing insidious long-term health risks to populations using river water or consuming crops irrigated with it (Njuguna et al., 2017; Kinuthia et al., 2020).

As seen in other African cities, this dual burden, being both recipients of pollution and targets of environmental blame, reinforces stigmatization and fuels policies premised on eviction rather than systemic environmental management (Cobbinah et al., 2023; Owuor et al., 2021).

This nexus of waste, sewage, land use, and flooding therefore reflects deep structural inequality rather than individual behavior which calls for integrated planning approaches that simultaneously address environmental governance, risk reduction, and social justice in African cities.



Image 12: Pollution affecting the Mathare River, 2025. Michael Mawuena Baccah

6 Social Inequality, Informality and Vulnerability

Poverty, limited services, and insecure living conditions

The proliferation of informal settlements represents Nairobi's most visible manifestation of spatial inequality and constitutes the primary human geography shaping interactions with river systems. Informal settlements as mentioned emerged during the colonial period when African populations, legally restricted from residing in European zones and unable to access formal housing markets, established unauthorized settlements on marginal land including riparian zones, steep slopes, and railway reserves (Ono & Kidokoro, 2020).

Nairobi's history of a racial segregation recently has become more socioeconomic. It is estimated that 60% of the population of Nairobi currently live in informal areas. (Iddi et al., 2024; Population Matters, 2024). The rivers show the socioeconomic divide in Nairobi as it flows through the city. Upstream, there are more green and affluent areas, while downstream - in the flood plains - are the densely populated neighborhoods. These areas lack proper infrastructure to protect the people against flooding and other threats. Many informal settlements in Nairobi are hardly visible in the cityscape, because they hide away in the river valleys.

Spatial inequality in Nairobi is not limited to the formal-informal binary, but manifests within informal settlements themselves. Geography determines dignity, where structures often located near main roads command higher rents and feature more durable construction, while those closest to rivers, the most environmentally hazardous locations, house the poorest residents in flimsy structures (SDI-Kenya, 2025). The women, who in the household are primarily responsible for childcare and sanitation, in context of infrastructure deficit experience disproportionate exposure to pollution and time poverty (Odeny., 2020). Children play near contaminated water, suffering elevated rates of diarrheal disease and other illnesses. Flooding during rainy seasons impacts those in low-lying riparian areas, with contaminated floodwaters entering homes, destroying possessions, and creating acute health emergencies (Weru, 2012).

According to UN-Habitat, the urban poor living in informal settlements are arguably the most vulnerable regarding the adverse impacts of climate change. These fragile and marginalized communities are often trapped at the intersection between unplanned, inefficient urban expansion, and vulnerable natural habitat, leaving them highly susceptible to climate hazards and disaster risks. (UN-Habitat, 2024)

In a Nairobi city report by African Cities Research Consortium (ACRC), researchers point out many issues affecting disproportionately the informal neighbourhoods in Nairobi such as inadequate housing, water scarcity, poor sanitation and waste management, lack of access to education, limited access to healthcare, inadequate transportation and cartels that control basic services. (Sverdlik et al., 2025)

Nairobi's informal settlements typically lack decent shelter and complementary systems. For instance, non-state service providers may clash amongst themselves or raise prices to create scarcity and undercut formalisation strategies (for example, water and electricity cartels). At the same time, these low-quality shelter and services can be extremely lucrative for private developers and politicians, who benefit from kickbacks. (Sverdlik et al., 2025)



Image 13: Kibera informal settlement, 2025. Michael Mawuena Baccah



Image 14: Mathare informal settlement, 2025. Michael Mawuena Baccah

According to Thorn et al. (2015), institutionalised development policies, such as risk reduction frameworks, do not result in practical solutions in Informal settlements. They are typically not given attention in these policies, and many recommendations remain too broad for local application (Kuyo, 2025). While the more affluent areas of the city have resources to "train the river"—building fences and barriers—the residents downstream face the power of the rivers firsthand but lack the resources to mitigate the effects. Also, limited land ownership and tenure insecurity in Nairobi hinder people's incentives to invest in permanent infrastructure to buffer themselves from flood events. (Thorn et al., 2015)

Informal settlements as essential yet marginalized urban contributors

The residents of informal settlements are often ignored as essential contributors to the city's economic dynamics. Ng'weno (2025) points out in her book on anti-urbanism that Nairobi is designed for temporary migrants who were not meant to stay. She claims that urban planning, policy, laws and administration have been geared toward "maintaining some people as temporary residents in order to make the city a permanent home for others". (Ng'weno, 2025) This attitude is still visible when looking at informal settlements. The people who are needed to create and maintain "modern," "futuristic," "world-class," or "global" cities are not wanted in these spaces once they are built.

According to research on climate adaptation by Anguelovski et al. (2016), land use plans in the name of climate adaptation or resilience can produce maladaptive outcomes for historically marginalized residents. Infrastructure investments, land use regulations, or new protected areas disproportionately affect or displace disadvantaged groups. Angulovski et al., (2016) also argue plans that protect economically valuable areas over low-income or minority neighbourhoods, frame adaptation as a private responsibility rather than a public good, failing to involve affected communities in the process. (Anguelovski et al., 2016)

Rights-based perspectives on housing and the city

Informal settlements, often viewed as illegitimate, makeshift, and temporary, are places experienced by many residents as permanent communities characterised by rapid environmental change. Eviction of residents and removal of illegal homes along the riverbanks is a present threat. Kenya's National Environmental Management Act, requiring a 30 m riparian buffer to reduce floodwater damage, sequester carbon and aid water purification (Muketha, 2020), may be easily used to justify removals.

Other than the Nairobi River Regeneration Project, essential infrastructures, affordable housing along the riparian reserve is also being built (Nzau et al., 2020). However, in many cases, this "affordable housing" is not actually affordable for people who live in informal settlements and work in the informal economy. According to African Cities Research Consortium (ACRC, 2022), proposed mortgage capitation targeting low-income earners is still far beyond the reach of most informal settlement residents. Rigon (2022) stated that many of the vulnerable communities see this housing as an attempt to displace and relocate them to the edges of the city. To some authorities, regeneration means beautification, which doesn't include showing vulnerable communities as part of the city (Rigon, 2022).

In Nairobi, the continuing alienation of the majority from formal planning is exacerbated by post-colonial neglect and, in more recent decades, also by neo-liberal patterns of development. (Nijman et al., 2023) According to the international NGO Centre on Housing Rights and Evictions (COHRE, 2014), the Kenyan government does not formally recognize the existence and rights of the residents of informal settlements. This is particularly in relation to their rights to be protected from forced eviction and to have access to basic services. The UN Commission on Human Rights has affirmed that the practice of forced eviction "constitutes a gross violation of human rights, in particular the right to adequate housing." (COHRE, 2014)

7 Governance and Planning Approaches

Urban regeneration initiatives are never merely technical exercises; they are deeply political processes shaped by institutional design, historical legacies, and power relations. The governance and planning failures that characterize many regeneration projects particularly in African cities are rooted in three interrelated challenges: fragmented institutional authority, colonial planning traditions, and weak regulatory enforcement. These dynamics are not unique to Nairobi but represent a broader pattern observed across post-colonial urban systems.

Fragmented Institutional Roles and Overlapping Mandates

The governance architecture of urban regeneration in many developing cities is characterized by institutional fragmentation and overlapping mandates, resulting in policy incoherence and weak coordination. Scholars have extensively documented how multiple agencies operating within unclear or competing mandates create administrative paralysis rather than collaborative governance (Ostrom, 2017; B. G. and P. J. Peters, 2000). In the absence of effective coordination mechanisms, regeneration projects often become contested by bureaucratic territories rather than coherent development programmes.

In African urban contexts, this problem is exacerbated by hybrid governance structures where national agencies, county governments, international donors, and quasi-autonomous development authorities operate simultaneously without clear line authority (Rakodi, 2003; UN-Habitat, 2018). Watson (2009) argues that institutional multiplicity has become a characteristic feature of African urban governance, producing "management without authority", as responsibilities are dispersed without corresponding accountability.

Urban political economy literature further demonstrates that fragmented institutions enable political capture, whereby elites and politically connected actors manipulate regulatory ambiguity to avoid compliance (Leftwich, 2000; North D.C., 1990). When authority is dispersed but power remains centralized, regulation becomes selective rather than systematic. This configuration transforms regeneration into a politically negotiated process rather than a planned developmental intervention (Swyngedouw, 2004).

Top-Down Planning Traditions Rooted in Colonial Models

Urban regeneration in post-colonial cities remains strongly influenced by colonial-era planning paradigms that prioritized spatial order, control, and segregation over social equity (Home, 2013; Myers, 2011). Colonial planning frameworks were primarily instruments for enforcing social hierarchy through spatial control rather than facilitating inclusive urban development. These legacies persist in contemporary regeneration practices that continue to favor top-down decision-making and technocratic planning models.

Watson (2014) critiques this persistence of imposed planning norms, arguing that African planning practice remains "structurally disconnected from lived urban realities" and is ill-equipped to manage rapid informal urbanization. Rather than accommodating urban informality, regeneration projects often replicate colonial urban logics by treating informal settlements as threats to order rather than expressions of socio-economic survival (Roy, 2005).

Yiftachel (2009) extends this critique by framing urban planning in post-colonial contexts as a form of "creeping apartheid," where spatial



Image 15: Recently built reinforced riverbeds in Nairobi River in Korogocho, 2025. Michael Mawuena Baccah

governance systematically marginalizes informality while legitimizing elite development enclaves. As a result, regeneration programmes frequently reproduce exclusionary patterns, displacing poor communities in the name of environmental improvement without addressing underlying inequalities (Watson, 2014).

Policy Gaps and Weak Enforcement in River Management

While policy frameworks for environmental management exist on paper, their implementation remains weak and highly politicized. Meadowcroft (2007) argues that environmental governance fails where institutions lack both authority and political backing. In such environments, regulation becomes symbolic rather than operational.

The expansion and persistence of informal settlements reflects structural failures in Kenya's urban land and housing systems rather than individual failure or moral shortcoming (Ono & Kidokoro, 2020). Nairobi's formal housing sector caters overwhelmingly to middle and upper-income populations, with less housing finance directed toward low-income housing despite the urban poor constituting the demographic majority (Mwau & Sverdlik, 2020). Restrictive planning regulations, expensive building standards, lack of serviced land, and high costs of urban living systematically exclude wage labourers from accessing formal housing, pushing them into informal settlements regardless of legal status (Jimmy, 2024). This creates a situation where informal settlement residence is not a choice but a necessity, making it the only housing option within economic reach of workers whose labour sustains the formal economy, yet whose compensation does not permit participation in formal housing markets.

In river regeneration, enforcement failure is often produced not by legal absence but by institutional unwillingness to confront powerful polluters (Yarime, M, 2011). When environmental agencies operate under political constraints, compliance is negotiated rather than enforced (Langbein & Kerwin, 1985). This has been observed across African urban river systems where regulatory agencies exist, but ecological conditions continue to decline due to elite intervention and administrative corruption (UNEP, 2019).

Nairobi River governance reflects what J Ferguson (1990) describes as "anti-politics machine" development where environmental projects are framed as neutral technical exercises while obscuring the political structures that determine failure or success. Under such governance, clean-up programmes replace structural infrastructure development, while visible investments substitute systemic reform.

Governance Failure as Structural, Not Accidental

Taken together, literature confirms that governance breakdown in urban regeneration is structural rather than incidental. State fragmentation, colonial legacies, and politicized enforcement combine to create institutionalized dysfunction. As Grindle (2012) notes, reform without institutional protection is "reform in name alone".

Institutional economics literature reinforces this view. North (1990) argues that weak institutions produce development dominated by short-term political incentives rather than long-term planning horizons. This is mirrored in urban governance where regeneration becomes politically cyclical rather than ecologically cumulative.

Swyngedouw (2004) ultimately reframes environmental governance as a struggle over power rather than resources, arguing that ecological outcomes are socially produced through political systems. Urban rivers degrade not because cities lack knowledge, but because governance arrangements distribute power without accountability (Odume et al., 2022).

8 Community Action and Collaboration

Public participation is widely acknowledged as a foundational principle of equitable and sustainable planning, particularly in contexts characterised by socio-spatial inequality and environmental risk. Rather than being limited to consultative mechanisms, participation is increasingly framed as a redistributive process through which communities affected by planning decisions gain influence over outcomes and assume responsibility for their long-term implications (Forester, 1989; Lachapelle, 2008).

Grassroots Environmental Initiatives and Insurgent Planning

Research on grassroots environmental initiatives in the Global South has progressively challenged conventional planning narratives by foregrounding the role of marginalised actors in the production of urban space. Miraftab's (2009) formulation of insurgent planning conceptualises informal settlements and community-driven practices as politically generative, emerging beyond formalised planning institutions and state control.

Although the legal precariousness of informality may expose communities to state manipulation, these same conditions foster counter-hegemonic mobilisation through which residents assert claims to urban space and resources (Miraftab, 2009). Within radical planning scholarship, development is thus understood as unfolding through the everyday practices of disenfranchised groups—such as squatters, migrants, and women—whose collective efforts in housing and infrastructure provision also cultivate forms of participatory democracy rooted in lived experience (Appadurai, 2019, as cited in Miraftab, 2009). Given that a substantial proportion of cities in the Global South have evolved through such processes of "insurgent urbanization," these grassroots initiatives represent a structural, rather than residual, dimension of urban development (Holston, n.d., as cited in Miraftab, 2009).

NGOs, Partnerships, and Participatory Co-Creation

According to Miraftab (2009), the role of NGOs and institutional partnerships in participatory planning remains contested within development theory. While NGOs frequently operate as intermediaries facilitating engagement, participation constrained to formal or "invited" spaces risks reproducing existing power asymmetries and neutralising more transformative forms of collective action (Miraftab, 2009).

People-centred development perspectives instead emphasise collaborative processes in which communities participate as co-creators and decision-makers, drawing upon local knowledge systems and relational trust (Otsuki, 2016). Lachapelle (2008) conceptualises this dynamic through the notion of a sense of ownership, highlighting how trust and perceived legitimacy shape whose voices carry weight and who assumes responsibility for outcomes over time.

Evidence from slum upgrading programmes further indicates that when residents are excluded from early stages of planning and design, participation often becomes procedural rather than substantive, undermining maintenance practices and long-term environmental sustainability (Cotton & Skinner, 1998). Taken together, these studies show that effective collaboration depends on moving beyond technocratic, top-down approaches toward participatory frameworks that redistribute decision-making power and treat local knowledge as legitimate expertise.



Image 16: Mathare informal settlement, 2025. Giulia Sagarriga Visconti.

9 Theoretical Foundation

This research is grounded in an integrated theoretical framework that combines systems thinking, degrowth theory, pluriversal and insurgent planning, as well as climate justice and urban vulnerability theory to examine the governance, environmental, and social dynamics shaping urban river systems and informal settlements in Nairobi.

Systems thinking provides the overarching analytical lens. Urban rivers are understood as complex socio-ecological systems in which land use, infrastructure, governance, social inequality, and environmental processes are interconnected. Meadows (2008) argues that interventions focused on isolated symptoms fail to address the structural feedback loops that continuously reproduce vulnerability. Voulvoulis et al. (2022) emphasize that sustainable urban water and environmental management requires integrated systems approaches that account for cross-sectoral interactions, institutional coordination, and long-term dynamics. In Nairobi, systems thinking reveals how fragmented governance, inadequate infrastructure, and exclusionary planning interact to intensify both environmental degradation and social risk along the rivers.

Degrowth theory challenges growth-oriented urban development models that prioritize land commodification, infrastructure expansion, and economic accumulation at the expense of ecological integrity and social equity. Scholars D'Alisa et al. (2014) and Kallis (2018) argue that environmental crises are rooted in economic systems that normalize overconsumption and externalize social and ecological costs. This perspective is relevant to Nairobi, where speculative land markets and infrastructure-led growth displace low-income populations to environmentally hazardous riverine spaces, while environmental degradation is treated as an acceptable byproduct of urban growth.

Pluriversal theory and insurgent planning perspectives address questions of governance and participation. Miraftab (2009) conceptualizes insurgent planning as the everyday practices through which marginalized communities claim space, rights, and recognition outside formal planning systems. Complementing this, Escobar's (2018) notion of the pluriverse emphasizes the legitimacy of multiple ways of knowing and planning rooted in local, lived experience. These theories frame community-led environmental stewardship, such as river clean-ups, public space creation, and ecological restoration, not as informal activity, but as legitimate planning practices that challenge top-down governance models.

Climate justice and urban vulnerability theory situates environmental risk within political, economic, and institutional structures rather than natural conditions alone. Watts and Bohle (1993) argue that vulnerability is socially produced through unequal access to resources, power, and protection. Schlosberg and Collins (2014) extend this argument by linking environmental justice to recognition, participation, and capabilities. In urban contexts, climate-related hazards disproportionately affect communities that are structurally excluded from formal planning systems and infrastructure provision (Dodman et al., 2019). This framework explains why communities along Nairobi's rivers face exposure to flooding and pollution despite contributing least to environmental degradation.

These theoretical perspectives support the central argument of this research: environmental degradation and vulnerability along Nairobi's rivers are not technical failures, but outcomes of governance mindsets rooted in exclusion. Addressing these challenges therefore requires a shift from control-oriented planning toward collaborative, community-led, and justice-centered approaches to urban governance.

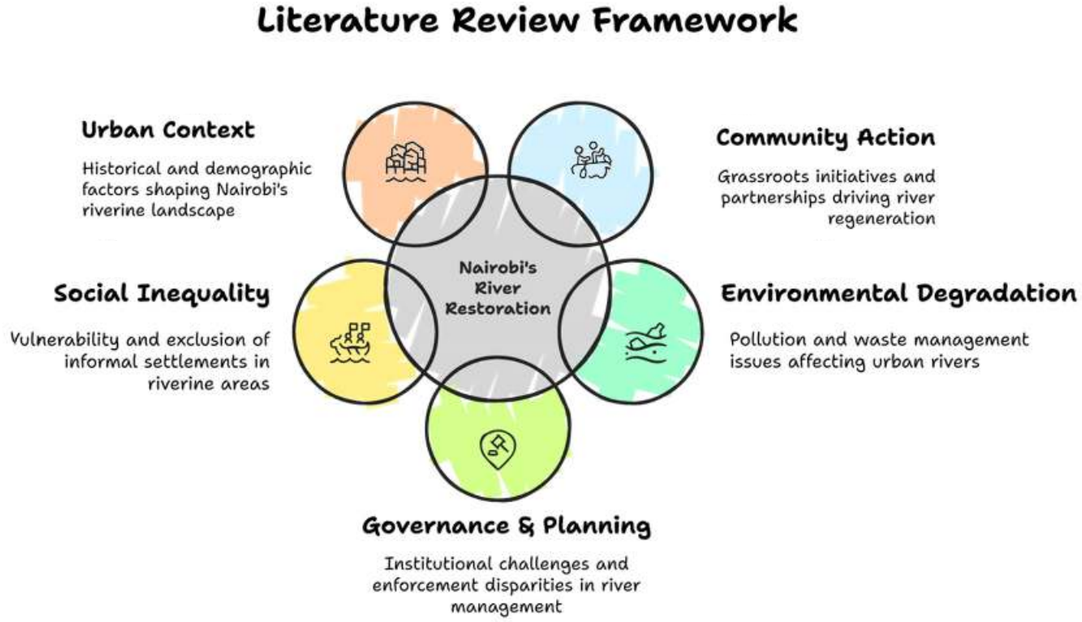


Image 17: Literature Review Framework on our five previous literature chapters 4-8

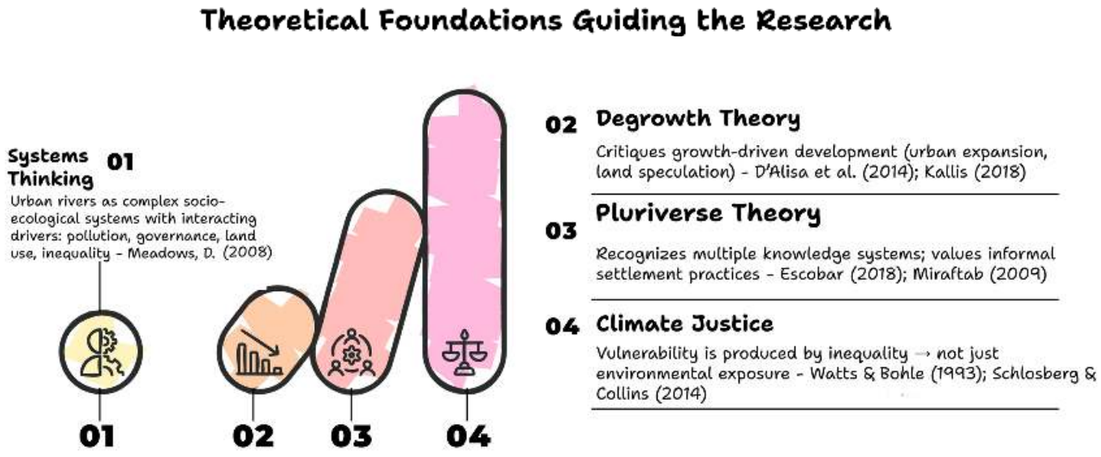


Image 18: Theoretical Foundation: Meadows (2008), Voulvoulis et al. (2022) D'Alisa et al. (2014), Kallis (2018), Escobar (2018), Miraftab (2009), Watts and Bohle (1993), Schlosberg and Collins (2014)



Image 19: Calvin Opoku, Michael Mawuena Baccah, Ann Nyambura, Sarah Wangari, Annu Kumpulainen, Saidia Bulle, Giulia Sagarriga Visconti. Photo: Anthony Mwoki

10 Key Actors

This stakeholder classification is based on qualitative field research, including semi-structured interviews with key actors, direct observation, and a review of institutional websites and project documentation.

For this study, stakeholders are structured into three layers to reflect differences in authority, scale of action, and proximity to communities. Government actors establish policy, provide regulation, and implement large-scale planning through formal legal mandates. This layer can be further divided into two levels: the National Government, which provides overarching policy direction and legislation, and the Nairobi City County Government, which implements planning and development at the metropolitan scale. While institutional mandates are continuous, political leadership at both levels follows a five-year electoral cycle.

Non-profit organizations (NGOs) operate as intermediaries, translating policy into practice through advocacy, design, and community-based programs, often bridging the gap between government institutions and local residents. Finally, community-based organizations (CBOs) and local actors represent lived experience and day-to-day stewardship of land and resources, ensuring that river interventions are socially grounded, locally relevant, and sustainable over time.

Within the Nairobi River Basin, these stakeholders participate in river management and rehabilitation through different roles and mandates. Notably, the Nairobi River Commission has only recently been instituted by the National Government with the specific aim of coordinating previously fragmented river-related initiatives and consolidating ongoing efforts under a single institutional framework.

1. Government

The **National Government** provides policy direction, legislation, and national development priorities. Institutional mandates are continuous, while political leadership typically follows a five-year electoral cycle.

Nairobi River Commission (NRC) is a special-purpose, inter-agency body focused on the rehabilitation, protection, and coordinated management of the Nairobi River ecosystem. Its mandate is to align environmental restoration efforts with urban development objectives by bringing together expertise and operational capacity from multiple ministries and agencies. The Commission is presidentially instituted rather than constitutionally established, which raises uncertainty regarding the continuity of its mandate and initiatives beyond future electoral cycles.

The **Ministry of Environment** is responsible for environmental policy, conservation, climate action, and oversight of environmental agencies under national legislation.
Initially, the Ministry served as the institutional home of the Nairobi River Commission. Although the Commission has since been relocated under another ministry, the Ministry of Environment retains key departments—such as Waste Management—that remain directly relevant to pollution control and river health within the Nairobi River Basin.

The **Ministry of Lands, Public Works, Housing and Urban Development** oversees land administration, housing policy, urban development, and public works. It plays a central role in spatial planning and infrastructure development along the river corridors. The Ministry recently became the institutional home of the Nairobi River Commission, likely following the enforcement of riparian zoning regulations

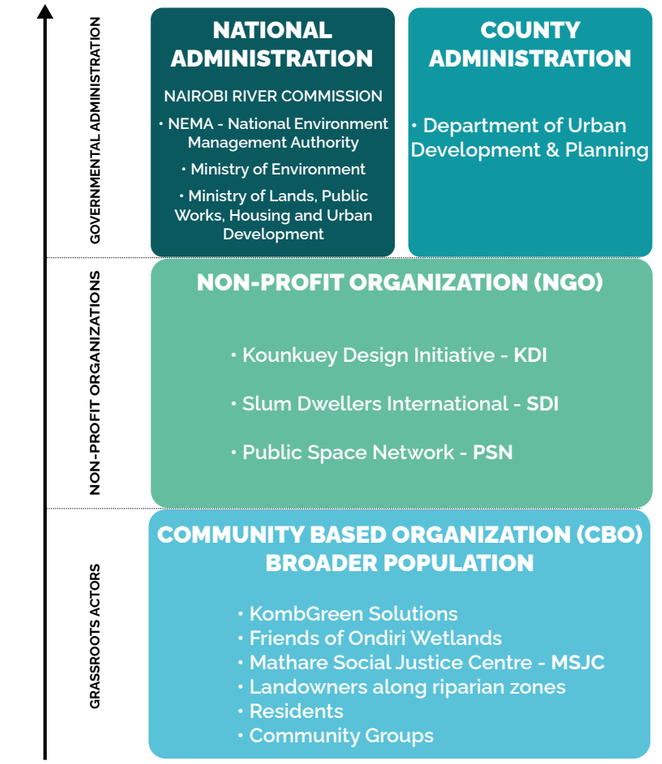


Image 20: Hierarchical Mapping of Key Actors.

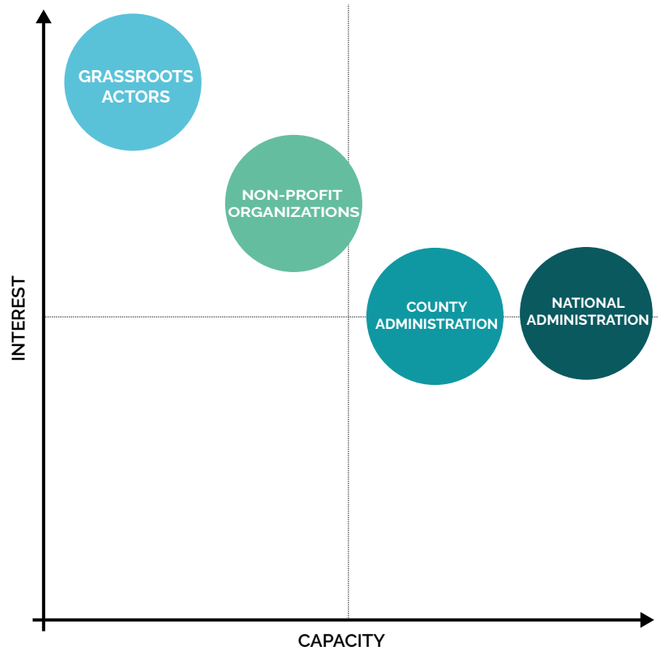


Image 21: Visualization of Stakeholders by Capacity and Interest

and the rollout of public housing programs linked to the relocation of communities from informal settlements situated along the riverbanks.

The **National Environment Management Authority (NEMA)** is a statutory regulatory agency with a permanent national mandate. NEMA is responsible for environmental licensing and enforcement, including Environmental Impact Assessments (EIAs/ESIAs), compliance monitoring, and pollution control. Along the Nairobi Rivers, it enforces environmental regulations related to effluent discharge, solid waste, and development within riparian zones.

The **Nairobi City County Government** implements planning and development at the metropolitan scale, with elected leadership serving five-year terms.

The **Department of Urban Development & Planning** is responsible for local spatial planning, zoning, development control, and urban regeneration within Nairobi County. The department plays a key role in river-adjacent development by regulating land use, approving developments, and ensuring compliance with riparian setback regulations and public access policies along the Nairobi River corridors.

2. Non-Profit Organizations (NGOs)

Non-profit organizations involved in the Nairobi River Basin are primarily funded by international donors, philanthropic foundations, development agencies, and public—private partnerships. They work closely with river-adjacent informal settlements and vulnerable communities, establishing strong collaborations with community-based organizations (CBOs) to ensure inclusive participation, local ownership, and long-term sustainability of projects after implementation. NGOs have a crucial role in stewardship, monitoring, maintenance, and social sustainability of river-related interventions.

Kounkuey Design Initiative (KDI) is an international NGO funded by philanthropic foundations and development partners. KDI collaborates with riverine communities to co-design flood-resilient public spaces, green infrastructure, and river-edge upgrading projects. In Nairobi, KDI has developed 11 projects within the Kibera informal settlement, applying a strongly participatory approach that actively involves local residents in planning, construction, and maintenance.

Slum Dwellers International (SDI) is a global network supported by international donors and development agencies. SDI facilitates community savings groups, participatory mapping, and community-led upgrading in informal settlements located along the Nairobi Rivers and their tributaries. Within this study, SDI's work was observed primarily in the Mathare informal settlement.

Public Space Network (PSN) is a locally based organization advocating for inclusive, safe, and accessible public spaces, including river corridors. For this study, projects in Dandora were examined.

3. Community-Based Organizations (CBOs) and Local Actors

These stakeholders have no formal political mandate but derive legitimacy from local presence, community membership, land tenure, and daily interaction with the rivers, playing a crucial role in stewardship, monitoring, maintenance, and social sustainability of river-related interventions.

KombGreen Solutions is a community-focused social enterprise promoting green solutions, waste management, and livelihood creation to reduce pollution entering the Nairobi Rivers. Activities include tree planting, greenhouse-based food and plant production for distribution within communities (particularly Korogocho), and social inclusion programs supporting women in vulnerable situations through training in skills such as painting, carpentry, and cabinet making.

Friends of Ondiri Wetlands is a grassroots conservation organisation dedicated to protecting the Ondiri Wetlands, a critical ecological buffer within the Nairobi River system. This CBO focuses on conservation advocacy, community awareness, and wetland restoration.

Riverside Youth Group is a local youth group maintaining and expanding Kibera Public Space Project 05 developed by KDI in Kibera. This CBO operates small-scale income-generating activities, such as a community car wash, to fund ongoing maintenance and stewardship of the site.

New Nairobi Dam Community Group is a CBO that partners with KDI on Kibera Public Space Project 01. The group has been involved since the project's inception and is responsible for maintaining the site, which includes a pavilion, office, garden, bridge, and gabions. The space also supports a savings and loans program, a women's craft cooperative, and a composting business.

Supermamas is a CBO formed by local women who produce bags and jewelry, with proceeds reinvested in community initiatives. The group is organized by young mothers with children living in Kibera.

Muungano wa Wanavijiji (SDI-affiliated) is a national federation of slum dwellers representing informal settlement communities. The group supports grassroots organization, advocacy, and upgrading initiatives along the Nairobi Rivers.

Mathare Social Justice Centre (MSJC) is a community-led organization advocating for environmental justice, equitable river access, and accountability in Mathare. Affiliated community groups include **Mothers of Victims, SunCity Youth Group, The Achievers Youth Group, and Miami Florida Youth Group**, all engaged in local advocacy, youth empowerment, environmental activities, and community support.

Landowners along riparian zones are private and institutional landowners whose land-use practices directly influence river health, erosion control, public access, and ecological restoration along the Nairobi River corridors.



Image 22: Visualization of Partners

Partners

The partners involved in this research project were primarily United Nations agencies, operating through the Nairobi River Basin Programme, which established the Nairobi River Joint Studio. This initiative aimed to address existing data gaps through research and spatial analysis, generate evidence-based recommendations for river regeneration, and develop interdisciplinary solutions that go beyond conventional planning approaches. It also focused on strengthening community awareness, participation, and co-creation processes, while facilitating skills transfer and mutual learning among institutions, students, and local communities.

Academic Partners
Aalto University, NTNU, JKUAT, and the University of Nairobi are academic partners that contributed research, river-basin analysis, design experimentation, and monitoring to support evidence-based rehabilitation of the Nairobi River.

United Nations Agencies have supported Nairobi River restoration through policy guidance, technical assistance, and funding, promoting integrated approaches to urban sustainability and ecosystem recovery.

11 Methods and Field Activities

This study adopted a methodological configuration that reflects the complexity, contested nature, and multi-actor governance landscape of the Nairobi River Basin. Given the socio-political, ecological, and institutional dimensions of the research problem, the methodological orientation was designed to capture not only observable conditions, but also underlying perspectives, power relations, and lived experiences that shape regeneration outcomes.

Research Philosophy: Transformative Paradigm

The enquiry was guided by a transformative worldview, which recognises that environmental research particularly in contexts involving urban inequality, ecological injustice, and institutional fragmentation, is inherently value-laden and political. The philosophy positions knowledge as a vehicle for social change, seeking not merely to document conditions but to challenge dominant narratives, empower marginalised stakeholders, and interrogate structural barriers affecting the Nairobi River Basin.

Research Design: Exploratory Orientation

The study employed an exploratory research design to uncover patterns, processes, and relationships that are insufficiently documented in existing literature. Given the fragmented and often opaque nature of data on river basin interventions, the exploratory design enabled the research team to engage flexibly with emergent issues, map unrecorded actors and initiatives, and refine analytical focus as new evidence surfaced during fieldwork. This design was instrumental in understanding not only what is happening along the river, but why it persists.

Research Approach: Qualitative Research Methods with Participatory Action Orientation

A qualitative research methods approach was adopted, forming the dominant analytical lens. This allowed for the triangulation of observable environmental conditions, institutional claims, and community-level practices, thereby enhancing credibility and depth. Central to the approach was Participatory Action Research (PAR), which positions stakeholders, notably community groups and local actors, as co-researchers rather than passive respondents (Reason & Bradbury, 2008, p. 34). The PAR orientation enabled joint interpretation of river conditions, collaborative mapping of ongoing interventions, as well as reflexive dialogue on river governance systems. This participatory stance ensured that the research process not only examined the Nairobi River regeneration ecosystem but also contributed to strengthening community agency within it.

Sampling Techniques: Convenience and Purposive Sampling

Sampling followed a hybrid strategy. Purposive sampling was used to identify institutions and organisations with substantive roles in river governance, infrastructure provision, policy enactment, or community mobilisation. This ensured inclusion of actors with relevant knowledge, authority, or experience. Convenience sampling complemented this selection in contexts where site access, availability of respondents, and operational constraints shaped the feasibility of engagement. This pragmatic approach was necessary due to fluid stakeholder schedules, dispersed field sites, and ongoing interventions.

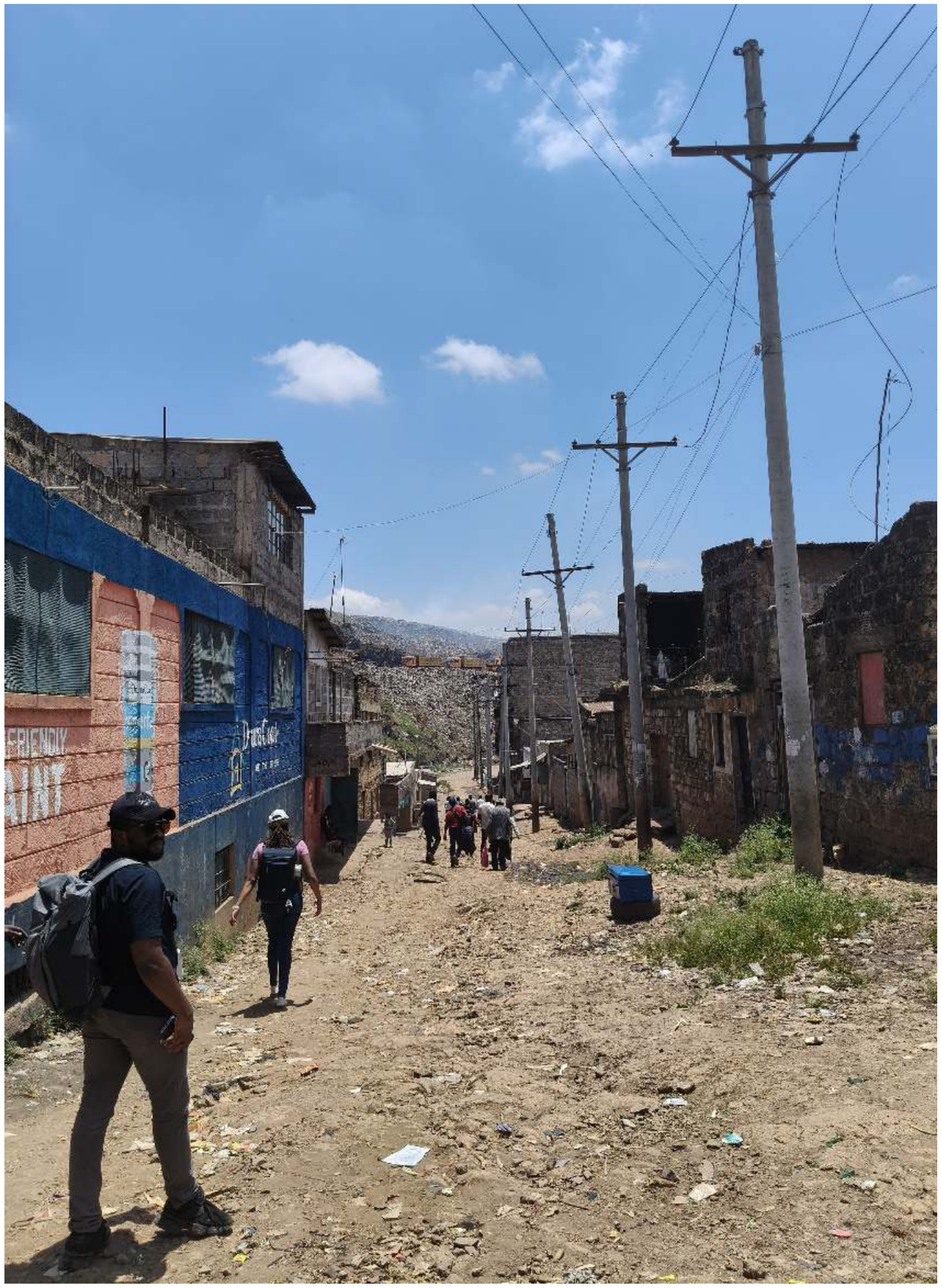


Image 23: Field observation in Dandora on the 15th of October 2025. Giulia Sagarriga Visconti

Data Collection Methods

Multiple data collection instruments were deployed to capture policy narratives, institutional practices, spatial conditions, and community knowledge systems.

1. Document and Literature Review

Prior to fieldwork, policy documents, academic studies, legal frameworks, and project reports were analyzed to identify key stakeholders, provide secondary data for triangulation, and contextualize findings

2. Field Observations

Direct observation of river segments, infrastructure, settlement patterns, and waste pathways provided empirical validation of reported conditions and insights into ecological and social patterns. Five site visits were conducted, summarized below:

Informal Settlements

- **Dandora & Korogocho (Oct 15)** - Facilitated by the UN and accompanied by the Public Space Network. In Dandora, we visited Dandora Community Park, a project of the Public Space Network, to observe community-led management of green public space. We also visited the Dandora dumpsite, the largest dumpsite in Kenya along the river, to document waste flows, environmental pressures, and the conditions of the surrounding informal settlement. In Korogocho, we met with KombGreen, who presented their ongoing environmental and community activities.
- **Kibera (Oct 23)** — Facilitated by the UN in collaboration with Kounkuey Design Initiative. Visited two projects along the Ngong River: Project 05, maintained by the Riverside Youth Group, and Project 01, maintained by the New Nairobi Dam Community Group, highlighting community stewardship, infrastructure maintenance, and integrated livelihood activities.
- **Mathare (Oct 24)** — Facilitated by the UN and accompanied by Muungano wa Wanavijiji (affiliated with Slum Dwellers International) for general settlement observations and river-related projects. Additionally, we visited the Mathare Social Justice Center independently to conduct a community project mapping exercise (Oct 31), engaging residents in participatory mapping and storytelling. This activity combined observation with direct community participation, providing insights into local practices, priorities, and spatial understanding of the settlement.

Other River Sites

- **Ondiri Wetlands (Oct 17)** — Coordinated directly with Friends of Ondiri Wetlands to visit the source of the Mathare River, documenting upstream ecological conditions and wetland conservation practices.
- **Hon. John N. Michuki Park (Oct 21)** — Observed the river stretch from the National Museum of Kenya to the Globe Roundabout Matatu station, recording urban pressures, pollution patterns, and interactions with built infrastructure.



Image 24: Dandora dumpsite, 2025. Annu Kumpulainen



Image 25: Kibera, 2025. Giulia Sagarriga Visconti



Image 26: Mathare, 2025. Annu Kumpulainen

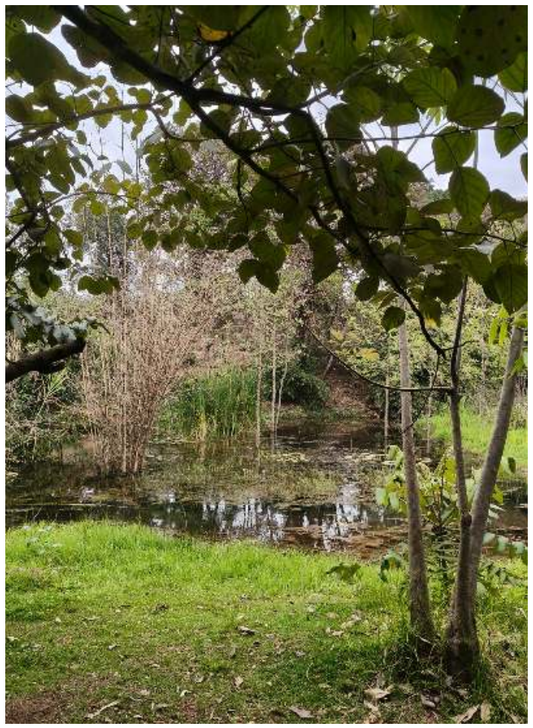


Image 27: Ondiri Wetland, 2025. Giulia Sagarriga Visconti

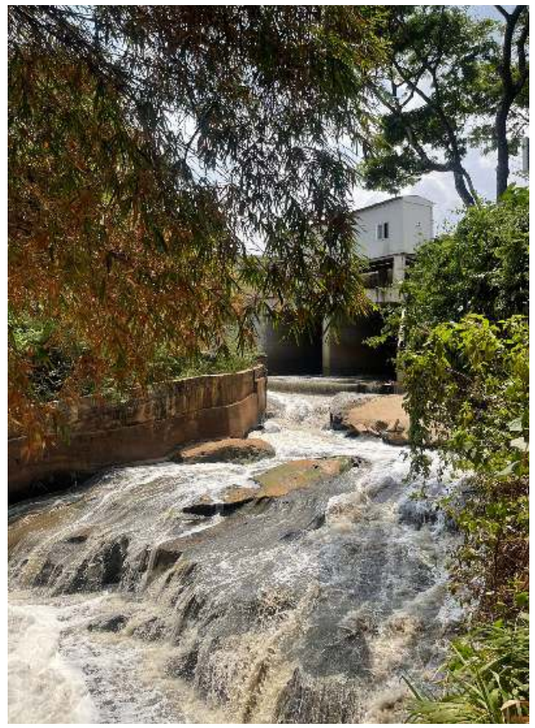


Image 28: Hon. John N. Michuki Park, 2025. Michael Mawuena Baccah

3. Semi-Structured Interviews

Semi-structured interviews were conducted throughout the fieldwork to capture the perspectives of government administrations, NGOs, CBOs, and academic stakeholders. The main aim was to understand both institutional positions and community-based insights regarding Nairobi River regeneration.

The interviews were structured around three main objectives:

- **Assessing the current conditions of the Nairobi Rivers** — Questions focused on environmental, social, and infrastructural dimensions, including institutional mandates, water quality, sewer connectivity, point-source pollution, riparian compliance, regulatory enforcement, and data management.
- **Mapping ongoing and completed projects** — Stakeholders described their programmes, coordination mechanisms, community engagement, monitoring practices, project inventories, sectoral funding allocation, overlap or duplication of efforts, and long-term maintenance responsibilities.
- **Identifying challenges and opportunities for river basin regeneration** — Questions explored policy guidance, implementation challenges, key successes, political or institutional misalignments, gaps in current frameworks, barriers to effective action, long-term funding strategies, enforcement rates, community incentives, and regulatory conflicts.

This semi-structured approach allowed the research team to collect both quantitative information (e.g., sewer coverage, enforcement rates, funding allocation) and qualitative insights (e.g., governance challenges, opportunities, and institutional perspectives), providing a comprehensive understanding of stakeholder roles, river conditions, and potential pathways for regeneration.

The interview structure was flexible, allowing follow-up questions and deeper exploration of emerging topics. Interviews typically lasted 1—1.5 hours and were preceded by a consent form, in which participants were informed of the research purpose, the team's role, and permissions for audio recording and photography. Questions were adapted depending on whether participants were government officials, NGO representatives, CBO members, or academics.

Most of the interviews were initiated through walk-in visits, which either led directly to interviews or to follow-up appointments scheduled for more in-depth discussions. This approach allowed the research team to engage a wider range of stakeholders and accommodate varying schedules.

A total of eleven interviews were conducted with the following stakeholders:

Administrative Stakeholders

- *Ministry of Environment* (22/10);
- *Department of Waste Management* (22/10);
- *NEMA,* National Environment Management Authority, Director of Environmental Enforcement (27/10);
- *NCG*, Nairobi County Government, Department of Urban Development & Planning (27/10);
- *NRC expert,* 2 experts from Nairobi River Commission (29,31/10);
- *UN*, United Nations — Urban Basic Services Section (30 Oct);

Non-Governmental Organization - NGOs

- *SDI*, Slum Dwellers International (28/10);
- *KDI*, Kounkuey Design Initiative (28/10);

Community-Based Organization - CBO

- *MSJC*, Mathare Social Justice (31/10);

Academic Stakeholders

- *Professor from Nairobi University* (29/10)

All interviews were transcribed following the fieldwork and used to inform the study's main findings. Engaging with government officials, NGO representatives, and community leaders allowed the team to identify governance bottlenecks, role ambiguities, intervention strategies, and perceptions of basin-wide challenges.



Image 29: Interview with Nairobi River Commission Expert. Michael Mawuena Baccah



Image 30: Interview with Slum Dwellers International. Michael Mawuena Baccah



Image 31: Interview with UN-Habitat. Michael Mawuena Baccah



Image 32: Interview with NEMA. Michael Mawuena Baccah



Image 33: Mathare Social Justice, participatory mapping discussion. Giulia Sagarriga Visconti

4. Participatory Mapping

Participatory mapping is a part of Participatory Action Research (PAR) method (Reason & Bradbury, 2008). Since we had a short time and a large area to cover during our fieldwork, we wanted to focus on an activity that can be done concisely and that benefits also the local communities. We decided to work together with Mathare Social Justice Center (MSJC), because they are a community-based organization that has been working actively for a long time in Mathare, which was one of our focus areas. The members were also mainly residents, and they had done a lot of significant research related to the neighbourhood.

We wanted to create an encounter of knowledge exchange, where we could gather important local information related to places along the rivers, and support the residents in documenting their projects. We asked the participants to suggest us a route along the river in advance and think of important places to them: places of current projects, previous projects or places of memory. We would walk together the route they proposed while adding points of interest and stopping along the way. We prepared everyone beforehand a small map of the area, where each could take notes. In the end, we collected the information on a bigger map in the MSJC office. The walk was also photographed, captured on audio and video and drawn on the map.

During the walk, we heard about the history of Mathare as well as everyday struggles of living in the area. The group we engaged with, MSJC, had Ecological Justice campaign as well and they planted memorial trees along the river for the victims of police brutality and the floodings and demolitions. So, the interventions don't only have an ecological, but also social and collective memory aspect. These parks along the river are telling stories of the area and the people who inhabit it. After the exercise, we compiled all information of the walk and the original map and made a map of the area showing all interventions along the river with photographs.

"*We organize an ecological justice campaign. Trying to solve environmental crisis, where we have been experiencing ecological injustices. We are organizing through creating community parks, safe spaces for children and trying to advocate about the river to restore its ecosystem. We used to have fish in the river, but now we don't have. And that's what we are pushing.*"

"*Now Mathare Social Justice is who started to bring people together in Mathare, because of Mathare River. And we came here to plant memorial trees for people.*"

"*As we know, the riparian land in Mathare is for us. In Mathare riparian land along the river is for community. You see there; the community is not struggling with food. They plant food along the river.*"

Data Analysis: Qualitative Thematic Analysis

Data analysis followed a thematic analysis procedure, enabling systematic identification, categorisation, and interpretation of recurrent patterns. Interview transcripts, field notes, and mapping artefacts were inductively coded and clustered into thematic constructs aligned with the study objectives. Thematic analysis was particularly suited to uncovering cross-cutting issues such as institutional incoherence, socio-spatial inequality, community resilience, and environmental governance gaps that do not emerge from quantitative metrics alone.

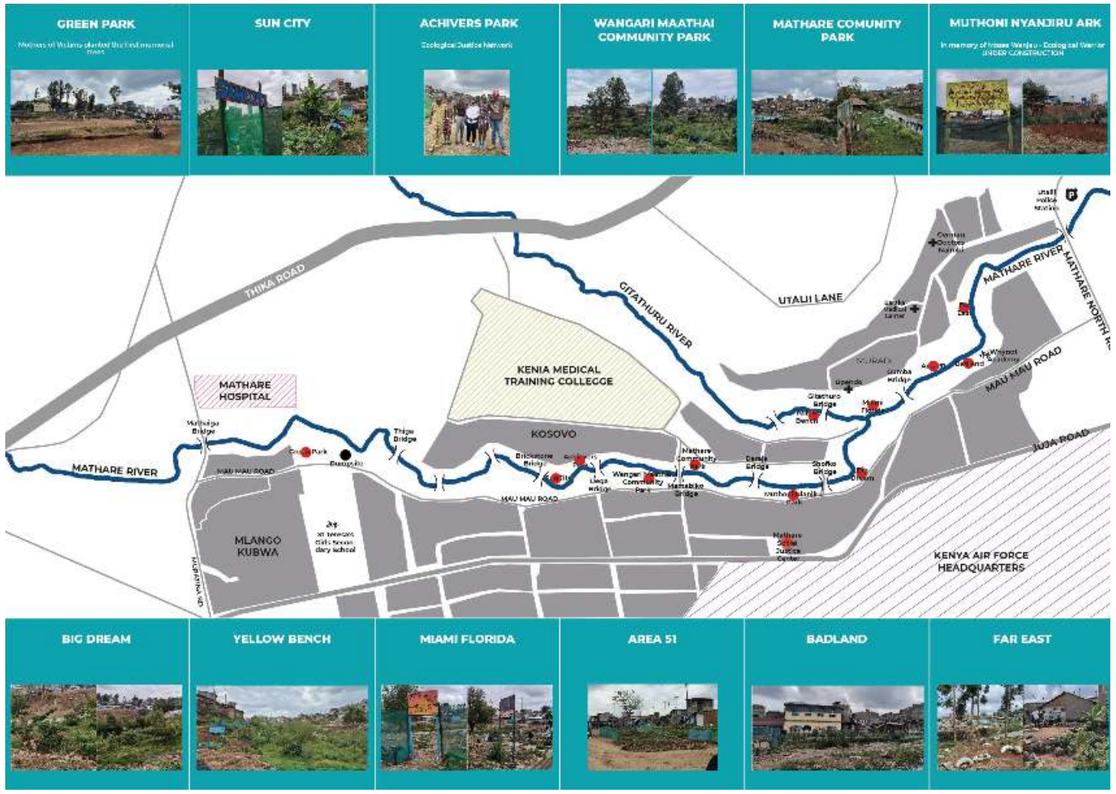


Image 34: Mathare Social Justice Center, participatory mapping result.



Image 35: MSJC, participatory mapping discussion. Michael Mawuena Baccah



Image 36: MSJC, Walkshop. Anthony Mwoki



Image 37: MSJC, Walkshop. Michael Mawuena Baccah



Image 38: MSJC, Walkshop. Michael Mawuena Baccah

WEEK 1

Day 2
(Oct 14, 2025)



NTNU Seminar at the University of Nairobi

Day 3
(Oct 15, 2025)



Mathare Site Visit, Dandora Dumpsite with UN-Habitat, Public Space Network, KombGreen

Day 4
(Oct 16, 2025)



Research Direction Meeting with Saija at Light Villas Hotel

Day 5
(Oct 17, 2025)



Ondiri Swamps Visit with Steven from Friends of Ondiri Wetlands (CBO)

WEEK 2

Day 9
(Oct 21, 2025)



Condition of the Nairobi River at National Museum of Kenya, Nairobi CBD

Day 10
(Oct 22, 2025)



Government Institutions Meetings: Meeting with the Director of Communications, National Environment Management Authority (NEMA)

Day 11
(Oct 23, 2025)



A tour with KDI along the Ngong River in Kibera (Aalto Team, UN-Habitat, JKUAT, Nairobi University)

Day 12
(Oct 24, 2025)



A meeting with Madoya Tumaini Community-Based Organization (CBO), Mathare (Aalto Team, SDI, UN-Habitat, JKUAT)

WEEK 3

Day 15
(Oct 27, 2025)



NEMA + Nairobi City County Government Interviews

Day 16
(Oct 28, 2025)



KDI & SDI Interviews

Day 17
(Oct 29, 2025)



Formal Interview Session with Dr Karisa, Commissioner at the Nairobi Rivers Commission — University of Nairobi

Day 18
(Oct 30, 2025)



Formal Interview Session with UN-Habitat — United Nations Office at Nairobi (UNON)

Day 19
(Oct 31, 2025)



Planning a Story telling Walkshop & Mapping Exercise with Mathare Social Justice Centre at their office

Image 39: Fleldwork timeline. WiT Programme - Nairobi, 2025



Image 40: Giulia Sagarriga Visconti

12 Main Findings

The field investigation across multiple segments of the Nairobi River Basin confirmed that the persistent degradation of the river system is not merely a product of environmental neglect, but a reflection of governance deficits, infrastructural failure and socio-economic tensions embedded within Nairobi's urban fabric. Although the basin hosts a diverse ecosystem of state actors, non-state agencies and community-led initiatives, their collective efforts remain fragmented, unevenly supported, and often misaligned with long-term ecological objectives. The findings below distil the dominant themes gleaned from our analysis of the field data.

Governance and Institutional Coordination

Evidence from interviews and document reviews indicate that governance of the Nairobi River Basin is marked by institutional fragmentation and overlapping mandates. Multiple public agencies, including the National Environment Management Authority (NEMA), the Water Resources Authority, Nairobi City County, and the Nairobi Rivers Commission, exercise concurrent authority over riparian regulation, environmental management, housing, infrastructure, and urban development. However, many of the respondents consistently reported limited formal mechanisms for inter-agency coordination, resulting in contradictory authority, uneven enforcement, and delays in implementation. This fragmentation is most visible in the inconsistent interpretation and application of riparian buffer standards. One county official highlighted this lack of harmonisation, stating: "*We have a very huge problem of harmonisation of policies... 10 meters, 30 meters, 6 meters,*" illustrating how parallel regulatory frameworks operate without alignment across institutions (Nairobi City County). Similar observations emerged across interviews, suggesting that regulatory instruments exist largely in isolation rather than as part of an integrated basin-wide governance system.

Political and administrative instability further compounded these coordination challenges. Several respondents emphasised that frequent changes in political leadership and senior management disrupt institutional continuity. As one official explained, "*After every five years, you're not guaranteed the same CEO... hampering the projects,*" indicating how electoral cycles interrupt long-term planning and weaken institutional memory (Nairobi City County). Some interviewees also noted competitive rather than collaborative dynamics between agencies, with one respondent observing that "*each department wants to stand out... there's room for improvement,*" pointing to siloed operational cultures. Even at the community level, practitioners and NGO representatives reported that these governance gaps translate into uncertainty over institutional responsibility. Communities and CBOs often struggle to identify which agency is accountable for specific interventions, leading to stalled projects and diminished trust in public institutions. One NGO practitioner summarised this challenge by noting that communities are frequently left with "*no clear answer on who is responsible for what*".

Systems thinking argues that these patterns of government are representative of the ineffectiveness of piecemeal, linear problem-solving in dealing with complex urban issues. Sustainable environmental management, according to Voulvoulis et al. (2022), necessitates awareness of feedback loops and cross-sectoral integration, yet, the institutional structure in Nairobi functions due to mandates that are siloed, which hinders such integration. According to Kallis (2018), environmental



Image 41: Mathare Informal Settlement, Unequal Riparian Area, 2025. Giulia Sagarriga Visconti



Figure 1: Meeting with the Nairobi County Government

preservation is seen as fitting within the logic of growth-oriented urban development rather than standing in opposition to it. This is demonstrated by the selective implementation of riparian restrictions. While official developments that intrude on riparian zones are frequently left alone due to their economic and political significance, informal settlements are subject to removal under the guise of environmental rehabilitation. Environmental restrictions are not universally applied to protect ecological integrity, but rather to benefit property and accumulation interests, as shown by this uneven enforcement.

The policy-implementation gap sheds light on the shortcomings of technocratic administration, as identified by pluriversal and insurgent planning theory (Miraftab, 2009; Escobar, 2018). Respondents' accounts of political meddling and corruption reveal systemic power imbalances in the realm of environmental governance. According to climate justice frameworks (Schlosberg & Collins, 2014), the division of power in politics and the economy dictates who gets their environmental rights violated and who doesn't. Vulnerable communities cannot fight police efforts, but developers with connections can. Technically speaking, this is not a failure of governance, rather, it is governance that is based on power relations that consistently prioritise particular interests over the collective ecological wellbeing.

Economic Constraints and Funding Prioritization

Interview data consistently identified budgetary limitations as a central constraint shaping river regeneration efforts within the Nairobi River Basin. Government officials across multiple agencies emphasised that environmental and river restoration initiatives operate within tightly constrained financial envelopes, with funding routinely prioritised toward politically visible infrastructure projects rather than ecological systems, long-term maintenance, or participatory processes. As one senior official from the Ministry responsible for waste management acknowledged, "*environment is not prioritised and waste management is even worse,*" noting that environmental departments are often among the least resourced within county governance structures.

Respondents further described a disconnect between approved river restoration plans and actual budgetary allocations. While ambitious strategies are frequently endorsed at policy level, they are rarely matched with sufficient or sustained funding. Ministry of Environment representative explained that once limited resources are distributed across competing priorities, "*you only get what you get, then you have to prioritise again,*" often reducing interventions to short-term or symbolic actions rather than systemic solutions.

Officials also highlighted how funding decisions are shaped by broader political priorities. Sectors such as health, housing, transport, agriculture, and food security were repeatedly cited as taking precedence over river restoration in budget allocation processes. As one government interviewee observed, "*the counties have a lot of issues, their priority might be health, agriculture, food security,*" leaving river-related investments marginal and episodic. Within this funding landscape, allocations for ecological rehabilitation, wastewater infrastructure upgrades, long-term maintenance, and public participation were identified as particularly weak.

The degrowth theory outlines systemic aspects of growth-oriented government, such as the fiscal marginalisation of river restoration (D'Alisa et al., 2014; Kallis, 2018). Government priorities are structured by measures of GDP growth, and expenditures in environmental protection are de-emphasised because they fail to produce obvious financial benefits, political support, or other indicators of economic success. Meadows (2008) and Voulvoulis et al. (2022) argue that the financing pattern, when viewed through the lens of systems thinking, is a feedback loop wherein immediate political incentives perpetuate environmental degradation over the long term. Instead of investing in ecological restoration, politicians choose to fund infrastructure projects like roads, buildings, and service supply, which produce results within election cycles. Systems theory sees cross-sectoral, long-term coordination as vital for addressing complex environmental concerns (Voulvoulis et al., 2022). This generates a structural bias against it, as the funding mechanisms incentivise initiatives that are way out of sync with ecological timelines and systemic causality, which is why the river keeps getting worse despite all the planning.

The fact that ecological repair, maintenance and participation receive low funding demonstrates what pluriversal and insurgent planning frameworks criticise as technocratic governance that prioritises infrastructure above connections (Miraftab, 2009; Escobar, 2018). Participation is resourced minimally because it is understood as procedural requirement rather than generative process; maintenance is unfunded because it lacks visibility; ecological work is marginalised because its beneficiaries, including future generations, non-human species and marginalised communities, lack political voice. Climate justice frameworks reveal how funding prioritisation operates as a mechanism distributing environmental burdens inequitably (Schlosberg & Collins, 2014; Dodman et al., 2023). When rivers lack resources for restoration, pollution and flooding intensify. Meanwhile, resources flow toward infrastructure serving wealthier areas and economic growth objectives. The budget is not neutral, rather, it is a political instrument through which structural inequalities in environmental exposure are materially produced and maintained.

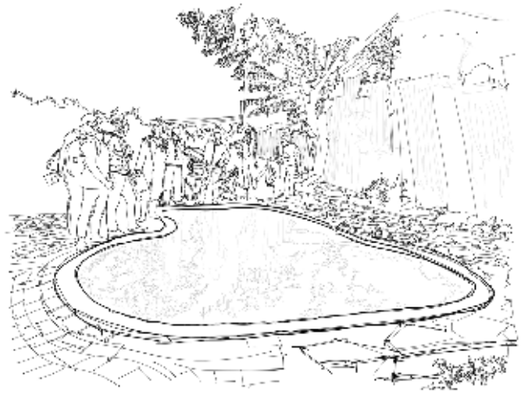


Figure 2: Engagement with KombGreen, A CBO in Dandora

Ecological and Environmental Sustainability Challenges

The ecological condition of the Nairobi River Basin reflects decades of cumulative environmental degradation that ongoing restoration efforts have struggled to reverse. Across the basin, interviewees consistently described ecological priorities as contested and unstable, shaped by persistent tensions between environmental conservation and immediate socio-economic imperatives. Several respondents emphasised that ecological objectives are frequently subordinated to development pressures, with one environmental officer noting that "*environmental restoration is always competing with housing, roads, and livelihoods, and usually the environment loses*" (National agency).

In practice, these competing demands generate a zero-sum dynamic in which environmental protection is perceived as incompatible with survival and livelihood needs. A community-facing practitioner explained that "*you cannot tell someone to protect the river when that river is the only space left for their shelter or income*" (Civil-society actor), highlighting how ecological goals become socially and politically volatile in contexts of scarcity. Interviews further revealed that rehabilitation initiatives in riparian zones are frequently undermined by competing land uses, short-term infrastructure projects, and pressures to accommodate housing and informal economic activity within river corridors.

A recurring challenge identified across interviews is the absence of clearly defined ecological thresholds and restoration benchmarks. One technical expert observed that "*we talk about cleaning the river, but there is no shared agreement on what a 'restored' river actually looks like*" (River-basin specialist). Respondents noted that without agreed standards for water quality, riparian buffer integrity, or ecosystem functionality, it becomes difficult to assess progress, enforce compliance, or measure ecological impact over time. As a result, interventions remain isolated and project-based rather than guided by ecosystem-wide objectives.

One of the problems with growth-oriented urban development that degrowth theory points out is how socio-economic imperatives take precedence over ecological priorities (D'Alisa et al., 2014). The river becomes a sacrifice zone, ecologically degraded so that development can proceed unimpeded. Yet this framing obscures a false choice. Systems thinking reveals that ecological degradation and socio-economic wellbeing are not genuinely in competition but are interconnected within urban socio-ecological systems (Meadows, 2008; Voulvoulis et al., 2022). River pollution creates health costs, flooding destroys livelihoods, and environmental decline undermines the ecosystem services that informal economies depend upon. The absence of ecological thresholds and restoration benchmarks further demonstrates the many technocratic governance failures that pluriversal planning perspectives often critique

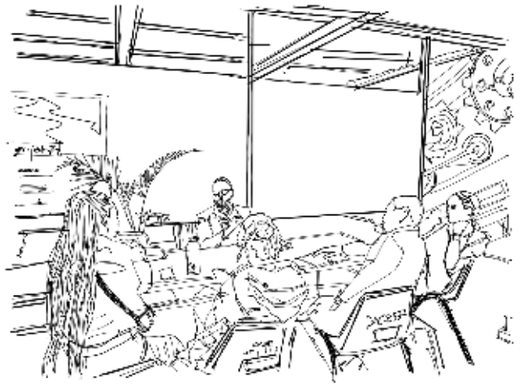


Figure 3: Interview session with NRC representative
.

(Escobar, 2018). Without agreed standards, restoration becomes whatever interventions are politically convenient or donor-funded, rather than guided by ecological science or community-defined priorities. This allows for symbolic interventions like cleanups and tree plantings to substitute for systemic transformation. The river's ecological condition thus becomes negotiable rather than grounded in scientific necessity or community needs.

Waste Management and Infrastructure Deficit

Infrastructural inadequacies emerged as a central driver of river pollution across the Nairobi River Basin. Interviews with government officials, regulators, and civil-society actors consistently identified weak sewerage systems and fragmented waste-management infrastructure as contributors to river degradation. One regulatory actor emphasised that the challenge is systemic, explaining that "*the sewer coverage is very low compared to the population growth, and what exists is overstretched*" (Water-sector official). As a result, untreated wastewater frequently enters open drains and river channels, embedding pollution into the everyday functioning of the city. Respondents also stressed that infrastructural failure is not confined to informal settlements. A county planner noted that "*you find illegal connections even in planned areas, especially where the old sewer lines have collapsed*" (Nairobi City County), highlighting that formal neighbourhoods also contribute significantly to river pollution through damaged infrastructure and unregulated discharge. Despite this, institutional discourse often continues to associate waste generation primarily with informality. During field discussions, one official acknowledged that "*it is easier to point fingers at informal settlements than to admit that the city infrastructure itself is failing*" (County official). The absence of an integrated waste-management strategy further entrenches these challenges. Several informants described a linear waste system in which collection, transport, and disposal are poorly coordinated. One interviewee observed that "*once waste enters the drainage system, there is no mechanism to intercept it before it reaches the river*" (Environmental NGO), reinforcing the role



Figure 4: Meeting with SDI and Muungano wa wanavijiji in Madoya Tumaini CBO

of rivers as de facto conduits within Nairobi's waste economy. This dynamic is intensified by the spatial concentration of disposal infrastructure around Dandora, where solid waste, leachate, and stormwater converge into downstream river sections.

The infrastructural inadequacies driving river pollution exemplify what systems thinking identifies as treating symptoms while ignoring structural causes (Meadows, 2008; Voulvoulis et al., 2022). Officials acknowledged sewerage coverage inadequate and existing systems as "overstretched". Still, the responses focus on cleaning rivers rather than building infrastructure that prevents pollution entering rivers initially. This reflects the linear problem-solving characteristic of fragmented governance, which addresses visible pollution downstream without intervening in waste generation and disposal systems upstream. The observation that infrastructure failure affects formal areas through collapsed sewer lines and illegal connections, not just informal settlements, challenges dominant narratives associating pollution with informality. Degrowth perspectives reveal how this narrative displacement operates, as characterising informal settlements as pollution sources obscures how growth-oriented urban expansion has systematically underinvested in waste infrastructure relative to population increase and economic activity (D'Alisa et al., 2014; Kallis, 2018). The absence of integrated waste management strategy highlights the fragmentation what systems thinking identifies as preventing effective intervention (Voulvoulis et al., 2022). When waste enters drainage with no mechanism to intercept it, the river becomes infrastructure - a waste conduit within urban metabolism. This reveals systemic failure towards understanding the river as a socio-ecological system rather than engineering infrastructure. Systems approaches recognise that waste management, water quality, land use and housing are interconnected; yet governance treats them through separate agencies with non-coordinating mandates.

Riparian Encroachment and Contestations Over Land Use

Riparian encroachment emerged as one of the most visible and contested challenges facing the Nairobi River Basin. Across both upstream and downstream sections, developments within legally designated riparian zones are widespread, ranging from formal residential estates and commercial buildings in wealthier areas to dense informal housing in low-income settlements. Government officials acknowledged that enforcing riparian setback requirements is constrained by political interference, institutional limitations, and the sheer scale of existing violations. A Nairobi County official noted that "*if you were to enforce the riparian law strictly, you would have to demolish half of the city,*" illustrating how deeply entrenched encroachment has become within Nairobi's urban fabric. Officials from the Nairobi Rivers Commission emphasised that the challenge lies less in the absence of regulation and more in its uneven application. One expert explained that "*the problem is not that the rules do not exist, but how they are applied on the ground.*" Representatives from NGOs highlighted that enforcement disproportionately targets those with the least power. Kounkuey Design Initiative (KDI) observed that "riparian regulation is mostly enforced where people have the least power," while SDI Kenya noted that "t*he river is often used as a justification for evictions, but not for regulating wealthy developments*". These regulatory asymmetries intensify contestations over land tenure, property rights, and belonging. Informal residents are frequently framed as illegal occupants despite settling along riverbanks due to structural exclusion from formal land

markets. Meanwhile formal developments benefit from regulatory ambiguity and political protection. As one Nairobi Rivers Commission official acknowledged, "*people living along the river are treated differently depending on who they are*".

Differential enforcement of riparian regulations strongly demonstrates what climate justice agendas identify as environmental governance operating through power relations rather than through universal principles (Schlosberg & Collins, 2014). The respondents' observations about riparian regulation being mostly enforced where people have the least power shows environmental law functioning as a tool of social control rather than ecological protection. Regulations, nominally neutral, become mechanisms reinforcing existing inequalities when applied selectively based on the residents' political and economic power. Degrowth theory shows how this selective enforcement serves growth-oriented development logic (D'Alisa et al., 2014; Kallis, 2018). Formal developments encroaching riparian zones represent capital accumulation through real estate value, commercial activity and elite housing, thus escaping enforcement despite their ecological impacts. The river becomes a site where contradictions between accumulation imperatives and ecological limits are resolved through displacing the latter's costs onto the politically powerless. Pluriversal and insurgent planning perspectives reframe informal riparian occupation as spatial claim-making by populations structurally excluded from formal land markets (Miraftab, 2009; Escobar, 2018). And so when SDI notes that only a very small percentage of people living in Mathare actually own the land or structures they occupy, they identify tenure insecurity as structural condition produced by land commodification and exclusionary planning, not individual failure. Informal settlement is therefore insurgent practice, as residents claim space for survival where formal systems provide none. Even the demolitions framed as environmental restoration become acts of spatial injustice, erasing these claims without addressing the existing housing crisis that generates them in the first place.



Figure 5: Planning a story-telling walkshop with Mathare Social Justice Center

Social Inequality and Urban Vulnerability

Findings from interviews and field observations indicate that environmental degradation within the Nairobi River Basin is associated with patterns of social inequality and differentiated exposure to risk. Communities located along polluted and flood-prone riverbanks experience heightened vulnerability linked to insecure tenure, limited access to sanitation, inadequate housing, and recurrent exposure to pollution and displacement. In contrast, upstream formal neighbourhoods generally benefit from stronger infrastructure provision and regulatory protection, even where developments encroach into riparian zones.

Civil society organisations emphasised that environmental exposure is structurally produced rather than accidental. SDI Kenya noted that pollution cannot be separated from service deprivation, stressing that "*people are not polluting because they want to, but because there are no services provided*" (SDI Kenya interview). NGOs and CBOs further identified flooding as a key manifestation of vulnerability along the river corridor. KombGreen Solutions described how flood events repeatedly erase accumulated investments in housing and livelihoods, observing that "*when floods come, everything is swept away and communities are forced to start again from zero.*" These impacts persist because of limited extension of protective infrastructure and flood mitigation measures into informal settlements.

Displacement emerged as an additional layer of vulnerability. While riparian evictions are framed by authorities as technical interventions for ecological restoration and flood control, NGOs and CBOs described them as socially destabilising and procedurally unjust. KDI highlighted uneven enforcement, stating that "*regulations are enforced very strictly in informal settlements, while developments in other parts of the city are left untouched.*" SDI Kenya further emphasised that evictions fail to address underlying tenure inequalities, noting that "*only a very small percentage of people living in Mathare actually own the land or structures they occupy.*" Without parallel investments in affordable housing and secure tenure, displacement was observed to shift vulnerability rather than resolve it.

Because vulnerability itself does not arise from natural hazards, but from social, political and economic structures that dictate differential exposure and capacity to cope, the idea that environmental exposure is "structurally produced rather than accidental" directly invokes the central insight of vulnerability theory (Watts & Bohle, 1993). They articulate how infrastructure exclusion creates conditions forcing behaviours that generate environmental harm, a structural rather than individual causation. Climate justice frameworks reveal the distributional injustice inherent in this pattern (Schlosberg & Collins, 2014; Dodman et al., 2023). Upstream formal neighbourhoods benefit from infrastructure investment and regulatory protection even where developments encroach riparian zones, whereas the downstream informal settlements experience infrastructure deficit, pollution exposure, flooding and demolition threats. This is not coincidence, but systematic patterns through which urban governance distributes environmental benefits upward and burdens downward along socio-economic hierarchies. More so, the description of flooding as repeatedly erasing accumulated investments in housing and livelihoods, forcing communities to start again from zero illuminates circular vulnerability that climate justice scholarship identifies in contexts of structural marginalisation. Systems thinking would recognise this as reinforcing feedback loop (Meadows, 2008), as initial vulnerability generates exposure to hazards; hazard impacts deepen poverty and insecurity; and then the deepened vulnerability increases future exposure. Breaking this loop requires intervening in structural conditions not just emergency response. Pluriversal planning perspectives thus challenge how displacement is framed as technical intervention rather than political violence (Miraftab, 2009; Escobar, 2018). When evictions proceed without parallel investments in affordable housing and secure tenure, they reproduce spatial exclusions that generated riparian occupation initially. Communities are characterised as illegally occupying ecologically sensitive zones, yet their presence reflects failure of formal planning systems to provide housing accessible to urban workers. This insurgent character of informal settlement causes it to become criminalised as environmental violation, while the planning failures necessitating such claims remain unaddressed.

Public Participation and Trust Deficits

Empirical evidence suggests that, despite formal policy commitments to participatory planning, meaningful public participation in Nairobi River regeneration remains uneven. Interviews indicated that participation is constrained by institutional timelines, limited resources, and historically strained state-community relations. Officials from the Nairobi Rivers Commission acknowledged that participation is frequently complicated by fear and suspicion shaped by earlier demolition-led interventions. One commissioner observed that "*when government comes in, people immediately think it is about evictions*". Nairobi County officials similarly reflected on participation gaps. One official admitted that "*the project really failed in public participation,*" particularly in contexts where eviction processes proceeded without adequate consultation.

NGOs working at the community level also highlighted how repeated engagement processes that fail to deliver tangible outcomes have weakened public confidence. SDI Kenya emphasised that participation becomes

difficult when communities feel excluded from implementation, noting that "*people have been consulted many times, but the decisions are still made elsewhere.*" This perception reinforces disengagement and undermines the legitimacy of participatory forums. Public Space Network (PSN) further stressed that participation loses meaning when it is limited to information sharing rather than shared decision-making. One representative explained that "*calling people to meetings is not enough if they are not part of shaping what happens next,*" underscoring the gap between procedural participation and genuine co-creation. UN-Habitat officials also echoed these concerns, pointing out that trust-building requires institutional follow-through. As one interviewee noted, "*communities judge participation by what changes on the ground, not by how many meetings are held.*"

The description of public participation as constrained by institutional timelines, limited resources and historically strained relations reveals what pluriversal and insurgent planning view as participation that is structured by state power rather than genuine co-governance (Miraftab, 2009; Escobar, 2018). When officials acknowledge that evictions come to mind whenever government comes in, they describe historical relationships in which participation has meant extraction of information or legitimation of predetermined decisions, not shared power over outcomes. Trust deficits emerge not from community irrationality, but from the accumulated experience of participation's emptiness. The observation that people have been consulted many times, but the decisions are still made elsewhere illustrates what the pluriversal framework identifies as denial of epistemic legitimacy to non-expert knowledge (Escobar, 2018). Communities are invited to speak but not to decide, and also to provide input but not to shape priorities or allocate resources. This technocratic model treats participation as information-gathering for expert decision-making rather than recognising communities as legitimate co-planners. The result, as interviewees note, is disengagement, rational response when participation consumes time without influencing outcomes.

Systems thinking further reveals how this participation deficit creates feedback loops that undermine regeneration effectiveness (Voulvoulis et al., 2022). Interventions designed without the community's knowledge often misunderstand local conditions, priorities, and constraints; implementations fail or face resistance; failures reinforce official beliefs that communities are obstacles rather than partners; future interventions become more top-down; and then trust further erodes. Breaking this loop requires recognising that participation is not secondary, but constitutive of effective governance in complex socio-ecological systems where local knowledge is essential for understanding causation and designing contextually appropriate responses. Climate justice frameworks also situate participation deficit within broader patterns of procedural injustice (Schlosberg & Collins, 2014). When communities bearing greatest environmental burdens lack voice in decisions affecting them, governance reproduces rather than challenges the power asymmetries that distribute environmental harms unequally. Participation must therefore translate into material transformation of conditions, not merely symbolic inclusion in processes whose outcomes remain predetermined by more powerful actors.

Community-Led Environmental Action

Despite institutional shortcomings, community actors emerged as some of the most innovative and sustained contributors to ecological rehabilitation along the Nairobi River Basin. Community-based organisations (CBOs) in settlements such as Korogocho, Mathare, and Kibera are actively engaged in river clean-ups, urban agriculture, waste-repurposing initiatives, and public space creation. These efforts have produced functional micro-regeneration zones that foster social cohesion, improve environmental quality, and enhance local awareness of ecological responsibility. A representative from KombGreen Solutions emphasised that "*people here feel responsible for the river because it is part of our everyday life,*" underscoring relational ties between communities and the river environment.

Beyond visible interventions, many CBOs have developed informal yet systematic knowledge systems that are rooted in everyday interactions with the rivers. As one community organiser from Mathare Social Justice Centre explained, "*we observe the river every day, so we know when something has changed before anyone else notices.*" This locally embedded knowledge enables early detection of environmental changes and demonstrates forms of environmental governance that operate outside formal institutional frameworks. Such grassroots practices highlight the unrealised capacity of communities to co-govern environmental spaces. However, the absence of systematic documentation, long-term financing, and formal recognition constrains the scalability of these initiatives. A practitioner from Kounkuey Design Initiative (KDI) noted that "*communities are doing a lot of work, but it remains invisible because it is not captured in official systems.*" Similarly, Public Space Network (PSN) highlighted that while community groups often successfully manage spaces after project handover, "*there is no central place where these efforts are recorded or linked to wider river strategies.*" As a result, many community-led interventions remain peripheral rather than catalytic at the basin scale.

The innovative environmental work by CBOs demonstrates what pluriversal and insurgent planning frameworks recognise as legitimate planning practice operating outside formal systems (Miraftab, 2009; Escobar, 2018). When communities conduct river cleanups, establish urban farms, create public spaces, and develop waste-repurposing initiatives, they are enacting spatial transformation guided by collective priorities and local knowledge. Characterising these as "informal" or "grassroots" obscures their planning character and maintains the narrative that legitimate planning can only occur through state institutions and credentialed experts. The account that the people feel responsible for the river because it is part of their daily life articulates relational epistemology that pluriversal approaches value, in the sense that knowledge and care emerge from sustained and embodied relationships rather than technical expertise (Escobar, 2018). When organisers note that they know when

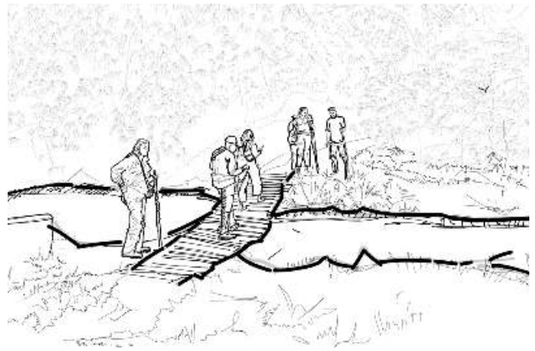


Figure 6: A walk through the Ondiri Swamp with Steven from Friends of Ondiri Wetlands (CBO)

something has changed before anyone else notices, they claim epistemic authority grounded in proximity and attention, knowing what technocratic governance often dismisses, yet are essential for understanding dynamic socio-ecological systems.

From a systems thinking perspective as well, community-led initiatives represent adaptive responses to governance and infrastructure failures, demonstrating capacity for innovation, self-organisation, and context-specific problem-solving (Meadows, 2008). These are not coping mechanisms, rather, they are expressions of agency in constrained conditions. Systems approaches recognise communities as components of urban socio-ecological systems with agency, knowledge and capacity rather than as passive beneficiaries or problems to manage. When practitioners note that communities are doing a lot of work although it still remains invisible, they describe how technocratic governance's documentation requirements function as gatekeeping mechanisms determining what counts as "legitimate intervention". Community initiatives that lack formal registration, standardised reporting or professional credentials remain peripheral rather than catalytic, not due to ineffectiveness, but due to institutional structures that recognise only certain forms of knowledge and action as valid. Climate justice frameworks further situate community environmental action within struggles for recognition, participation and capabilities (Schlosberg & Collins, 2014). The initiatives by communities represent claims to

environmental stewardship rights, demands for recognition as legitimate governors of shared spaces and demonstrations of capabilities that formal systems often fail to acknowledge. The challenge therein is not an absence of community capacity, but rather, governance structures that systematically devalue and exclude capacities not legible through technocratic frameworks.

Role of NGOs and Partnerships

Interviews revealed that non-governmental organisations play a critical role in addressing service provision and infrastructural gaps along the Nairobi River Basin, particularly in informal settlements. NGOs reported sustained investments in WASH infrastructure, including public toilets, water kiosks, waste collection systems, and sanitation education programmes. A representative from SDI Kenya emphasised that "*where services do not exist, people improvise, and that improvisation is then blamed on them,*" drawing attention to how infrastructural exclusion is often reframed as environmental misconduct. NGOs have also been instrumental in reclaiming river-adjacent spaces for public use. Public Space Network described interventions that intentionally reposition the river as a shared urban asset rather than a zone of risk, noting that "*our work does not stop at construction; we remain involved so that communities can manage, protect, and sustain the space*." These projects include parks, playgrounds, and communal areas that support both environmental awareness and social cohesion. Despite these contributions, NGO engagement with government institutions remains uneven. While instances of collaboration exist, interviewees consistently pointed to the absence of coordination frameworks. As SDI Kenya observed, "*many organisations are doing important work, but there is no common system that brings these efforts together.*" Consequently, NGO-led initiatives operate as parallel interventions rather than as integrated components of a basin-wide regeneration strategy.

NGOs' role in filling these gaps illuminates what degrowth and critical development scholarship identify as privatisation of public goods through NGO substitution for state infrastructure (D'Alisa et al., 2014). In their observation that where services do not exist, people improvise, SDI outlines a system where donor-funded NGO projects compensate for state withdrawal from infrastructure provision in informal settlements. This arrangement relieves pressure on government to universalise services while maintaining spatial inequalities that structure environmental vulnerability. The observation that NGOs remain involved so that communities can manage, protect and sustain the space reflects pluriversal planning's emphasis on sustained relationships and co-governance rather than project-based interventions (Escobar, 2018; Miraftab, 2009). NGOs operating through long-term partnership models recognise that infrastructure alone is insufficient without social infrastructure that enables the communities to govern spaces over time. This contrasts the technocratic approaches that deliver infrastructure and then withdraw, which results in infrastructure deterioration and absent mechanisms for sustained community stewardship.

Furthermore, the absence of coordination frameworks reveals systemic fragmentation that limits NGO impact despite investments (Voulvoulis et al., 2022). Individual NGO successes cannot substitute for systemic transformation when problems are structural to begin with. Climate justice perspectives further raise critical questions about NGO roles in contexts of state service deficits (Dodman et al., 2023). While the NGO infrastructure provision materially benefits the local communities, it can normalise state withdrawal and depoliticise infrastructure access as development charity rather than state obligation and community right. When environmental services depend on NGO projects and donor funding cycles, vulnerability to service loss intensifies and communities' claims on state accountability weaken. The challenge then is ensuring NGO contributions complement rather than substitute for state responsibility, and that partnerships empower local communities to claim rights rather than positioning them as beneficiaries of externally provided assistance.

Figures 1-6: Illustrations by Michael Mawuena Baccah

13 Reflection

Following the completion of the interviews and field observations, and after a systematic analysis of the findings across thematic areas, we identified nine principal domains that structure the empirical evidence:

1. *Governance and Institutional Coordination;*
2. *Economic Constraints and Funding Prioritization;*
3. *Ecological and Environmental Sustainability Challenges;*
4. *Waste Management and Infrastructure Deficits;*
5. *Riparian Encroachment and Contestations over Land Use;*
6. *Social Inequality and Urban Vulnerability;*
7. *Public Participation and Trust Deficits;*
8. *Community-Led Environmental Action;*
9. *the Role of NGOs and Partnerships.*

Collectively, these thematic areas highlight the pronounced complexity of the case under study and underscore the interdependence of environmental, institutional, social, and political dynamics. The findings demonstrate that it is not possible to adopt a singular analytical perspective without accounting for the interactions among these multiple dimensions, each of which shapes and is shaped by the others.

In recognition of this complexity, the research team adopted a differentiated analytical strategy in which each member undertook an in-depth examination of a specific thematic focus, while remaining embedded within the shared overarching framework.

Joan's contribution, *How Governance and Politics Shape Nairobi River Regeneration*, concentrates exclusively on Governance and Institutional Coordination (Theme 1), offering a focused analysis of how political dynamics and institutional arrangements influence river regeneration processes.

Calvin's chapter, *Nairobi Rivers' Degradation: Unveiling the Hidden Depths*, addresses Ecological and Environmental Sustainability Challenges (Theme 3), Waste Management and Infrastructure Deficits (Theme 4), Riparian Encroachment and Contestations over Land Use (Theme 5), and Social Inequality and Urban Vulnerability (Theme 6), thereby illuminating the interconnected environmental and socio-spatial drivers of river degradation.

Michael's analysis, *From Control to Co-Creation: Why a Government Mindset Shift Is Essential in Planning for Nairobi's Informal Settlements*, adopts a broad, integrative perspective that primarily engages with Governance and Institutional Coordination (Theme 1), Ecological and Environmental Sustainability Challenges (Theme 3), Waste Management and Infrastructure Deficits (Theme 4), Riparian Encroachment (Theme 5), Social Inequality and Urban Vulnerability (Theme 6), Public Participation and Trust Deficits (Theme 7), Community-Led Environmental Action (Theme 8), and, to a lesser extent, the Role of NGOs and Partnerships (Theme 9), functioning as an overarching narrative that binds the thematic framework together.

Giulia's contribution, *Community Participation and Sustainable Urban Development*, focuses on Public Participation and Trust Deficits (Theme 7) and the Role of NGOs and Partnerships (Theme 9), highlighting participatory mechanisms and collaborative approaches to urban sustainability.

Finally, Annu's chapter, *Displacement of Communities*, engages primarily with Social Inequality and Urban Vulnerability (Theme 6) and Riparian Encroachment and Contestations over Land Use (Theme 5), while also partially addressing Public Participation and Trust Deficits (Theme 7), particularly in relation to affected communities' voices and inclusion in decision-making processes.

Together, these contributions provide a coherent yet differentiated understanding of the nine thematic areas, offering both depth and integration in the analysis of Nairobi's river-related challenges.



Image 42: Graph showing how our chapters are intertwined with the river-related themes we observed.

14 Nairobi Rivers' Degradation: Unveiling the Hidden Depths

Calvin Opoku

URBAN ECOLOGIES AND MATERIAL AFTERLIVES

Introduction: Repositioning Environmental Degradation

The deteriorating ecological conditions along the Nairobi River Basin cannot be understood through isolated analysis of local pollution or community behaviour alone. Rather, river degradation must be read as a material expression of intersecting global and local processes, including the circulation of discarded commodities from wealthy nations to African urban systems, demographic pressures that push low-income populations toward ecologically fragile zones, and fragmented environmental governance that cannot coordinate responses across these scales. From this perspective, the river functions not merely as a natural ecosystem but as a socio-material archive in which the contradictions of contemporary urbanisation and global capitalism are sedimented. The accumulation of waste, informal settlements, and infrastructural neglect along its banks reflects how global consumption regimes externalise environmental costs to peripheral urban spaces, while rapid urban growth intensifies competition over land and access to livelihoods. These dynamics are further compounded by governance arrangements that remain institutionally compartmentalised, with environmental regulation, urban planning and social policy operating in parallel rather than in concert. As a result, interventions tend to address symptoms such as waste removal or riparian clearance, without engaging the structural drivers that continually reproduce degradation. Framing the current state of the Nairobi Rivers in this way shifts analytical attention from proximate causes to the broader political, economic and ecological systems within which river degradation is produced, thereby underscoring the need for multi-scalar approaches capable of aligning urban development, environmental protection, and social equity.

Urban Metabolism: Cities as Material Processing Systems

Urban metabolism conceptualises cities as organisms that consume resources and eliminate waste, providing a metaphorical framework to study interactions between natural and human systems. Kennedy et al. (2011) define urban metabolism as "the sum total of the technical and socio-economic processes that occur in cities, resulting in growth, production of energy and elimination of waste." Cities do not function as isolated administrative islands, but are connected to global and local resources and supply chains, with products and wastes undergoing complex processing across spatial and temporal scales (Miller & Mössner, 2020). Nairobi's rivers, in this framing, become visible as metabolic channels through which the city attempts to eliminate waste produced through consumption practices shaped by both local poverty and global commodity chains. By tracing material flows rather than isolated pollutants, it reveals how everyday urban practices such as household consumption, informal manufacturing, food processing and waste scavenging, are embedded within wider global circuits of value. Second-hand clothing, plastics, electronics and packaging imported from the global North enter the city as commodities, circulate briefly through formal and informal markets, and then exit rapidly as waste, often without adequate systems for recovery or reuse. In this sense, the rivers absorb the metabolic surplus of a city whose consumption is structurally decoupled from its waste-handling capacity. At the same time, Nairobi's rivers operate as ecological sinks for the failures of both local governance

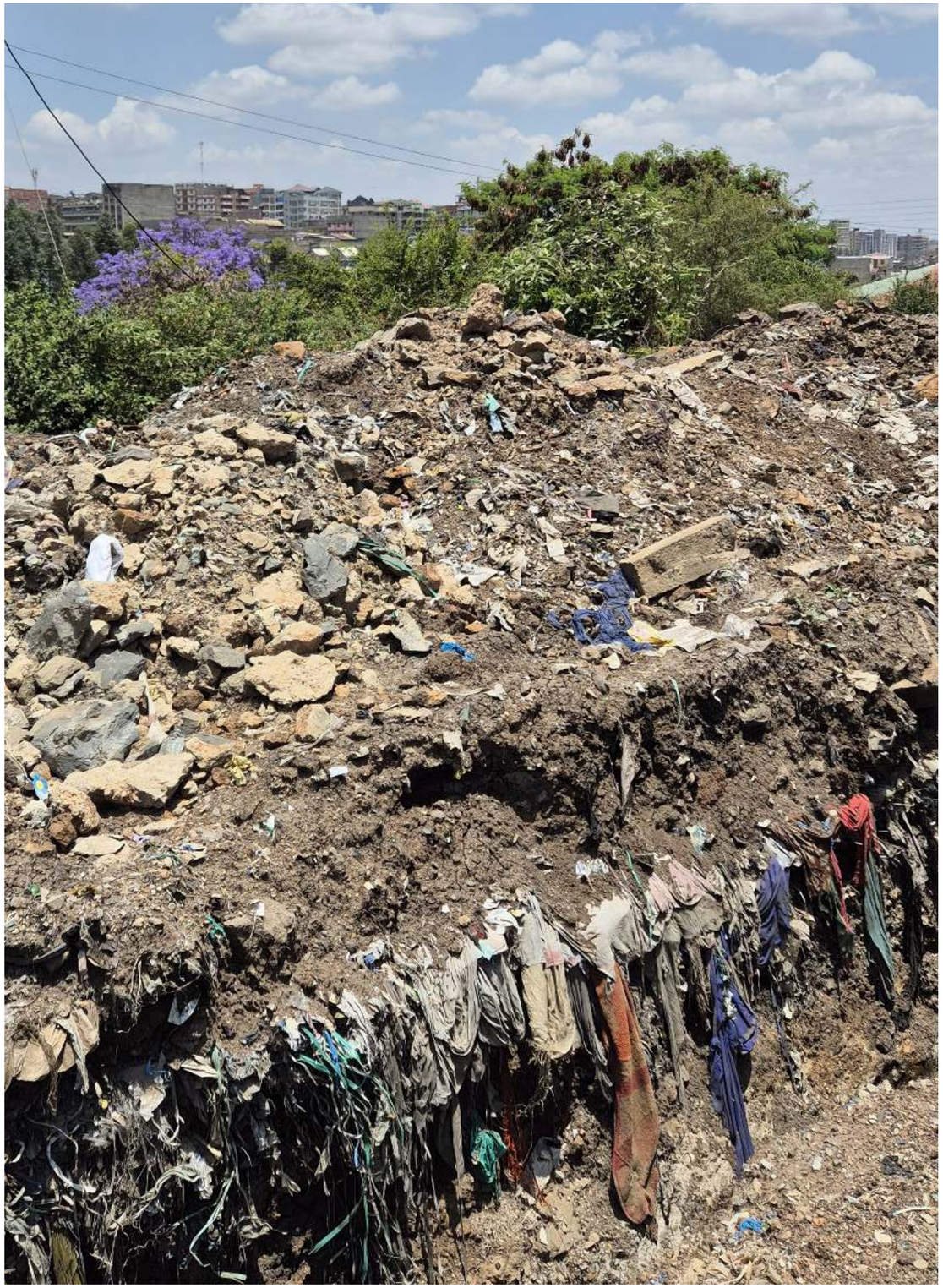


Image 43: Layers of different waste in Dandora Dumpsite, 2025. Annu Kumpulainen

and global disposal regimes. The absence of inclusive, city-wide waste infrastructure channels discarded materials toward waterways, while upstream decisions about production, packaging and transnational trade remain spatially and politically distant from their environmental consequences (Schramm & Bize, 2023). The framework thus exposes a critical asymmetry where the benefits of global consumption are distributed across international markets, while the environmental costs are localised within riverine ecologies and the communities that depend on them. Framing the rivers as metabolic endpoints underscores how urban environmental degradation is produced through the convergence of local survival economies and global systems of material offloading.

Global Value Chains and the Political Economy of Waste

Waste is not merely a crisis but an economy that intersects with informal livelihoods, globalised trade in waste materials and existing urban geographies. The global second-hand clothing trade represents a particular manifestation of how wealthy economies export end-of-life goods to African urban systems, where they generate employment in resale markets but also create waste streams that local infrastructure cannot absorb. Scholarship on global commodity and value chains has demonstrated that contemporary production and consumption systems are spatially fragmented, with different stages of value creation, use and disposal distributed unevenly across regions (Butollo, 2021; Gong et al., 2022). Within the textile and clothing sector, this fragmentation is particularly pronounced. Encino-Munoz and Morone (2023) showed that second-hand clothing flows from Europe and North America to African markets are not residual or marginal, but structurally embedded within global apparel economies, extending the life of garments while simultaneously displacing the environmental and social costs of disposal. While a portion of imported clothing is absorbed into resale and reuse circuits, a significant fraction rapidly becomes waste due to poor garment quality, over-supply, and fast fashion production cycles. The Mitumba Association in East Africa further demonstrated that policy responses within the East African Community have struggled to reconcile the economic benefits of second-hand clothing markets with their longer-term environmental implications, particularly the accumulation of low-value textile waste that exceeds local recycling and disposal capacities (Mitumba Consortium Association of Kenya, n.d.). More recent analyses of fast fashion underscore how accelerated production, declining garment durability, and synthetic fibre dominance intensify waste generation, externalising environmental harms to importing cities where waste management systems remain structurally under-resourced (Pääkkönen, 2023; Das et al., 2025). The political economy of this arrangement is clear. Northern consumption generates waste, which is exported as "development opportunity" (through mitumba markets providing affordable clothing and livelihoods), but the environmental costs of disposal accumulate locally in cities like Nairobi that lack waste management infrastructure adequate even for locally-generated waste, let alone global import waste.

RAPID URBANISATION, HOUSING PRESSURES AND ECOLOGICAL RISK

Urbanisation Without Infrastructure

Urbanisation in Africa is characterised by population growth without complementary infrastructural development, weak coping strategies against climate extremes, and high risk of environmental pollution (Ofoezie et al., 2022). This pattern is not accidental but reflects historical underinvestment, colonial infrastructure legacies inadequate for current populations, and governance structures that prioritise visible projects over systemic infrastructure. Urbanisation in Nairobi has unfolded through a similar trajectory, shaped by colonial planning, post-independence demographic expansion, and persistent structural underinvestment in urban infrastructure (Finn & Cobbinah, 2024). Originally designed as a colonial administrative and railway hub, the city's spatial and infrastructural layout was never intended to accommodate its current scale or socio-economic diversity. Since independence, Nairobi has experienced sustained rural-urban migration driven by economic centralisation, agrarian stress and regional inequalities, resulting in accelerated population growth that has consistently outpaced the expansion of housing, sanitation, drainage, and waste management systems (Onyango et al., 2021). Crucially, this pattern of urbanisation without infrastructure is not merely a technical failure but a political one. Governance priorities have historically favoured highly visible, centralised projects over the incremental, city-wide provision of basic services, particularly in low-income and informally governed areas (Hendricks, 2010).

The Housing Crisis and Riparian Encroachment

The expansion of informal settlements into riparian zones is not evidence of environmental ignorance or disregard but a spatial manifestation of Nairobi's housing crisis. As outlined previously, the city's urban metabolism and waste economies intersect with chronic housing shortages to produce spatial outcomes in which rivers function simultaneously as ecological systems and residual urban space. Formal housing markets, shaped by speculative land practices, rising construction costs, and regulatory frameworks misaligned with low-income realities, systematically exclude the majority of urban residents (Schramm & Bize, 2023). In this context, riparian zones, despite their ecological fragility and legal ambiguity, emerge as some of the few remaining spaces where proximity to employment, affordability, and survival can be reconciled. From an ecological perspective, housing scarcity translates directly into heightened vulnerability. Settlement in floodplains and along riverbanks exposes residents to recurrent flooding, waterborne disease and contamination from upstream waste flows. At the same time, the absence of tenure security discourages long-term investment in both housing quality and environmental management. Households facing constant threats of eviction or demolition are unlikely to invest in durable sanitation systems, flood protection measures, or riparian restoration, even where local knowledge and willingness exist (Juma, 2011; Roberts & Okanya, 2022). This precarity produces a cycle in which environmental degradation is both a cause and consequence of insecurity, one where degraded river environments increase risk to residents, while insecurity limits the possibility of collective stewardship and ecological repair.

Moreover, the governance treatment of riparian settlements as illegal or temporary reinforces this ecological vulnerability. Periodic clearance operations, often justified in the name of environmental protection, disrupt social networks and informal infrastructure without addressing the underlying housing deficit (Muketha, 2025). In the absence of viable relocation alternatives, such interventions frequently result in re-encroachment, further destabilising river ecosystems. Seen through this lens, riparian encroachment is not an aberration but a predictable spatial response to housing scarcity, producing landscapes where ecological risk is socially produced and unevenly distributed.

Urban Development Logic: Land Commodification Over Ecological Integrity

According to Bon (2021), urban development in Nairobi is governed by a planning logic that privileges land as a commodity and urban space as a vehicle for capital accumulation, often at the expense of ecological integrity and social equity. Planning instruments, zoning regulations, and infrastructure investments are disproportionately oriented toward areas deemed economically productive or investment-ready, reinforcing patterns of spatial selectivity that favour formal, high-value real estate development (Schramm & Bize, 2023). In this regard, ecological considerations are frequently subjected to land valorisation, with rivers, wetlands and open spaces treated less as critical urban ecosystems than as obstacles to be engineered or displaced in the pursuit of urban growth. This commodified development logic simultaneously produces spatial inequality and ecological degradation. Infrastructure provision is concentrated in

wealthier neighbourhoods and commercial districts, where it serves to stabilise property values and attract further investment (Schramm & Bize, 2023). Conversely, low-income and informal areas remain under-served, leaving rivers to absorb untreated waste, surface runoff and floodwaters generated elsewhere in the city. Ecological degradation is thus not randomly distributed, but follows the contours of urban investment, with environmental risk displaced onto marginal spaces that lie outside formal planning priorities.

Crucially, this logic also shapes how environmental regulation is applied. Enforcement tends to be selective, targeting informal riparian settlements while overlooking environmentally harmful practices associated with large-scale developments, such as river channelisation, wetland infill or upstream effluent discharge linked to industrial and high-end residential projects. In this way, planning and regulatory systems operate less as neutral arbiters of environmental protection and more as mechanisms that stabilise existing power relations over land. The result is an urban landscape in which ecological systems are progressively fragmented and degraded, even as inequality is reproduced through differential access to serviced, environmentally secure space.

THE GLOBAL AFTERLIFE OF CLOTHING

The Mitumba Economy: Development Opportunity or Waste Displacement?

The second-hand clothing market (mitumba in Swahili) is frequently framed in development discourse as a win-win: Northern consumers dispose of unwanted clothing, East African traders and vendors earn livelihoods, and low-income urban populations access affordable clothing (Kiss, 2025). This framing, however, obscures the unsold, damaged or unmarketable textiles that often accumulate without disposal infrastructure. Kenya is among the largest importers of second-hand clothing in sub-Saharan Africa, with mitumba constituting a substantial share of national apparel consumption. Estimates from industry and policy-oriented studies suggest that the country imports several hundred thousand tonnes of used clothing annually, primarily from Europe, North America, and Asia, making second-hand garments the dominant source of clothing for a majority of low- and middle-income households (Panju, 2024). The mitumba sector supports extensive employment across the value chain, including importers, bale sorters, wholesalers, market traders, tailors, transport workers, and ancillary services, with livelihood dependence often estimated in the hundreds of thousands nationally and concentrated in major urban centres such as Nairobi.

This economic significance underpins the persistence of mitumba within development and trade policy narratives, where the sector is framed as an accessible employment generator and a critical source of affordable clothing. However, these aggregate figures obscure a structurally embedded waste stream. A significant proportion of imported bales, commonly reported in the literature as ranging from 20 to 40 per cent, depending on garment quality and market conditions, is unsellable due to damage, poor fabric quality, or misalignment with local demand (Lee et al., 2025). With the rise of fast fashion, declining garment durability, and increased synthetic fibre content, the proportion of low-grade and non-reusable clothing has increased, intensifying the volume of textile waste generated downstream. Crucially, while the economic benefits of mitumba are distributed through urban markets and informal employment, responsibility for managing the residual waste is entirely localised. Unsold textiles accumulate in markets, informal sorting spaces, and residential areas, eventually entering municipal waste streams that are already overstretched or, in many cases, bypassed altogether. By foregrounding this unseen waste fraction, the mitumba economy can be reinterpreted not only as a development opportunity, but also as a mechanism through which the environmental costs of Northern consumption are displaced onto urban ecologies and governance systems that are ill-equipped to absorb them (Lee et al., 2025).

Textile Waste as Unmanageable Surplus

Unlike organic waste or even plastics, textile waste presents particular disposal challenges, as they are often too contaminated or damaged for reuse, difficult to recycle given mixed fibre compositions, and voluminous relative to weight (Lee et al., 2025). Field observations from multiple river-adjacent settlements and market areas indicated that discarded textiles constitute a persistent and visually prominent component of urban waste accumulation. Along riverbanks, piles of clothing offcuts, torn garments, and fabric scraps are frequently entangled in riparian vegetation, trapped against bridge pylons, or lodged within drainage outfalls. Market vendors and bale sorters in mitumba markets often illuminate the scale of this surplus. Traders consistently reported that a substantial share of each bale is unsellable, describing garments that are irreparably torn, heavily stained, or degraded due to low-quality synthetic blends. These items are often stored temporarily near stalls before being discarded due to lack of alternative disposal options (Mitumba Consortium Association of Kenya, 2023). Waste collectors echoed these accounts, noting that textiles are among the least desirable materials to handle: they have low resale value, are cumbersome to transport, and are frequently contaminated with organic waste, rendering recovery or recycling economically unviable. As a result, such materials are routinely abandoned at collection points, dumped illegally, or washed into nearby waterways (Mitumba Consortium Association of Kenya, 2023).

From Global Closet to Local River: Tracing Material Flows

The lifecycle of a garment illustrates the asymmetric geographies of contemporary consumption and disposal. Typically manufactured within low-cost production hubs in Asia under resource-intensive and labour-intensive conditions, garments are exported to consumer markets in Europe and North America, where accelerated fashion cycles encourage short periods of use (Gupta, 2018). Once discarded, these items enter donation or resale streams that reclassify them from waste into commodities (Gupta, 2018). Through global logistics networks, they are exported to East Africa as second-hand goods, arriving in ports such as Mombasa before being distributed inland to urban markets in Nairobi (Mitumba Consortium Association of Kenya, 2023). Within Nairobi, this global flow is temporarily re-embedded in local economies. Garments are sorted, traded, altered, and sold through dense networks of wholesalers, market vendors, and informal retailers (Mitumba Consortium Association of Kenya, 2023). Some items are worn for extended periods, but a significant proportion is either unsellable upon arrival or rapidly discarded. At this stage, the garment's commodity status collapses, and it re-enters the city's material stream as waste. Lacking systems for textile recovery or safe disposal, these materials are absorbed into Nairobi's already overburdened waste infrastructure, where they accumulate in markets, informal dumpsites, drainage channels, and ultimately river systems. This trajectory reveals Nairobi as a metabolic sink within the global fashion system. The city absorbs the downstream residues of global consumption without possessing the infrastructural or institutional capacity to process them sustainably. Tracing the garment from global closet to local river makes visible how river pollution is not an accidental by-product of local behaviour, but the final stage in a transnational material flow that externalises waste management to urban ecologies least equipped to bear it.

INFRASTRUCTURE FAILURE, WASTE SYSTEMS AND URBAN ECOLOGICAL COLLAPSE

Absence of Comprehensive Waste Planning

African cities face severe infrastructure deficits, with limited access to clean water leading to waterborne diseases and sanitation challenges, yet comprehensive planning remains absent. In Nairobi, waste management operates reactively, featuring periodic cleanups and emergency responses to flooding, rather than through systematic infrastructure that prevents waste from entering into the rivers

in the first place. Interviews with officials from county-level environmental departments and affiliated waste management agencies consistently point to a reactive governance posture shaped by chronic resource constraints and fragmented institutional mandates. Respondents acknowledged that while river pollution and flooding are recognised as urban risks, planning horizons remain short-term and event-driven. Some respondents described waste management along river corridors as "largely crisis management", noting that interventions are mobilised after extreme events or political pressure, rather than through anticipatory infrastructure investment designed to intercept waste upstream. Officials highlighted structural budgetary limitations and misaligned funding priorities as key barriers to planning. Capital-intensive investments in sewerage expansion, decentralised treatment systems and integrated solid waste infrastructure were repeatedly described as "beyond current allocations", particularly in informal and peri-urban areas that fall outside formal service plans. As a result, agencies rely heavily on ad hoc clean-up exercises, donor-supported pilot projects, and enforcement campaigns that target visible dumping without addressing systemic waste flows.

Several interviewees noted that such initiatives create an illusion of action while doing little to alter the underlying pathways through which waste enters river systems. Coordination failures across institutions emerged as a recurrent theme. Responsibilities for sanitation, drainage, solid waste, housing, and river management are distributed across multiple departments and agencies. Interviewees described weak data sharing, parallel planning processes and unclear leadership over river basin management, resulting in gaps where no institution assumes responsibility for preventing waste at source. In this governance context, rivers become residual spaces that absorb the consequences of institutional fragmentation. Taken together, these evidences reinforce the argument that ecological degradation in Nairobi's rivers is produced not by an absence of awareness, but by systemic planning deficits in which infrastructural prevention is deferred in favour of reactive, downstream responses.

Dandora: Spatial Endpoint of Collective Neglect

Dandora exemplifies how infrastructure failure at one node cascades through the entire river system. Improper landfilling creates leachate that contaminates groundwater and surface water feeding the river, while physical collapse of dump materials directly introduces waste into river channels. Dandora operates as the terminal node of Nairobi's waste system and makes visible the cumulative consequences of infrastructural neglect across the city. Established as an open dumpsite rather than a sanitary landfill, it receives mixed municipal, industrial, and in some cases medical waste from across Nairobi without adequate lining, leachate control or systematic waste segregation. This structural deficiency renders Dandora not merely a disposal site, but a chronic source of environmental contamination, with impacts that extend beyond its immediate vicinity into the wider river system. In several locations, portions of the dumpsite appear to have physically collapsed, with compacted waste forming semi-stable "islands" along riverbanks and within the channel itself. These accumulations alter flow patterns, trap additional debris, and accelerate riverbank erosion, transforming the river into an extension of the dumpsite. Such conditions illustrate how the failure to contain waste at a single infrastructural node generates cascading ecological effects downstream. While waste picking provides critical livelihoods, the absence of protective infrastructure and the lack of alternatives for managing overflow waste deteriorate water quality, increases odours and heightens health risks to conditions at the dumpsite. Dandora exemplifies how spatially concentrated infrastructure failure produces system-wide ecological consequences. The dumpsite's inability to safely contain waste transforms it into a continuous source of pollution that feeds directly into Nairobi's river network, affecting communities far from the original site of disposal. In this sense, Dandora is not an anomaly but a spatial endpoint of collective neglect, one where the cumulative effects of underinvestment, fragmented governance and linear urban metabolism converge and are ultimately transferred to downstream ecologies and populations.

CONSEQUENCES – ECOLOGICAL INJUSTICE AND URBAN VULNERABILITY

Rivers as Informal Sanitation and Waste Repositories

In the absence of formal sewerage and waste collection systems serving informal settlements, Nairobi's rivers have become de facto sanitation and waste infrastructure. This is not a matter of cultural practice or behavioural failing but a structural inevitability. When populations lack toilets, sewers, or reliable waste collection, waterways emerge as the only viable disposal mechanism. Field observations along multiple stretches of the Nairobi River and its tributaries reveal continuous discharge of untreated sewage, alongside extensive accumulation of solid waste at points where footpaths, drainage channels, and informal outfalls intersect the river. Makeshift latrines constructed over or immediately adjacent to riverbanks, improvised drainage pipes leading from densely populated housing clusters, and open channels conveying greywater all indicate the systematic use of rivers as functional extensions of settlements' sanitation systems. The rivers also serve as the spatial and material endpoint for the global fast-fashion economy. Textile waste accumulates in river channels, becomes entangled with vegetation and other debris and obstructs flow. Field observations indicate concentrated deposits near informal settlements and market-adjacent drainage channels, where textiles mix with plastics, organic matter and construction debris. These materials decompose slowly, leaching dyes and synthetic fibres into water, while simultaneously exacerbating flooding by blocking channels. Analytically, these patterns are best understood as consequences of infrastructural exclusion and global-local material flows rather than expressions of community neglect. Where sewer networks and collection services do not extend, households are left with no alternative for managing human and material waste, and rivers absorb both local and transnational residues. Continuous organic loading depletes dissolved oxygen, while plastics and textile fibres obstruct flow, degrade riparian habitats and amplify flood risk. Residents' awareness of health and environmental hazards underscores a disjuncture between ecological knowledge and infrastructural capacity. Framed in this way, river degradation emerges as a governance and infrastructural failure embedded within uneven urban development. Nairobi's rivers are not merely polluted by informal settlement life, but are materially constituted by the city's inability to provide basic sanitation, manage local waste and absorb global textile surplus in an environmentally sustainable manner.

Demolition as Environmental Discourse; Displacement as Outcome

In Nairobi, environmental restoration rhetoric is frequently invoked to justify the demolition of informal settlements along riverbanks. Field interviews with residents of affected communities reveal that these operations are often abrupt, poorly coordinated and accompanied by limited or no provision of alternative housing. Families described the destruction of homes, communal sanitation points, and small-scale economic infrastructure, sometimes with only days' notice, leaving residents physically and economically vulnerable. More so, cleared areas are rarely accompanied by improvements in upstream waste management, industrial effluent control, or municipal sewage provision. Critical analysis situates these demolitions within broader political and environmental discourses. By framing riparian settlements as inherently "polluting" or environmentally destructive, authorities and development actors can legitimise interventions that primarily serve land commodification, regulatory visibility and urban beautification agendas, rather than ecological restoration. This aligns with scholarship on green gentrification and eco-violence, where environmental imperatives are mobilised to justify the removal of marginalised populations, often reinforcing spatial and socio-economic inequalities (Kem & Kovesi, 2018; Anguelovski et al., 2019; Environmental Law Institute, 2021). Differential enforcement that targets informal settlements and overlooks formal or industrial contributors to river pollution, illustrates the selective application of environmental governance and underscores the role of power in shaping who

bears ecological costs. The empirical evidence demonstrates that demolitions function less as tools for systemic environmental improvement and more as mechanisms of social control. While framed as environmental stewardship, they fail to address structural drivers of riparian occupation, including chronic housing shortages, urban migration pressures and inadequate waste and sewage infrastructure. In effect, environmental discourse becomes weaponised, legitimising displacement under the guise of sustainability, transferring ecological responsibility onto vulnerable communities while absolving formal institutions of accountability for the persistent degradation they contribute. This dynamic highlights the entanglement of environmental governance, urban inequality, and socio-spatial vulnerability, reinforcing the argument that meaningful river restoration must integrate both infrastructural interventions and housing security measures to avoid perpetuating these cycles.

Circular Vulnerability

The dynamics of river degradation in Nairobi illustrate a self-reinforcing cycle of social and ecological vulnerability. Spatial inequality and chronic housing shortages force low-income populations to occupy ecologically sensitive riparian zones, exposing them to flood risk, waterborne disease, and waste accumulation. The absence of adequate infrastructure in these settlements, including sewer networks, waste collection, drainage and sanitation facilities transforms rivers into de facto sanitation channels, further intensifying environmental degradation. This degradation is then leveraged to justify demolitions and forced evictions, displacing vulnerable communities without addressing the structural drivers of their marginalisation. Evicted populations are often resettled or self-relocate to other informal or ecologically fragile areas, restarting the cycle of exposure and degradation. Superimposed onto this pattern is the contribution of global waste flows, particularly from the second-hand clothing trade, which adds substantial volumes of textiles and associated pollutants to river systems already stressed by local infrastructural deficits. The result is a circular vulnerability in which socio-economic inequality, infrastructural neglect, environmental degradation and global consumption patterns converge to reproduce both ecological harm and social precarity. Rivers thus become both a symptom and a conduit of systemic inequities, absorbing the material consequences of poverty and globalised waste while simultaneously serving as the rationale for policies that further marginalise those least able to influence the very processes shaping their exposure. Addressing this cycle requires interventions that integrate housing security, infrastructural expansion and sustainable waste management, alongside environmental restoration, in order to break the mutually reinforcing links between social inequality and ecological harm.

CLOSING ARGUMENT – BEYOND MORALISM AND TECHNICISM TOWARD STRUCTURAL TRANSFORMATION

Current efforts to regenerate the Nairobi River have relied predominantly on moral appeals, isolated cleanups, and forced demolitions, each with demonstrable limitations. Behaviour change campaigns exhorting residents not to litter or promoting community "ownership" of rivers fail to address the structural drivers of pollution - households dispose of waste in waterways not from ignorance but from lack of viable alternatives, a reality consistently observed in riparian settlements. Periodic cleanups temporarily remove accumulated refuse, yet local and imported waste flows quickly replenish blockages, rendering these interventions symbolic. Demolitions of informal settlements, framed as environmental restoration, shift populations without resolving upstream pollution sources or providing alternative housing, merely redistributing environmental burdens. Moreover, efforts to transform Nairobi's river system confront entrenched interests benefiting from the status quo. Landlords profit from informal rental markets; importers and traders gain from unregulated textile flows; politicians leverage demolitions for political visibility; and wealthier residents avoid confronting ecological consequences of their consumption. Without



Image 44: Nairobi River dives under an island of trash in Dandora, 2025. Annu Kumpulainen

confronting such political-economic realities, technical or infrastructural solutions alone will be insufficient to achieve lasting ecological and social transformation.

The Nairobi River carries more than water, sewage and textile waste; it archives the legacies of colonial spatial planning, decades of infrastructural neglect and the global flows of discarded commodities, alongside the survival strategies of urban poor navigating systems designed without them. Interpreted politically, the river reveals the interconnections of power, inequality and global-local entanglements, showing that ecological restoration is inseparable from social justice. Its future depends on whose knowledge, priorities and interests shape governance, and on the extent to which urban transformation addresses not only environmental symptoms, but also the structural and political conditions that produce vulnerability. Genuine ecological recovery demands systemic interventions that address the structural roots of degradation rather than its symptoms. At the global scale, regulation of textile imports and implementation of extended producer responsibility could shift accountability for waste from urban communities to the corporations generating it. Within the city, massive investment in sewerage networks, waste collection, and sanitation infrastructure is needed, not as discrete environmental projects, but as fundamental urban services. Addressing the housing crisis is equally critical - affordable housing, tenure security, and spatial planning that anticipates rather than criminalises informal settlement formation, would reduce ecological exposure along riparian corridors. Finally, governance coordination across water, waste, housing and environmental authorities is essential to prevent fragmented interventions from undermining one another, enabling systemic rather than reactive responses to river degradation.

15 How Governance and Politics Shape Nairobi River Regeneration

Joan Gachoki

Urban rivers reflect not only a city's environmental condition but also its political capacity and institutional effectiveness. In many African cities characterised by rapid informal urbanisation, chronic underinvestment in infrastructure, and fragmented governance arrangements, rivers have increasingly become both ecological casualties and political instruments (UN-Habitat, 2020). The Nairobi River Basin, central to Kenya's capital economy and urban metabolism, now functions primarily as a receptacle for untreated industrial effluents, domestic sewage, and solid waste. Despite sustained political attention and recurring intervention programmes, the ecological condition of the river has shown little improvement. This persistent failure raises a fundamental governance question: is Nairobi River degradation a consequence of weak engineering, or the result of institutional and political failure?

As Swyngedouw (2004) aptly observes, "environmental problems are not simply ecological conditions; they are socially and politically produced phenomena embedded in power relations." This perspective shifts the analytical focus from technical remediation alone toward examining how political incentives, institutional design, and governance structures actively shape environmental outcomes.

Kenya's electoral cycle has repeatedly reshaped the institutional architecture governing the Nairobi River. Instead of consolidating and strengthening existing governance structures, successive administrations have introduced new agencies, redefined mandates, and transferred institutional oversight across ministries. This pattern incentivises highly visible political interventions at the expense of long-term ecological investment (Grindle, 2012).

North (1990) conceptualises this instability as a central development constraint, noting that "institutions are the humanly devised constraints that structure political and economic interaction; when they are unstable, development becomes episodic rather than cumulative." Nairobi River governance exemplifies this dynamic. Under previous administrations, the river programme fell within the mandate of the Ministry of Environment. More recently, coordination has been transferred to the State Department of Housing with the establishment of the Nairobi River Commission, a move that repositions environmental restoration within a built-environment and political infrastructure framework.

Field observations further illustrate the institutional ambiguity produced by this reconfiguration. During engagements with both the Ministry of Environment and the State Department of Housing, it became apparent that responsibilities for river management were unclear across departments. At the Ministry of Housing, attempts to identify the appropriate officer responsible for river matters reflected both administrative opacity and fragmented institutional accountability. Eventually, officials indicated that the Nairobi River Commission reports directly to the Office of the President, bypassing conventional ministerial structures. This verticalisation of authority further distances river governance from professional environmental oversight and embeds it within the executive political hierarchy.

Insights from interview respondents indicate that Michuki Memorial Park is regarded as one of the few tangible regenerative outcomes along the Nairobi River corridor. At the same time, they highlighted that the project's decade-long implementation reflects bureaucratic inertia and fragmented governance structures. From this perspective, the extended delivery



Image 45: View from the intersection of Moi Avenue and City Hall Way in Nairobi Central Business District of Nairobi where many County goverment offices are located, 2025. Annu Kumpulainen

timeline was not viewed as a marker of institutional success, but as evidence of the challenges inherent in sustaining environmental interventions within politically discontinuous governance contexts.

Political discourse and media narratives surrounding Nairobi River regeneration are dominated by clean-up campaigns, short-term youth employment programmes, and periodic dredging exercises. Media analysis, supported by interview evidence, demonstrates an emphasis on visible, short-term interventions that are readily communicable to the public. Respondents contrasted this focus with the marginalisation of long-term ecological recovery, basin-scale planning, and institutional coordination. At the same time, environmental infrastructures — sewerage systems, waste-water treatment facilities, and integrated solid-waste management — remain under-developed or inadequately maintained. This pattern indicates a governance orientation that privileges political visibility and performative intervention over systemic remediation and institutional reform.

Ferguson (1990) conceptualises this phenomenon as "development as spectacle," arguing that "symbolic performance becomes more politically efficient than structural change." In Nairobi, successive administrations have operationalised this logic through youth-focused labour programmes framed as environmental restoration initiatives. Under the previous administration, the Kazi Mtaani programme, administered through the National Youth Service, framed river clean-ups as employment creation and ecological intervention. The current administration has rebranded this approach through the Climate WorX Mtaani initiative, under which youth are engaged in environmental restoration tasks such as riverbank cleaning and earn daily wages (The Star, 2024; The Kenya Times, 2024; Eastleigh Voice, 2024).

Field observations conducted along the Nairobi River revealed groups of youth engaged in litter collection along riparian zones. Activities that, while providing temporary income relief, do not address pollution at source nor contribute to long-term ecosystem rehabilitation. Rather than resolving infrastructural deficits, such programmes serve primarily to advance political employment narratives while enabling the state to project social responsiveness.

Interview respondents raised concerns regarding the financial governance of employment-based river regeneration interventions. According to respondents, budgetary allocations are weakly audited and inadequately disclosed, generating uncertainty around financial accountability and increasing the risk of misallocation, and politically mediated expenditure. Without transparent reporting, independent audits, and systematic outcome evaluation frameworks, respondents indicated that programme resources are prone to absorption by administrative inefficiencies or patronage dynamics rather than contributing to ecological restoration. This fiscal opacity was further described as undermining sustainability by diverting resources away from infrastructure investment toward short-cycle programmes with limited environmental returns.

Multiple state and non-state institutions exercise overlapping jurisdiction over the Nairobi River corridor, producing structural fragmentation and weakened accountability. Rather than fostering coordinated governance, this institutional landscape generates rivalry, regulatory ambiguity, and policy inertia. As Ostrom (2010) cautions, "without coordination mechanisms, polycentric governance risks becoming institutional chaos rather than layered resilience."

Interviews with key actors across governmental, non-governmental, and professional institutions revealed an imbalance between authority and responsibility. While formal mandates exist across agencies, respondents from partner organisations and sectoral stakeholders described their roles in river regeneration as advisory, with no clear decision-making authority or operational control. This widespread perception reflects a governance arrangement in which participation is symbolically encouraged, but substantive influence over policy direction and implementation remains centralised.

Interviews with officers from the National Environment Management Authority (NEMA), Kenya's primary environmental regulator further revealed structural constraints on enforcement. Although NEMA holds statutory responsibility under the Environmental Management and Co-ordination Act (EMCA), respondents acknowledged that enforcement is often undermined by political interference and elite influence. Several respondents indicated that some of the most significant polluters along the river corridor maintain close connections with political actors and high-level institutions, which limits NEMA's capacity to impose sanctions or ensure compliance.

The result is a governance environment in which authority is simultaneously dispersed and ineffectual. While multiple institutions are nominally involved, functional control remains politically concentrated, and regulatory action becomes selective rather than systematic. River governance thus operates less as a structured administrative process and more as a politically negotiated system in which enforcement is contingent on power relations rather than environmental risk.

The politicisation of Nairobi River regeneration has produce'd cumulative structural and ecological consequences that extend beyond environmental degradation into the domain of governance failure. Public resources are dissipated through cyclical institutional restructuring, politically driven programme redesign, and the prioritisation of short-term interventions that do not yield durable ecological returns. Rather than advancing systemic restoration, investment is channelled into performative activities that neither address pollution at source nor establish long-term management infrastructure, resulting in ecological stagnation despite increased financial outlays. Simultaneously, sustained political volatility has contributed to declining public confidence, as affected communities observe persistent degradation alongside escalating political promises. The recurrence of legal disputes, evictions, and administrative conflicts further entrenches institutional delay while increasing transaction costs. Collectively, these dynamics erode the effectiveness of environmental governance and transform regeneration from an ecological objective into a politically contingent process with limited sustainability outcomes.

Reversing ecological decline along the Nairobi River demands governance transformation rather than incremental technical adjustment. Central to this shift is the establishment of a legislatively mandated river-basin authority insulated from executive influence and electoral volatility. Such an institution must operate under a multi-year planning framework supported by dedicated financing mechanisms focused on permanent ecological infrastructure rather than politically instrumentalisable employment schemes. Equally critical is the repositioning of civil society, technical professionals, and riparian communities from consultative participants to institutional partners with decision-making authority embedded in governance frameworks. Regulatory agencies must be strengthened through judicial independence and statutory enforcement protection to ensure that compliance is not mediated through political hierarchy. Finally, restoration must be governed through performance-based accountability systems that link expenditure to measurable ecological indicators. Without institutional restructuring, sustainability discourse will remain aspirational rather than operational.

The failure of Nairobi River regeneration cannot be attributed to inadequate planning, insufficient expertise, or funding constraints. Instead, it reflects systemic governance pathology rooted in politicized leadership, institutional instability, and short policy horizons. Environmental restoration has been absorbed into political narrative management, where symbolism outweighs systemic reform and visibility substitutes for impact. Until ecological governance is structurally decoupled from political cycles and embedded within professional, legally autonomous institutions, environmental deterioration will persist irrespective of investment levels. Sustainable regeneration is therefore contingent not on political intent but on institutional continuity, regulatory integrity, and long-term commitment to ecological stewardship.

16 Why a Government Mindset Shift Is Essential in Planning for Nairobi's Informal Settlements

Michael Mawuena Baccah

Introduction: Reframing Urban Inequality as a Governance Mindset Problem

Urban inequality in the Global South—expressed through displacement, environmental injustice, and the marginalization of informal settlements—is often attributed to poverty, inadequate infrastructure, or rapid urbanization. However, it can also be rooted in the governance mindset shaping planning practice (Tonkiss, 2020). These systems, shaped by colonial-era rationalities and sustained through postcolonial bureaucratic cultures, continue to conceptualize informal settlements as deviations from an imagined urban order according to Miraftab (2009). As a result, spatial exclusion is reproduced through planning systems that rely on enforcement, demolitions, and restrictive interpretations of environmental regulation.

This chapter argues that transforming Nairobi's rivers and urban systems therefore requires more than technical interventions. It demands a fundamental reorientation of governmental thinking—from top-down, enforcement-driven approaches to one that acknowledges residents of informal settlements as legitimate residents, and co-creators of resilience. The analysis unfolds through interrelated dynamics of historical exclusion, environmental degradation, vulnerability, and emergent community-led interventions, demonstrating why a shift toward collaborative, community-led planning is essential for sustainable, equitable, and community-rooted urban transformation.

Social and Economic Marginalization

The marginalization of communities such as Mathare, Kibera, and Mukuru, is directly tied to Nairobi's colonial origins (Ono & Kidokoro, 2020). These spatial hierarchies, designed to ensure a cheap labor supply while limiting urban citizenship, deeply influenced the development trajectories of postcolonial Nairobi. Informal settlements remain home to populations whose labor sustains the city—construction workers, domestic workers, waste collectors, transport operators, and traders—yet these residents remain excluded from serviced neighborhoods due to persistent poverty, limited access to formal employment, housing insecurity, inadequate infrastructure, land tenure issues and other deep socio-economic disparities. As SDI Kenya emphasized, "*Informal settlements did not emerge by accident – they were created because people needed to live near the jobs the city depended on.*" As the city expands land values rise, low-income households are again pushed outward—toward overcrowded, hazard-prone areas along rivers and floodplains. KDI explained this displacement logic clearly: "*People are pushed to the riverbanks not because they want to be there, but because those are the only places left.*" Thus, informal settlements have evolved not as spontaneous encroachments but as structural outcomes of exclusion.

Land, Power, Exclusion, and the Production of Vulnerability

Economic exclusion and insecure tenure force low-income households to settle on unsafe land—steep slopes, floodplains, riparian strips, and degraded patches near industrial zones. As one KombGreen member explained, "*This place was a dumpsite... people settled here because everywhere else was already taken or too expensive.*" Residents are not making free choices, but adapting to structural limits placed on where they are allowed to exist in the city.

These communities experience recurrent flood events not because of negligence but because



Image 46: Mathare informal settlement, 2025. Giulia Sagarriga Visconti

protection infrastructure does not reach them. A local resident recalled recent disasters: "*Everything was swept away...we are just starting afresh.*" Homes, public spaces, and years of investment can disappear overnight—without compensation or support.

Yet these residents are often framed not as victims of systemic injustice, but as encroachers whose settlements threaten the rivers' natural ecosystem. One KDI representative noted, "*Riparian land regulation is only applied in informal settlements they say it's 30 meters, then 60 meters, but upscale developments are left untouched.*" Riparian regulation becomes a mechanism of displacement rather than environmental protection, applied stringently in informal settlements while inconsistently enforced in wealthy or politically protected areas.

SDI noted, "Only 4% of people living in Mathare own the structures – and even fewer own the land." Land tenure systems further entrench inequality: many informal settlements like in the case of Mathare are owned by non-resident landlords who profit from high-density rental structures while providing minimal infrastructure. Meanwhile, residents lack formal rights, representation, and institutional recognition. This reflects a structural condition where informal residents contribute economically yet lack the protections and entitlements afforded elsewhere in the city. Thus, environmental narratives, land politics, and governance failures converge to justify the displacement of communities structurally denied safer alternatives.

Environmental Blame, Infrastructure Failure, and Ecological Inequity

Environmental degradation along the Nairobi, Mathare, and Ngong Rivers is frequently blamed on residents of informal settlements, reinforcing longstanding stigmas. Yet these communities face chronic deprivation of essential services: waste collection, sewerage systems, drainage networks, and sanitation facilities. One Mathare community participant emphasized, "*we don't pollute because we want to – we have no services.*" Pollution and environmentally harmful practices thus arise not from cultural behavior or indifference but from structural constraints and the absence of alternatives. Without access to basic amenities, residents must prioritize daily survival over ecological protection. Public Space Network during an interaction noted that, "*the risk of getting electrocuted is much less than the risk of getting sick*" illustrating how survival needs outweigh environmental concerns. Meanwhile, pollution from upstream formal neighborhoods, industrial zones, markets, and citywide waste systems flows downstream, ultimately accumulating in lower-lying informal settlements. This upstream—downstream dynamic makes these communities both the recipients of citywide waste and the main targets of environmental blame as seen starkly in Dandora.

Despite decades of clean-up efforts, the rivers remain polluted because of the systemic drivers—weak governance, fragmented institutional responsibilities, and insufficient citywide waste and sewage infrastructure—remain unaddressed. "*Institutional responsibilities are unclear, and priorities keep changing*" —a systemic barrier highlighted by KDI—making it difficult to sustain environmental progress. Environmental degradation is thus both a symptom and a consequence of historical exclusion and ongoing infrastructural neglect.

Community-Led Action and the Struggle for Belonging

In response to systemic exclusion and repeated evictions, communities along Nairobi's rivers have increasingly mobilized to create their own solutions—both to protect their homes and to assert their right to belong in the city. "*People who live in these settlements are not passive – they are very engaged. They feel responsibility for the river and want to make it better*" an NTNU PhD student during her presentation talk highlighted. Community-based organizations such as KombGreen Solutions in Korogocho, the Mathare Social Justice Centre, Kibera Community Cleaners, and other grassroots collectives, exemplify how marginalized populations engage in environmental restoration, river clean-ups, tree planting, urban farming, public space development, youth empowerment. These efforts reflect what the speaker described as



Image 47. Field visit with UN-Habitat to community-led project KombGreen park in Korogocho, 2025. Michael Mawuena Baccah

"*environmental stewardship rooted in memories of swimming in the river, of fishing, and of a time when the river was alive and clean.*"
These initiatives are not simply environmental projects; they are expressions of belonging, agency, and resistance to displacement. They reveal a desire among residents to be recognized as part of the city's social, ecological, and economic fabric. The NTNU student similarly stated, "*Their actions are rooted in everyday survival, but also in dignity and belonging.*" In many cases, these interventions serve dual purposes: mitigating environmental degradation and creating community assets—safe play spaces, memorial parks, and urban farms that provide both dignity and livelihood support. Such initiatives demonstrate that residents of informal settlements should not be labeled as the source of urban degradation, but active contributors to its repair.

These community-led efforts challenge persistent stereotypes that portray informal residents as passive recipients of aid or environmental threats to the city. Instead, they highlight localized knowledge, collective care, and the desire for recognition. As KombGreen stated, their work is driven by the belief that "*we must give back to the community* " and by a refusal to wait for external rescue: "*We can't do anything without approval, but we don't want them to develop plans in offices without coming to the ground to see what communities need.*"

Toward Collaborative Governance: Lessons from NGOs and Community Partnerships

While governmental institutions often struggle to engage communities meaningfully, frequently relying on enforcement and eviction, several NGOs and international organizations—such as Kounkuey Design Initiative (KDI), Public Space Network, and SDI Kenya—have cultivated long-term, trust-based relationships with these informal communities demonstrating how collaborative, participatory, and co-creative planning can produce impactful and sustainable results. These organizations work closely with CBOs to implement small-scale but



Image 48: Exhibition and documentation of collaborative design process for Mathare River led by SDI and Muungano wa Vanavijiji. Michael Mawuena Baccah

transformative interventions, demonstrating how environmental restoration and social empowerment can be pursued simultaneously. As KDI emphasized, "*Part of what our process does is that when we get resources we don't just cherry-pick. We invite communities to apply and we co-design with them.*" This approach ensures that the ideas and priorities come from residents themselves, not external planners.

Their models emphasize long-term presence, relational governance, and shared decision-making—principles that contrast sharply with the hierarchical, enforcement-based approaches prevalent in state-led planning. PSN highlighted their role in sustaining long-term engagement beyond project completion: "*Once the project is done, it is handed over to the group, but we remain available for technical support, capacity, and governance issues.*" This relational continuity strengthens community stewardship and resilience. These organizations show that sustainable urban transformation requires not only physical interventions but also the redistribution of voice, recognition, and agency and provide compelling lessons for government bodies like the Nairobi Rivers Commission, seeking to implement citywide regeneration strategies. Adopting such collaborative frameworks requires a government mindset shift: from controlling communities to working with them; from viewing informal settlements as problems to recognizing them as essential contributors to Nairobi's resilience.

Documentation, Visibility, and the Case for an Interactive Mapping Platform

Despite the extensive work undertaken by CBOs, NGOs, government agencies, and local actors, their efforts remain poorly documented and highly fragmented. Lack of visibility reinforces the narrative that nothing is happening along the rivers, further marginalizing community efforts, and preventing effective project integration. As the NTNU student emphasized, "*There are many interventions happening, but they are often disconnected they do not always align or reinforce each other.*"

A publicly accessible interactive mapping platform would address this gap by documenting all community, NGO, and government projects. This will create visibility and legitimacy for community-led initiatives; support coordination among stakeholders; inform resource allocation and policy decisions; enable transparency and accountability across institutions; strengthen public participation at all planning stages.

Such a platform advances decolonial thinking by recognizing marginalized residents as creators of urban knowledge and making their contributions visible within formal planning processes. More importantly, it supports a transition from top-down control to collaborative, inclusive governance—ensuring that those who build and sustain the city are also partners in shaping its future.

Conclusion: Toward Co-Creative Urban Futures

Nairobi's river basin challenges cannot be solved through enforcement-driven approaches that displace the very communities most affected by urban inequality. Sustainable transformation requires a shift in governmental mindset: from control to co-creation and from viewing informal settlements as encroachments to recognizing them as urban communities whose knowledge, labor, and aspirations are integral to the city. Grassroots initiatives in settlements such as Mathare, Korogocho, Kibera, and Mukuru already demonstrate the possibilities of community-led environmental stewardship and social resilience. The task now is for government institutions to engage these communities as partners, not obstacles. An interactive mapping platform offers one concrete mechanism for enabling this shift by enhancing transparency, documenting contributions, and supporting participatory collaboration. Ultimately, moving from control to co-creation is not only a more ethical pathway—but an effective and sustainable one toward a more resilient, equitable, and inclusive Nairobi.



Image 49: Children playing in KombGreen Park in Korogocho, 2025. Annu Kumpulainen

17 Community Participation and Sustainable Urban Development

Giulia Sagarriga Visconti

More than two-thirds of cities in the Global South have emerged through unplanned and spontaneous processes. (Holston-James-Insurgent-Citizenship, n.d.)
The majority of residents in these informal settlements bear responsibility for confronting the numerous challenges they face—from planning and construction, to establishing self-made shelters, and earning a livelihood in an informal setting. As a result, the role of the principal actor in urban development within these contexts shifts from formal planning institutions to community-based, informal processes. (Miraftab, 2009: p42)
When talking about such realities, central to people-oriented development is the recognition that individuals and communities affected by development should actively shape it (Johannes & Botes, 1999); ordinary people are increasingly viewed as co-decision makers (Mayo & Craig, 1995: p11)
As Berger (1974:p13) observes, those who inhabit a place understand it in ways that go beyond any external interpretation. For this reason, people and local communities are not only the purpose of development but also the main source for it.(Johannes & Botes, 1999)
From the Brundtland Commission's findings to the Earth Summit's agenda, ensuring genuine citizen participation has been identified as a fundamental requirement for achieving sustainable development (Johannes & Botes, 1999:p18).
Sustainable development is defined by the Brundtland Commission as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987: p16). Consequently, a truly sustainable development can only emerge from the actions, expectations, and critical awareness of the people themselves, with communities taking the lead in shaping their own futures rather than remaining passive recipients. (Johannes & Botes, 1999)
In this regard, Kakonge and Imvboré (1994:8) note that environmental initiatives in Africa have often failed due to insufficient local participation.
Furthermore, Kaya (1989:50) observes that when communities are actively involved in their own development, they are more likely to assume ownership of and responsibility for the services and outcomes generated by such projects.

Sense of ownership

In community development, a "sense of ownership" is widely recognised as a fundamental condition for meaningful participation and long-term project viability. The concept of ownership extends beyond spatial attachment to include responsibility, commitment, and an ongoing relationship to both process and outcome (Watt, Higgins, & Kendrick, 2000; Doe & Khan, 2004; Harvey & Reed, 2007).
The sense of ownership is not confined to a single level, but is distributed across social, political, and ecological scales, shaping who is affected by decisions and how responsibility for their outcomes is shared (Lachapelle, 2008). It also introduces a strong temporal dimension, linking present-day choices to the long-term consequences experienced by future generations, particularly when development produces lasting environmental impacts. In this way, ownership makes visible the interconnected spatial and temporal relationships through which development decisions are understood, accepted, and sustained in both research and practice (Lachapelle, 2008).



Image 50: Mathare Informal Settlement, Nairobi, 2025. Giulia Sagarriga Visconti



Image 51: Kibera Informal Settlement, Nairobi, 2025. Giulia Sagarriga Visconti

The role of Trust

The potential for ownership is closely linked to the presence of trust. Trust contributes to learning, relationship-building, constructive engagement between citizens and institutions, and the creation of inclusive and fair decision-making processes (Rousseau et al., 1998).
Rather than being a specific behaviour or individual choice, trust operates as an underlying condition that shapes interaction and influences cooperation and participation (Lachapelle, 2008). As Weber and Carter (2003: 5) note, trust "*emerges out of the interactions between individuals and it serves to order these relationships by influencing interaction*".
In planning and governance contexts, the recognition and validation of decision-making authority is therefore crucial, as it continuously reinforces or erodes patterns of trust and distrust (Forester, 1989)

The issue of Maintenance

A factor that must be considered when discussing the sustainability of a project is the community's ability to maintain it over time. As Cotton & Sinner (1990) note, the adage "*build what you are capable of maintaining, not what you are capable of building*" highlights that the choice of technology directly affects the complexity of maintenance and the extent to which it can be managed by households or community groups. Tasks requiring specialist skills or equipment are generally beyond the realistic capacity of local communities (Cotton & Skinner, 1990).
The potential for community participation in maintenance is significant, but only if maintenance is treated as a central objective in both infrastructure planning and design. Communities should be engaged from the earliest stages to ensure that the services provided are aligned with their needs and are perceived as belonging to them. Without such involvement, the likelihood of sustained participation in upkeep is limited. Professional attitudes that dismiss the community as incapable of understanding complex issues further hinder effective engagement. Engineers and planners, therefore, may need to adopt a participatory approach themselves, which can require a shift in professional mindset (Cotton & Skinner, 1990).

Nairobi case in Kenyan context

As discussed, public participation and a sense of ownership are fundamental to the success of a project that can genuinely be considered sustainable. Kenya's legal framework reinforces this principle. The Constitution mandates citizen involvement in environmental management, including the protection, conservation, and sustainable use of natural resources (Constitution of Kenya, 2010, Part 2, Article 69). It also guarantees public access and participation in parliamentary business, ensuring that legislative processes and committee sittings are open and that citizens can meaningfully engage in decision-making (Constitution of Kenya, 2010, Part 5, Article 118). These provisions institutionalise participation as a core element of governance, linking community engagement directly to sustainable outcomes.

Kenya's Vision 2030 and the 2010 Constitution identify citizens as central actors in development, with one UN representative emphasising that both frameworks sought "*to put people at the centre of development*" (United Nation interview).
In principle, this approach is reflected in the Nairobi River Commission's hierarchical participatory framework. Engagement is organised through mapped communities grouped into zones, each with satellite stations linked in real time to a central hub at the Secretariat (Nairobi River Commission expert). These zones are coordinated by individuals "*selected by the communities themselves*" who function as liaisons between residents and the Commission (NRC expert). Non-state actors, NGOs, and government departments participate through "thematic working groups" focused on specific interests such as water and sanitation, ecological restoration, or livelihoods (NRC expert). These groups are tied to corresponding Commission committees, and national and county governments are connected through their departments. As summarised by the commission expert, the structure consists of "*three levels the strategic the thematic working groups then the communities" with interventions "targeted and resourced by whichever thematic group is related to that*" (NRC expert).

However, NGO accounts suggest a more ambiguous experience of participation in practice. Initially, there was clear willingness on the part of the Commission to involve communities and NGOs in planning. Kounkuey Design Initiative (KDI) recalled that initial invitations appeared to be aimed at "*developing kind of a community involvement strategy*" suggesting an intent to include stakeholders in shaping participation (KDI interview). Slum Dwellers International (SDI) similarly described close early cooperation, stating that they "*supported the commission to go to all these communities and created all these zonal*" and that the Commission "*found us with an ongoing program on climate change so it was easy for them to just ride on that energy*" (SDI interview). These accounts illustrate that, at least in the early stages, the Commission actively sought to engage communities and leverage existing NGO programs to facilitate participation. Over time, however, the process became "*confusing*" with contradictory messages from different commissioners: "*you find this one who will make you feel like you guys have convinced the Commission then one commissioner comes and says, we are not aware of you guys*" (SDI interview). In response, the Commission cited financial constraints, noting that "*Bill and Melinda Gates gave us a small grant*" (NRC expert), which required the engagement of a consultant to prepare an initial draft internally before broader stakeholder outreach, effectively shortening the scope and timing of public participation.

The UN highlighted broader challenges in understanding participation, noting that it is often undertaken because "*the law requires it, so it's more like a checklist*" rather than as genuine co-creation (UN interview). To address this, the UN has emphasized sustained engagement, capacity building, and civic education, collaborating with organizations such as KDI, which "*went to the ground*" and "*played a very important role in empowering the communities and actually engaging them*" (UN interview). This work focused on helping people understand "*what does participation mean and how exactly should it be carried out*" (UN interview), as well as informing them of their legal rights so that "*should they be facing similar challenges, they can know how to actually... defend themselves*" (UN interview).

Community-driven approaches also foster ownership and long-term sustainability. SDI stressed the importance of "*designing solutions with them so that they can be able to just own these initiatives and own these projects instead of planning for them*" placing "*community at the heart of all the initiatives and policy reforms and also interventions*" (SDI interview). This model was presented as a pathway to sustainability, with SDI noting that "*if the community drives this we'll find the community ready with these plans*" allowing "*the communitiesto be the ones doing the presentations*" (SDI interview). The Commission, in contrast, described its role primarily as coordinating, stating that "*long-term maintenance we guys are just coordinating*" while other ministerial structures remain responsible for implementation (NRC expert). Together, these perspectives underline differing interpretations of ownership: community-driven continuity versus institutional coordination.

Trust emerged as a central challenge, driven by abrupt actions such as demolitions, floods, extended planning processes, and perceived disregard for community input. SDI described a sense of betrayal, noting that interventions were "*very, very cruel in the way they did that*" (SDI interview), while KDI highlighted the uncertainty created when existing plans risked demolition despite advocacy for integration (KDI interview). The UN emphasized that mistrust is partly structural, reflecting differing priorities between government and communities: "*the government has some kind of priority on the river and the other NGOs are looking at the people first*" (UN interview). The UN also highlighted its mediating role, providing technical guidance while remaining neutral, though tensions persist because communities feel "*their ideas were not heard*" (UN interview).

These tensions were further complicated by contrasting philosophies of project design and implementation. The UN reflected on the disconnect between government-led actions and bottom-up approaches, noting that demolitions sometimes occurred unexpectedly: "*there was a complaint then the next morning, there's demolition on the ground it even caught people in the agency by surprise*" (UN interview). Rebuilding trust requires the "*aggressor to understand*" and alignment of perspectives, yet "*there's dissonance of philosophies the government's philosophy will always, we are the government, we have the mandate, we will do it*" (UN interview). A path-dependent, top-down mindset persists: "*we come from a system where things were originally centralized people within government still don't see the community as people who even have ideas*" (UN interview). In response, the UN emphasized its role in influencing processes to encourage greater consideration of community input. SDI provided an example of bottom-up solutions, describing locally implemented actions—later conceptualized as an "*ecosystem-based adaptation planner*"—to unify youth groups that had been working independently: "*most of those youth groups were operating in silos. But in order for us to be able to take the river to the initial state it was, the groups should be able to act as a unit*" (SDI interview).

Conclusion

Ensuring the long-term sustainability of the Nairobi River Regeneration Plan therefore requires meaningful, community-driven participation that fosters ownership, strengthens maintenance, and mitigates mistrust. SDI highlighted that "*if they're able to design for themselves, then you're also building the capacity. And even when SDI Kenya won't be around or a different organization will come into place, they can still continue through those skills that they have gathered from here*" (SDI interview). This demonstrates that real participatory processes, rather than top-down directives, empower communities to maintain projects and adapt across changing regimes. Recognizing existing efforts through tools such as an interactive archive map can document community projects, provide visibility, and offer proof of their existence and environmental benefits, helping to prevent neglect or unfair demolition. By combining structured participation, local ownership, and mechanisms that validate and unify community actions, such approaches can support continuity, resilience, and sustainability in urban environmental interventions.

18 Displacement of Communities

Annu Kumpulainen

This chapter discusses the flooding and consequent demolitions along the riparian reserve of Mathare River in April-May 2024. The text compares how government representatives discuss the issue of flooding and demolitions in the interviews we have gathered, and how locals see the demolitions and how they influenced their lives and livelihoods. The chapter is based on qualitative semi-structured interviews conducted during field visits in Mathare in October 2025. The experiences of residents regarding the flooding came up during our field walks quite spontaneously, as it was a current issue affecting the community. By juxtaposing official narratives with lived experiences, this chapter reveals how disaster response can reproduce existing power asymmetries. This chapter argues that the 2024 demolitions, while framed as purely flood risk management, functioned as selective displacement that reinforced existing socio-spatial inequalities.

Mathare Background

Mathare is one of the oldest slums in Nairobi and there are records of its existence since the 1920s. According to 2019 census, there are 206 564 residents, and the informal settlement has been divided into thirteen villages. Mathare has been the center of historical events in Kenya, for example as a Mau Mau movement base.

"This is the space of struggle. Mau Mau Road, it's the historical name of freedom fighters. And it connects Mathare with the ancestry of resistance. So that's why you find Mathare is a very effective community in advocacy, because it has connected that spiritual ancestry with present life. Mathare is a historical place, which has followed those steps of resistance." (Mathare resident)

Along the walks we did, we heard many stories of violence and police brutality happening in certain places like bridges along the river, mainly against local youth. There had also been tensions between the residents on both sides of the river before, but now the river is a uniting element. Many of the tree planting initiatives started as memorial tree planting. One of the first places was Green Park.

"We have trees there and children's parks to play. Here is where we started to plant memorial trees. With mothers of people. After, we documented the police to stop extrajudicial killings. Me, when I joined Mathare Social Justice in 2019, my first memorial tree I planted here in Mlango Kubwa Green Park. For my son." (Mathare resident)

These memorial practices situate environmental interventions within a longer history of violence, loss, and collective resistance. Youth are and have been a longstanding part of daily life in Mathare. It is only in the last few years that they have been more explicit about and comprehensively organizing around these killings (Jones et al., 2017). The killings and demolitions are only some of the many injustices these communities face. Understanding Mathare's history of political marginalization is essential for interpreting current community responses to flooding and eviction.

"We have been divided by the system of Kenya. The system of Kenya is not organizing the poor people. As you can see, we have been oppressed. We are not poor by the way. We are not poor by nature. We are poor by system." (Mathare resident)

Flooding and Demolitions

The floodings in Mathare River occurred in April 2024 after heavy rainfall. According to statistics, the floods affected nationally 82 552 households, totaling 412 763 individuals. (Kenya Floods Recovery Needs Assessment Report, n.d.) In Nairobi alone, 51 378 households were



Image 52: Lively streets in Mathare Informal Settlement, Nairobi, 2025. Annu Kumpulainen

affected and 22 679 households displaced. The floods forced more than 250,000 people from their homes. Floodwaters remained inside houses for prolonged periods, increasing health risks and disrupting economic activities. (Oluchiri, 2025)

In April 2024, in an address to the public, Nairobi Governor Johnson Sakaja stated that all the city's rivers had burst their banks, bridges had been swept away, and roads had been destroyed, creating a humanitarian crisis. He announced that the government would be clearing buildings along the rivers, no matter how long they had been there. He asked everyone to move and not wait to be moved. (Ng'weno, 2025)

Soon, in early May, as a precaution to prevent further flood-related deaths, the government demolished all construction within 30-meters distance from the river. There was only a 48h notice before the bulldozers came. Government representatives argue that the demolition along the rivers was done due to "adverse weather".

"People who were being carried away in the water were mainly from those informal settlements. Not from the rich, not the rich people. They are obliged to train the river. And so, because of the adversity of weather, the government said, we don't want to lose any more lives tonight. And that is why much of the demolition was done within those marginalized areas. They were being saved from the adversity of weather."
(Representative of NEMA)

The flooding and consequent demolishing took place only in the informal settlements adjacent to the river. More affluent areas were not affected, even though there was also construction within the riparian zone. According to the representatives of The National Environment Management Authority (NEMA), this was because most people living upstream, have documentation of their land and building permits. It is also possible to construct within the riparian area, as long as it's compatible with land use.

"So, you must have a document to authorize you to be within that area. If you don't have one, you are supposed to demolish. You can be in the riparian area if you have the appropriate documents. It can be private and public, but not residential. Land management is controlled by different laws. So that ten meters, although it is yours, it is controlled. But it is still your land. So you are free to apply for any development as long as it is compatible to the river. Development within the river can be private because land ownership goes to the middle."
(Representative of NEMA)

The Nairobi River Commission representative reminds of the laws prohibiting occupying the riparian area. He also emphasizes the importance of scientifically studying and deciding which places are truly in the flood risk area.

"You see, the law is the law, unfortunately, and we'll have to see how best to navigate that. But honestly, if it is done scientifically, it means by the time you are told you cannot really claim land beyond here, that the level of risk is real. Real in such a way that if you don't give it voluntarily, one day the river will take it. That's what we are saying. And many times, also we try to make people distinguish between land ownership and land use. The two are different because one is about property rights. The other one is about controls, including the environmental controls"
(Commission expert)

By emphasizing urgency and legality, official narratives position demolition as inevitable response, rather than as a policy choice.

We walked along Mathare river with the locals on two different occasions and two different areas. First walk was done in Huruma with community-based organizations Slum Dwellers International (SDI) and Muungano wa Wanavijiji. The second walk from Mlango Kubwa to Kwa Kariuki with Mathare Social Justice Center (MSJC). The walks revealed how residents understand demolition not as an isolated event, but as part of a cumulative process of dispossession. During these encounters, many residents brought up also the human suffering related to both the flooding and the demolitions. The community faced significant trauma because of the flooding, And due to the demolitions, the community suffered another setback while recovering from the previous one.

"And then before the floods here, it was full of houses. And now the government demolished without engaging people or telling them we're going to demolish. And then it left people like that. Bare land without nothing, without solution, how the land will be used." (Mathare resident)

The locals showed us many areas along Mathare river that had been demolished. The areas in the before and after pictures are just a few examples of how the landscape changed after demolitions. Some of the buildings in the riparian reserve were animal shelters, schools, industries and enterprises - but also housing.

"Yes. We know here as Getaduro Village. But this used to be houses. Sorry to say. And here there were permanent buildings. Five story buildings that were brought down." (Mathare resident and community coordinator)

Most residents don't live near the rivers because they want, but because it's the only thing they can perhaps afford. They also know the risks involved in living close to the river.

"The more you are near to road, the more expensive life is. And the more you are near to river, the cheaper life is. So the houses near the river are cheaper and more threatened." (Mathare resident)

On Muthaiga bridge, which separates the rich upstream neighbourhood from the informal settlement, you can really see the unfair treatment. The tall buildings in Muthaiga are basically right next to the river but haven't been demolished. Some of them are even quite new and built within five years. The uneven enforcement of demolition exposes how environmental regulation operates differently across socio-economic contexts.

"Now you see this place? This is where the flood was very difficult. The water was all over there. Here were the houses of people and the government demolished here. This bridge is dividing Mathare and Muthaiga. Place, very, very rich (Muthaiga). And it wasn't touched in a single building. They said that they built it very well. They knew the river would come." (Mathare resident)

Demolition Impact on Community

Before the demolitions, community-led projects were mostly related to river cleanups and tree planting. Many agricultural and ecological interventions have come up after the demolitions as a way for the residents to occupy the riparian zone for the use of the community. These projects also have a social element to them, since they are keeping the youth occupied with other activities instead of crime.

"We started year 2020 when there was COVID-19 pandemic, where we came up as a youth. Because of the high rate of crime that was in our community, we started doing cleanups. We do cleanups. But on last year when the government was demolished the area, we came up with another idea. What can we do to remain with our land? So we came up with an idea of planting trees." (Mathare resident and member of Sun City)

Many established projects along the rivers were either washed away by flood or demolished after. Some of these projects were funded by the locals themselves, and some supported by NGOs. For example, the tree planting projects were demolished, even though they were not incompatible with the riparian reserve.

"This group planted 2500 bamboo seedlings on the other side. But today you can only see maybe 10. The other ones were destroyed by the bulldozers. So it was painful, but that was the executive order. So we had to obey." (Mathare resident and community coordinator)

These initiatives demonstrate how communities actively engage in environmental stewardship, in counter to narratives that portray them as encroachers. The destruction of these projects undermined not only livelihoods, but also community-led attempts at risk reduction. The flooding and evictions also raised the prices of rent and made the situation of housing even more dire. Several residents emphasized that rent doubled following the demolitions, intensifying housing precarity.

"What happened after eviction and flooding, rent of people in this area really changed because the

housing was being hired on a higher rate. So now we find the rent have come twice harder. So we find we have problems of housing. Others are going to live with their relatives, rather still homeless. At night we find a lot of people near the road sleeping outside. So we're having a shortage of housing." (Mathare resident)

The floods washed away most of the pedestrian bridges along Mathare river. Some of these bridges have been replaced by community effort, but some have been provided by the government. However, for locals, many of the government bridges are now associated with future plans of affordable housing.

"Government bridge. Yeah, because they want to build affordable (housing). Now this bridge is the signal from the government that they want to remove us here. They are signals. Because they say here where they put this bridge, they want to build affordable houses here." (Mathare resident)

Locals are aware of these affordable housing projects, but they are excluded from these plans. According to them, the government does not develop the riparian zone for public use, but for private use or housing, which is not actually affordable for the locals. Affordable housing emerges not as a solution to displacement, but as a mechanism through which exclusion is reproduced. Unfortunately, we didn't get interviews from anyone working directly with government affordable housing.

"If you see there in Pangani, the government have finished those affordable. We have courageous study in the center. If you don't have one and a half million (Kenyan shillings), you cannot. Our parents were born here, we were born here in Mathare. We have family here in Mathare, we don't want that affordable housing and it's not something we can afford." (Mathare resident)

We visited a community-led affordable housing project designed and implemented by SDI and Muungano wa Wanavijiji in Huruma. Part of the building block had been demolished after floods even though the residents tried to negotiate that the housing could be spared.

"Even during demolitions, we tried to negotiate with the government. It was constructed in a dignified way through Muungano wa Wanaviijji. Showing how a poor person can own a house in a simple way. But they rejected it and it was demolished. We have few remaining. These buildings were constructed in a way to accommodate all the poor people, including the elderly, the disabled. They were saving literally to 10 shillings, 20 shillings. But at the end of the day, everybody acquires a house." (Mathare resident)

In addition to all this material loss, there were many personal experiences of loss related to the flooding. We heard some devastating personal stories. One member of Mathare Social Justice Center had been killed in the floods. One of the community coordinators of SDI lost his house and cattle; others lost friends and family.

"Personally, I do pig farming as a livelihood. So, mine went; almost 26 mature and more than 86 piglets. I lost them in a day. But at least I'm now recovering. And the house also, and everything went. So, I'm one of the members who was totally affected by floods" (Mathare resident and community coordinator)

"Now, you see that stone. This is where our comrade called Mama Victor, who started Mothers of Victims and Survivors Network in our office. She was building a house there along the river and the flood came and took her with her children, five children, with her friend. It was very, very quiet in our office because we came and we started removing them. When we found Mama Victor, that tree was catching her. And then we get another woman in the corridor of the bathroom. She had built a house of stone, but the river took even the stone. And then there are two children who were not found. But one was found. One child was found in Dandora dumpsite." (Mathare resident)

These losses illustrate how flooding impacts extend beyond material damage to long-term social and emotional consequences. Personal accounts of loss make visible the human cost of policies implemented without adequate protection or support.

In this context, demolition became a catalyst for collective mobilization rather than compliance. The community was ever more determined to defend their right to occupy the riparian land for public use. Even the larger protests against



Image 53: Shofco bridge in Mathare before flood and demolitions. Picture from Google Maps taken in October 2023



Image 54: Shofco bridge in Mathare after flooding and demolitions.
Picture taken in October 2025 by Michael Mawuena Baccah

the government in June 2024 had roots in the demonstration against demolitions, which started in Mathare.

"We are the one who sparked the protest which is going on till now and we are organizing and we are trying to fight for our justice and tell our people this is their right; this is their land. The riparian land is not for government, but they are saying that the riparian land is for government. The riparian land is for the public." (MSJC member)

Controversy

The demolitions followed widespread flooding in the city, after which the government sought to crack down on those who have built on riparian reserves along the city's rivers. The disproportionate focus of this crack-down on informal settlements, however, raises questions. (ROAPE, 2024) From a writing by members of Kounkuey Design Initiative (KDI), it is evident that this unfair treatment "the veneer of 'aesthetic violence' veils the underlying agendas of gentrification". (O'Donovan-Iland, 2024) They also observed a stark contrast in the treatment of informal settlements in Nairobi compared to upscale developments, that remained unaffected by evictions despite their illegality or closeness to affected drainage channels. The framing of demolition as environmental necessity risks concealing processes of displacement and urban restructuring.

Representatives from The Nairobi River Commission and The National Environment Management Authority commented on the unfair treatment between different areas in Nairobi. The representative of NEMA highlighted again the importance of building approvals and land tenure, which affluent areas had and the informal areas didn't. Some landowners threaten the government with lawsuits. While framed as administrative constraint, these explanations highlight how legality itself becomes a mechanism of exclusion.

"Because within those rich areas, some of them are approved. You are there now making choices. You know the informal settlements; nothing was approved. So, it was easier to do (demolish). But now when you get to the rich, some have licenses, although they're in the wrong place. So, what do we do with this? And you know they also take us to court. You don't touch anybody who has a license. And then when you see it, then you say 'ah this is discrimination.' But it's because the government is very careful, because the initial mistake has been done and if you get touched, then you pay. So, those are some of the challenges that, let me call them challenges. Let me not call it whatever he said." (Representative of NEMA)

The Nairobi River Commission representative reminds of the importance of scientifically studying and deciding which places are in the flood risk area. He has also heard complaints of unequal treatment of informal areas during demolitions and commented on why the richer areas haven't been touched.

"There's a lot that downstream communities are asking. It's been over one year now, how come the affluent areas have not been [touched]? But whenever these matters come up, there are explanations that the downstream was the most impacted during the flooding. So, if you're talking over things that were bordering on emergencies, they were on the downstream because that's where the floodplain is. Unfortunately, that is also where the low income are. So, it's very delicate, and that's why before the planning and the scientific investigations are done, I don't think we can sort it out. People have sentimental attachments to this land. They were born here. They've always gone farming right to the edge of the river. And today you are telling them, it's this. So, it must be a very well-minded process. Unfortunately, we have not had the time to really approach it like that. It's the first time we are declaring riparian areas as special planning areas." (Commission expert)

There are a lot of discussions within the communities about what is the exact definition of a riparian area. There is construction in the riparian zone, which has been finished after the demolitions. For example, one school building is new and from google satellite photos we can see it has been under construction in February 2024. So most probably it started operating after the floods in April 2024. The locals do not see logic in this – at the same time they demolish schools for the vulnerable on the other side of the river due to flood risks, and at the same time open a school on the riparian zone on the other side.



Image 55: View from Muthaiga bridge towards Mathare Informal Settlement before demolitions. Picture from Google Maps taken in August 2022



Image 56: View from Muthaiga bridge towards Mathare Informal Settlement right after demolitions. Picture from Google Maps taken in July 2024



Image 57: New public school is enchroaching the riparian land, but didn't get demolished after flooding.

"We are also asking ourselves, that what is riparian space? I've always been asking those questions. Is riparian land to the poor people who cannot help themselves? While to the government projects and to the good buildings that are being owned by billionaires, to them, riparian space it's not the 30 meters that we are being told. Because I wonder. It is not even 5 meters away from there (the river)." (Mathare resident and community coordinator)

"Yes, and I'll show you another school on the other side, which, while we were demolished, a wonderful public school is being erected. And on the other side, there was a private school known as Mother Kelvin. It is totally finished. You will see the few classes that are remaining. You'll just see by yourself, this private school that is helping the vulnerable communities being demolished while a public school is being erected three meters away from the river. And this one was 5 meters away from the river. So, you don't understand what is riparian zone. To us, we don't understand what is riparian zone." (Mathare resident and community coordinator)

These inconsistencies further erode trust in riparian regulations and raise questions about transparency and accountability.

Future

During the implementation of Nairobi River Basin Regeneration Programme, some form of demolition will take place - whether it's justified by building new sewage systems, public spaces, "affordable housing" along the rivers - or safety reasons. So, how could this type of demolition disaster be avoided in the future? The representative on Nairobi River Commission puts an emphasis on the importance of public participation. The commission also acknowledges that the affected communities should be compensated fairly, which has not happened after the 2024 demolitions.

"Move with the people. I think the level of participation will increase. And you see, participation has many levels. I think there has been a lot of imaginary walls that we need to dissolve. I will tell you for sure, quite a number of the people who move things may not have done well in terms of community engagements from two angles. Either they were not exposed to that space. So here you are with key decisions on your table, but you are not very familiar with that space. Working with communities, especially those kind of communities, is not easy." (Commission expert)

The Nairobi River Commission representative also admitted that there was no public participation done for the current master plan. However, now they have gotten a grant from Bill and Melinda Gates Foundation, which enabled them to engage a consultant. They have designed a stakeholder engagement framework, that, according to them, would be in effect from January 2026. They call this the "bottom-up empowerment and transformation approach". Public participation emerges as both a governance challenge and a potential pathway toward more equitable outcomes. While these commitments signal potential change, they remain aspirational unless accompanied by enforceable protections for affected communities.

"So, you can't just wake up and say you're on public land, leave now. So, it says information, fair notice, and in some cases, also some level of compensation, depending on the situation. Meaning, even if we are to evacuate people, it cannot happen the way it happened back a few months. So, we're getting somewhere. It's a painful journey, but I think there are also some lessons that are coming up. The costs themselves also have; they are rolling up sensitization land clinics with these communities." (Commission expert)

One of the things that the communities could do to defend their neighborhoods, is document their interventions and projects. The representative from community-based organization Slum Dwellers International points out, that the communities are beginning to understand the importance of documenting each project.

Communities are also trying to be more self-sufficient and continue promoting truly affordable housing for themselves. The government is unwilling to offer them decent living conditions or truly affordable housing, so they are trying to cooperate with universities, NGOs, and architects.

"How we can acquire that genuine land and build a good house. So it is one of our objectives. We are doing it. We are saving 500 shillings per Sunday. So it is 2,000 per month. We are trying our best to make sure that we do it because we don't want to be evicted again." (Mathare resident)

There are competing narratives surrounding the flooding and demolitions in Mathare. Government officials frame demolitions as an urgent measure to protect lives, while residents experience them as forced evictions that deepened mistrust and vulnerability. Implemented with little notice and without adequate compensation, these interventions increased homelessness and intensified an already severe housing deficit in the area.

Collapse, demolition, and the riparian environment define modern Nairobi. All these factors are inflected by the effects of climate change. (Ng'weno, 2025) Demolishing buildings in the name of protecting the environment was unprecedented in Nairobi before. For residents, this has raised questions about the underlying motivations behind these interventions.

Conclusion



Image 58: Annu Kumpulainen

Conclusion

This research examined the persistent degradation of the Nairobi River Basin not as an isolated environmental failure, but as an urban condition shaped by the interaction of ecological decline, governance practices, and social inequality. Rather than treating pollution, flooding, or riparian encroachment as discrete technical problems, the study shows that these outcomes are produced through interconnected planning systems, infrastructure deficits, political decision-making, and uneven urban development. Viewed through systems thinking, degrowth theory, pluriverse theory, and climate justice frameworks, the Nairobi River emerges as both a material and political site where urban contradictions are negotiated, often at the expense of ecological integrity and vulnerable populations.

Across governance structures, the findings reveal a persistent inability to coordinate institutions operating within the basin. Overlapping mandates, shifting political priorities, inconsistent enforcement, and administrative instability limit the capacity of state agencies to pursue coherent, basin-scale interventions. Systems thinking highlights how such siloed and reactive governance is ill-suited to managing a complex socio-ecological system in which land use, housing, waste management, infrastructure, and livelihoods are deeply interconnected. What appears as policy failure is better understood as governance structured by short electoral cycles, institutional competition, and power-laden decision-making.

Degrowth theory further illuminates how these governance failures are embedded in a political economy that prioritises growth, visibility, and accumulation over long-term ecological care. Chronic underinvestment in sewerage, drainage, and waste management reflects political choices rather than technical constraints. As a result, infrastructural systems lag behind rapid urbanisation, and the river itself becomes a conduit for untreated waste. Environmental degradation thus emerges as a systemic outcome of growth-oriented urban metabolism, rather than an exception or accident.

Ecological degradation is inseparable from social inequality. The study demonstrates how exposure to pollution, flooding, and displacement is unevenly distributed, with informal and downstream communities bearing disproportionate risk due to exclusion from formal planning, secure tenure, and protective infrastructure. Climate justice frameworks clarify that this uneven distribution is structurally produced through selective enforcement of environmental regulations and demolition-led interventions framed as protection or safety. Riparian evictions frequently displace residents without addressing the housing shortages and land insecurity that push people into hazardous locations, shifting rather than reducing vulnerability.

At the same time, the research documents the critical role of community-based organisations and NGOs as sustained contributors to river regeneration. Through clean-ups, waste-repurposing initiatives, urban agriculture, public space projects, and environmental education, these actors demonstrate locally grounded forms of stewardship and adaptive capacity that align with pluriversal understandings of planning and knowledge. However, limited funding, documentation, and institutional recognition keep these efforts peripheral to formal governance, constraining their potential to influence basin-wide transformation.

Public participation emerges as a central fault line. While widely referenced in policy frameworks, participation often remains consultative, offering limited influence over outcomes. Repeated experiences of engagement without follow-through have generated deep trust deficits between communities and state institutions. From a climate justice perspective, this represents procedural injustice; from a systems perspective, it reinforces feedback loops in which poorly designed interventions fail, mistrust deepens, and governance becomes increasingly top-down and ineffective.

Taken together, the findings show that the degradation of the Nairobi River Basin is not a technical problem awaiting better management tools, but a predictable outcome of how urban development, governance, and inequality are organised. Systems thinking reveals reinforcing loops that perpetuate degradation; degrowth theory exposes growth-centric priorities that marginalise ecological care; pluriverse theory challenges the exclusion of community knowledge; and climate justice foregrounds the unequal distribution of environmental harm and decision-making power. Meaningful river regeneration therefore requires structural transformation — integrating ecological limits, redistributing power, recognising diverse forms of knowledge, and addressing the socio-economic conditions that shape environmental outcomes.

Ethical Considerations



Image 59: Annu Kumpulainen

Compliance with ethical principles and relevant legislations

This chapter outlines the ethical considerations and measures undertaken during the research process to ensure the integrity and credibility of research findings, safeguarding the rights and well-being of participants, and maintaining public trust in scientific investigations.

Ethical principles and approvals:
All human-participant activities (PAR, interviews, ethnography, creative documentation, surveys, mapping) have been conducted with informed consent, transparency on data use, withdrawal rights, and context-appropriate consent processes for individuals and communities. All activities have been carried out in compliance with the European Code of Conduct for Research Integrity by ALLEA (All European Academies), ESF (European Science Foundation), the Finnish National Board on Research Integrity (TENK) and the Finnish University Partnership for International Development (UNIPID).

Data protection and privacy:
All data was treated with the security measures of confidential personal data, according to the General Data Protection Regulation (GDPR). Personal data from interviews, observations, media, and narratives has been minimised, pseudonymised/anonymised where feasible, and stored with access controls. Where identifiable images, audio, or culturally sensitive material are used in public outputs (e.g., exhibitions, conference presentations), explicit consent was obtained, and culturally appropriate restrictions were applied when requested by contributors.

Knowledge governance, attribution, and benefit sharing:
To avoid misappropriation, the project applied protocols for documenting, attributing, and, where needed, restricting or contextualising dissemination of sensitive knowledge. Member-checking, co-authorship/acknowledgement, and reciprocal benefits will be integrated into knowledge transfer. Participation in activities was voluntary, with a continuous option for opting out. Secure exit was ensured, potential re-traumatising content was avoided, and appropriate referral pathways were provided.

Local permissions, environmental safeguards, and site-specific compliance:
Field activities were coordinated with consent from municipal authorities and complied with local regulations. Existing local collaboration networks were used to secure permissions, ensure community access, and mitigate risks around leadership engagement and knowledge transfer.

Risk management, do-no-harm, and dissemination:
The project's risk assessment acknowledges possible access challenges, low participation, and leadership engagement issues with mitigation via partnerships and networks; it also embraces learning from unexpected outcomes. A do-no-harm approach has guided language on colonial legacies and local governance, with options for anonymisation or restricted dissemination where disclosure could lead to harm. The project's broader dissemination acknowledges local partners, securing appropriate research integrity and recognition.

Non-EU activities and EU allowability:
Activities were planned in Kenya/Rwanda/Tanzania, a low- and middle-income country, applying standard and EU-permitted social science and arts-based methods when conducted under ethics approval and data protection. We ensure that any activity performed outside the EU would also be allowable in at least one EU Member State and comply with national laws and institutional requirements at each site.



Image 60: A child in Kibera Informal Settlement, Nairobi, 2025. Giulia Sagarriga Visconti



Image 61: Michael Mawuena Baccah

19 Introduction

The preceding analysis demonstrates that river regeneration in Nairobi is constrained primarily by structural governance failures rather than technical capacity deficits. Fragmented institutional mandates, weak inter-agency coordination, political discontinuity, and selective regulatory enforcement have undermined the ability of state actors to pursue coherent, basin-scale interventions.

Although environmental legislation and planning instruments exist, their implementation remains uneven and politically mediated, with enforcement disproportionately directed toward informal settlements while powerful polluters and upstream actors remain insufficiently regulated. As a result, river regeneration has largely unfolded through fragmented, project-based interventions rather than integrated strategies capable of addressing the socio-ecological complexity of the Nairobi River Basin.

The research further identifies persistent participation and trust deficits between communities and state institutions. Despite the formal incorporation of public participation within Kenya's planning and environmental governance frameworks, engagement practices remain procedural, offering limited opportunities for affected communities to influence decision-making or implementation outcomes. Repeated experiences of consultation without accountability or continuity have contributed to declining public trust, reinforcing perceptions of participation as symbolic rather than substantive. These dynamics weaken institutional legitimacy and generate resistance, contestation, and displacement, thereby undermining the long-term effectiveness of regeneration initiatives.

It is within these intersecting structural gaps; fragmented governance, weak coordination, limited accountability, and the systematic invisibility of community-led action that the proposed interactive **Nairobi Rivers Mapping Platform** is situated. The platform is not conceived as a technical solution in itself, but as a governance-support mechanism that responds directly to the institutional failures identified in this research. By systematically documenting actors, projects, and interventions across the river basin, the platform establishes a shared spatial evidence base through which coordination can be strengthened, duplication reduced, and regulatory inconsistencies made visible.

The Nairobi Rivers Mapping Platform platform further addresses deficits in transparency and institutional memory within a governance context characterized by political turnover and administrative fragmentation. Publicly accessible spatial documentation of river-related interventions enables scrutiny of the alignment between policy commitments and on-the-ground implementation, while simultaneously legitimizing community and civil society initiatives that are routinely excluded from formal planning records. In contexts where future interventions or demolitions are justified through claims of environmental compliance, such documentation provides a critical counter-archive that challenges erasure and selective enforcement.

Beyond coordination and transparency, the **Nairobi Rivers Mapping Platform** explicitly engages participation and trust as governance problems rather than procedural shortcomings. By recognizing communities as producers of urban and environmental knowledge, the platform reconfigures participation from consultative inclusion toward epistemic and political recognition. When supported by clear verification protocols and institutional stewardship, it enables communities to document lived conditions, articulate priorities, and contribute to collective understanding of river dynamics. In doing so, the platform accommodates multiple socio-ecological narratives and repositions river regeneration as a relational, contested, and lived urban process rather than a narrowly technocratic intervention. Overall, the findings of this research suggest that sustainable river regeneration in Nairobi requires not only infrastructural investment and regulatory enforcement, but also institutional mechanisms capable of enhancing coordination, visibility, and shared responsibility across fragmented governance landscapes.

The interactive **Nairobi Rivers Mapping Platform** proposed in this chapter responds to these requirements by operationalizing collaboration across governance institutions, ecological systems, and urban livelihoods. The sections that follow outline the platform's conceptual framework, governance architecture, and conditions for long-term institutional embedding within a more inclusive and accountable approach to river regeneration in Nairobi.

20 Analysis of Existing Digital Interactive Maps

MapHab / Stop Evictions!

MapHab is a mapping initiative developed under the research project Critical Mapping in Municipalist Movements (CMMM), in collaboration between researchers/activists from the Observatori DESC, the technical-lab Labor-K Lab, and the TU Berlin.
The main aim is to make visible — geographically and temporally — eviction events in Barcelona (and eviction-alert calls), in order to expose "who evicts", where and when, and to build data-driven awareness and advocacy around housing injustices.
Currently, the website hosts two separate but related maps:
a) "*Eviction Cases Barcelona (2016–2022)*" — a record of eviction cases supported by housing-rights collectives, especially the local branch of the Plataforma de Afectados por la Hipoteca (PAH) Barcelona.
b) "*Eviction Alert*" — a (more recent) map of calls to block forthcoming evictions (from 2023 onward), based on mobilization / activist-generated information (e.g. via a Telegram broadcast channel). The map aggregates grassroots/activist-collected data rather than official eviction records — with the explicit aim of making visible what official data (or its lack) tends to obscure: the geography of eviction, the identity of landlords, density and temporal patterns, and the loci of activism.

Data & Quality

Source: PAH cases and Telegram alerts
License & Access: No formal open license
Spatial Detail: Exact address and building level
Temporal Detail: Dates, sometimes times, included
Update Frequency: Not documented
Completeness & Bias: Under-reports outside activist networks
Validation: No systematic official verification

Data Model & Metadata

Standards: No formal standards mentioned
Relations: Limited links to external documents

Map Features

Filtering & Search: Basic, limited filter options
Timeline / Time Slider: Temporal evolution supported
Clustering & Heatmaps: Not described or visible
Popups / Detail Cards: Shows basic eviction information
Storytelling: Strong advocacy and political framing
User Contributions: Restricted to activist collectives

Governance & Sustainability

Maintainers: Observatori DESC and TU Berlin
Funding: Partially supported by research grants
Maintenance: Long-term plan not clearly stated
Community Engagement: Actively tied to housing movements

Strengths:

Makes spatial eviction patterns visible
Transparent, bottom-up activist data
Strong advocacy and justice focus

Limitations / Gaps:

Partial data, activist-network bias
No clear long-term maintenance
No links to documents or media

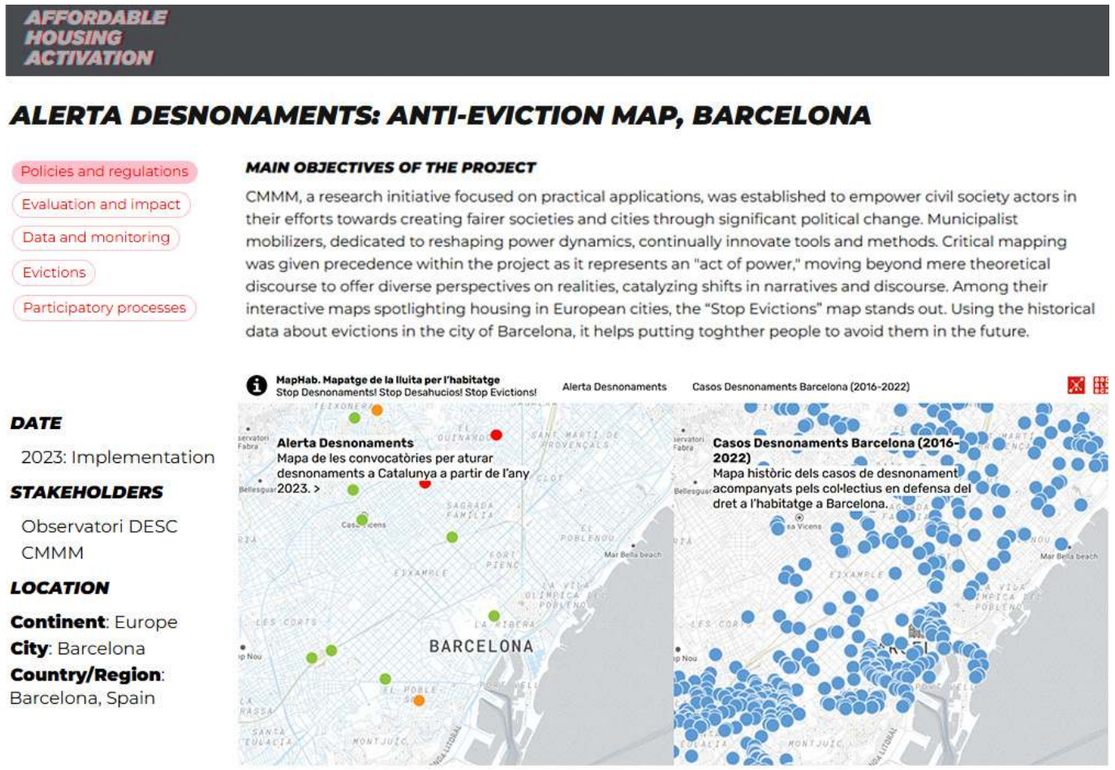


Image 62: Source: Alerta Desnonaments https://atlas.affordablehousingactivation.org/ficha/alerta-desnonaments-mapa-contra-desahucios-barcelona/ and https://cmmm-maps.eu/barcelona/

Demolition Map

The Demolition Map (demolitionmap.uk) is a volunteer-run, crowd-sourced interactive map that gathers information on buildings in the UK that are threatened, demolished (since 2016), or saved. It aims to reveal the scale and geography of demolition (including impacts on social housing and cultural heritage), promote reuse and retrofit over demolition, and support advocacy to reduce unnecessary demolition. People add entries via a web form (pin the location, fill a facts/media form); a team of volunteer moderators reviews submissions before publishing.

There is also a Finnish version called Purkukartta (www.purkukartta.fi), which is focusng on buildings under threat in Finland.

Data & Quality

Source: Crowd-sourced + ACAN support
License & Access: Public, license not stated
Spatial Detail: Pin on address-level map
Temporal Detail: From 2016, status tagged
Update Frequency: No schedule documented
Completeness & Bias: Volunteer-driven, biased coverage
Validation: Human moderation, no cross-check

Data Model & Metadata

Standards: No public schema found
Relations: Photos and stories only

Map Features

Filtering & Search: Basic categories and list
Timeline / Time Slider: Start-year only, no slider
Clustering & Heatmaps: Not available
Popups / Detail Cards: Text and image details
Storytelling: Narratives and memories supported
User Contributions: Open form, moderated

Security, Ethics & Privacy

Policies: Minimal, informal statements

Governance & Sustainability

Maintainers: ACAN UK & Scotland
Funding: Donations, volunteer-based
Maintenance: Development ongoing, unclear future
Community Engagement: Strong advocacy orientation

Strengths

Simple, accessible contribution process
Strong activist and awareness focus

Limitations / Gaps

No official data verification process

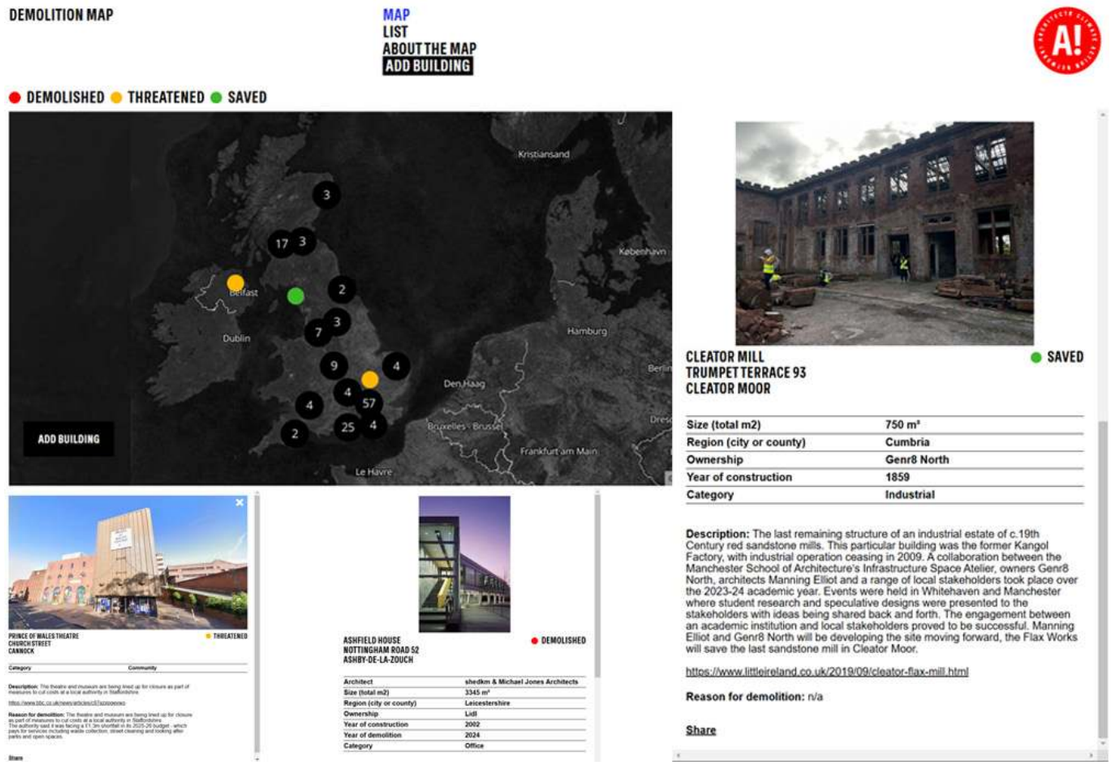


Image 63: Source: Demolition map https://www.demolitionmap.uk/map

21 Framework for the Nairobi Rivers Interactive Mapping Platform

An Open-Source, Co-Created Infrastructure for Visibility, Accountability, and River Regeneration

1. Vision and Rationale: Why This Platform Matters

The Nairobi Rivers Interactive Mapping Platform is conceived as a public, open-source, multi-stakeholder digital infrastructure that documents, visualizes, and connects all interventions related to Nairobi's river regeneration.

Core objectives

- Make community, NGO, academic, and government interventions visible;
- Address fragmentation across actors and projects;
- Promote collaboration among the vari ous stakeholders;
- Support evidence-based planning and coordination;
- Promote transparency, accountability, and trust;
- Recognize communities as knowledge producers, not passive beneficiaries;

Lessons from *MapHab / Stop Evictions* and The *Demolition Map* demonstrate that **visibility itself is political**: what is mapped gains legitimacy; what is invisible remains vulnerable. This platform therefore treats mapping as a **governance reform tool**, not merely a technical product.

2. Governance and Institutional Stewardship

Hybrid Custodianship Model

To avoid the weaknesses of purely activist- or volunteer-led platforms, governance is distributed across institutions with complementary strengths.

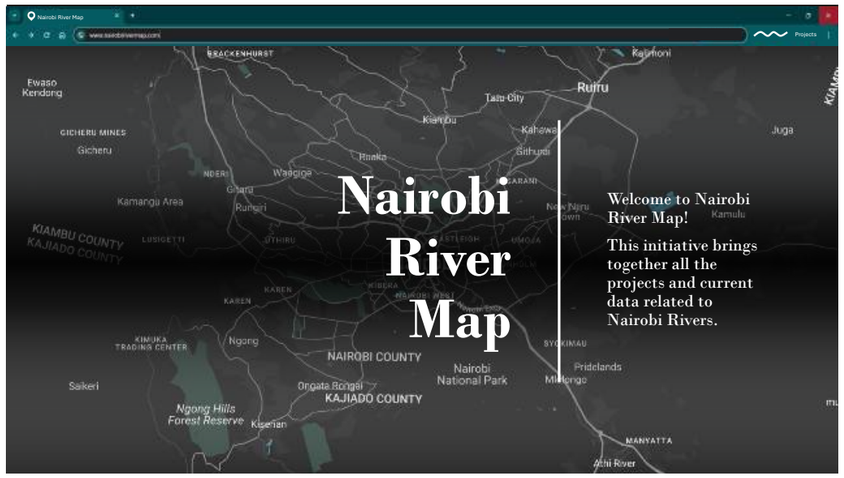
Primary custodians

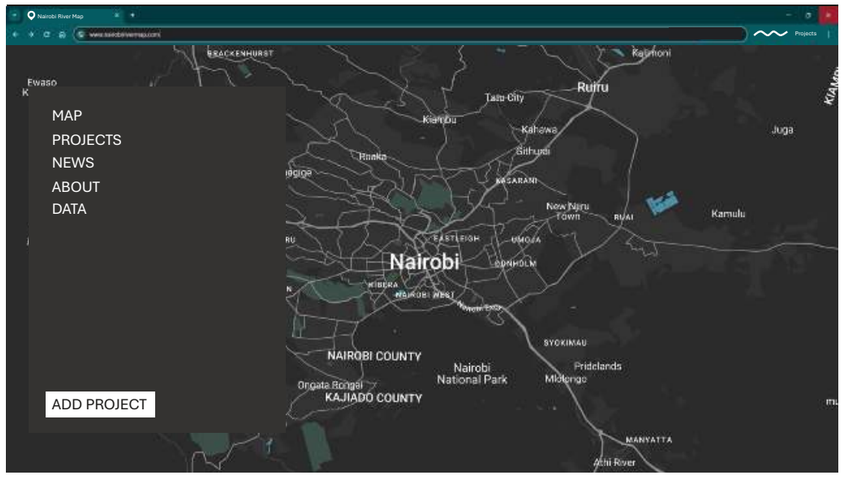
- UN-Habitat (Nairobi Office)
  - Institutional legitimacy
  - Policy linkage
  - Alignment with global urban agendas
- Local universities (University of Nairobi, JKUAT, Technical University of Kenya, others)
  - Research rigor
  - Continuity and knowledge retention
- Student and faculty involvement
- Verification capacity

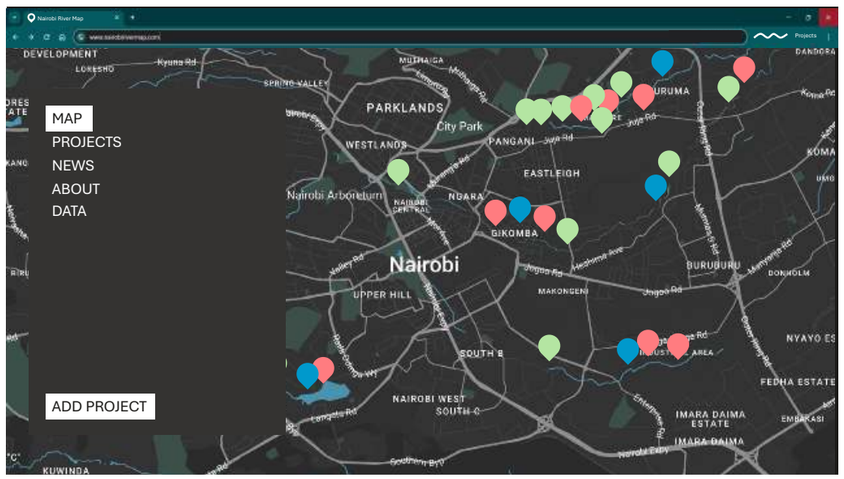
Supporting actors

- NGOs (KDI, PSN, SDI Kenya)
- Community-Based Organizations (CBOs)
- Independent researchers and planners
- Nairobi Rivers Commission and related government agencies

This governance model ensures co-production of spatial knowledge, credibility for policy use, and long-term institutional anchoring.







Graphs on page 129: Nairobi River Mapping Plat- from layout: Initial page, Selection menu and Map interface with projects visually displayed

3. Co-Creation and Platform Development Process

Nairobi Rivers Mapping Hackathon

Platform development should begin with a multi-day co-creation hackathon, following participatory design principles.

Participants

- Community mappers and CBO representatives
- Urban planners and environmental scientists
- Software engineers and GIS specialists
- UI/UX designers
- Data ethics and governance experts

Hackathon outputs

- Shared open-source framework
- Core data model and metadata schema
- Web and mobile prototypes
- Verification, ethics, and governance protocols

This avoids extractive tech development and builds **local ownership from inception.**

4. Data Architecture and Project Classification

Who Can Contribute

Registered users may include:

- General public
- Community groups
- NGOs
- Government agencies
- Universities and research institutions

Note: Users will need to create an account on the platform to be able to contribute to adding projects, data or verify already existing information

Project Categories (Filterable)

- WASH & sanitation
- Sewage & drainage
- Flood mitigation
- Waste management
- Water quality
- Ecological restoration
- Public spaces
- Housing & upgrading
- Infrastructure
- Social programs

Core Project Metadata

Each mapped project includes:

- Project name and description
- Implementing actor
- GPS location and river name
- Start year, completion year, duration
- Project status (ongoing, completed, threatened, demolished)
- Funding source
- Maintenance responsibility
- Before/after images
- Supporting documents (permits, designs, reports)
- Community narratives

This structured metadata directly addresses the documentation gaps seen in the case studies.

5. Verification and Trust Framework

(Learning from Wikipedia)

To balance openness with credibility, the platform uses layered verification:

Step 1: Initial Screening

- Conducted by UN-Habitat and partner universities
- Checks for location accuracy, completeness, basic evidence

Step 2: Community & Peer Verification

Registered users can:

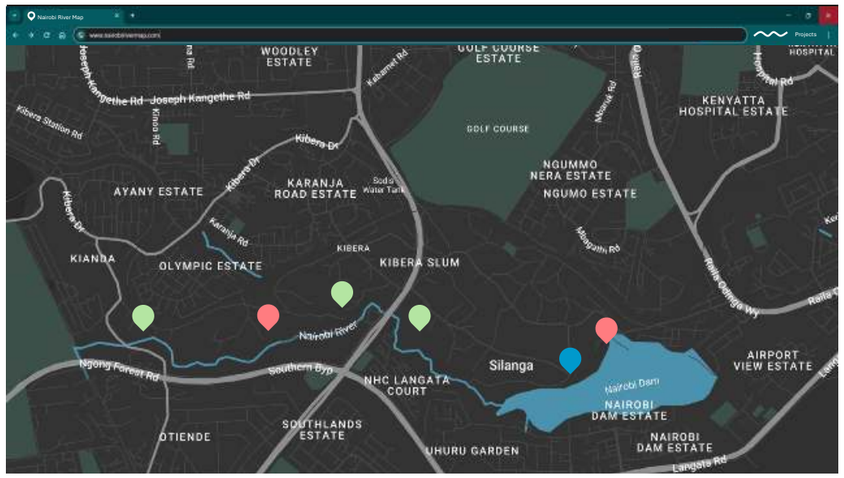
- Flag inconsistencies
- Add corroborating photos or updates
- Comment using local knowledge

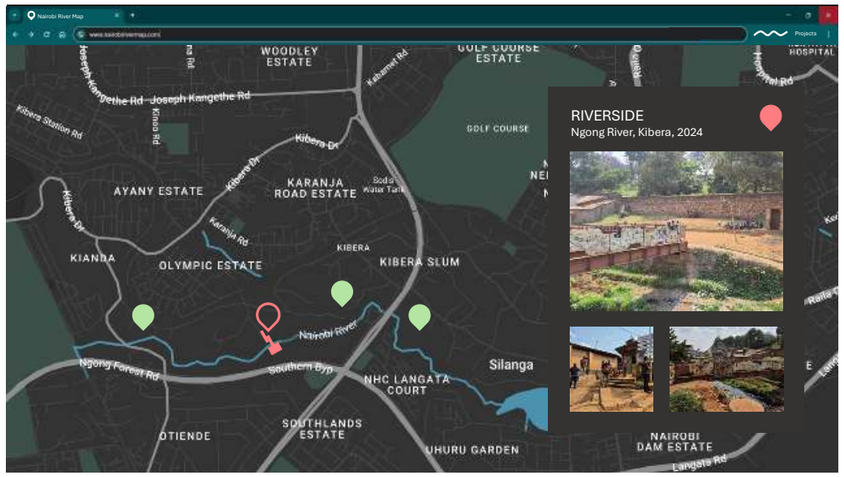
Step 3: Institutional Authentication

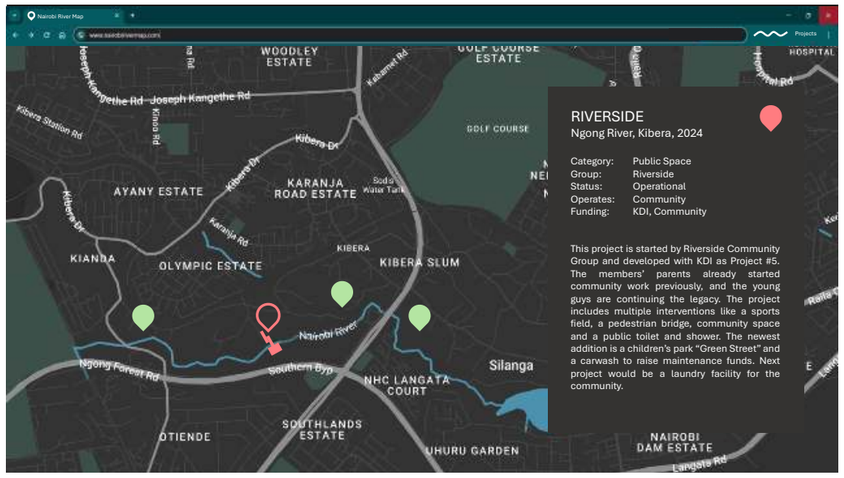
- Universities, NGOs, and UN-Habitat can officially verify projects
- Verified entries receive a visible verification badge

This system preserves grassroots openness while increasing policy trust and usability.

Graphs on page 131: Close-up of selected project area in Kibera: Pictures, location and information of example project intervention







6. Ethics, Privacy, and Data Responsibility

To address ethical gaps identified in MapHab and the Demolition Map, the platform includes:

- Clear submission guidelines
- Consent-based photo and narrative uploads
- Redaction options for sensitive locations
- Transparent data-use and removal policies
- Protection of vulnerable communities

Ethics are treated as *core infrastructure*, not an afterthought.

7. User Guidance, Platform Literacy, and Capacity Building

In-Platform User Guidelines

A visible *User Guidelines* section explains:

- Who can submit data and under what conditions
- What can be mapped
- Required metadata
- Verification steps and timelines
- Ethical rules and privacy protections
- How to flag or correct information

In-App Tutorials and Guided Onboarding

- Step-by-step onboarding for first-time users
- Tooltips and visual prompts for:
  - Adding projects
  - Uploading evidence
- Understanding verification status
- Using filters and timelines

External Learning Resources

A *Learning Hub* links to:

- YouTube video tutorials
- Recorded webinars and hackathon sessions
- Case-study walkthroughs
- FAQs and troubleshooting guides

Content should be co-produced with NGOs, universities, and CBOs.

Training and Awareness

- Workshops led by NGOs, universities, and UN-Habitat
- Pilot participatory mapping exercises
- Community mapping days
- Multi-stakeholder forums with feedback loop

8. Interface Design and Accessibility

Multi-Device Strategy

- Desktop/web version
- Mobile-responsive site
- Dedicated mobile app (Android, IOS)
- Offline data-collection mode with later sync

UI/UX Principles

- Simple icons and color coding
- Visual-first navigation
- Low-data-usage mode
- Multilingual support (English, Kiswahili)

Advanced Filtering and Analysis

Users can filter by:

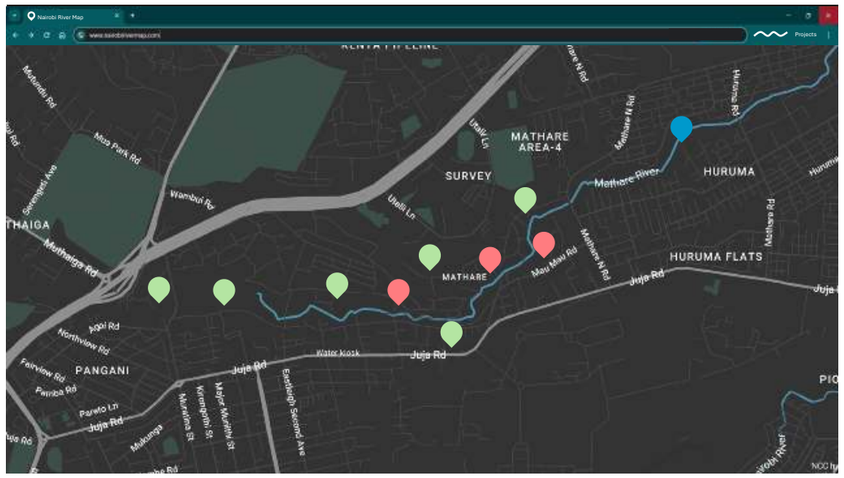
- Actor (community / NGO / government / university)
- Thematic filters (WASH, flood mitigation, waste management, public spaces, ecological restoration, etc.)
- Temporal tracking (planned, ongoing, completed)
- River Type (Nairobi, Ngong, Mathare)
- Year and duration
- Status (ongoing, completed, threatened, demolished)
- Funding source

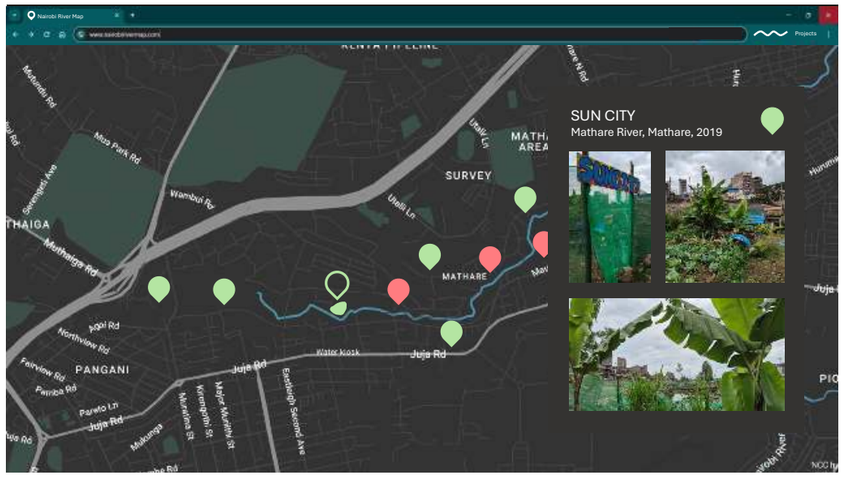
9. Accountability, Transparency, and Analytical Tools

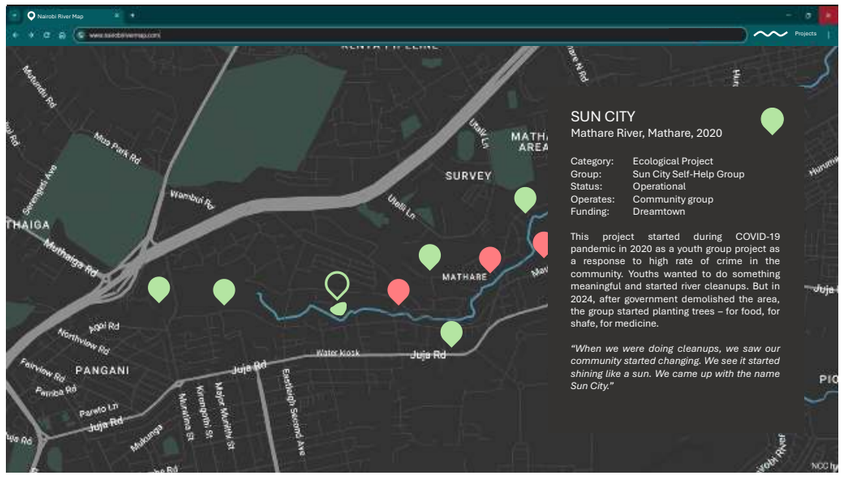
Key features include:

- Timeline views of project evolution
- Layer comparisons (e.g. community vs. government projects)

Graphs on page 133: Close-up of selected project area in Mathare: Pictures, location and information of example project intervention







- Alerts for threatened or demolished projects
- Open-data downloads
- Project duplication detection
- Public dashboards

These features directly address fragmentation and invisibility identified in prior mapping initiatives.

10. Longevity and Sustainability

Institutional Continuity

- Integration into university curricula
- Student-led maintenance teams
- Research grants and fellowships
- Alignment with UN-Habitat programs
- Annual public review forums

Building Public Trust

Trust is built through:

- Transparent governance rules

Visible verification labels (Indicating verification stage: Initial Screening; Community & Peer Verification; Institutional Authentication)

- Recognition of community contributions
- Regular updates and responsiveness

11. Technical Platform Options

Recommended stack

- Leaflet.js + OpenStreetMap
- Open-source backend (PostGIS)
- GitHub-hosted codebase

Alternatives

- Mapbox (powerful but costly at scale)
- QGIS web plugins (strong academically, less public-friendly)

12. Platform Navigation, Core Sections, and User Interface Elements

To ensure clarity, usability, and long-term engagement, the Nairobi Rivers Interactive Mapping Platform should adopt a simple, transparent, and standardized navigation structure, modeled on best practices from civic-tech platforms and participatory mapping tools.

Core Navigation Sections

The platform interface should include the following primary sections, consistently visible across devices:

1. MAP (Home View)

The central interactive map displaying all documented river-related projects, interventions, and activities. This serves as the default landing page and primary analytical interface.

2. ADD PROJECT

A structured submission portal allowing registered users (CBOs, NGOs, researchers, government agencies, and trained community members) to upload new projects.

Submissions include:

- Project location (map pin)
- Category (e.g., WASH, flood mitigation, public space, waste management)
- Implementing actor
- Timeline (start—end dates)
- Supporting media (images, documents)
- Maintenance responsibility

All submissions pass through an initial moderation and verification workflow before publication.

3. DATA

A transparent data access section providing:

- Metadata standards and data schemas
- Downloadable datasets (where permitted)
- Data use and licensing information
- Version history and update logs

This section reinforces transparency and enables academic, policy, and civic reuse.

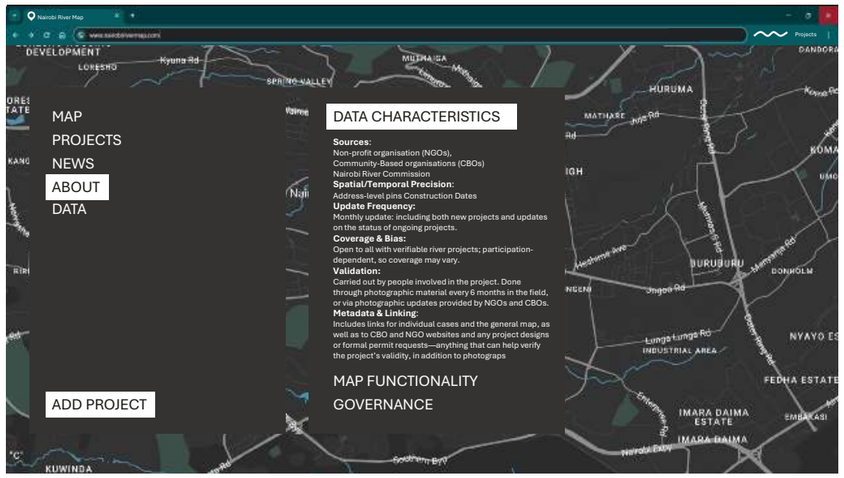
4. NEWS / UPDATES

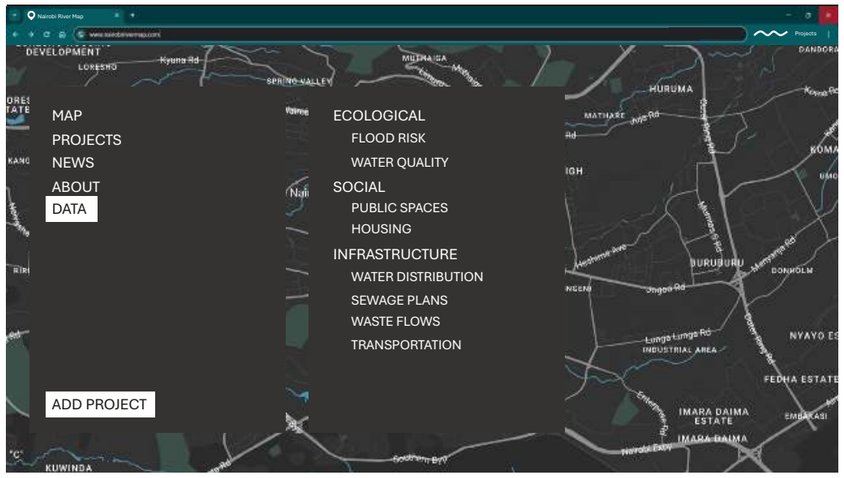
A regularly updated section highlighting:

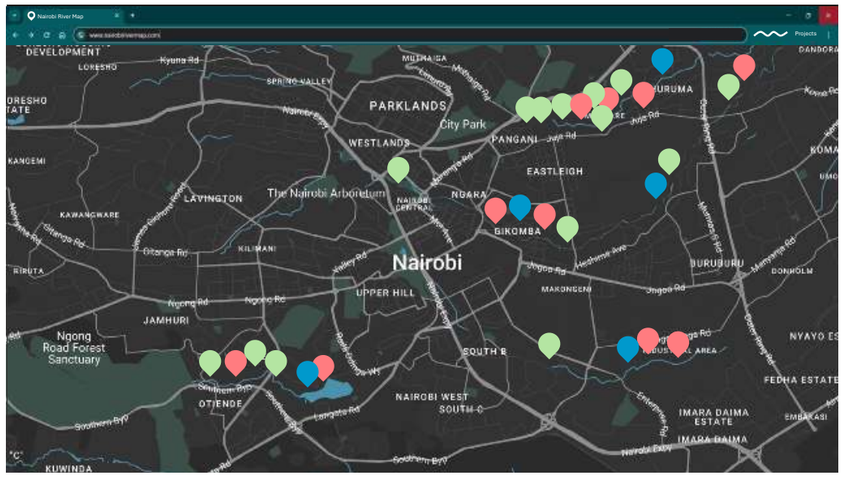
- Newly added or verified projects
- Ongoing river initiatives
- Policy announcements
- Community events and clean-up activities

This feature promotes continued engagement and reinforces the platform as a living system rather than a static archive.

Graphs on page 135: Available background information and data regarding Nairobi Rivers displayed on the Mapping Platform.







5. ABOUT
A contextual section explaining:

- The purpose and vision of the platform
- Governance and stewardship structure (UN-Habitat, universities, partners)
- Ethical commitments and data princi ples
- Acknowledgment of contributors and collaborators

This section builds institutional trust and public legitimacy.

6. GUIDELINES & LEARN
A dedicated learning and support hub containing:

- User guidelines
- In-app tutorials and walkthroughs
- External links to video tutorials (e.g., YouTube)
- FAQs and reporting mechanisms

This lowers barriers to participation, especially for community groups and first-time users.

Core Map Buttons and Interactive Controls

The map interface should include intuitive, icon-based controls such as:

- **Filter Button** — filter by actor, project type, year, or river section
- **Layer Toggle** — switch between satel- lite, street, hydrology, or administrative layers. Low data mode
- **Time Slider** — visualize projects by year or project phase
- **Search Bar** — search by location, project name, or organization
- **Legend / Key** — clarify symbols, colors, and categories
- **Share Button** — generate shareable links for projects or filtered views
- **Feedback / Flag Button** — allow users to suggest corrections or report issues

These tools enhance analytical depth while keeping the interface accessible to non-experts.

Interface Accessibility and Platform Versions

To maximize reach and usability, the platform should support:

- Responsive web design for desktop and mobile browsers
- A lightweight mobile application (Android-first, with iOS support)
- Offline data entry with later synchroni- zation
- Compatibility across major operating systems and screen sizes

Separate interface optimizations should be provided for:

- Desktop users (policy analysts, re- searchers)
- Mobile users (community members, field workers)

Contribution to Accountability and Trust

By clearly separating i**nformation (ABOUT), participation (ADD PROJECT), evidence (DATA), and dialogue (NEWS)**, the platform promotes:

- Transparency in decision-making
- Accountability across stakeholders
- Recognition of community-led action
- Sustained public trust and daily use

These interface features ensure the platform functions not only as a map, but as a shared civic space for river governance.

Conclusion

The Nairobi Rivers Interactive Mapping Platform reframes mapping as a tool for collaborative governance rather than technical oversight. By combining grassroots visibility, institutional stewardship, and shared verification, the framework addresses the structural fragmentation undermining river regeneration efforts. Ultimately, the platform supports a broader shift from control-oriented planning toward co-creation, accountability, and justice-centered urban governance.



Image 64: Sun CIty Community Park in Mathare, 2025. Michael Mawuena Baccah



Image 65: Giulia Sagarriga Visconti

References

Books:

Alshammari, E., Rahman, A. A., Rainis, R., Seri, N. A., & Fuzi, N. F. A. (2023). The Impacts of Land Use Changes in Urban Hydrology, Runoff and Flooding: A Review. Current Urban Studies, 11, 120-141. https://doi.org/10.4236/cus.2023.111007

Appadurai, A. (2019). The capacity to aspire: Culture and the terms of recognition. In N. Mirzoeff (Ed.), Globalization and culture (pp. 23—43). Duke University Press.

Berger PL. 1974. Pyramids of sacrifice: political ethics and social change. Middlesex: Penguin.

D'Alisa, G., Demaria, F., & Kallis, G. (Eds.). (2014). Degrowth: A vocabulary for a new era. Routledge. https://doi.org/10.4324/9780203796146

Escobar, A. (2018). Designs for the Pluriverse: Radical Interdependence, Autonomy, and the Making of Worlds. New York, USA: Duke University Press. https://doi.org/10.1515/9780822371816

Grindle, M. S. (2010). Good governance: The inflation of an idea (HKS Faculty Research Working Paper Series No. RWP10-023). Harvard Kennedy School https://books.google.com/books?hl=en&lr=&id=Wik3AgAAQBAJ&oi=fnd&pg=PA259&dq=Good+Governance:+The+Inflation+of+an+Idea&ots=RVZ7XOmzgU&sig=-zwsDeAk-axO5LDwKWPZ-woJets

Holston, J. (n.d.). Insurgent citizenship: Disjunctions of democracy and modernity. Princeton University Press.

Kallis, G. (2018). Degrowth (Vol. 7). Newcastle upon Tyne: Agenda publishing.

Kaya HO. 1989. People's participation programmes and the dilemma of rural leadership in Tanzania. Berlin: Schreiber

Kimari, W. (2021). 'We will be back to the street!': Protest and the 'empires' of water in Nairobi. Refractions of the National, the Popular and the Global in African Cities, 99.

Leftwich, A. (2000). States of development: On the primacy of politics in development. Cir.Nii.Ac.Jp. https://cir.nii.ac.jp/crid/1130000795828262784

Lüthi, C. (2016). Slum improvement lessons in Africa: Kibera. In Learning from the Slums for the Development of Emerging Cities (pp. 115-124). Cham: Springer International Publishing

Mayo M. & Craig G. (eds.) 1995. Community empowerment: a reader in participation and development. London: Zed.

Meadows, D. (2008). Thinking in systems: International bestseller. chelsea green publishing.

Mitumba Consortium Association of Kenya (2023). The quality of second-hand clothes imported to Kenya and the associated environmental impacts. Retrieved from: https://mitumbaassociation.org/wp-content/uploads/2023/11/The-Quality-of-Second-Hand-Clothes-Imported-to-Kenya-and-the-Associated-Environmental-Impacts.pdf

Myers, G. Andrew. (2011). African cities: alternative visions of urban theory and practice. 242.

Ng'weno, B. (2025). No Place Like Home in a New City: Anti-Urbanism and Life in Nairobi (4281149). University of California Press. https://research.ebsco.com/linkprocessor/plink?id=7f19d8aa-a0ab-3927-9438-cccfd9ba8071

Nijman, J., Oomen, B., Durmuş, E., Miellet, S., & Roodenburg, L. (2023). Urban Politics of Human Rights (3389425). Routledge. https://research.ebsco.com/linkprocessor/plink?id=c46d1ebc-b779-330a-80c0-cf25e6ae5fa2

North, D. C. (1990). Institutions, Institutional Change and Economic Performance. Cambridge: Cambridge University Press.

Nyingi, D. W., Gichuki, N., & Ogada, M. O. (2013). Freshwater ecology of Kenyan highlands and lowlands. In Developments in earth surface processes (Vol. 16, pp. 199-218). Elsevier.

Shubhankar, B., Rani, R., Sinha, N., Tyagi, S. (2025). Real-World Case Studies in Water Quality Management. In: Gautam, S., Joshi, S.K., Ambade, B. (eds) Blue Sky, Blue Water. Springer, Cham. https://doi.org/10.1007/978-3-031-82559-0_17

Swyngedouw, E. (2004). Social Power and the Urbanization of Water: Flows of Power. Oxford University Press. https://doi.org/10.1093/oso/9780198233916.001.0001

Tella, T. A., Festus, B., Olaoluwa, T. D., & Oladapo, A. S. (2025). Water and wastewater treatment in developed and developing countries: Present experience and future plans. In Smart Nanomaterials for Environmental Applications (pp. 351-385). Elsevier. https://doi.org/10.1016/B978-0-443-21794-4.00030-2

The Brookings Institution. (2012). The 10 Traits of Globally Fluent Metro Areas: Nairobi. Retrieved from: https://www.brookings.edu/wp-content/uploads/2016/07/Nairobi.pdf

Weber, L. R., & Carter, A. (2003). The social construction of trust. New York, NY: Plenum Publishers.

Scientific (Journal) Articles:

Anguelovski, I., Shi, L., Chu, E., Gallagher, D., Goh, K., Lamb, Z., Reeve, K., & Teicher, H. (2016). Equity Impacts of Urban Land Use Planning for Climate Adaptation: Critical Perspectives from the Global North and South. Journal of Planning Education and Research, 36(3), 333—348. https://doi.org/10.1177/0739456X16645166

Balakrishnan, A. K., Otieno, S., Dzombo, M., Plaxico, L., Ukoh, E., Obara, L. M., Brown, H., Musyimi, C., Lincoln, C., Yang, L. S., Witte, S. S., & Winter, S. C. (2024). Socio-ecological impacts of extreme weather events in two informal settlements in Nairobi, Kenya. Frontiers in public health, 12, 1389054. https://doi.org/10.3389/fpubh.2024.1389054

Bon, B. (2021). Invisible Sprawl: Land, Money and Politics at the Rural-Urban Interface in Kenya. disP - The Planning Review, 57(3), 33—49. https://doi.org/10.1080/02513625.2021.2026649.

Butollo, F. (2021). Digitalization and the geographies of production: Towards reshoring or global fragmentation?. Competition & Change, 25(2), 259-278.

C Rakodi. (2003). Politics and performance: the implications of emerging governance arrangements for urban management approaches and information systems. Elsevier C RakodiHabitat International, 2003·Elsevier. https://www.sciencedirect.com/science/article/pii/S0197397503000043

Chen, S. S., Kimirei, I. A., Yu, C., Shen, Q., & Gao, Q. (2022). Assessment of urban river water pollution with urbanization in East Africa. Environmental Science and Pollution Research, 29(27), 40812-40825. https://doi.org/10.1007/s11356-021-18082-1

References

Cobbinah, P. B., Amoako, C., & Yeboah, A. S. (2023). Informality and the politics of urban flood management. Environment and Planning C: Politics and Space, 41(4), 826-843.https://doi.org/10.1177/23996544231163739

Cotton, A. P., & Skinner, R. (1998). Resident participation in slum improvement: The maintenance question. Habitat International, 22(1), 95—108.

Cotton, A., & Skinner, R. (1990). Barriers to Resident Participation in Slum Improvement: The Maintenance Question. In Development Journal (Vol. 25, Issue 1).

Das, A. K., Hossain, M. F., Khan, B. U., Rahman, M. M., Asad, M. A. Z., & Akter, M. (2025). Circular economy: A sustainable model for waste reduction and wealth creation in the textile supply chain. SPE Polymers, 6(1), e10171.

Dodman, D., Archer, D., & Satterthwaite, D. (2019). Responding to climate change in contexts of urban poverty and informality. Environment and Urbanization, 31(1), 3-12. https://doi.org/10.1177/0956247819830004

Dodman, D., Hayward, B., Pelling, M., Castán Broto, V., Chow, W., Chu, E., ... & Ziervogel, G. (2023). Cities, settlements and key infrastructure. Retrieved from: https://escholarship.org/content/qt81q9s1z4/qt81q9s1z4.pdf

Encino-Munoz, A. G., & Morone, P. (2023). Second-hand clothing trade: achieving circular economy in the fashion sector through international cooperation. Acta Innovations, (49), 75-91.

Finn, B. M., & Cobbinah, P. B. (2024). Pandemic urbanization: Colonial imprints in the urban present. Cities, 153, 105261.

Forester, J. (1989). Planning in the face of power. Berkeley, CA: University of California Press.

Gong, H., Hassink, R., Foster, C., Hess, M., & Garretsen, H. (2022). Globalisation in reverse? Reconfiguring the geographies of value chains and production networks. Cambridge journal of regions, economy and society, 15(2), 165-181.

Grindle, M. S. (2010). Good Governance: The Inflation of an Idea. Research Papers in Economics. https://dash.harvard.edu/bitstream/handle/1/4448993/Grindle_GoodGovernance.pdf?sequence=1

Gupta, S. (2018). Cradle To Cradle: Clothing As Material Culture. East Asia, 4, 1-1.

Hendriks, B. (2010). City-wide governance networks in Nairobi: Towards contributions to political rights, influence and service delivery for poor and middle-class citizens?. Habitat international, 34(1), 59-77.

Home, R. (2013). Of planting and planning: The making of British colonial cities. In Of Planting and Planning: The Making of British Colonial Cities, Second Edition. Taylor and Francis. https://doi.org/10.4324/9780203384763/PLANTING-PLANNING-ROBERT-HOME

Iddi, S., Akeyo, D., Sanya, R. E., Wamukoya, M., & Asiki, G. (2024). Determinants of under-five mortality in informal settlements in Nairobi, Kenya from 2002 to 2018. BMC Public Health, 24(1), 2855.

Ikotun, O. O., Olafusi, O. S., Quadri, H. A., & Bolarinwa, O. A. (2012). Influence of human activities on the water quality of Ogun River in Nigeria. Civil and Environmental Research, 2(9), 36-48. http://www.iiste.org/Journals/index.php/CER/article/view/3172

J Ferguson. (1990). The anti-politics machine. Cambridge.Org. https://www.cambridge.org/us/universitypress/subjects/anthropology/social-and-cultural-anthropology/anti-politics-machine-development-depoliticization-and-bureaucratic-power-lesotho?site_view=desktop

Jones, P. S., Kimari, W., & Ramakrishnan, K. (2017). 'Only the people can defend this struggle': the politics of the everyday, extrajudicial executions and civil society in Mathare, Kenya. Review of African Political Economy, 44(154), 559—576. https://www.jstor.org/stable/48540793

Juma, L. (2012). Nothing but a mass of debris: Urban evictions and the right of access to adequate housing in Kenya. African Human Rights Law Journal, 12(2), 470-507.

Kakonge JO. & Imvbore AM. 1994. Achieving Sustainable development in Africa. Lesotho Social Sciences Review. 1 (1): 1-13.

Kennedy, C., Pincetl, S., & Bunje, P. (2011). The study of urban metabolism and its applications to urban planning and design. Environmental pollution, 159(8-9), 1965-1973.

Kern, L., & Kovesi, C. (2018). Environmental justice meets the right to stay put: mobilising against environmental racism, gentrification, and xenophobia in Chicago's Little Village. Local Environment, 23(9), 952-966.

Kimari, W., & Parish, J. (2020). What is a river? A transnational meditation on the colonial city, abolition ecologies and the future of geography. Urban Geography, 41(5), 643-656.

Kinuthia, G. K., Ngure, V., Beti, D., Lugalia, R., Wangila, A., & Kamau, L. (2020). Levels of heavy metals in wastewater and soil samples from open drainage channels in Nairobi, Kenya: community health implication. Scientific reports, 10(1), 8434.

Kiss, J. (2023). Mitumba: Second-Hand Clothing Industry in Kenya. A Blessing or a Curse?. Hungarian J. Afr. Stud., 17, 23.

Krhoda, G. O., & Kwambuka, A. M. (2016). Impact of urbanization on the morphology of Motoine/Ngong River Channel, Nairobi River basin, Kenya. Journal of Geography and Regional Planning, 9(4), 36.

Lachapelle, P. (2008). A Sense of Ownership in Community Development: Understanding the Potential for Participation in Community Planning Efforts. In COMMUNITY DEVELOPMENT: Journal of the Community Development Society (Vol. 39, Issue 2).

Langbein, L., & Kerwin, C. M. (1985). Implementation, negotiation and compliance in environmental and safety regulation. Journals. Uchicago.Edu, 47(3), 854—880. https://doi.org/10.2307/2131214

Lee, J., Park, C. H., Yun, C., & Lee, S. (2025). Textile waste management and its sustainability: a review. Journal of Material Cycles and Waste Management, 1-15.

Lema, M. W. (2025). Wastewater crisis in East African cities: challenges and emerging opportunities. Discover Environment, 3(1), 18. https://doi.org/10.1007/s44274-025-00206-w

Meadowcroft, J. (2007). Who is in Charge here? Governance for Sustainable Development in a Complex World*. Journal of Environmental Policy & Planning, 9, 299 - 314.

References

Miller, B., & Mössner, S. (2020). Urban sustainability and counter-sustainability: Spatial contradictions and conflicts in policy and governance in the Freiburg and Calgary metropolitan regions. Urban Studies, 57(11), 2241-2262.

Miraftab, F. (2009). Insurgent planning: Situating radical planning in the global south. Planning theory, 8(1), 32-50. https://doi.org/10.1177/1473095208099297

Miraftab, F. (2009). Special issue: Strangely familiar Planning. New Delhi and Singapore, 8(1), 32—50. https://doi.org/10.11

Muchiri, C. N., & Opiyo, R. O. (2022). Community adaptation strategies in Nairobi informal settlements: Lessons from Korogocho, Nairobi-Kenya. Frontiers in Sustainable Cities, 4. https://doi.org/10.3389/frsc.2022.932046

Muketha, S. (2025). Anthropogenic Activities and their Implications on the Physical Extents and Ecological Conditions of Riparian Zones in Nairobi River Basin, Nairobi City County: A Case of Ngong, Mathare and Nairobi Rivers. AFRICA HABITAT REVIEW, 20(1), 3210-3238.

Muketha, S. M. (2020). Riparian Land Control, Contestation and Its Implication to Conservation in Nairobi City. AFRICA HABITAT REVIEW, 14(3), 1949-1962.

Mundia, C. N., & Murayama, Y. (2010). Modeling Spatial Processes of Urban Growth in African Cities: A Case Study of Nairobi City. Urban Geography, 31(2), 259—272. https://doi.org/10.2747/0272-3638.31.2.259

Mutisya, E. Y. M. (2011). Understanding the grassroots dynamics of slums in Nairobi: the dilemma of Kibera informal settlements. Academia.EduM YarimeInternational Transaction Journal of Engineering, Management, & Applied, 2011·academia.Edu. https://www.academia.edu/download/38600937/Understanding_Grassroots_Dynamics_of_Slums_in_Nairobi_Dilemma_of_Kibera_Informal_Settlements.pdf

Mwau, B., & Sverdlik, A. (2020). High rises and low-quality shelter: rental housing dynamics in Mathare Valley, Nairobi. Environment and Urbanization, 32(2), 481-502.

Newton, T.J., Mayer, D.A., Rogala, J.T., Madden, S.S. and Gray, B.R. (2023). Responses of native freshwater mussels to remediation to remove polychlorinated biphenyl contaminated sediments in the upper Hudson River. Aquatic Conservation: Marine and Freshwater Ecosystems, 33(12), pp.1413-1430. https://doi.org/10.1002/aqc.4026

Ngatia, M., Kithiia, S. M., & Voda, M. (2023). Effects of Anthropogenic Activities on Water Quality within Ngong River Sub-Catchment, Nairobi, Kenya. Water 2023, 15, 660.

Njeru, G. W., Maina, S., & Munene, M. (2021). Flexibility of Interior Spaces for Low Cost Housing in Kenya-A Case Study of the Kibera Soweto East Housing Project in Nairobi, Kenya.

Njoroge, P., Ambole, A., Githira, D., & Outa, G. (2020). Steering energy transitions through landscape governance: Case of Mathare informal settlement, Nairobi, Kenya. Land, 9(6), 206.

Njuguna, S. M., Yan, X., Gituru, R. W., Wang, Q., & Wang, J. (2017). Assessment of macrophyte, heavy metal, and nutrient concentrations in the water of the Nairobi River, Kenya. Environmental monitoring and assessment, 189(9), 454.

Nyambura Ndichu, N., Abuyeka Tela, S., & Kweyu, R. M. (2023). Analysis Of Riparian Land Rehabilitation on Water Quality and Macro Invertebrates' Diversity Along Nairobi River, Kenya. International Journal of Water Research, 5(4).

Nyika, J. (2017). Situational analysis of Nairobi river basin (NRB). Water Practice and Technology, 12(3), 589-603.

Ntajal, J., Höllermann, B., Falkenberg, T., Kistemann, T., & Evers, M. (2022). Water and health nexus—land use dynamics, flooding, and water-borne diseases in the Odaw River basin, Ghana. Water, 14(3), 461.

Nzau, B., & Trillo, C. (2020). Affordable Housing Provision in Informal Settlements through Land Value Capture and Inclusionary Housing. Sustainability, 12(15), 5975. https://doi.org/10.3390/su12155975

Odha, G. A., Mbataru, P. (2024). Environmental policy implementation effects on river water pollution control and prevention in Kenya: A case of Ngong River, Nairobi City County. International Academic Journal of Arts and Humanities, 1(4), 116-130. https://iajournals.org/articles/iajah_v1_i4_116_130.pdf

Odume, O. N., Onyima, B. N., Nnadozie, C. F., Omovoh, G. O., Mmachaka, T., Omovoh, B. O., ... & Arimoro, F. O. (2022). Governance and institutional drivers of ecological degradation in urban river ecosystems: Insights from case studies in African cities. Sustainability, 14(21), 14147.

Ofoezie, E. I., Eludoyin, A. O., Udeh, E. B., Onanuga, M. Y., Salami, O. O., & Adebayo, A. A. (2022). Climate, urbanization and environmental pollution in West Africa. Sustainability, 14(23), 15602.

Ogega, M. B., Kathambi, B., & Kiemo, K. (n.d.). Policy Action in Environmental Behavior Transformation Towards Inclusive Governance of Water Resources in Nairobi River Ecosystem. Available at SSRN 4883507.

Oluchiri, S. O. (2025). Urban Flooding in the Cities of Kisumu, Mombasa, and Nairobi, Kenya: Causes, Vulnerability Factors, and Management. African Journal of Empirical Research, 6(1), 342—351. https://doi.org/10.51867/ajernet.6.1.29

Omohwovo, E. J. (2024). Wastewater management in Africa: challenges and recommendations. Environmental Health Insights, 18, 11786302241289681. https://doi.org/10.1177/11786302241289681

Omokaro, G. O., Michael, I., & Evgenievich, P. V. (2024). Assessing the environmental and health implications of waste disposal: a case study of Africa's largest dumping site. Journal of Geography, Environment and Earth Science International, 28(5), 16-30. https://dx.doi.org/10.9734/jgeesi/2024/v28i5767

Ono, H., & Kidokoro, T. (2020). Understanding the development patterns of informal settlements in Nairobi. Japan Architectural Review, 3(3), 384-393.

Onyango, C. H., & Nganga, T. K. (2016). Trade facilitation and foreign direct investment flows in Kenya. In Trade Costs and Inclusive Growth: Case Studies Presented by WTO Chair-Holders (pp. 25-48). WTO iLibrary

Onyango, E. O., Crush, J., & Owuor, S. (2021). Migration, rural—urban connectivity, and food remittances in Kenya. Environments, 8(9), 92.

Opanga, I., Omuterema, S., & Panyako, O. (2025). Level of Degradation Along the Nairobi River Basin Riparian Zone Between 1991 and 2021. International Journal of Disaster Management and Risk Reduction, 1(1), 13-23.

References

Oriaso, S. O., & Joshua, R. (2025a). Effective Communication Framework for Stakeholder Engagement for Nairobi River Resource Conservation and Restoration in Kenya. Journal of Media and Communication (JMC), 4(1), 92-104.

Oriaso, S. O., & Joshua, R. (2025b). Navigating Climate Challenges through Communication Strategies for Conserving and Restoring Nairobi River Water Resources in Nairobi City, Kenya. Journal of Environmental Sciences and Technology (JEST), 4(1), 40-52.

Ostrom, E. J. (2017). Polycentric systems for coping with collective action and global environmental change. Taylorfrancis.ComE OstromGlobal Justice, 2017·taylorfrancis.Com, 423—430. https://doi.org/10.4324/9781315254210-18/POLYCENTRIC-SYSTEMS-COPING-COLLECTIVE-ACTION-GLOBAL-ENVIRONMENTAL-CHANGE-ELINOR-OSTROM

Otsuki, K. (2016). Infrastructure in informal settlements: co-production of public services for inclusive governance. Local Environment, 21(12), 1557-1572.

Owen, C. (2025). The History of Nairobi. In Oxford Research Encyclopedia of African History. https://doi.org/10.1093/acrefore/9780190277734.013.643

Owuor, M. O., & Mwiturubani, D. A. (2021). Nexus between flooding impacts and coping strategies in Nairobi's settlements. International journal of disaster risk reduction, 64, 102480. https://doi.org/10.1016/j.ijdrr.2021.102480 PDF (www.parliament.go.ke)

Panju, M. (2024). What Goes Around Comes Around?: The Sustainability Paradox of Second-Hand Clothing Marketplaces in a Cross-Cultural Context. East African Journal of Interdisciplinary Studies, 7(1), 1-27.

Peters, B. G. and P. J. (2000). Citizens versus the new public manager: The problem of mutual empowerment. Journals.Sagepub.ComBG Peters, J Pierre Administration & Society, 2000·journals.Sagepub.Com, 32(1), 9—28. https://doi.org/10.1177/00953990022019335

Reason, P., & Bradbury, H. (Eds.). (2008). The SAGE handbook of action research: Participative inquiry and practice (2nd ed.). SAGE Publications.

Roberts, R. E., & Okanya, O. (2022). Measuring the socio—economic impact of forced evictions and illegal demolition; A comparative study between displaced and existing informal settlements. The Social Science Journal, 59(1), 119-138.

Rigon, A. (2022). Diversity, justice and slum upgrading: An intersectional approach to urban development. Habitat International, 130 (2022), Article 102691

Rosetta W. (2022). Impacts of Water Pollution on Nairobi River, Kenya: A Critical Literature Review. Journal of Physical Sciences, 4(1), 27—41. https://doi.org/10.47941/jps.872

Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so different after all: A cross-disciplinary view of trust. The Academy of Management Review, 23, 393-404.).

Roy, A. (2005). Urban informality: Toward an epistemology of planning. Taylor & Francis A Roy Journal of the American Planning Association, 2005·Taylor & Francis, 71(2), 147—158. https://doi.org/10.1080/01944360508976689

Schlosberg, D., & Collins, L. B. (2014). From environmental to climate justice: climate change and the discourse of environmental justice. Wiley Interdisciplinary Reviews: Climate Change, 5(3), 359-374. https://doi.org/10.1002/wcc.275

Schramm, S., & Bize, A. (2023). Planning by exception: The regulation of Nairobi's margins. Planning Theory, 22(3), 316-337.

Thorn, J., Thornton, T. F., & Helfgott, A. (2015). Autonomous adaptation to global environmental change in peri-urban settlements: Evidence of a growing culture of innovation and revitalisation in Mathare Valley Slums, Nairobi. Global Environmental Change, 31, 121—131. https://doi.org/10.1016/j.gloenvcha.2014.12.009

Tonkiss, F. (2020). City government and urban inequalities. City, 24(1-2), 286-301.https://doi.org/10.1080/13604813.2020.1739931

Voulvoulis, N., Giakoumis, T., Hunt, C., Kioupi, V., Petrou, N., Souliotis, I., & Vaghela, C. J. G. E. C. (2022). Systems thinking as a paradigm shift for sustainability transformation. Global Environmental Change, 75, 102544. https://doi.org/10.1016/j.gloenvcha.2022.102544

Wanjiru-Mwita, M., & Giraut, F. (2020). Toponymy, pioneership, and the politics of ethnic hierarchies in the spatial organization of British colonial Nairobi. Urban Science, 4(1), 6.

Watson V. (2009). Seeing from the South: Refocusing urban planning on the globe's central urban issues. Journals.Sagepub.Com, 46(11), 2259—2275. https://doi.org/10.1177/0042098009342598

Watson V. (2014). African urban fantasies: dreams or nightmares? Journals.Sagepub.Com, 26(1), 215—231. https://doi.org/10.1177/0956247813513705

Watts, M. J., & Bohle, H. G. (1993). The space of vulnerability: the causal structure of hunger and famine. Progress in human geography, 17(1), 43-67.https://doi.org/10.1177/030913259301700103

Waturu, M., Sitoki, L., Lalah, J., Chasia, S., & Mbao, E. (2023). Effect of land use/land cover changes on water quality in the Upper Athi River sub-catchment in Kenya. African Journal of Aquatic Science, 48(3), 247-260.

Williams, D. S., Máñez Costa, M., Sutherland, C., Celliers, L., & Scheffran, J. (2019). Vulnerability of informal settlements in the context of rapid urbanization and climate change. Environment and urbanization, 31(1), 157-176.https://doi.org/10.1177/0956247818819694

Wolf, S., Esser, V., Schüttrumpf, H., & Lehmkuhl, F. (2021). Influence of 200 years of water resource management on a typical central European river. Does industrialization straighten a river? Environmental Sciences Europe, 33(1), 15https://doi.org/10.1186/s12302-021-00460-8

Yiftachel, O. (2009). Critical theory and "gray space": Mobilization of the colonized. Taylor & Francis, 13(2—3), 246—263. https://doi.org/10.1080/13604810902982227

Conference papers/proceedings:

Abuje, S. J., Otoki, B. M., Njuguna, B. M., & Munala, G. (2020). The Vulnerability of Nairobi to the Effects of Climate Change between 1984 and 2016. Landsc. Archit. Reg. Plan, 5, 38.

Andvig, J. C., & Barasa, T. (2014). A political economy of slum spaces: Mathare Valley (NUPI Working Paper No. 838). Norwegian Institute of International Affairs.

References

Anguelovski, I., Connolly, J. J., Pearsall, H., Shokry, G., Checker, M., Maantay, J., ... & Roberts, J. T. (2019). Why green "climate gentrification" threatens poor and vulnerable populations. Proceedings of the national academy of sciences, 116(52), 26139-26143.

Reports:

African Cities Research Consortium. (2022). Nairobi city report / research progress and collaboration areas workshop report. ACRC. https://www.african-cities.org

African Development Fund. (2017). Nairobi Rivers Basin Rehabilitation and Restoration Program: Sewerage Improvement Project.
URL: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Kenya-Nairobi_Rivers_Basin_Rehabilitation_and_Restoration_Program_Sewerage_Improvement_Project.pdf

COHRE. (2014, February 25). Listening to the Poor? Housing Rights in Nairobi, Kenya (revised edition). Humanitarian Library. URL: https://www.humanitarianlibrary.org/resource/listening-poor-housing-rights-nairobi-kenya-revised-edition-0

Kenya Floods Recovery Needs Assessment Report. (n.d.). UNDP. Retrieved 17 December 2025, URL: https://www.undp.org/kenya/publications/kenya-floods-recovery-needs-assessment-report

Kenya National Bureau of Statistics. (2012). 2009 Kenya Population and Housing Census: Analytical Report on Urbanization.
URL: https://www.knbs.or.ke/wp-content/uploads/2023/09/2009-Kenya-population-and-Housing-Census-Analytical-Report-on-Urbanization.pdf

Kenya National Bureau of Statistics. (2019). 2019 Kenya population and housing census: Volume I — Population by county and sub-county. Government of Kenya. https://www.knbs.or.ke

Mbui, D., Chebet, E., Kamau, G., & Kibet, J. (2016). The state of water quality in Nairobi River, Kenya. Asian Journal of Research in Chemistry, 9(11), 579-586.

Mburu, N. B., Kirui, L., Karugia, J. T., & Adam, R. (2024). Policy and institutional landscape analysis in Kenya's food, land, and water systems: Flagship report. Retrieved from: https://cgspace.cgiar.org/server/api/core/bitstreams/a066dc64-832a-47ab-84a9-6e2dea272656/content

Ministry of Water (2021) Annual Status Report on Water, Sanitation and Irrigation from Minitry of Water https://www.parliament.go.ke

Mitumba Consortium Association of Kenya (n.d.). the second-hand clothing industry in the East African Community. Retrieved from: https://mitumbaassociation.org/wp-content/uploads/2023/08/EAC-Report.pdf

Munkholm, L. (2025) Wastepickers at the Dandora dumpsite, Retrieved from: https://eng.mst.dk/media/zlba3iep/ssc-report-wastepickers-at-the-dandora-dumpsite-may-2025.pdf

Sverdlik, A., Gichuiya, L. N., Glück, Z., Kanyinga, K., Kimari, W., Magero, J., Maina, M., Michuki, G., Mwangi, V., Mwau, B., Njoroge, I., Otiso, L., & Owuor, S. (2025). Nairobi: City report. Working Paper No. 24. https://www.african-cities.org/publications/

UN-Habitat. (2023). Global report on sanitation and wastewater management in cities and human settlements. United Nations Human Settlements Programme. https://unhabitat.org/sites/default/files/2023/06/water_report_web.pdf

UN-Habitat. (2024). Multilayered Vulnerability Assessment Handbook—Resilience planning for urban, biodiversity and climate action. https://unhabitat.org/multilayered-vulnerability-assessment-handbook-resilience-planning-for-urban-biodiversity-and-climate-action

UN-Habitat. (2022). World cities report 2022: Envisaging the future of cities. United Nations Human Settlements Programme. https://unhabitat.org/wcr/

United Nations, Department of Economic and Social Affairs. (2022). World urbanization prospects: The 2022 revision. United Nations. https://population.un.org/wup/

United Nations Environment Programme (UNEP). (2019). Global Environment Outlook 6 (GEO-6): Healthy Planet, Healthy People. United Nations Environment Programme, Nairobi. https://www.unep.org/resources/global-environment-outlook-6

urbanNext. (n.d.). The History of Nairobi and the Origins of Slums. Retrieved from: https://urbannext.net/the-history-of-nairobi-and-origins-of-the-slums/

World Bank. (2024). Urban population growth (annual %): Kenya. World Development Indicators. https://data.worldbank.org/indicator/SP.URB.GROW?locations=KE

World Commission on Environment and Development. (1987). Our common future. United Nations. https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf

Dissertations:

Botes, L. J. S., & Snyman, J. B. (n.d.). Community participation in the upgrading of informal settlements: Theoretical and practical guidelines. Development Studies Working Paper.

Fritz, M. (2021). The social-ecological system framework in the global south-an illustrative case: river basin pollution in Nairobi, Kenya. Retrieved from: https://aaltodoc.aalto.fi/server/api/core/bitstreams/29ffbf33-e780-4462-bd93-cb863301e1da/content
Jimmy, E. N. (2024). Reconsidering informality: Informal housing practices, illegal actors, and planning response strategies within middle-income neighbourhoods in Nairobi city Kenya. URL: https://iris.gssi.it/bitstream/20.500.12571/34285/1/2024_PhDThesis_Jimmy.pdf

Johannes Botes, S. (1999). Philosophiae doctor at the University of the Orange Free State [Doctoral dissertation, University of the Orange Free State].

Kuyo Ojal, M. (2025). Disaster Risk Creation in Nairobi, Kenya: Influence of Institutional-Actor Relationships (Doctoral dissertation, UCL (University College London)).

Murugi Muthungu, S. (2025). Governance Enablers and Barriers of Constructed Wetlands as a Nature Based Solution for Wastewater Treatment in Nairobi, Kenya (Doctoral dissertation, Loughborough University). Retrieved from: https://repository.lboro.ac.uk/articles/thesis/Governance_Enablers_and_Barriers_of_Constructed_Wetlands_as_a_Nature_Based_Solution_for_Wastewater_Treatment_in_Nairobi_Kenya/30774377/1/files/60233273.pdf

References

Nyamache, T. J. (2018). The Effects of Solid Waste Dumping on Infrastructures and Human Health: Dandora Dump Site, Nairobi County (Doctoral dissertation, University of Nairobi). http://hdl.handle.net/11295/104970

Odeny, M. A. (2020). The relation between access to water poverty and patriarchy: The case of women slum dwellers in Kibera Kenya. University of Pretoria (South Africa).

Pääkkönen, S. (2023). Fast fashion—the environmental and social challenges and the generation Z's attitudes toward the industry. Retrieved from: https://aaltodoc.aalto.fi/server/api/core/bitstreams/99665e0e-d753-45d8-b8c5-c7074ed69dc7/content

Poulman, O. A. (2022). Settlement Development and Its Implications on Nairobi River Riparian Zone, Nairobi City County, Kenya (Doctoral dissertation, Kenyatta University).

Websites:

CMMM — Critical Mapping in Municipalist Movements. (n.d.). MapHab: Alerta de desnonaments / Casos desnonaments Barcelona. https://cmmm-maps.eu/barcelona/map

Demolition Map. (n.d.). Demolition map. https://www.demolitionmap.uk/

Environmental Law Institute. (2021). Environmental Justice in Urban Development: The Problem of Green Gentrification.
Retrieved from: https://www.eli.org/vibrant-environment-blog/environmental-justice-urban-development-problem-green-gentrification

Habitat International Coalition. (n.d.). They are Not "Informal Settlements"—They are Habitats Made by People.
Retrieved from: https://hic-net.org/they-are-not-informal-settlements-they-are-habitats-made-by-people/

Mathare Slums Community Association. (n.d.). How Mathare Began.
Retrieved from: https://mathare.org/history-of-mathare/

Mathare Social Justice Centre. (2024). Mathare River Festival: #LetTheRiverFlow.
Retrieved from: https://www.matharesocialjustice.org/mathare-green-movement/ecological-justice-network/mathare-river-festival-let-the-river-flow/#:~:text=The%20Mathare%20River%20is%20one,a%20natural%20source%20of%20life.

Muungano wa Wanavijiji (2019) The mathare zonal plan. Available at: https://www.muungano.net/browseblogs/2011/10/28/the-mathare-zonal-plan (Accessed: 31 January 2026).

O'Donovan-Lland, B. (2024, May 23). Double Disaster: Flood fallout and state eviction in Nairobi & Karachi. Institute of Development Studies.
Retrieved from: https://www.ids.ac.uk/opinions/double-disaster-flood-fallout-and-state-eviction-in-nairobi-karachi/

Population Matters. (2024). Urbanisation challenges in Kenya's Nairobi: a tangled web of issues.
Retrieved from: https://populationmatters.org/news/2024/01/urbanisation-challenges-in-kenyas-nairobi-a-tangled-web-of-issues/

Pulitzer Centre. (2012). Kibera: Kenya's Settlement of the Stateless.
Retrieved from: https://pulitzercenter.org/stories/kibera-kenyas-settlement-stateless

ROAPE. (2024, July 19). First came the floods that washed away people's homes, then came the bulldozers that destroyed everything that was left. ROAPE.
Retrieved from: https://roape.net/2024/07/19/first-came-the-floods-that-washed-away-peoples-homes-then-came-the-bulldozers-that-destroyed-everything-that-was-left/

The Eastleigh Voice. (2025). City MCAs order halt to Nairobi River project over land disputes.
Retrieved from: https://eastleighvoice.co.ke/city-affairs/219529/city-mcas-order-halt-to-nairobi-river-project-over-land-disputes

UN-Habitat. (2023). Kenyan President launches Nairobi Rivers Commission.
Retrieved from: https://unhabitat.org/news/24-feb-2023/kenyan-president-launches-nairobi-rivers-commission

Weru, G. (2012). Nairobi rivers pose health, safety hazards.
Retrieved from: https://reliefweb.int/report/kenya/nairobi-rivers-pose-health-safety-hazards