

**Initiatives on equitable urban health and
wellbeing in East and Southern Africa**

**CASE STUDY REPORTS:
NAIROBI, KENYA**

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Contents

1. Background.....	2
2. General Nairobi context.....	2
3. Case study 1: Kibera Public Space Project - Kounkuey Design Initiative.....	4
4. Community-led Mapping of Food Vendors in Nairobi’s Informal Settlements.....	15
5. Urban agriculture in Nairobi County.....	24
6. References	32

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2. Context information for Kampala prepared by GM, with review feedback from C Walyaro, RL
3. Three case study reports written by Constance Walyaro (CW), reviewed by RL, GM, and finalised by CW
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1. Background

The International Society for Urban Health (ISUH) is implementing the Accelerating City Equity (ACE) Project to build a 'community of practice' (CoP) on healthy urban societies to accelerate the exchange of global knowledge on the drivers of equity in sustainable urban development, and contribute to the implementation of practices found to be most catalytic in cities. The work connects six regional hubs and working groups, who will identify and assess 'bright spots' with a shared framework of key questions regarding the mechanisms and processes that promote equitable health and wellbeing in 'bright spot' examples, workshopped with the regional hubs to review and provide feedback in order to adjust it to the local context. Towards this, work is being implemented by TARSC in EQUINET in 2022 in East and Southern Africa (ESA) to map the actors, priorities and actions on determinants and pathways for change towards equity in urban health and wellbeing, to contribute to the learning in the region and to share and exchange with other regions in the ACE Project. The work includes gathering evidence on urban 'bright spot' case studies from a defined urban area in 4 ESA countries. Nairobi was selected from a background document review by TARSC (separately reported). This document presents the Nairobi context and three case studies prepared by TalkAB[M]R, Kenya, drawing on documents and key informant interviews of initiatives in Nairobi that demonstrate promising practice in improving urban health equity and wellbeing.

2. General Nairobi context

Kenya's capital Nairobi gets its name from a Maasai word that means "cool waters" and is part of the Greater Nairobi Metropolitan region. The city has a lot of parks and green spaces, but rapid population growth has led many public spaces to be encroached on by an expanding urban population and private land developers. The city was initially established in 1899 as a train depot on the Uganda-Kenya Railway and was declared the capital city in 1907, and epicentre of sisal, coffee, and tea industries after Kenya gained independence in 1963. Due to its elevated location, mild climate, ample water supply, and proximity to the steep ascent of the Limuru escarpments, the site was also favoured as a perfect resting area. The town's early years were, however, beset by problems with malaria and plague, and at one point the original town was completely burnt down to control an outbreak of plague (Wikipedia, 2022).

Demographic features: According to the 2019 census, the city proper had a population of 4.4million while the metropolitan region had a population of 9.4 million. Nairobi has had one of the highest growth rates of any African city (4.1% annually) and has grown to become the second largest city in the African Great Lakes region. The rapid population growth can be attributed to urban migration and high birth rates, with growth in high-density, low-income areas. Modern skyscrapers look out over vast informal settlements. Older and more prosperous neighbourhoods are ethnically mixed and well served by utilities and other amenities, whereas the informal settlements are organised ethnically and poorly serviced (Ntarangwi et al., 2021). The majority of Nairobi's lower-middle and higher middle-class neighborhoods are located in the north-central areas, while the city's low- and lower-income neighborhoods are mostly found in the east.

Economic features: Nairobi serves as the regional headquarters for a number of international corporations and economic organisations, such as the Nairobi Securities Exchange, Africa's fourth largest trading exchange in terms of volume, and factories. Nairobi is also both a tourist destination and a transportation hub and is experiencing a construction boom. A large and dynamic informal economy contributes significantly to job creation, income generation, poverty reduction, and economic growth. In 2019, the informal economy accounted for 83% of total employment and 91% of new job creation. The informal economy's role as a driver of economic growth, job creation, and poverty reduction is well recognised in Kenya's Vision 2030 and Kenya's Employment Policy and Strategy, with an intention to stimulate economic growth by removing impedimental regulations and licensing regimes (ILO, 2021).

Infrastructures and services: The right to health is guaranteed in the Kenyan Constitution 2010 by Article 43 (1)(a), which states that "every person has the right to the highest attainable standard of health, including the right to health care services, including reproductive health care."

(Republic of Kenya, 2010b). The Constitution states that the state shall take legislative, policy, and other measures, including the establishment of standards, to achieve the progressive realization of the guaranteed rights and that organs and public officers are obligated to address the needs of vulnerable groups in society, including children's rights. Kenya's Public Health Act establishes rules for, among other things, food hygiene and safety, protection of water supplies, management of zoonotic risks, and of safe sanitation (Republic of Kenya, 2010b; KELIN, 2018).

Major plans are being implemented to alleviate traffic congestion in the city, and to improve the railway infrastructure for regional connectivity. Matatus, Nairobi's most common mode of public transportation, are privately owned minibuses, often overloaded and with a poor safety record. Buses are becoming more common, with a bus rapid transit system with 100 high-capacity buses commencing in and in July 2022. To better handle heavy traffic, a system of roads, flyovers, and bridges has been designed, and most roads are now well-lit and have adequate signage. Nairobi gets 94% of its piped water supply from rivers and reservoirs in the city's north. However water distribution losses can reach as high as 40%. Slum residents receive water from water kiosks and pay much higher water prices than those who have piped water. Lack of access to adequate sanitation in slums, as well as sewer blockages resulting in overflows, pose serious health risks. (Wikipedia, 2022). Slums, which cover only 5% of the city area, are estimated to house half of the population. Nairobi's slums have their origins in the pre-independence period, when the urban layout was based on government-sanctioned racial segregation, and expanded post independence with urbanisation, poor town planning, and the inability of low-income earners to afford housing. Kibera is one of the largest slums in Africa, and is situated to the west of Nairobi and other notable slums include Mathare and Korogocho. Job opportunities are scarce and high unemployment is associated with social instability (Kindernothilfe, 2022).

Kenya's policy provides for a devolved health system, including to improve access and equity and to promote accountability and transparency in service delivery. (Wikipedia, 2022). Despite spending more on health than the national average and having 14 doctors /100 000 people compared to 10 for the rest of the country (32% of all doctors in Kenya work in Nairobi); a healthcare insurance coverage of 35%, which is significantly higher than the national average of 27% Nairobi's health outcomes remained poor. TB prevalence was also found to be twice as high as that of other counties, with maternal mortality ratio 1.5 times higher than the national average (Mukuna, 2019).

In 2018, 18.5% of Kenya's adult population was illiterate, the highest rate in East Africa. Kenya's public universities are highly commercialized, with only a small percentage of qualified high school graduates admitted on limited government sponsorship into programmes of their choice, others in middle-level diploma programs at public or private universities, colleges, and polytechnics. There are significant regional disparities: and Nairobi has the highest level of literacy (87%) compared to North Eastern Province's lowest level of 8% (Wikipedia, 2022). Kenya's government implemented free primary education for all in 2003, followed by free secondary education in 2008. As a result, nearly three million more primary school students were enrolled in 2012 than in 2003, and the number of schools increased by 7,000. As graduates of the new free primary program progressed through the system, the secondary gross enrollment ratio increased from 43% to 67% between 2003 and 2012 (Clark, 2015). The slums have poorer conditions for education (Kindernothilfe, 2022)

3. Case study 1: Kibera Public Space Project - Kounkuey Design Initiative

Summary: Since 2016, Kounkuey Design Initiative (KDI) has built a network of over 10 productive public spaces to improve livelihoods and resilience across Kibera. In the design and development of each Kibera Public Space Project (KPSP) site in the network, Kounkuey has used a fully collaborative approach. Kounkuey accommodates the needs of local residents from Kibera, while connecting local expertise from within Kibera with technical resources from Kounkuey and its partners. This case study presents the context, design, implementation, outcomes, lessons learned from the Kounkuey and the Kibera Public Space Projects.

3.1. Context

Kounkuey Design Initiative's Kibera Public Space Projects (KPSP), are a network of community managed spaces that provide essential services for communities in Kibera, while mitigating flood risk. Kibera is an informal settlement in Nairobi. It has the highest settlement density of any settlement in Kenya and has an estimated population of about 250,000, which makes it the biggest informal settlement in Africa. The settlement which is located along the Ngong River, a tributary of Nairobi River is crowded and lacks many essential services. It is made even more vulnerable to numerous social, economic, environmental and health challenges by its high levels of unemployment, precarious housing, high crime rates, inadequate road infrastructure and severe flooding that is worsened by poor drainage and sanitation infrastructure. It also has very limited and shared water, sanitation and hygiene(WASH) facilities. However, Kibera is also a colorful melting pot of creativity; it is endowed with a vibrant youth population, immense community activism and a wealth of entrepreneurs who make a living from the informal economy. Kibera is split into the following 18 villages: Mashimoni Makongeni, Lindi, Laini Saba, Makina, Raila, Soweto East, Kisumu Ndogo Soweto East, Kianda, , Kambi Muru, , Olympics, Toi Market, Silanga DC Village, Karanja, Anyany, and Gatwekera. Anyany, Karanja and Olympic Estates are not included in some Kibera surveys because they are made up of a combination of formal and informal areas (UN Habitat, 2020).

Nairobi city was founded in 1899 when the Ugandan Railway was built, and Kibera originated in the forests on the outskirts of Nairobi when Nubian soldiers who served the British colonial army returned from serving with the King's African Rifles in 1904, and were allocated this land as compensation. The Nubians have lived on this land in the 'Native Reserves' for over 100 years but still have no claim to it. Over time, as urban Nairobi has developed economically and railway traffic increased, Kibera has grown immensely as Kenyans from every ethnicity have migrated from rural Kenya to the city, renting land and houses from Nubian landlords. In the late 1920's proposals were made to demolish and relocate Kibera because it sat within the European residential holdings, and also based on numerous colonial government laws such as the 1922 Vagrancy Act, that sought to limit the movement of indentured workers and natives by evicting, arresting, segregating or expelling them. However, these and many more proposals were rejected by residents, including those made during the time when Kibera was rendered an unauthorized settlement because of its illegal housing in 1963, when Kenya gained independence (Wikipedia, 2022).

The numerous challenges and urgent necessity for better development models in Kibera, have seen it attract a great volume of national and international interest that has made Kibera a highly concentrated focal point of diverse development processes and organizations, including UNHabitat, which has its headquarters nearby.

3.2. Aims and intended change

Since 2016, Kounkuey Design Initiative (KDI) has built a network of over 10 productive public spaces to improve livelihoods and resilience across Kibera. In the design and development of each Kibera Public Space Project (KPSP) site in the network, Kounkuey has used a fully collaborative approach. Kounkuey accommodates the needs of local residents from Kibera, while connecting local expertise from within Kibera with technical resources from Kounkuey and

its partners. Each site always merges river remediation and sustainable drainage infrastructure with sanitation and laundry facilities, recreation areas, community buildings, and spaces for small businesses such as food kiosks, fresh produce stalls, clothes shops, hairdressers and barbers etc ((KDI, 2022)

Kounkuey uses a series of iterative workshops facilitated with community organizers and organizations as a base; the outcome of each workshop being the starting point for the next one. Kounkuey has mobilized and worked with Kibera residents and local community groups to design the built components of each site, while also teaching local residents management skills, and how to set up businesses and develop programs that have the potential of giving light and life to the sites. Kounkuey's vision has always been to build a network of community spaces within Kibera where flood protection and green and grey infrastructure are infused with community designed and community managed public spaces. These spaces deliver essential services and amenities. Green infrastructure refers to an interconnected grid of open green or ecological spaces that can be naturally occurring or engineered and have the characteristics of living infrastructure. They are created and managed mainly to control storm water but also display economic, social and environmental benefits. Gray infrastructure refers to physical, manmade structures that are adapted to the changing and intensifying impacts of climate change or breakdown, like rising sea levels, stronger storms and heavier floods, and include water treatment facilities, seawalls, roads, dams etc (KDI, 2022)..

The land on which Kibera stands is owned wholly by the Government of Kenya. It is estimated that 10% of the residents are landlords who rent out their shacks/rooms to the remaining 90% of Kiberans, who are tenants without rights. This extended and often contentious association between residents, landlords, local leaders and the government has often been beset with harassment, injury, torment, forced evictions. This has led to insecure land tenure, destroyed livelihoods and death. A foundation of trust has thus always been a crucial starting point for each and every Kibera Public Space Project (KPSP). Kounkuey has therefore always made every effort to develop and sustain trust with the residents of Kibera as well as other stakeholders. This has been achieved through honest, active communication, learning and engagement processes and also through continuous delivery of effectively high quality, community approved and managed public spaces (Wikipedia. 2022, (KDI, 2022). Each KPSP is different and has its own resource structure and funders that includes a mix of community based organizations, academia, government international and local donors and businesses

3.3. The design of the work

KDI is a community development organization that was founded in 2006 by six Harvard graduate school students. They partner with under resource communities to improve livelihoods and promote equity by co-designing and co-building "productive public spaces" that meet the environmental, social and economic needs of the communities. The team is made up of community organizers, researchers, civil engineers, architects, urban planners and landscape architects (KDI, 2022).

In 2006, KDI began its work in Kibera. Partnering with the New Nairobi Dam Community Group, they focused on co-designing their first public space in Kibera. Kounkuey has continued to focus on creating a vibrant network of community managed public spaces that effectively cater for the communities' social, physical and economic needs. This has been achieved by ensuring that their public spaces create opportunities for small businesses, health, recreation, sanitation and laundry facilities while also reducing exposure to flood risks by bringing together river remediation and sustainable drainage infrastructure. Since 2016, Kounkuey's network of productive public spaces has continued to increase in number while improving livelihoods and flood resilience across Kibera. The Kibera Public Space Project has also earned Kounkuey Design Initiative one of the finalist positions in the WRI Ross Centre Prize for Cities 2020-2021., The World Resources Institute (WRI) Ross Center Prize for Cities *is the premier global award celebrating and spotlighting transformative urban change. The Prize for Cities seeks to inspire urban change-makers by elevating trailblazing initiatives and telling impactful stories of sustainable urban transformation* (WRI, 2022).

The name Kounkuey means “to get to know something intimately” and is a perfect symbolization of KDI’s approach that focuses on actively working with communities to increase positive public spaces, improve livelihoods, remediate polluted land, and build flood resilience by improving access to drainage and sewerage; and all this is done without removing existing housing. This approach differs greatly from the more traditional global approaches that build or upgrade services and infrastructure in informal settlements by solely focusing on “raze and replace” existing infrastructure with newer alternatives. Kounkuey also works with academia, civil society organizations, local and county governments

3.4. The implementation of the work

In 2011 Kounkuey, launched a very public, easy to understand, easy to engage in, call for proposals process to create clear and open partnerships with any and all community members and community-based organizations in Kibera. This was a means of building and sustaining a firm foundation of trust. In each area, and Kounkuey, ensured that it worked with at least one credible community-based organization and local residents, to carry out research to help establish the most urgent and pressing needs of local communities. Thereafter, together with residents and community based organizations such as the Kibera Action Group Organization and many others, Kounkuey would create plans and decide upon the appearance and necessary functions of the new public spaces. Kounkuey always ensured that the new public spaces were effectively transforming the existing unsafe and underutilized spaces into “productive public spaces” equipped with key services such as water and sanitation facilities, community buildings,, business areas, and open spaces for exercise and recreation – according to the communities’s needs and desires. Experiences, recommendations and other contributions were also sought from women and children to help guide the designing of spaces such as the laundry and play areas; these were being created mainly to help mothers balance housework and childcare. Kounkuey always focused on using buildings and amenities that could fulfill several functions at the same time or consecutively. This allowed every Kibera Public Space Project (KPSP) to be able to incorporate many essential services in a single space. For example, there is a community hall in Makina village, Kibera that can be used as a community meeting space, a school and place of worship, and more so, its rooftop is structurally designed to capture water when it rains. This helps reduce flooding and challenges associated with flooding such as increased water borne diseases, destruction of property and loss of life. The water collected from the rooftops is also being used to irrigate a connected greenhouse that provides fresh produce and is a source of income, improved health and livelihoods.



Designing communications systems at a community workshop. KDI, 2022

Kounkuey's site development process is executed using a four phased approach that includes: design and build; plan and program; research and test; and advocate and educate.

During the first phase, design and build, Kounkuey focused on working with the residents and community organizations to plan and build up underused sites. Kounkuey transformed the sites into productive multifunctional public spaces that were much safer, much healthier, more vibrant and helped the surrounding communities to prosper. These sites are equipped with water and sanitation facilities, spaces for exercise and recreation, community buildings, areas for small businesses, green infrastructure and water and sanitation facilities. This approach is most evident in Kibera Public Space Project (2006-Ongoing) and includes nine Kibera Public Space Projects from 2006 to ones that are still ongoing. All the KSPS projects share a joint goal but have unique objectives, for example, Kibera Public Space Project 02 (2010-2011) the second KPSP was set up with a focus on income generation so as to capitalize on its location near a busy route, whereas Kibera Public Space Project 08 (2016-2018) the eighth KSPS, was set up with a focus on improving learning opportunities that was realized through the construction of Anwa Junior Academy, through a community led participatory process that engaged local youth as skilled labor and Kounkuey as technical assistants (KDI, 2022).

During phase 2, plan and program, Kounkuey considered the long term vision, and created sessions, meetings, trainings and interaction processes that would allow the community members, leaders and organizations in Kibera to lead and facilitate planning and change that promoted equity, and was sustainable for the long-term. This included supporting and building the capacity of residents of Kibera to design and implement programmes that promoted culture, generated incomes, and increased communities' abilities to address current and future challenges. This approach is most evident in the KDI-Kenya forestry Research Institute KDI-KEFRI Carpentry Academy (2016-Ongoing) that empowers youth in Kibera with carpentry skills



Sanding the desks for Anwa Academy using new tools, KDI, 2022

During Phase 3: Kounkuey focused on research and testing projects. From the beginning, Kounkuey recognized that there was insufficient data to support policy makers, residents and development organizations in making well informed evidence based decisions about the priority

needs and solutions that would effectively address those needs. Thus Kounkuey had to find ways to fill these knowledge gaps and also create a foundation for more effective, innovative and equitable development. This was achieved by working with local community members, community networks and organizations in Kibera to design and present extremely thorough and carefully researched and tested projects that all improved livelihoods and helped mitigate flood risks in a variety of ways. This approach is most evident in the following projects: Living Data Hubs (2019-Ongoing), Community-Responsive Adaptation to Flooding (2017-Ongoing), WATSAN Portal Kibera (2013), Why We Disagree About Resilience - WhyDAR (2016-2018), Risk or Resilience (2016-2018), Building Urban Slum Resilience (2015-2016), DARAJA (2018-2020);

During Phase 4: Kounkuey focused on advocacy and education. Kounkuey has continued to invest in the new, emerging generation of community-engaged planners, designers, policy makers and students by providing teaching, lecturing, and other capacity building processes for them. They have leveraged knowledge and experiences from the community and community networks, and from their own built work and research, and from partners, to help shape policy and practice in partnership with residents, agencies, CSOs, NGOs, governments and universities to advocate for improved policy and practice for residents of Kibera. This approach is most evident in Engineering for People Design Challenge (2017-2018); Tujenge Kibera (2015-Ongoing) and Rivers and People (2016-Ongoing) and in their interactions with Nairobi Metropolitan Service (NMS)

In May 2020, NMS, launched a new integrated upgrading programme for the Kibera Physical Development Plan in line with the requirements of physical and Land Use Planning Act, 2019 that declared large parts of Kibera a Special Planning Area (SPA). It stated: *Pursuant to the Deed of transfer of functions from the Nairobi City County Government to the National Government published vide Gazette Notice No. 1609 of February 25, 2020, Section (26) of the Intergovernmental Relations Act (No.2 of 2012), and continued in exercise of powers conferred by section 52 (1) of the Physical and Land Use Planning Act, 2019 the Nairobi City County Government declares the informal settlements of Sarangombe, Lindi, Makina and Laini Saba all within Kibera Constituency within Nairobi City County as a special planning area.*"

This declaration not only recognized Kibera's unique development challenges but also allowed NMS to put together a development plan that was supposed to actively involve participation of Kibera residents, provide even more socioeconomic benefits, conserve the environment, and promote health and wellbeing of all residents. These views are also reflected in Kounkuey's mission of achieving inclusive and resident-led upgrading, and are in line with what it has been advocating for in Kibera since 2006. On February 3rd 2021, Director General Badi of the Nairobi Metropolitan Services (NMS) announced "the delivery of a 444 km access road across Nairobi County's informal settlements, including 28km of tarmacked roads in Kibera to be completed within one year. This development has the potential to improve the livelihoods of Kibera's residents if planned and built in a manner that is appropriate with the context of the area. The road would help improve security and access for emergency and essential services such as fire engines, water bowsers, police vehicles, ambulances and sewerage exhausters. Through megaphone announcements, the local chief informed residents of Sarang'ombe ward of this new development as the process would involve demolitions. He even urged them to demolish their own houses as they would be compensated and also that they would be consulted before houses to be demolished were marked. However neither compensation nor consultations took place. Numerous meetings were organized by community leaders and community based organizations that involved other community development organizations and local government representatives to raise their concerns, experiences and potential solutions (KDI, 2022; Kinyanjui, 2020).

In response to this, in March 2021, Kounkuey collaborated with Architectural Association of Kenya (AAK), and the Institute for Transportation and Development Policy (ITDP), who are also experts in development, planning and engineering, especially in informal settlements, and how livelihoods in these communities can be enhanced by infrastructure and community

development. Jointly, Kounkuey, AAK and ITDP reviewed infrastructural upgrades proposed by NMS and jointly developed a Technical brief on the same titled: “Kibera Road Developments 2021 - Technical brief on Kibera Road Developments 2021”. During the preparation process of the technical brief, Kounkuey and partners also met with local residents from Kibera, and visited construction sites where they engaged with relevant technical staff. The brief acknowledged the potential benefits of NMS’s road upgrading initiative, highlighted concerns and challenges for consideration, and also made recommendations about: i) road standards for informal settlements, ii) recognizing context and risks in planning, iii) development that is informed by flood risk analysis, iv) communication around the project & stakeholder engagement, and v) recognising existing infrastructure, community assets and livelihood sources (KDI, 2022).

Kibera Public Space Project (KPSP)11

Kibera Public Space Project 11, located in Makina Village, is the 11th public space in the KPSP network and second built intervention after KPSP10, under the Community Responsive Adaptation to Flooding research project. KPSP10 was located in Andolo Village Kibera and was set up to test, evaluate and refine the productive public space model and its ability to mitigate flood risks while integrating and addressing communities’ socioeconomic needs (KDI, 2022).



Andolo village, site of first physical intervention, borders flood-prone Ngong River, KDI, undated

This KPSP11 is situated much further from the waterways of Kibera than several of the other KPSP sites, but according to community driven research, it is also plagued by flooding problems that afflict about 40% of households. Vijana Usafi na Maendeleo (Youth for Sanitation and Development) are Kounkuey’s key partners in Makina, and have been greatly involved in the flood resilience design and construction of KPSP11. This partnership was cemented, following VUMA’s invitation to Kounkuey to take part in their monthly clean up exercises. VUMA helped Kounkuey organize and jointly facilitate co-design workshops, and in many instances they enthusiastically took leadership of the workshops. To ensure that the voices of women and children in Makina were well captured, Kounkuey and VUMA also organized gender-segregated

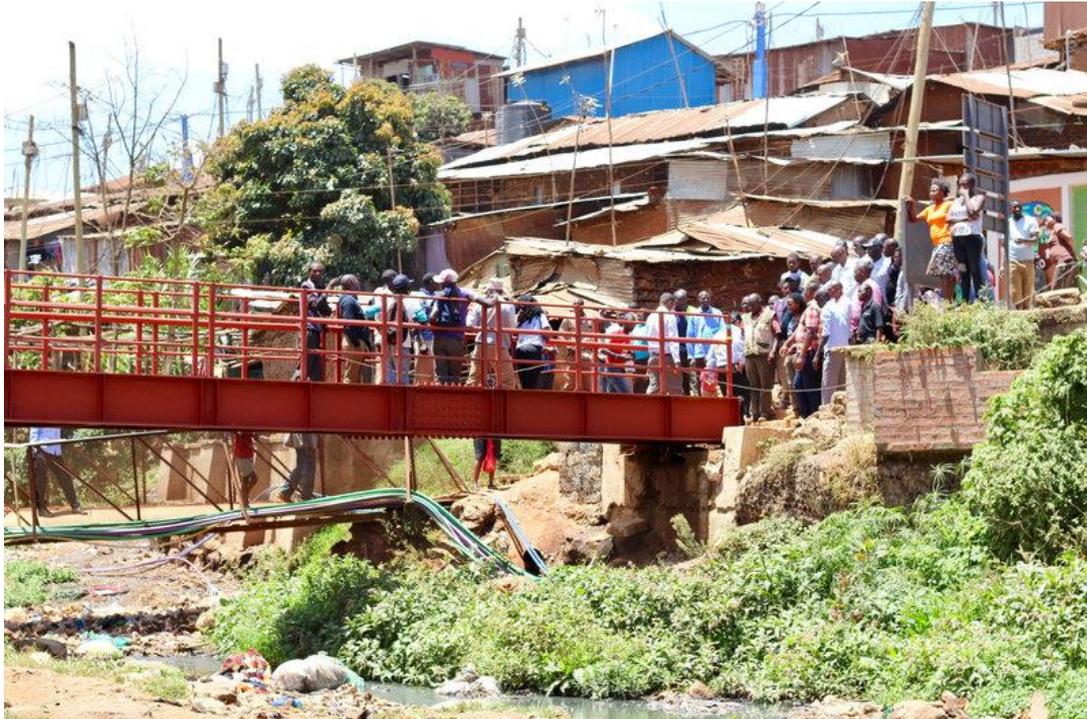
meetings where women shared their concerns and recommendations; and workshops where children contributed to the design of their play spaces; and also other sessions where community members used bricks provided by the Nexon Foundation to create their own models of the sight. WUMA has also been actively involved in the creation of job opportunities for unemployed youth and other community members (KDI, 2022).

When VUMA came on board, they had numerous goals which have been realized in the design of KPSP11. They wanted a site that provided for the wellbeing of Makina's children, women, youth and community members; a site that improved community safety, promoted environmental cleanliness, and also provided platforms to further boost financial stability and to help grow Makina's wealth, as it was considered one of the wealthier villages. Furthermore VUMA ensured that KPSP11 was favoured with water tanks and kiosks, a children's 'playground, a community hall, and a sanitation block that enhanced existing youth operated facilities. To adhere to Kounkuey vision of active community leadership and engagement, VUMA, were given the responsibility to source 90% of the construction labour force that was made up of local residents, thereby creating jobs for locals. This not only provided employment opportunities for the many unemployed youth, but it also helped to teach and instill project planning principles into the workers. Furthermore and from the start , since VUMA had played a very active role in co-leading the design and construction of KPSP11, they also developed their own competencies in managing multifunctional/multifaceted sustainable community driven development processes.

Commencing in 2017, the Community-Responsive Adaptation to Flooding Research Project was developed on the successes achieved through the Kibera Public Space Project (KPSP) network. With this project Kounkuey has partnered once again with informal settlement residents, community organizations, universities, local government and other stakeholders to collect and provide information on the costs, delivery and impact of flood adaptation processes that consider and incorporate input from the community. This kind of information is very important not only because flooding is one of the biggest concerns afflicting cities that are undergoing rapid urbanization, but even more fundamentally because, according to Kounkuey, currently no examples exist of successful (services and infrastructure) collaborations involving communities and their governments.



Flooding at the old KPSP05 bridge, undated



Celebrating the completed bridge at KPSP05, KDI, 2022

In this project, working at high-risk sites, Kounkuey and partners have co-designed and rolled out a chain of “community-responsive adaptation” interventions to help improve community solidarity and build local resilience to flooding. This has been coupled with pre and post intervention household surveys, structured interviews and focus group discussions to assess flooding impact on health and welfare, rent, mobility and general extent of damages. KPSP10 in Andolo was the first site completed in 2019, KPSP11 in Makina village the second site is still under construction. Each site uses a combination of hard and soft solutions, income generating activities and social initiatives. Soft solutions include processes to manage waste, flood preparedness and early warning systems. Hard solutions include improved drainage infrastructure, rainwater harvesting and flood protection. The Community-Responsive Adaptation to Flooding Research Project is still ongoing (KDI, 2022).

3.5. Outcomes

The partnership between Kounkuey and over 5000 residents of Kibera in the design and development of Kibera Public Space Project (KPSP) sites has resulted in 11 new climate-resilient public spaces, which makes up about 35% of all purpose-built public spaces in Kibera, and includes the installation of 520 meters of flood protection and 840 meters of drainage infrastructure. This drainage infrastructure has helped address damage to the entire watershed, provided a foundation for a network of over 250 community leaders, and increased access to essential services that caters for over 10,000 people each day (KDI, 2022)..

The first Kibera Public Space Project (KPSP) was established in 2010. These sites have continued to play a very important role in promoting sustainable and effective resident driven upgrading in Kibera, and have considerably improved access to essential services and enhanced flood protection infrastructure and resources for more than 125,000 of the 250,000 residents of Kibera. The biggest beneficiaries have been the women and young people because the KPSP have created training opportunities and jobs for youth and created support systems that allow women with children to balance work and childcare. This has positively influenced how newer water, sanitation and climate initiatives are considered, developed and utilized across Nairobi and also encouraged a new approach in programmes intended for the upgrading of informal settlements that now consider the experiences, knowledge and perspectives of the local communities as a priority.

The first Kounkuey site was opened in 2010, and since then 10 more public spaces have been built with the extensive expertise, support and leadership of community members, networks and partners such as; this camaraderie has further enhanced the flexibility and resilience of the Kibera Public Space Project (KPSP) sites. For example, during the installation of a new municipal sewer line in 2015, for the line to be operational, it was necessary for the community to almost completely demolish an existing and fully operational site. However through spirited negotiations led by other community based organizations, the community was able to agree upon an alternative that allowed the line to be connected to other Kibera Public Space Project (KPSP) sites resulting in access to formal sewerage facilities for two additional locations within Kibera. These additional connections, as well as the blocks of toilets put up in other sites helped reduce the quantities of sewerage entering the adjacent Ngong river, which is one of the major sources of contamination/effluent entering Nairobi's watershed (KDI, 2022).

As a result of its trustworthiness and reputation in 2016, making use of data collected from almost 1,000 households and community groups, Kounkuey was able to sign a memorandum of understanding with the Nairobi County Department of Public Works to help address flood associated risks in hotspots along the Ngong River. And in 2018, working with the Kenya Meteorological Department, Kounkuey created a platform to make information about the weather/climate available to residents of informal settlements in Nairobi, including those in Kibera, and help them better prepare for rainy episodes and seasons.

Progressively, Kounkuey and its partners have continued looking for more official windows to help improve the way Nairobi city officials approach informal development processes and also to find a way to more effectively incorporate the knowledge, experiences and perspectives of residents, especially those from informal settlements. Consequently, working with slum/shack Dwellers International, Kounkuey began to lobby Nairobi Metropolitan Services (NMS) for the Kibera Special Planning Area, and after two years, in 2020, it was approved (KDI, 2022)..

In the Kibera Public Space Project 11, through the contributions and collaboration of many partners, the numerous environmental, social and economic elements needed for the operationalization of KPSP11 were realized. These included:

- a solar powered water heating system that was donated by Davis & Shirtliff, it was the cornerstone for the development of the sanitation unit business,
- a rainwater harvesting and storm water management system that was created through SUDs, the Sustainable Urban Drainage strategies programme,
- a partnership with Living Data Hubs (LDH) that resulted in the installation of WiFi facilities inside the community hall. LDI is a project partnership that brings together residents of informal settlements, Kounkuey, Massachusetts Institute of Technology's (MIT), Civic Data Design Lab and TunapandaNet to jointly set up community based WiFi hot spots, and
- vent windows that were made by young people in Kibera through the KDI-KEFRI Carpentry Academy Programme.

Young people in Kibera are greatly affected by high unemployment rates, poor educational opportunities, difficult living and family situations, insecurity, drugs, crime and illicit drugs, and ethnic tensions especially during political campaigns. However just like a lot of young people everywhere, they are optimistic and eager to use their creativity and innovation to improve themselves and their communities. In 2016, the KDI-KEFRI Carpentry Training Academy was set up to improve career opportunities for young people in Kibera by providing a carpentry training course that taught students how to use bamboo and timber and improved joinery techniques to make furniture and fittings that have already been used to furnish and transform several KPSP sites, including KPSP08, KPSP11, and provided desks and chairs for teachers and students at Anwa Junior Academy in Kibera. The students also built and installed doors and windows which allow teachers to alter the amount of light getting inside classrooms and also control the temperature within the classes. This has greatly improved the learning environment for over 400 children learning there. The Academy is not only contributing to community driven development efforts but also generating incomes for the young carpenters



Original furnishings at Anwa Junior Academy, KDI, 2022



Anwa school with newly fitted window shutters and doors, KDI, 2022

KPSP11 projects has brought an assortment of essentials skills, services and opportunities to the residents of Makina village, and provided a platform for further research and collection of vital information on community responses and adaptation approaches to climate risks such as flooding through the “Community Responsive Adaptation to Flooding Research Project” that is being used by community members, the government, development organizations, researchers and other stakeholders.

3.6. Enablers, barriers and lessons learned

The Kibera Public Space Projects are created through highly collaborative process with numerous enablers that have helped address the barriers including the technical expertise and credibility of Kounkuey; the collaboration in design and leadership and provision of labour by the community leaders, residents and community based organizations in Kibera; the productive public spaces that are KPSP sites themselves; the KDI _ Kenya Forestry Research Institute Carpentry Academy, that has provided furniture and training; academia, civil society organizations, including local and county governments that have increase the community voice in

policy and practice to improve livelihoods and increase access to essential services through collection of essential data and advocacy; also collaboration between the communities leaders, member and organizations in Kibera, civil society, academia, Kounkey and the private sector to establish KPSPs.

Kounkey has provided Kibera residents and local community based organization with technical skills and financial resources, and then they jointly shared the responsibility in the construction and the management of the sites. Kounkey has also focused on the examination of sites and making joint decisions on what types of infrastructure can be installed to ensure the sites are centers of economic activity, cultural exchange, and environmental remediation that involves the removal of pollution or contaminants from the soil, groundwater, sediment, surface water etc. This formula has allowed local residents through Kounkey's support and training to not only learn and build on their capacity but also to generate and use this new knowledge to open small businesses and run income-generating programs at the sites. These activities have provided new sources of much needed income for the many unemployed youth and residents who also face high unemployment, and also provided other essential services such asthat have helped to make these public spaces vibrant, self-sustaining community hubs.

Kounkey's ability to negotiate with community members, local and national government has not only been enriched by its trustworthiness, but also by its solid reputation for exceptional project delivery and management. This has helped Kounkey bring the experiences, knowledge and insights of Kibera residents and those from other informal settlements to official development and policy making processes with the government and associated agencies.

Some of the barriers have included community flooding; inefficient interventions by local and county governments; limited community access to basic services such as water, roads, sanitation and electricity; high rates of crime and unemployment in the community; and limited data to enable greater community engagement in policy and practice.

Lessons learned

Community lead flood mitigation approaches often focus on coping with the immediate challenges, rather than a longer term process that allows communities to learn from the challenges and develop remedial measures that allow them to adapt to or mitigate flood risk/challenges; while conversely the governments 'top down approaches are often immediate and short term and known to have mixed results, some even increasing flood risks.

The outcomes of the Kibera Public Space Project (KPSP) sites and Community-Responsive Adaptation to Flooding Research Project are providing crucial evidence that has not been available before on feasibility of community-responsive flood adaptation measures. This is crucial evidence that can be used by governments, development organizations and other decision makers to guide/inform policy formulation and practice in Kibera and other cities that are urbanizing very quickly, especially across sub Saharan Africa. this information will also be very beneficial for those working with marginalized and vulnerable flood afflicted communities who would be interested in replicating remedial measures such as KPSP. Additionally the Community-Responsive Adaptation to Flooding Research Project puts to the test, and validates Kounkey's theory that productive public spaces like Kibera Public Space Project (KPSP) sites can be a practical and sustainable community led and managed climate adaptation to mitigate flooding, that not only incorporates the community voice, but also accommodates and addresses communities socioeconomic needs.

4. Case study 2: Community-led Mapping of Food Vendors in Nairobi's Informal Settlements

Summary: This case study presents the context, design, implementation, outcomes, lessons learned from an initiative by Muungano wa Wanavijiji the Kenyan federation of slum dwellers and urban poor. An exchange visit was used to highlight and discuss experiences of urban food security in Kenya's Nairobi informal settlements and those of Ghana. The participants used the new learning from the meeting to improve existing initiatives in their communities. A study was conducted in Kenya using participatory methods to map food vendors in Nairobi's informal settlements. The findings helped the community members to create more inclusive and effective strategies and also identify priorities that needed action by the community as well as by government to promote and improve food security and food safety in their communities and other informal settlements. The initiative showed the vendors' capacity to organize and advocate for greater community inclusion in policy making, development and infrastructure improvement.

4.1. Context

In 2013-2014 Muungano wa Wanavijiji, the Kenyan federation of slum dwellers and urban poor, in partnership with Muungano Support Trust, the International Institute for Environment and Development (IIED) and University College London's Development Planning Unit, spearheaded a community led mapping and advocacy process with food vendors, their customers and livestock keepers. The exercise was carried out in three informal settlements in Nairobi - Kibera, Mathare and Mukuru - to explore and better understand food vendors' role in the urban food systems (Ahmed et al., 2014)

Food vendors and hawkers in informal settlements in Nairobi play a vital role in the informal urban food systems by supplying a wide variety of affordable and easy to access meals. However, they are often sidelined in urban food policies and planning or overlooked by local leaders who fail to recognize the benefits of creating inclusive, equitable and sustainable urban food systems. These sustainable systems should ideally create a situation where all people in informal settlements continuously have socioeconomic and physical access to the right amounts of safe and nutritious food that meets their preferences and dietary requirements for them to continue living healthy and active lives.

In many African cities which have undergone rapid urbanization and have experienced widespread increases of informal settlements, malnutrition and food insecurity have become a very real and regular challenge for the urban poor, majority of whom reside in informal settlements like Kibera, Mathare or Mukuru areas in Nairobi. An equally big challenge is the lack of sufficient political will by local government to drive the interventions that would help create better solutions towards food security by addressing the facilitators of poverty, climate change and the ever increasing food and fuel prices that worsen already existing inequalities.

In low income households in Mukuru, Korogocho, Viwandani, Dandora and other informal settlements in Nairobi, food expenditure accounts differently for over 50% of total household income, and about 40% of total expenditure. (Amendah et al., 2014). Many of the households members are malnourished and children are often underweight and stunted. In these informal settlements food vendors play a major role in the food system by being a vital source of a variety of affordable, easily accessible - raw, processed or cooked - foods for low income consumers who do not have the facilities, time or money to prepare the food themselves. Aside from selling a variety of food, vendors also have different selling patterns that vary during the day, for example some vendors prepare breakfast tea and snacks in the morning, while others provide lunches for workers in Nairobi's industrial areas or on construction sites, while others provide late night meals, and others vend their items throughout the day.

In Korogocho, a report from 2001 showed that almost 86% of women and children, and almost 70% of men consumed foods from street vendors as their main source of food not prepared in their homes (Van't Riet et al., 2001). According to local vendors, a family can be fed for about

KSh150/- or \$1.26 a day, with one serving of beans costing KSh10 (Sverdlik et al., 2016) This has had the added benefit of reducing the workload, of mostly women, who bear the extra responsibility of doing household chores and also prepare food at home (Ahmed et al., 2015). In Asia and Africa, street food vendors who are mostly women, and they play a very important role in the economies of urban and peri urban communities; in Accra, Ghana for example, street food vendors generate millions of dollars in revenue, accounting for about 40% of the amount of food purchased by low income families. In the Philippines 90% of street vendors are women, 67% in Nigeria and in 53% in Senegal. (Proietti et al., 2014).

There are also hierarchies within the food vendor system that are determined by one's level of training or education, their access to resources, credit and other inputs, their location and level of mobility (Ahmed et al., 2015). Other factors that contribute to one's hierarchy include: their proximity to vending infrastructure, water and other essential services; their involvement in trade unionism and organizations; their relationship to /or degree of cooperation with urban authorities, local leaders and the security systems or police, and the setup of their vending business – which could either be on the ground, temporary wooden structure, permanent kiosk or small restaurant.

It is estimated that Nairobi has over 170 informal settlements with a total population of over two and a half million residents who represent about 60% of the population of Nairobi but occupy only an estimated 6% of the city's land area. Kibera, Mathare and Mukuru are among the biggest informal settlements in Nairobi (Ahmed et al., 2015). All these areas have extremely high rates of poverty and they lack sufficient access to most basic and essential infrastructure such as water, sanitation, healthcare and education.

The case study covers communities in Mathare or Mathare Valley, located along the Mathare and Nairobi rivers in the north east of Nairobi, and is about 5 kilometers from the central business district, in an area of about 0.9 square kilometres. It is the second largest informal settlement in Nairobi and is home to an estimated 200,000 residents according to the National Housing and Population Census (2019). Like other informal settlements, Mathare is congested and packed with informal structures, limited basic services including road infrastructure, water, sanitation and garbage disposal facilities. There are also high levels of unemployment and insecurity. Kenya has experienced a huge and rapid rural-urban migration resulting in, the Valley's population exploding. This massive population growthed and has continued to grow unabated since then. Kibera, the second area covered, is Nairobi's and Africa's biggest informal settlement, with an estimated population of about 350,000 residents located about 5km away from Nairobi's central business district, along the Ngong River, a tributary of Nairobi River. Like other informal settlements it is overcrowded and lacking in many essential services, leaving the residents extremely vulnerable to numerous socioeconomic, environmental and health challenges that are exacerbated by its high levels of crime, unemployment, precarious housing and severe flooding that is worsened by poor drainage and sanitation infrastructure (UNHabitat, 2020). Furthermore, the road infrastructure is grossly inadequate and access to the shared water, sanitation and hygiene (WASH) facilities is limited. Mukuru, the third informal settlement, is located in the industrial area of Nairobi city and is the site of an old quarry that provided the main raw materials used to construct the surrounding factories. Consequently parts of that area were converted into a dumpsite for industrial and household waste. Like other settlements Mukuru has very high levels of poverty, high levels of congestion, insecurity and unemployment and also very limited basic services such as road infrastructure, water, electricity, sanitation and garbage disposal facilities. Mukuru is divided by the railway, with Mukuru kwa Njenga located in the east and Mukuru kwa Rueben located in the west Mukuru has a total estimated population of about 200,000 according to research by the University of Nairobi and Muungano (AMT et al. 2014). The Slum/Shack Dwellers International (SDI) was established in 1996 to bring to the fore the concerns and voices of those living in informal settlements and low income households to city policy making and development processes. SDI is present in 33 countries across Africa, Asia and Latin America and its traditions of daily savings, loans for shelter or livelihood, community led development, and advocacy for greater recognition and inclusion, have been embraced by Muungano wa Wanavijiji. SDI has extremely developed enumeration systems for informal settlements in cities that include: mapping of housing, services and infrastructure, settlement

profiling led by the community, surveys of vacant land and widespread demographic data collection at the household level. Community members have also been involved in gathering oral narratives to investigate population dynamics, community histories, past struggles, structure maps and current settlement boundaries using Geographic Information Systems (GIS) in the form of ubiquitous GPS-enabled mobile phones and satellite images. This extensive amount of data generated has not only increased the awareness and confidence of community members, and created regularly updated locally certified datasets, it has also earned SDI members credibility and leverage in their negotiations and interactions with local governments in their advocacy work towards better services, for infrastructure and service delivery upgrading, for new resettlement projects or to halt demolitions and evictions.

4.2. The aims of the initiative

An exchange visit was to highlight and discuss experiences of urban food security in Nairobi informal settlements in Kenya and similar groups in Ghana. Participants aimed to use new learning from a mapping exercise to improve existing initiatives in their communities.

Participatory methods then aimed to enable outcomes and recommendations for community members to create more inclusive and effective strategies and identify priorities for action by the community and by government, to promote and improve food security and food safety in their communities and other informal settlements. Aside from mapping, the initiative aimed to emphasize the vendors' capacity and their envisaged role in organizing and advocating for greater community inclusion in policy, development and infrastructure improvement.

4.3. The design of the work

Muungano wa Wanavijiji (<https://www.muungano.net>) is the Kenyan federation of slum dwellers and urban poor operating in 21 Kenyan counties. It is the social movement branch of the Muungano Alliance, works along with the **Akiba Mashinani Trust** which is the urban poor fund branch, and SDI Kenya which is the branch that provides professional and technical support to the federation. The Alliance partners with civil society, academia and the government to influence policy and practices so that they integrate and upgrade informal settlements and improve the livelihoods of the residents. Muungano wa wanavijiji is made up of about 1000 autonomous slum based groups, including informal markets, squatters and urban poor from towns and cities across Kenya, and has a membership of about 100,000 people. These groups work on issues that affect their communities such as improving housing, security, and land rights; and delivery of basic services such as water, sanitation, electricity and roads

In 2013-2014, the federation of Kenyan slum-dwellers' associations - Muungano wa Wanavijiji, in partnership with Muungano Support Trust, the University College London's Development Planning Unit, and the International Institute for Environment and Development (IIED), mobilized its members, food vendors, the food vendors' customers and livestock keepers from three informal settlements in Nairobi (Kibera, Mathare and Mukuru) to explore the role of food vendors and the vending industry in the food systems of informal settlements using participatory methods. During this process they also took into consideration the impact of water access, sanitation, security, clean energy, health, infrastructure, transport and socioeconomic development on the vending industry (Amendah et al., 2014).

The genesis of the Muungano wa Wanavijiji community mapping study was in 2012, during an exchange visit organized in Accra Ghana by the Ghanaian and Kenyan urban food federations and their partners. Their agenda was to highlight and deliberate on the experiences of urban food security in Kenya and Ghana and draw lessons that could be used to improve existing initiatives in their communities and develop even better ones for the future. The meeting participants were chosen from the membership and partnerships of the federations,

At the beginning of the exchange visit participants engaged in sessions in which they talked about the increasing prices of food, role of government, their desires for more support in terms of government subsidies and their strategies to secure more land for agricultural activities. During the deliberations, participants noted challenges that were not feasible to address and focused on mapping and acting on food vending and food vendors. While some residents saw food vendors

as manipulative salespersons, some who were food vendors themselves noted how important food vending was in their communities, including as a source of income for many women in informal sectors in both Accra and Nairobi. After these deliberations it was clear that more information was needed about food vending and especially food vendors so as to begin a process of destigmatizing the industry that many consumers viewed as manipulative. Female food vendors were especially eager to lead these efforts through further deliberations and associated mapping activities.

According to the female vendors participating in the exchange visit the process of mapping food consumption spaces in informal settlements would involve further investigation of access to infrastructure and also clearly trace, the interactions that vendors had with their customers and local environments as a means of improving urban food safety, and cementing the food vending industry not only as a significant and sustainable livelihood opportunity but also as an important source of affordable and easily accessible food.

4.4. Implementation of the work

Following the Accra meeting, Nairobi based Muungano wa Wanavijiji, began its community mapping research study in 2013 and ended in 2014 (Ahmed et al. 2015)

The community led mapping research study by Muungano wa Wanavijiji, was carried out in 11 villages in Mathare, which are: Kosovo, Village 2, 3B, Bondeni, 3C, 4B, Kiamutisya, Mashimoni, Village No.10, Mabatini and Gitathuru3 villages in Kibera, which are Soweto East, Mashimoni, and Laini Saba, and in 4 villages in Mukuru, which are Simba Cool, Rurie, Feed the Children and Gatope. Muungano wa Wanavijiji mapped and profiled 174 informal settlements in Nairobi and enumerated over 50,000 inhabitants.

The Muungano wa Wanavijiji led research used numerous study techniques and further took lessons from organizations such as Slum/Shack Dwellers International (SDI). The enumeration and mapping exercises conducted by SDI are community led and community focused and have similarities with participatory or community-led mapping or participatory GIS (PGIS). Community-led mapping encourages, empowers and builds the capacity of communities to get a better understanding of their neighborhoods, the surrounding resources, services, infrastructure and challenges, and uses that information to not only augment community voices and gain greater recognition in the unequal arena of urban development but also uses that information to guide the necessary actions to address key concerns and improve where communities live.

Brainstorming and building consensus: The study process started in 2013/14 began with community brainstorming workshop sessions which involved further exploration of what the community already knew, who else to involve in the process, what was to be mapped and why, and in which villages in Kibera, Mathare and Mukuru as well as what tools, resources and techniques were available to them. The sessions also considered the operational conditions of food vendors working in different villages and further emphasized the significance of the data collection processes to all attendees, including the community teams that were identified, trained and empowered with the necessary skills, tools and resources to be community data collectors. Some of the participants involved were already members of Muungano wa Wanavijiji, while others became members during the project.

The subsequent community workshops facilitated by Muungano wa Wanavijiji were carried out in the selected villages involving community members, to verify essential information gathered from the initial workshop session, and further deliberate and create strategies using participatory methods to harness local community knowledge. During this process the participants identified the main actors in the food system such as food vendors, livestock keepers and customers or consumers. The grouping of food vendors was further broken down into those selling cooked or uncooked food and those selling fruits or vegetables.

Selection of villages in Kibera, Mathare and Mukuru: Participants selected the 15 villages that would be involved in mapping and further investigations that aimed to create and promote

comprehensive narratives about food access and safety, and also expose the interconnections between environmental concerns and challenges and food vendors in informal settlements in Nairobi. The criteria used to select villages considered, areas highly impacted by floods, areas that had numerous livestock and food vending activities and areas that were more exposed to other types of environmental hazards. The criteria were set by the Muungano Alliance.

The detailed mapping in the villages was done from 2013 -2014. It utilized a mix of methods combining qualitative research and participatory mapping with strong backing and immense input from residents of the selected villages including community groups, food vendors and their customers, and livestock keepers. It was led by Muungano wa Wanavijiji with support from the Muungano Support Trust (MuST), the International Institute for Environment and Development (IIED) and the Development Planning Unit (DPU) of University College London (UCL). The Urban Zoo project - a research programme that focused on the ecology, socioeconomics and epidemiology of disease emergence in Nairobi (ZED, 2015) also provided support to the research and used outcomes from the process to inform its own research activities, methodologies and data collection.

In Kibera, Mathare and Mukuru; the Muungano wa Wanavijiji team used a combination of community brainstorming and focus group discussions (FGDs), community led paper mapping techniques and community led digital mapping techniques, that included balloon mapping (low cost aerial photography using cameras hanging from helium balloons) to capture; food vending/vendors, environmental dangers such as open sewers and reservoirs, dumpsites, steep slopes, areas prone to floods among others. The mapping also helped to bring infrastructure maps up to date, with a focus on public and private toilets, electricity sources, roads and footpaths etc. The participatory community-led mapping activities explored vending locations, spatial patterns and environmental dangers that the vendors encountered.

Utilizing local knowledge: To enhance the street food research process further and encourage even more community participation, the team introduced focus group discussions plus (FGDs+) in 2013. FGDs+ were - in selected villages - a combination of the traditional focus group discussions (FGDs) and indoor mental mapping exercises in which participants used paper and digital maps to pinpoint their location and those of community facilities , and give a visual image of areas in which street vendors were dispersed or concentrated in each village. . The team preferred to use focus group discussions (FGDs) with the food vendors instead of surveys, because surveys did not provide much room for in depth exploration of one's opinions whereas focus group discussions (FGDs) were extremely open, inclusive and engaging, thus providing a platform for food vendors to fully present their stories including successes and challenges while also identifying key priority areas and potential actions needed for positive change. The focus group discussions (FGDs) encouraged community leadership of the research and also enabled participants to deliberate about shared topics such as concerns around improving food access and safety, improving access to essential services, improved infrastructure and more public spaces

Through the FGDs Muungano wa Wanavijiji, food vendors were able to discuss how they were impacted by physical constraints in their areas of operation, including inadequate access to water and water storage facilities, insecurity, poor road systems, overcrowded public spaces and limited or absent sewerage systems (that created an additional risk to food safety such as contamination) as well as poor hygiene and food handling practices. It was also noted that working in their own communities, reduced the costs associated with transportation and allowed them to better balance their childcare and household chores with running their businesses. The participants included consumers, vendors and livestock keepers to help gather a diversity of perspectives about the participants' complex interactions with food vendors, food vending practices, vending places and challenges faced that would help shape subsequent sessions. During the sessions food vendors talked about their livelihoods, food vending activities and the challenges caused by poor infrastructure, environmental constraints and inadequate access to essential services. Livestock keepers talked about their challenges and also interactions with food traders, and how they utilized their vegetable and other waste produced by vendors to feed

their livestock as space and pasture were quite limited in the informal settlements. Customers on the other hand talked about food access, safety and handling, and the typical practices and patterns they used to buy vended food.

Afterwards, the team organized another series of focus group discussions plus (FGDs+) with livestock keepers and vendors who sold several categories of food in the villages being mapped. This helped to further triangulate findings and further investigate the types of foods that vendors sold, their hours of operation - opening and closing times, food security and safety situations including previous occurrences of food contamination or disease outbreaks, and other experiences that promoted food safety action

Field mapping: After the sessions of indoor cognitive/mental mapping, the team then used community-led paper-mapping and community led digital mapping tools and techniques in the field to verify claims and assumptions, and further explore the competing uses and demands of available public spaces. For example, streets and pathways in the informal settlement have a quadruple purpose as livestock rearing spaces, vendors' kiosk spaces, children's playgrounds as well as pedestrian traffic-ways. The participants analyzed stakeholder's interaction with food vendors, types of food available and proximity to services, infrastructure and dumpsites. Using numerous methodologies including mobile phone surveys, and also working with the residents, they captured the different types of food being vended with pictures, vending locations, indications of vendors' food safety practices such as covered foodstuffs, and also collected aerial photographs using balloon mapping. Balloon mapping (taking pictures with cameras on balloons) gave participants' bird's eye views of selected sites within the villages, the local built environment as well as images along the team's transect walk. With the necessary training from the team, community mappers were empowered to use these tools to make very creative low-cost substitutes to satellite imagery.

More specifically:

- The teams used both hardcopy and satellite maps that were created and printed for all the 15 villages and highlighted the main features such as pre-existing sewer lines, road infrastructure, drains and manholes; power access points, power generators and power lines; water lines, reservoirs and access points, sanitation blocks and boundaries of the village. The paper maps contained the basic facilities and services in the villages as previously captured in community mapping exercises carried out by Muungano and MuST. The satellite imagery helped residents orientate themselves in the villages.
- The team trained community research assistants to use a data collecting application, Epicollect7, on Android enabled smartphones that helped them create an image of the vending activities being undertaken in each village. The application included a short questionnaire on food classification, observable food safety concerns, and data on demographics. The mobile application was also complemented by paper notes that captured each food vendor's unique code and any other details that were not addressed by the mobile phone questionnaire.
- Balloon mapping was used. Although satellite imagery is widely available, easily accessible maps of informal are often not current or are slightly obscured or low-resolution and most conventional technologies for data collection are not affordable for those residing in poor communities. The teams therefore decided to use balloon mapping because it helped make a very creative, up to date and low-cost substitute to satellite imagery of areas of Nairobi city that are often terra incognita on government documentation and corporate imagery

The findings: The community led mapping study exposed the real conditions of the food vendors. For example the following findings were observed (Ahmed et al. 2015):

- Operation hours for most vendors were between 5am to 10pm, with those operating in areas with better security, street lighting and customer traffic being able to operate for much longer into the night. This was observed in Kosovo and Village4B in Mathare where vendors operated until about 11pm if stocks were still available. Vendors operating on major streets were safer and received more customers than those in inner and narrower streets, thus competition for space on major streets was high, resulting in conflict among traders. In

Mathare and Kibera vendors were required to pay a monthly fee to reserve and also protect their space, shed or kiosk. Vendors who worked in villages made up mostly of a single tribe like Village 4B were safer as local youth groups provided security and victimized outsiders, especially after 9pm.

- There were incidences of unsafe and contaminated foods reported by participants of FGD+ , that had caused outbreaks of cholera, diarrhea, typhoid, stomach aches and vomiting which were especially harmful for children under five. The contamination was a result of harmful and unsanitary food handling and selling environments characterized by inadequate water and sanitation facilities, open drains and sewers; rodents infestation and inadequate storage facilities. To overcome storage challenges, vendors in Kibera and Mukuru for example, would boil and dry leftover githeri (boiled maize and beans) for selling first the next day, or add pepper like (e.g. in Mathare) to mask any off smells. Others would add other preservatives like soda ash, aspirin or peroxide that are also normally used shorten cooking time; or margarine and baking powder to increase food volumes and profits. Spoilt githeri would be sold to unaware customers or livestock keepers. Vegetable vendors would store leftovers in crates or sacks outside overnight. Fish and meat vendors would buy small quantities that could be sold quickly or deep fry and store the fish in cartons or buckets overnight, a practice observed in Kibera. Residents were also unaware of the adverse impact such practices posed on their health.
- The places where food vendors operated from were prone to numerous hazards including blocked sewers, flying toilets (<https://www.aljazeera.com/features/2017/4/3/how-to-deal-with-kiberas-flying-toilets> explain.....) and open drainages that were clogged with foul smelling waste; heaps of uncollected garbage, congested and dusty roads, and infestations of disease causing mosquitoes, flies, rodents and other pests which greatly increased the risks of food contamination and created big challenges for food safety. Worse still, during the raining seasons, sewer and drainage regularly overflowed onto roads and other public places, further increasing the risk of food contamination and disease and disruption of vending activities. The fact that existing water and sanitation facilities are costly and inadequate, in many instances it meant vendors' food, utensils and hands were not well cleaned further, compromising food safety. In Mathare for instance, residents had to walk long distances to access water kiosks and buy water that may not be of good quality, further eating into profits while undermining food safety. Many vendors were aware of the numerous food safety risks and hazards but they themselves were unable to address them because of systemic challenges of inadequate access to essential services.
- During the spatial mapping process of the 15 villages in Kibera, Mukuru and Mathare, 660 vendors were identified, with Mathare 3B having the greatest number of vendors and Mashimoni the least. Across all three settlements, the major food categories for 660 food vendors identified included hot beverages such as porridge, tea and coffee; uncooked foods such as vegetables, meats, omena(fish), cereals, fruit, milk; and cooked foods such mandazi (doughnuts elaborate..), chips, chapatti, beans, roast meat and other meat products, fried fish, rice, ugali and githeri. In the three settlements, cooked foods and green vegetables accounted for 75% of food sold, and meat 12%. Some vendors also sold an assortment of food products.
- In all the villages there was a strong connection between location of food ventures and infrastructure, for example in Kibera were 82% of 176 mapped food vending areas were within 5 meters of road networks. In Soweto East village in Kibera there was a dominance of cooked food vendors because of the immense construction along Soweto Highrise that employed large numbers of casual laborers who did not have the time to cook and therefore preferred the readymade meals. Vendors in Mathare also experienced inadequate access to water, hand washing and sanitation facilities, forcing them to resort to alternative and nearby sanitation options, as they could not leave their stalls unattended for fear of pilferage.
- In the three settlements, ducks, chickens, sheep, goats, cattle, rabbits and pigs are the most common types of livestock kept. Because of the severe congestion and limited spaces, smaller animals are normally accommodated in small spaces within or adjoined to the households, with bigger animals - although less common - being left loose to freely roam the streets for food. Sometimes these animals eat vendors' wares, resulting in conflict with the owners or even killing of the animals. The livestock was also at risk of being hit by traffic,

theft and electrocution from illegal electricity connections. Furthermore there was the risk of the livestock spreading disease through contamination of food and water sources. Livestock - vendor conflict was less common in Mukuru (unlike in Mathare and Kibera) as Mukuru was fairly spacious, especially the areas bordering Nairobi river where residents kept several cows. Because of the high levels of theft in Mukuru, residents built pens for their livestock while the authorities banned stray livestock- a directive which was not observed in Kibera and Mathare. Livestock keepers also did not normally consult veterinarians and they often self-medicated their own livestock with medicines from chemists and agro vets even during disease outbreaks. Animals were normally slaughtered without being certified as safe by veterinary officers and sold within the settlements. Dead animals were sometimes disposed off into rivers, drains or along streets creating more health risks.

Sharing and Triangulation. After the community led paper and digital data collection and mapping sessions, the Muungano wa Wanavijiji and its partners deliberated in 2014 on the findings followed by knowledge strengthening sessions to refine and rank priorities, update existing maps and chart the way forward.

4.5. The outcomes of the initiative

According to Muungano wa Wanavijiji and the community led mapping study, helped to effectively mobilize, explore and highlight the experiences and challenges affecting food vendors and the vending industry. It enabled community actors to convene, deliberate and generate vital information about their livelihoods and operations and to strategize and build the capacity of the community to be attentive and participate in policy making processes that affected their own development (Amendah et al., 2014).

In addition to exposing the contribution and conditions of food vendors in the three areas, with the support of SDI and MuST, Muungano wa Wanavijiji has been able to negotiate and collaborate with local governments to promote projects that improved the delivery of services. For example, enumerations and mapping done in Kosovo village Mathare facilitated the establishment of individualized water connections by Nairobi City Water and Sewerage Company, and also prevented the eviction of residents and Aoko Road evictions of over 220 market traders. These accomplishments have continued to encourage **community mappers** and build their confidence, not only as community guardians but also as local experts who will not rubber stamp any initiatives or studies that do not include community participation.

The community led mapping also resulted in the creation of the Food Vendors Association that identified and took action to enhance food safety, including organizing monthly clean up, food handling and safety trainings, working with local government and community leaders to set up designated points for waste disposal, improvement of water provision and sanitation facilities, improvement of animal husbandry and increase settlement-wide data collection.

The community led mapping process also helped to: i) increase awareness about food vending and food vendors within their communities; ii) increase contact and familiarity between food vendors and their customers, and livelihood keepers and iii) helped improve food handling and safety among vendors, collectively helping to improve the vendors working conditions and interactions between food vendors and their customers..

4.6. Enablers, barriers and lessons learned

The enablers of the work are Muungano wa Wanavijiji and the residents of the 11 villages in Mathare, which are: Kosovo, Village 2, 3B, Bondeni, 3C, 4B, Kiamutisya, Mashimoni, Village No.10, Mabatini and Gitathuru, the 3 villages in Kibera, which are Soweto East, Mashimoni, and Laini Saba, and in the 4 villages in Mukuru, which are Simba Cool, Rurie, Feed the Children and Gatope. Muungano wa Wanavijiji.

The use of participatory mapping methodologies and expertise from the institutions supporting it were vital for effective community and stakeholder engagement and for the success of the study. The use of focus group discussions, brainstorming & consensus building, paper maps, mobile

phone digital mapping, balloon mapping, gave the participants platforms and opportunities to share their concerns, experiences and recommendations and also learn skills that helped them to collect useful data that has helped the communities organize as groups, and negotiate with other stakeholders, partners and local government for improved services and livelihoods.

The challenges and barriers are those faced by slum dwellers and urban poor people including lack of inclusion in policy development and slum upgrading, limited access to basic services such as water, sanitation, roads and electricity and higher crime and unemployment rates (Ahmed et al. 2015).

Lessons learned

According to members of Muungano, in informal settlements, food vendors and the vending industry are an important source of a variety of cheap and affordable meals for many of the residents, and play a critical role in the food systems of informal settlements. The challenges they faced due to insecurity, lack of information and hazards that greatly increase the risks of food contamination and the conditions affecting food safety and handling - such as from blocked sewers, flying toilets, free flowing sewer; uncollected garbage, congested and dusty roads, and infestations of disease causing mosquitoes, flies, rodents and other pests are a reality that needed to be well exposed in an exercise such as the mapping. This needs to also track the seasonal dimensions, such as aggravation of challenges during the rainy seasons when sewers and drainage regularly overflow onto roads and other public places, further increasing risks, and disrupting vending activities, as well as those due to wider service deficits such as inadequate safe water systems and storage and sanitation facilities that force vendors to take actions that compromise food safety.

While dialogue between communities and vendors is important as some of the challenges vendors encounter could be addressed with improved awareness and training on food preparation, handling and safety and community clean ups; the bigger systemic challenges are beyond the vendors and communities' capacity. They require intervention from local leaders and local government. In instances such as these, bodies such as the Food Vendors Association are vital in using the great amount of data generated by the community led mapping in negotiations with local governments for upgrading and betterment of services.

5. Case study 3: Urban agriculture in Nairobi County

Summary: This case study outlines the work led by Nairobi County, guided by a regulatory framework in Nairobi's Urban Agriculture Promotion and Regulation Act 2015, to contribute to and encouraging food security by promoting, facilitating and guiding the growth and improvement of urban agriculture in Nairobi county through the empowerment and building capabilities in UA, food processing, use and marketing by communities and institutions, including in terms of interventions on water, land, waste management, extension services, food safety, public health and environmental standards and with tools and resources to monitor the positive and negative impacts of agriculture in urban areas.

5.1. Context

It's estimated that Nairobi has between 64,000 and 200,000 households which practice some form of urban farming mostly in their backyards. However residents in the informal settlements who are already grossly affected by poverty, high rates of unemployment and insecurity, and limited access to basic services such as water, healthcare, sanitation, roads and electricity have very limited or no space at all to produce food for themselves or others through urban farming. Residents of informal settlements are also very hard hit by food insecurity and malnutrition. Since its establishment in 2013, addressing food insecurity and malnutrition has been one of the priorities and obligations of the Nairobi City County government that is also signatory to the Milan Urban Food Policy pact and others, plus the "right to food" is enshrined in Kenya's constitution Art.43, 21. The county council has partnered with several organizations including FAO, the World Bank, Mazingira Institute, community leaders and community based organizations from informal settlements and other stakeholders to facilitate this by promoting urban agriculture especially in informal settlements; by highlighting and addressing the factors that affect urban agriculture including soil quality, water and land access and climate change; and also by streamlining their own internal operations to improve service delivery. (Lee-Smith, 2019; World Bank, 2019; Committee of Experts, 2010)

In 2010, Kenyans voted to decentralize government and ratified a new constitution that created a devolved system of 47 lower county governments, governed by governors, their deputies and county assemblies and representatives. This new system was operationalized in 2013, soon after the March 2013 elections, and counties were given charge over several national government functions including the provision of pre-primary education, healthcare, food security and maintenance of local roads. Although county governments were also allocated a share of national revenues, they were expected to generate additional revenues from other sources within their boundaries, including, from taxation of property, advertising, entertainment, road usage and other public services (World Bank, 2012; 2019; Kimenyi, 2013).

As new establishments, all county governments have experienced numerous administrative, political and fiscal challenges during the provision of services to Kenyans. This has been due to limited knowledge, capacity and resources to effectively provide the devolution dividends of improved delivery of essential services, shared prosperity, and much better management of available public resources. As a result, numerous partners have come on board to fill in the capacity and resource gaps, providing technical, financial and partnership support for county governments to create stronger institutions, increase and improve citizen participation in governance and accountability and enhance delivery of essential services. (World Bank, 2012; 2019; Kimenyi, 2013).

For example, the World Bank through its Kenya Accountable Devolution Program (KADP) and the Kenya Devolution Support Program (KDSP), both World Bank managed with multi donor support from the governments of Finland, Denmark, Sweden, United Kingdom, United States and the European Union, is helping to streamline devolved functions and resources so as to improve the delivery of services and generation of additional revenue. This streamlining has involved gender mainstreaming, reforms in public finance management, improving revenue allocation systems and aligning them better to county priorities such as urban farming and food security in informal settlements, supporting initiatives for increased and improved public participation in

policies and interventions that affect their livelihoods , and also considering the impact of different dimensions of climate resilience in key sectors especially agriculture (World Bank, 2012; 2019; Kimenyi, 2013).

In 2015 the urban Agriculture Promotion and Regulation Act, that had specific provisions for Nairobi and also covered other urban areas, established the Nairobi City County Urban Agriculture Promotion Advisory Board. The Board was given a mandate to set up a regulatory framework that would govern urban agricultural practices in Nairobi County towards a sustainable food system, while also providing oversight. Urban agriculture according to the Act includes the cultivation of crops, land used for nurseries, gardens or agroforestry; and the breeding and rearing of livestock, including aquatic animals. Although no specific guidelines were provided for the promotion of urban agriculture in Nairobi in the Act, it advocated for the creation of the Board which in turn would bear the responsibility of promoting and regulating the development of Nairobi County's urban agriculture sector. This would be achieved by creating a strategic plan for agricultural programs while taking into consideration issues around urban agriculture, including reducing food loss and waste that are essential for realizing sustainable food systems especially with regards to growing urbanization. The Board would also ensure that processes and deliberations concerning food policy, urban planning and market infrastructure, considered the issues around urban farming. The Board consists of a Chairperson, Secretary, four other members and an Executive Committee Member representing the Nairobi City County Assembly. (St Germain, 2018; Nairobi City County Government, 2015; Karugu, 2019)

According to the Nairobi City County Food, Agriculture and Forestry sector, the full array of actors and value adding interconnected value processes and infrastructure involved in the primary production of food (as well as non-food agricultural products - and feeding of a population) the production, processing, storage, post-harvest handling, consumption, aggregation, marketing, distribution and disposal of food and food related items that come from different sectors including agriculture, fisheries, forestry and also sections of the wider social, economic, political and natural environments in which they are, is what is described as a food system. In the county these systems and processes influence people's physiological and biochemical processes involving the use of food to support life including: the substances consumed for nutritional support; their state of physical, mental and social wellbeing; the cultivation of plants and livestock, and how communities come together to find solutions and take actions to solve community challenges.

The Nairobi city county council alternative food systems focus on increasing food quality and access by using urban and peri-urban agriculture, farmers markets and community backed agricultural groups and alliances. These processes not only help to localize food production and distribution, allowing the consumers to decide how their food is consumed, but also support socioeconomic justice and sustainability of the environment. With the growing challenges of climate change, increasing global population and worsening soil quality, there is also increasing pressure on agriculture to increase productivity on the limited urban spaces and land available. Conventional farming practices, have been trying to address this by using smallholder farming systems and climate smart agriculture to increase crop yields. However, even in Nairobi limited knowledge of these practices affects urban agriculture (UA) and thus livelihoods and food security (Karugu, 2019; Nairobi City County Government, 2018; FAO, 2006; Wikipedia 2022)

Sustainable food systems are at the core of the Nairobi's Urban Agriculture Promotion and Regulation Act , as well as the United Nations' Sustainable Development Goals (SDGs) which it adheres to, and more specifically, Sustainable Development Goal 2 that aims to achieve "zero hunger" and Sustainable Development Goal 12 that calls for "responsible consumption and production" by 2030. The topic of sustainable food systems was also the key agenda issue during the first Food Systems Summit hosted by the United Nations in September 2021, where Kenya had representation (United Nations, 2015; Nairobi City County Government, 2015).

According to the county's food, agriculture and forestry sector, agricultural practices, including urban agriculture have a very big but varying impact on the surrounding ecosystems, depending

on the scale and type of farming practices used. For example the practices in UA can be more harmful to the environment than those practised in rural areas, such as in the contribution to environmental pollution, land degradation and water scarcity. Areas of concern raised in the Nairobi county integrated development plan 2018-2022; the Nairobi's Urban Agriculture Promotion and Regulation Act; the Constitution; the Urban Areas and Cities Act of 2011; the Milan Urban Food Policy pact; the county's Food security surveillance and response, urban early warning early action initiative, and a recently launched agricultural sector institutional capacity strengthening plan, include:

- Water scarcity from damming and unregulated irrigation reducing access to water resources for the water demands of the city. In informal settlements there has also been the added challenge of insufficient human capacity to deliver water resources using carts.
- Pollution of water bodies, groundwater, reservoirs, aquifers, rivers, and lakes from urban UA and industry activities introducing contaminants that affect water quality and availability. For example, informal settlements such as Kibera that lie along Ngong/Nairobi river introduce food and human waste, carcasses, and other rubbish into the river. Several companies in Nairobi's Industrial area have also been redflagged for discharging untreated wastewater into the environment (Nderitu, 2014).
- Erosion along riverbanks and agricultural, construction and other development land, and surface runoff leading to water pollution raises demand for management systems county (Karuku, 2018; Mulinge et al., 2015).
- Land degradation when people directly or indirectly disturb or change the landscape in a manner that is undesirable or harmful.
- Deforestation in the city leading land degradation and land to become biologically unproductive.

Addressing water scarcity and pollution, deforestation and land degradation have been at the core of the Nairobi City County's urban farming initiatives. For example Urban Agriculture Promotion and Regulation Act 2015 has emphasised supporting peri urban settlements to improve food security so as to ensure that all residents especially those residing in informal settlements have access to adequate amounts of safe, nutritious foods that meets their dietary requirements, their food preferences, and ensures that they can continue to lead active healthy lives.

Food insecurity is a key challenge to address. According to a status report on Kenya national food security: zero tolerance to hunger by the African Women's Studies Centre at the University of Nairobi and the Kenya National Bureau of Statistics, 14.5% of Nairobi inhabitants were afflicted by low food security, and 11.7% were chronically food insecure. In the poorest neighbourhoods of Nairobi, only one in five households were food secure (Nairobi City County Government, 2015; St Germain, 2018).

5.2. Aims of the initiative:

This initiative, guided by a regulatory framework in Nairobi's Urban Agriculture Promotion and Regulation Act 2015 thus aims to

- Contribute to and encouraging food security by promoting, facilitating and guiding the growth and improvement of UA agriculture in Nairobi county through the empowerment of communities and institutions, and as a result permitting and enabling agricultural activities for sustenance, job creation and commercial purposes
- Regulate access to water, land used in UA, establish relevant administrative measures such as on waste management and ensure strategies for oversight and enforcement of laws regarding UA.
- Promote and increase access to agricultural extension services and spearhead communities' capacity to produce and process food, build value chains and create employment opportunities
- Actively promote and protect food safety practices, public health interventions, and environmental conservation by clearly outlining the environmental standards to be used for UA.
- Create and make available, tools and resources to monitor the positive and negative impacts of agriculture in urban areas (Nairobi City County Government, 2015; St Germain, 2018).

5.3. The design of the work

In its master plan to create sustainable food systems that better address food insecurity and malnutrition, Nairobi City County Government Food, Agriculture and Forestry sector has focused on promoting improved and more sustainable urban agricultural practices especially in informal settlements. This has included cash transfers, supply of food supplements, the development of adaptable business models and farming practices that address water and land access, soil quality also highlight and mitigate climate change while continuing to feed an ever increasing population. The county's master plan has focused on using strategies that encourage community led interventions, and have engaged and partnered with several organizations including FAO, the World Bank, Mazingira Institute, community leaders and community based organizations from informal settlements and other stakeholders in facilitation. The master plan has focused on promoting urban agriculture especially in informal settlements; highlighting and addressing the factors that affect urban agriculture including soil quality, water and land access and climate change; and also streamlining the county's own internal operations to improve service delivery.(Lee-Smith,2018; World Bank, 2019; Nairobi City County Government, 2015).

The county's masterplan also reflects the Nairobi county integrated development plan, the Nairobi's Urban Agriculture Promotion and Regulation Act , the Constitution, the Urban Areas and Cities Act of 2011, the Nairobi City County Food security surveillance and response, Urban early warning early action initiative; the Milan Urban Food Policy pact and the recently launched Agriculture Sector Institutional Capacity Strengthening Plan (ICSP). This 5 year multi agency Agriculture Sector Institutional Capacity Strengthening Plan (ICSP) of the State Department of Crops Development and Agricultural Research was launched in June this year. It aims to boost nutrition and food security in the midst of irregular weather patterns and severe drought that has affected over 3 million Kenyans. The Milan Urban Food Policy pact on the other hand, was launched in 2015 by the Milan Municipality as an international agreement for cities from around the world to develop food systems that are safe, sustainable, resilient, inclusive. This food systems are supposed to use a human rights based framework to provide for all persons healthy affordable food, while reducing waste, conserving biodiversity, and reducing the effects of climate change (Kemunto et al., 2019; Karugu, 2019; Nairobi County Government, 2015; St Germain, 2018; Muindi, 2022; Committee of Experts et al., 2010).

5.4. The implementation of the work

In Nairobi, urban farming projects have been developed in all 17 sub counties, involving all the informal settlements in Nairobi county. The county has invested resources in reforestation, water harvesting and conservation, land management, soil erosion control and promoting sustainable urban agricultural interventions that include farming methods that are friendly to the environment while still facilitating the rearing of livestock and production of food crops without doing damage to the natural or man-made systems.

The county government in partnership with numerous organizations including FAO and Mazingira Institute, community based organizations from informal settlements, civil society organizations, academia, and private sector, has provided food supplements, cash transfers, intersectoral capacity building training sessions, technical assistance and platforms for further engagement, learning, action and advocacy to community focal points/leaders, community based organizations and farmers groups as well as its own staff from numerous departments including health, agriculture, environment, planning, trade, city inspectorate, livestock, veterinary services, fisheries, forestry and natural resources. These training sessions and platforms not only build the capacity of informal communities, they also provide them a platform to share experiences, concerns and recommendations with other community members, leaders and community based organizations and outreach officers from the Nairobi county government.

These interventions have included community leaders, community based organizations, Nairobi county outreach officers and other facilitators and stakeholders, and they've focused on improving:

- land management and design of settlement areas;

- land use systems that integrate trees, shrubs or crops among other crops or pasture;
- farming methods that involve both the raising of livestock and cultivation of crops, with the dung from livestock often being used as fertilizer;
- farming practices that involve the cultivation of two or more crops in the same piece of land during the same season;
- farming practices that reduce the soil degrading effects of monocropping;
- the creation and consumption of diets that greatly contribute to nutritional and food security while having only a small impact on the environment;
- the reduction of post-harvest food loss at the consumer and retailer stages that also has an overall mitigating effect on reducing environmental impacts of agriculture; and
- urban farming methods such as backyard gardens, tactical gardens, street landscaping, forest gardening, sack gardening, vertical farms, greenhouses, rooftop gardening, green walls, animal husbandry, aquaponics, hydroponics etc. Aquaponic food system involves rearing aquatic animals (aquaculture) like fish in water tanks while also growing plants in the water (hydroponics) in the same tank (Wikipedia, 2022).

In partnership with Mazingira Institute, in 2013 Nairobi County government enabled the Nairobi and Environs Food Security, Agriculture and Livestock Forum (NEFSALF) that has provided communities, networks of urban and peri-urban farmers, and the public and private sectors, a platform to engage, deliberate and take action on issues concerning agriculture, livestock and food security. NEFSALF has shaped and influenced policy and practice regarding food access and safety in Nairobi and across Kenya. It all started in 1985 when Mazingira Institute, a Kenyan research and development NGO, undertook a statistical survey on food production in urban areas in Kenya. It revealed large numbers of urban farmers, many being exposed to harassment and many lacking the necessary support as they tried to feed themselves, their families and others; it also presented an opportunity to advocate for policy change (Lee-Smith, 2019).

Following a series of informal meetings with farmers, Mazingira Institute organized a meeting of all stakeholders, including central government, to create a model to guide how communities, business and the government could work together to bring about change. Some of the issues brought to the fore were the development of a national urban and peri urban agriculture and livestock policy and also the farmers' request for training. With Mazingira Institute providing space as well as food systems and policy input, from then, till today the government through its extension services has provided two trainings to farmers a year, with greater focus now on young farmers. This system was quite an example of exemplary practice that in 2006, it was chosen to be the pilot of Kenya's National Agriculture and Livestock Extension Programme. A model further copied by urban farmers from Mombasa, Kisumu and Dar es Salaam, with Mombasa and Dar es Salaam entities active to today. With devolution in 2013, this responsibility was passed down to county governments, including Nairobi County government, with some of the policy discussions being interfered with and outrun by events such as the creation of Nairobi city council in 2013. However the council came equipped with a large staff of experts in livestock, fisheries, agriculture and veterinary practice, many of whom had not only interacted previously with farmers through the NEFSALF network and platform, but also during their extension services. The gradual transformation of urban farmers in Nairobi resulted in the passing of the Urban Agriculture Promotion and Regulation Act by the Nairobi City County, 2015. From 2013, the Nairobi City County took leadership of the food policy consultations. In 2016 the County organized a workshop to sensitize senior county officials on food systems planning and the place of urban agriculture in line with the act; and also organized a training for its staff members and staff from related sectors in the city county government on the same topic, all with the support of Mazingira Institute, RUAFA (<https://ruaf.org>) and Rooftops Canada (<https://www.rooftops.ca>). (Lee-Smith, 2019).

In 2017-2018, the development of a food strategy for Nairobi began with the participation of a diversity of food system stakeholders and FAO's (UN Food and Agriculture Organization) Nadhali project at a stakeholders forum. Although the forum worked immensely on food systems and even created a core team that established strong linkages, with the city with most of its members being formally incorporated into the governments' budget working group; the stakeholders

groups was not embedded into the local government administration and was eventually renamed the FLAG, the Food Liaison Advisory Group under a new 2019-2021 FAO project. The county council went further to set up a within its Food and Agriculture sector a Food System Directorate while also renaming the local government sector 'Food and Agriculture'. " Additionally, the county council through its Nairobi City County Food and Agriculture sector continued its relationship with NEFSALF, going even further to reach out to and engage with farmers in under resourced informal settlements, and empowering them through extension support services. For example in June 2019, the county council organized an urban farming field day in Mathare Valley that was led by a group of young livestock keepers who had received training from NEFSALF. Mathare is Nairobi's second largest informal settlements, after Kibera, with a population estimated to be 200,000 residents (Lee-Smith, 2019).

Nairobi City county has about 250 professional staff dedicated to food and agriculture alone in its local government, and is one of the most progressive governmental organizations in the global north in terms of power and size. The NEFSALF network is made up of independent member hubs which self-organize activities, while Mazingira Institute provides technical support and meeting space. For example, the women's hub meets monthly for loans and savings activities which have helped members expand their business, mostly involving food value addition. A youth hub was formed but didn't work. There's also a rabbit farmers hub that stopped meeting formally but rabbit farming and meat have increased greatly beyond informal to formal sectors, even causing the establishment of a rabbit slaughterhouse (Lee-Smith, 2019).

The council and communities have put in place numerous interventions including penalties for destroying forests, reforestation campaigns, and provision of free tree seeds and seedlings to help restore forests and woodlands intentionally depleted through deforestation like Karura forest (Smith, 2010). Reduction of soil erosion along riverbanks and on agricultural, construction and other development land has been addressed by setting up physical barriers from either rocks, vegetation or both to reduce the force of the water or wind causing erosion, for example the stabilization of riverbanks by Kibera residents, using stones and wire.. These systems have also included setting up - and maintaining - surface water drains/sewers that allow the excessive rain or storm water and the subsurface water (in rock and soil fractures and crevices from impervious surfaces such as sidewalks and footpaths, paved streets and car parks/parking lots or roofs) to drain into detention tanks, streams or rivers, or into sewage systems. These systems are often set up in combination with sediment controls that are built in such a way that they stop eroded soil washing away from construction sites and into to nearby water bodies and polluting them. These systems collectively not only reduce runoff, but they also reduce its speed and quantity which reduces loss and damage (KDI, 2022).

In informal settlements, the Nairobi county government has been working with local administration like chiefs, community leaders and community organizations to improve and set up appropriate infrastructure and technology such as water and sanitation facilities, sewerage treatment plants, and waste water treatment plants for commercial, industrial and agricultural activities where contaminants are removed from wastewater and turned into effluent that is then introduced into the water cycle without adverse effects in the environment or reused for other purposes such as irrigation of crops.(St Germain, 2018; Nairobi City County Government, 2018; Karugu, 2019).

5.5. The outcomes

According to the food security surveillance updates done by the Nairobi City County Government food, agriculture and forestry sector, there has been notable progress in improving food security in informal settlements of Mukuru, Kibera and Korogocho with an increase in food availability, food access and use and a reduction in food misuse (Karugu, 2019; FAO, 2006; Wikipedia, 2022).

The county government believes that the increase in food security has been as a result of their increased development of urban farming, especially in informal settlements in the county. They

have related improved food security to the investment (unspecified amount) in initiatives outlined in *Section 4* in the 17 sub counties (St Germain, 2018).

According to the county government, the increase in food security implies that its urban agriculture interventions - for example up upgrading and expanding of markets like Muthurwa and ensuring they have adequate water, sanitation and garbage disposal services have also contributed positively to the food security pillars (Omulo, 2021; Karugu, 2019; Kamunto et al., 2019; Nairobi City County Government, 2022). For example, more households have been able to lessen incidences of transitory, seasonal or chronic food security because of improvements in community's ability to obtain food over a period of time. There been an increase in opportunities and platforms for communities to contribute to decisions about the type of food they want to eat and produce, and also how their food is to be produced, processed, traded and distributed within food systems that they themselves created through community shaped policies and community led governance processes.

The County interventions have been able to influence land ownership by negotiating title deeds; and use by addressing soil erosion and land degradation; improving the management of soil through mulching and use of organic homemade fertilizers; improving the selection of crops by taking rainfall, temperature and soil composition into consideration; improving the breeding and management of livestock, and improving use of energy and human resources

5.6. Enablers, barriers and lessons learned

Through its interventions, the focus county government gave to the multiple dimensions of sustainable food systems that provide communities healthy food while safeguarding environmental, economic and social systems, backed by a clear legal mandate, enabled the interventions, as did giving focus for equity to UA and its issues in informal settlements.

The county government in partnership with numerous organizations including FAO and Mazingira Institute, community leaders and community based organizations from informal settlements, civil society organizations, academia, and private sector, as detailed in *Section 4*, have provided and jointly facilitated , intersectoral capacity building training sessions, technical assistance and platforms such AS NEFSALF for further engagement, learning, sharing, action and advocacy to community focal points/leaders, community based organizations and farmers groups as well as its own staff .

These partnerships needed to be supported by improved essential service delivery in informal settlements including water, sanitation, healthcare, improved citizen participation in policies and projects, as well as better prioritization and use of county resources through streamlining of internal operations within the county itself.

As key challenges, although Nairobi county has made progress in addressing food insecurity and malnutrition by promoting and developing urban farming, and especially in informal settlements where there's the highest rates of poverty, malnutrition and food insecurity, the emergence of the COVID pandemic has had major socioeconomic effects, and climatic changes has affected rain patterns, extended drought conditions and affected food production and the gains made in food security and sustainable food systems.

The work confirms the understanding that in urban areas sustainable food systems include:

- improving farming practices to make sure they sustainably meet communities' current food needs and also textile requirements without undermining the capability of present and future generations to also meet their food and textile needs;
- reducing the amount of food lost and wasted across all stages of the whole system including at production stage, at processing stage, at marketing and sales stages, as well as at consumption stage - this also has an impact on land use, pricing and supply;
- making the systems that supply the general populace with food more sustainable and; promoting diets that positively contribute to nutritional and food security, that have low impact on the environment and help ensure healthier lives for current and future generations

While this case study has focused on UA, there is recognition that UA and urban food systems generally also face new challenges that need to be integrated within these processes, including from climate change and associated water stress, flooding and scarcity; from urbanization and land degradation; zoonotic infections and risk of epidemics and pandemics, the diversion of food to biofuels and other crops and the expansion of multinational activities and ultra-processed foods in urban food systems (St Germain, 2018; Nairobi City County Government, 2015; Karugu, 2019; Lee-Smith, 2019; World Bank, 2019; MUFPP Secretariat, 2015). A comprehensive approach that is focused on food sovereignty and food as a right may be important in this.

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Key informant interviews (10)

- 2 female members of Muungano Alliance/Muongano wa Wanavijiji
- 2 male members of Muungano Alliance/Muongano wa Wanavijiji
- 2 residents of Kibera working with CBOs and associated with the Kibera Public Space Projects;
- 1 staff member Kounkuey
- 1 male and 1 female from informal settlements working on urban agriculture;
- 1 representative, Nairobi City County Council