



# Integrating urban communities for sustainable cities

Young Planning Professionals Workshop (YPP) of the International Society of City and Regional Planners (ISOCARP)

46th ISOCARP Planning Congress  
Nairobi | Kenya 15 - 18 September 2010



**ISOCARP**  
Knowledge for better Cities





**Young Planning Professionals Workshop Report**

# Nairobi 2010

Integrating Urban Communities for sustainable cities  
Lang'ata area | Kibera | Nairobi



City Council of Nairobi



University of Nairobi

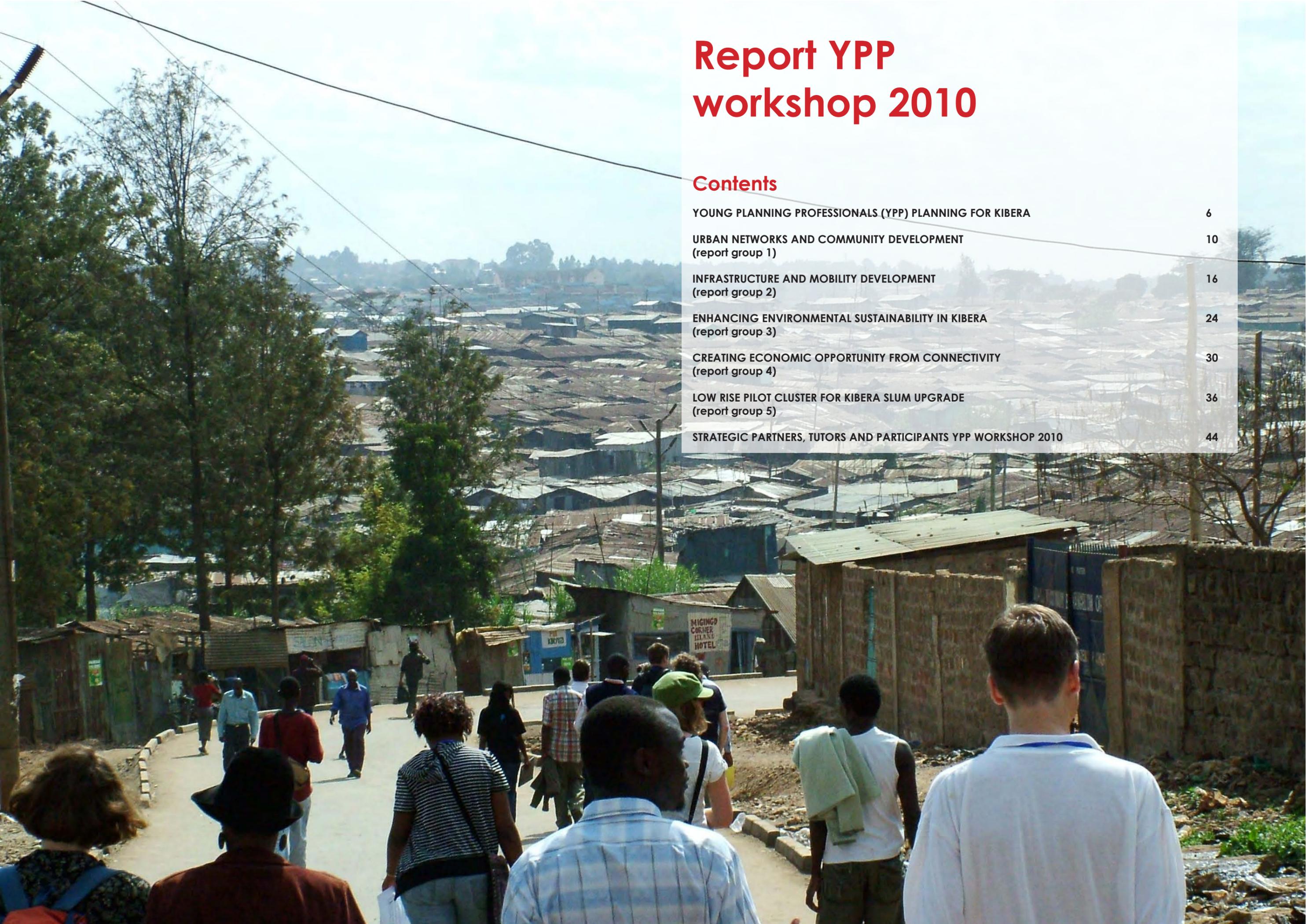


Government of Kenya

# Report YPP workshop 2010

## Contents

YOUNG PLANNING PROFESSIONALS (YPP) PLANNING FOR KIBERA	6
URBAN NETWORKS AND COMMUNITY DEVELOPMENT (report group 1)	10
INFRASTRUCTURE AND MOBILITY DEVELOPMENT (report group 2)	16
ENHANCING ENVIRONMENTAL SUSTAINABILITY IN KIBERA (report group 3)	24
CREATING ECONOMIC OPPORTUNITY FROM CONNECTIVITY (report group 4)	30
LOW RISE PILOT CLUSTER FOR KIBERA SLUM UPGRADE (report group 5)	36
STRATEGIC PARTNERS, TUTORS AND PARTICIPANTS YPP WORKSHOP 2010	44



# Young Planning Professionals Planning for Kibera



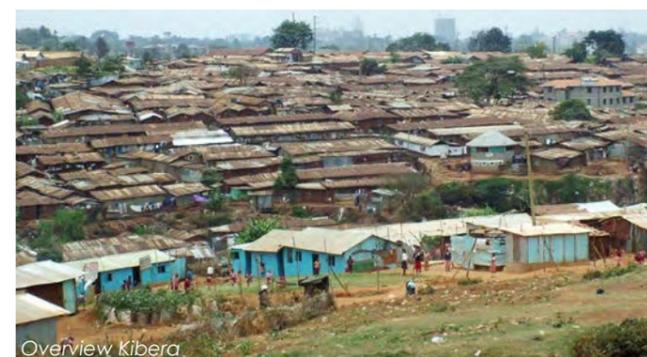
# Young Planning Professionals Planning for Kibera

Over a concentrated period of three to seven days, the YPPs work in closely-knit international teams, exchanging ideas and learning from each other. The workshops thus provide a synergetic platform where new ideas and creative solutions to complex and multifaceted urban issues are produced. The tangible results are then published in a Workshop Report. The intangible ones, however, stay in the hearts and minds of the participant YPPs, who not only learn from each other but often become life-long friends.

In 2010, ISOCARP celebrated the 20th Young Planning Professionals Workshop Anniversary during the 46th ISOCARP Congress in Nairobi, Kenya.

## YPP workshop Kibera

The theme of the Young Planners Professionals Workshop was the integration of Kibera, one of the largest informal cities in East Africa, into the surrounding neighbourhoods of Nairobi City. Kibera is located about 5 miles from the city centre. This informal city houses between 170,000 and 1.2 million people. Conditions in Kibera are extremely challenging for the inhabitants because of poverty and lack of access to basic services like running water and electricity.



Kibera originated when Nubian soldiers returning from the First World War were awarded plots of land, by the British colonial government, in the forests outside Nairobi. The colonial government allowed the settlement to grow informally because of the Nubians' service as soldiers in the Allied Army in the First World War.



After the independence of Kenya in 1963 the government declared certain forms of housing illegal, rendering Kibera an official unauthorized village. Over the years the inhabitants of Kibera increasingly rented out their properties to more tenants than were permitted by law. The rent in Kibera is very low and this attracted even more inhabitants, predominantly impoverished immigrants. In order to improve Kibera and transform the informal city into an integrated neighborhood of Nairobi, various upgrading programmes have been started by the Kenyan government and UN - Habitat. These programs are aimed at improving living standards within the neighbourhood and improve the connectivity with Nairobi.

### Programme YPP - workshop 2010

The main objective of the YPP workshop was to integrate Kibera in a sustainable way into the urban fabric of Nairobi. The study area was chosen to be an area of approximately 5 square miles located along the Ngong River and Nairobi Dam and about 10 km from Nairobi City Centre. The project area covered the informal city Kibera with its low income housing area including the Nyayo High-rise residential flats and Langata Road with adjacent residential neighbourhood of Dam Estate Onyonka, Otiende and Rubia.



Through the analysis of the project area and the ongoing projects of the national Kenya Slum Upgrading Programme (KENSUP), as well as extensive field research within Kibera, the Young Planning Professionals had to draft a plan to integrate Kibera into the urban fabric of Nairobi while taking into account the challenges being offered by the need for sustainable cities.



In order to integrate Kibera into Nairobi the Young Planning Professionals were divided into 5 working groups, each with a specific thematic area. Urban networks & community development had the task to research how to promote the integrated development of Kibera and improve the accessibility and connectivity. The second group dealt with infrastructure and mobility. This group had to design a creative infrastructure and mobility strategy that would increase opportunities for the inhabitants.



Another theme was environmental sustainability where opportunities had to be explored for the enhancement of sustainable environmental conservation & management within the settlement. The fourth group focused on the economic development of Kibera by framing and amplifying local economic opportunities. Group five focused on innovative designs for new shelters and houses in the informal settlement.

### Presentation

The results of the five working groups were presented on the opening day of the 46th ISOCARP congress hosted by the Architectural Association of Kenya, together with several Kenyan Government ministries, the Nairobi City Council and UN Habitat. The auditorium of the UN Habitat Campus, where the

opening day of the congress was held, was packed with some 800 planners and other professionals from all over the world. The Prime Minister of Kenya, Raila Odinga opened the congress. He and his ministers gave a powerful introduction of the needs of their country, of the challenges presented by migration to Kenya's urban areas, of the daunting task of tackling inequality and of the need to reverse environmental degradation.

Over the last 20 years, ISOCARP has organized many YPP workshops, but this presentation of the YPP workshop had the biggest audience of all. Through the technical tours organised by the Local Organising Committee, many delegates had the opportunity to see Kibera, Africa's biggest slum settlement, for themselves and to view the huge contrast between the wealth of Nairobi's central area and this massive district where the very poorest people live. The ideas presented by the five groups of Young Planning Professionals coincided with five big ideas for achieving sustainable cities that were identified by the General Rapporteur of the 46th ISOCARP congress. These were defined as integration, resilience, economic growth, a dialogue with traditional urban design and built form, and flexibility and adaptability of planning instruments.

### Hearts and minds

Young Planning Professionals workshops are great adventures for the mind and the soul. With their bright and outside-the-box ideas, the workshop participants bring hope to often-difficult planning issues and they provide confidence that planning problems are there to be solved and can be overcome. The participants of the YPP workshop in Nairobi came from all over the world. Most of them have not met each other before. Within hours after visiting Kibera and meeting the people of Kibera, they worked with an enormous energy and passion-ate drive. We got the spontaneous support of the many Kenyan students who worked with us for three days and nights. The presentation of their findings on the opening day of the ISOCARP congress, in front of hundreds of planners and eminent guests at the UN Habitat Headquarters, went very well and provoked discussions. Hopefully, the findings of the Young Planning Professionals workshop are useful for the future of Kibera. One thing I am sure of: Kibera and Nairobi will never leave the hearts and minds of the Young Planning Professionals.

It was a privilege to be one of the 2010 YPP workshop coordinators. I thank our host, our strategic partners, the ISOCARP YPP Vice President, my fellow workshop coordinators, the YPP students and the YPP volunteers who made this workshop a success.

*Martin Dubbeling, 2010 YPP workshop coordinator*

# Urban networks and community development

## Authors:

**Francisco Achwoka** (Kenya)

**Njeri Cerere** (Kenya)

**Bruce Githua** (Kenya)

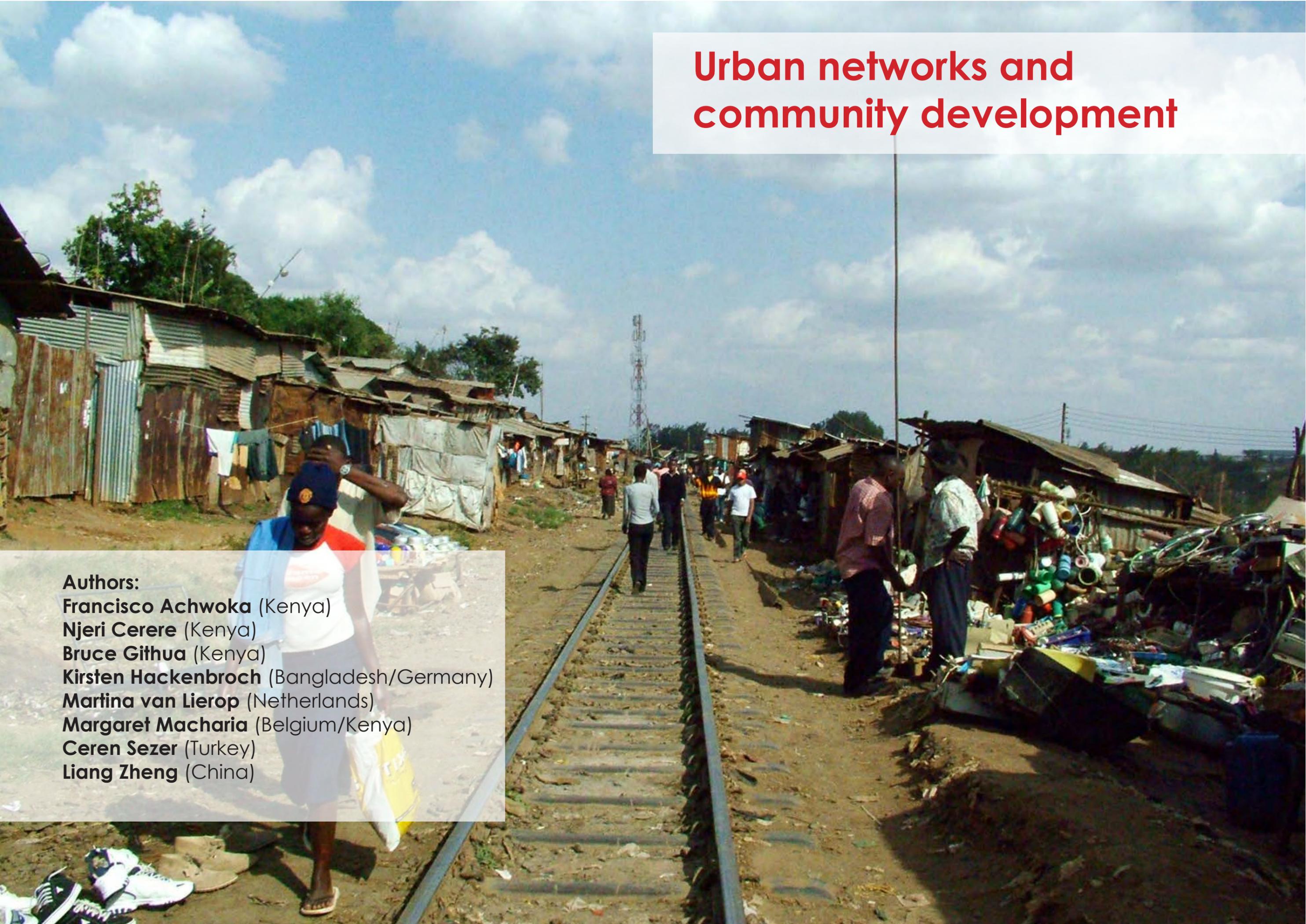
**Kirsten Hackenbroch** (Bangladesh/Germany)

**Martina van Lierop** (Netherlands)

**Margaret Macharia** (Belgium/Kenya)

**Ceren Sezer** (Turkey)

**Liang Zheng** (China)



# Urban networks and community development

## Integration and governance

The informal settlement of Kibera physically and socially can be characterised as an 'island' only partly connected to the broader urban area of Nairobi. Exchanges and flows are only one-way, i.e. Kibera's inhabitants are working in the city's industrial areas, in the housing estates of the surrounding middle and high-income neighbourhoods or commute to the city centre for recreational purposes. Mobility flows from other Nairobi areas to Kibera on the other hand rarely exist. Furthermore Kibera is not a homogenous entity but divided and fragmented especially between ethnic groups. Lack of exchange and cooperation between these villages (referring to the 13 quarters of Kibera) has triggered conflicts in the past, among these the recent post-election violence. Integration of Kibera both into the urban network of Nairobi as well as internal integration are thus major challenges.

Kibera is the location of a large number of interventions from the Government of Kenya, UN-Habitat and donors to NGOs and smaller scale organisations. To a large degree community development and upgrading have been funds-driven rather than originating from grassroots initiatives. This raises the question of how adequately represented the community is in the current internal governance structure. The challenge is to ensure the inhabitants' ownership of community development processes in order to achieve sustainability of approaches.

## Objectives and approach

The aim of this project is to identify the potentials of Kibera which can be built upon for integrating Kibera with the city of Nairobi and surrounding neighbourhoods as well as the villages of Kibera with each other. Two site visits of the village of Soweto East including discussions with members of the Settlement Executive Committee and interviews with seven community members provided the background for this studio work. The approach follows three levels to be integrated with each other:

- The physical network consisting of transportation networks and public spaces: how can the physical network be utilised and developed for integration

- The cultural and economic community assets: how can the cultural and economic community assets be utilised and developed for integration purposes?
- The governance structure and community participation process: how can the current governance set-up be enhanced to deliver a sustainable integration process?

The integration will be on three levels: between Kibera and the city of Nairobi, inside Kibera including the surrounding middle-income areas and Nairobi Dam, and in the village of Soweto East with its neighbouring two villages and adjacent middle-income areas.

The project group is aware of the current KENSUP projects of community upgrading. However, the proposals below are based on the currently existing settlement structures and we would like to propose a review of the path that has been taken so far with the aim to preserve existing community assets, especially with regard to economic small-scale activities.

## Integration of Kibera within Nairobi

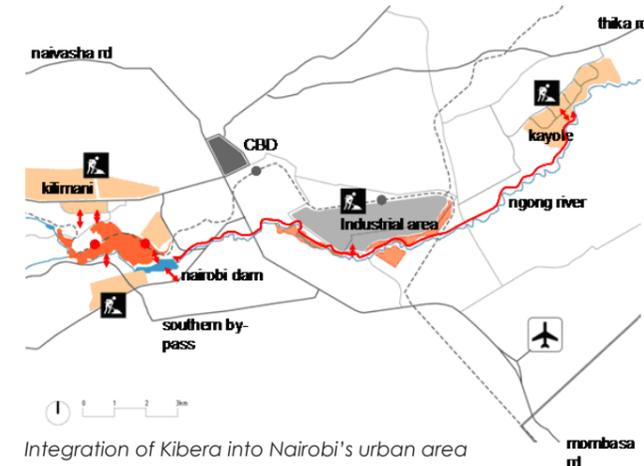
### Problems and potentials

The physical networks that connect Kibera with Nairobi are the railway lines, the important main roads along the edges of Kibera, including the Southern Bypass under construction, and the Nairobi River. Every day, especially in the morning and evening, a large number of Kibera's inhabitants walk to and from their workplaces in the industrial areas and construction sites southeast of the CBD. The residents interviewed also indicated Uhuru Park in the CBD as an important recreational site.

### Proposals

The existing linear features will be utilised to improve the linkage with Nairobi: a greenway corridor incorporating public spaces and a cycle and footpath along Nairobi River. These elements will be developed to link Kibera with the workplaces. The importance of the railway line for city transport will be promoted by two railway stops for rush-hour trains along Kibera and another one in the industrial area.

These are located close to the Toi Market and Laina Saba Market in order to harness their economic potential as entry points for promoting two-way exchange and flows. Furthermore connections to the main roads will be enhanced, including connection to the new Southern Bypass.



Integration of Kibera into Nairobi's urban area

## Integration of Kibera and surrounding neighbourhoods

### Problems and potentials

The existing road network in Kibera is currently a disjointed grid with only a few roads and footpaths traversing the complete area while the majority of access links are cul-de-sacs. Buses and matatus stop only on the edges of Kibera without going inside thus seriously hampering accessibility. One interviewee operating a carpentry shop informed us that he must bring heavy materials by manually operated pushcarts because the current access network does not allow easier modes of transport. The rivers and streams going through Kibera are currently open sewage canals, however they reserve linear public spaces and thus provide potentials for an enhanced network of public spaces, especially footpaths. The 13 villages of Kibera are fragmented with respect to ethnic groups and only little exchange exists between them, as confirmed by the interviewees. However, there have been projects in the past strategically placing facilities, for example sanitation blocks, on the village boundaries to enhance cooperation through the facility management committees.

The governance structure within Kibera and its villages is very diverse with internal informal institutions (village elders, community self-policing), internal more formalised institutions (Settlement Executive Committees, FBOs, CBOs, Youth Organisations) and external organisations (Government of Kenya, UN-Habitat and donors, NGOs). These existing structures are a strong asset, however, the different institutions and projects have not been integrated adequately and the communities seldomly were the ones initiating community development processes.

### Proposal

To enhance the accessibility of Kibera the currently unconnected grid will be transformed into a connected grid by extending cul-de-sacs to meet the adjoining paths and roads. A central ring road will connect Kibera with its surroundings as well as the villages within. Along this central ring road linkages to the surrounding road network and bus and matatu services will be introduced. Once the problems of water and sanitation have been solved these linear public spaces along existing streams and rivers could be developed as green recreational routes and connect to the lake through footpaths.



Integration of Kibera into Nairobi's urban area

Strategic nodes have been identified as potential connection points to the surroundings because of their high accessibility and inter-village location (see map above). At these nodes, communities will be able to access facilities and services that have been identified as important community assets, such as schools, hospitals, meeting places. Kibera Square, located in the middle of the settlement, will be a pilot strategic node. Besides providing various facilities, the nodes interlinking different villages will also diffuse ethnic tensions and help to create social cohesion in order to prevent future outbreaks of violence.



Kibera square

A Master Plan is proposed to be established for the development of transport networks and strategic nodes. The strategic nodes will be designed following the procedures of participatory design competitions. Here the inhabitants will participate both in designing their preferred strategic nodes, identifying the facilities most necessary and in selecting the final design solutions, i.e. they will form



Implementation mechanism

part of the jury and implementation committee. Here the existing organisational assets of Settlement Executive Committees, FBOs, CBOs and youth organisations will be utilised and integrated to find the appropriate design solutions (see figure above).

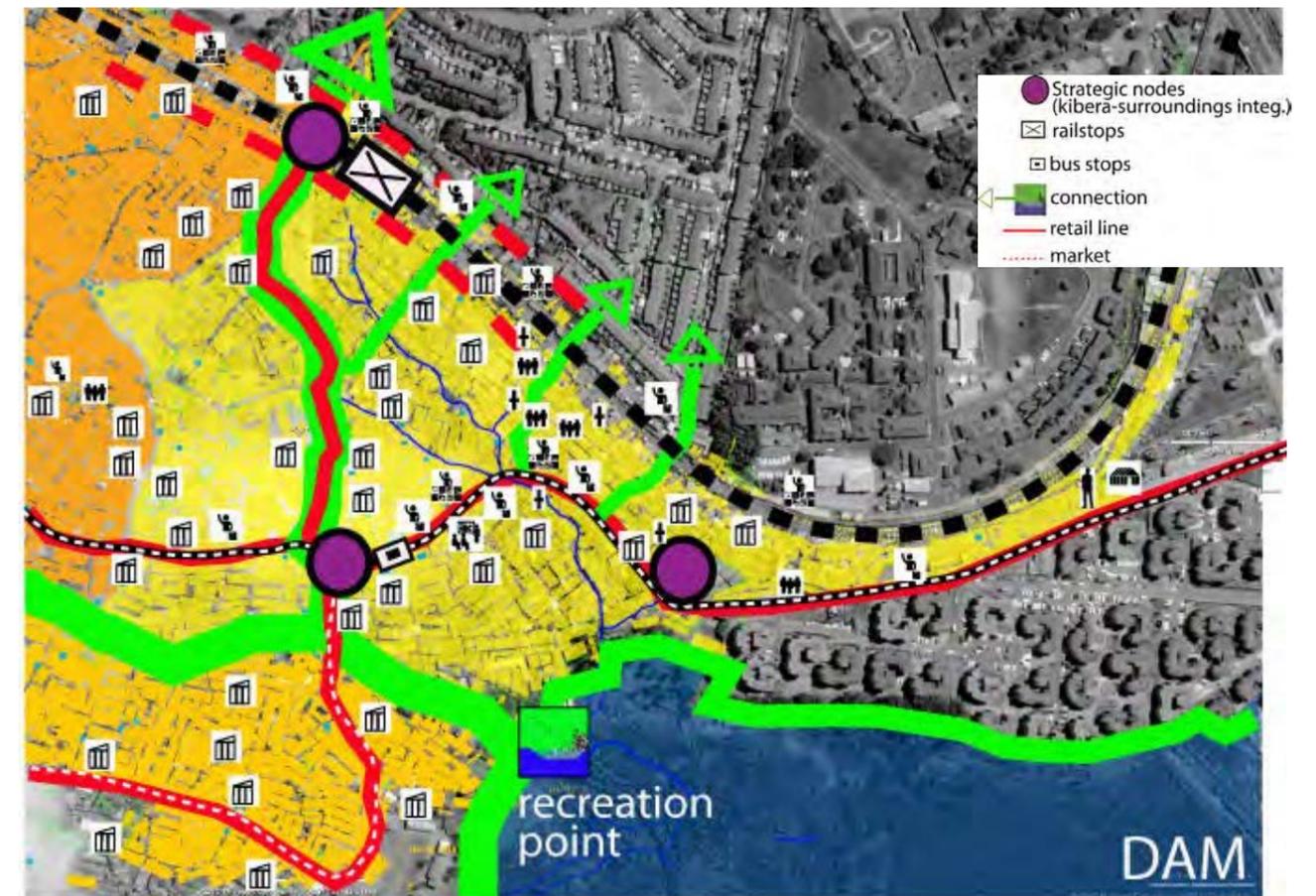
## Internal integration in Soweto East

### Problems and potentials

Currently a main road is under construction in the village of Soweto East that will traverse through Kibera. This road and the railway line are the physical networks that could be utilised and enhanced for integration. Valuable community assets include the market and hawking area along the railway tracks, as well as a smaller site along the road under construction. Along the slope connecting the road with the railway line – currently a sewage stream and a footpath with some open spaces in-between – a number of community-based organisations will be located, some of which are youth organisations and others are involved in waste management and urban agriculture.

### Proposal

Within the area of Soweto East there will be three strategic nodes located at the newly introduced bus stop, the railway stop and at the location of the main church. The main road network as well as the area around the new train station will be a potential area for development and consolidation of markets and small-scale hawking. In order to overcome existing boundaries between Kibera and the surrounding middle-income areas we propose to open access especially via the railway stop, the bus stop and towards the Nairobi dam. Once the Nairobi Dam has been rehabilitated this will serve as a recreation area for all citizens of Langata and thus realise its potential as a shared public space to integrate Kibera and the surrounding middle income residential estates on Langata Road.



Internal Integration of Kibera Soweto East Village

## Conclusion

The group acknowledges that in order for implementation of the proposed interventions to be realized at the local level, political will from the government will be a vital requirement. Furthermore, regulations will be needed for the development of the proposed physical networks as well as incentives for the developers will need to be achieved. The strategic location of the proposed community facilities will further enhance the community's assets and contribute towards the community's overall development.

In relation to the governance and participation of the community a planning commission is hereby proposed which integrates participants from within the community. Co-operative finance schemes are considered as being instrumental to the development process alongside enhanced civic engagement within the Kibera community.

# Infrastructure and mobility development

## Authors:

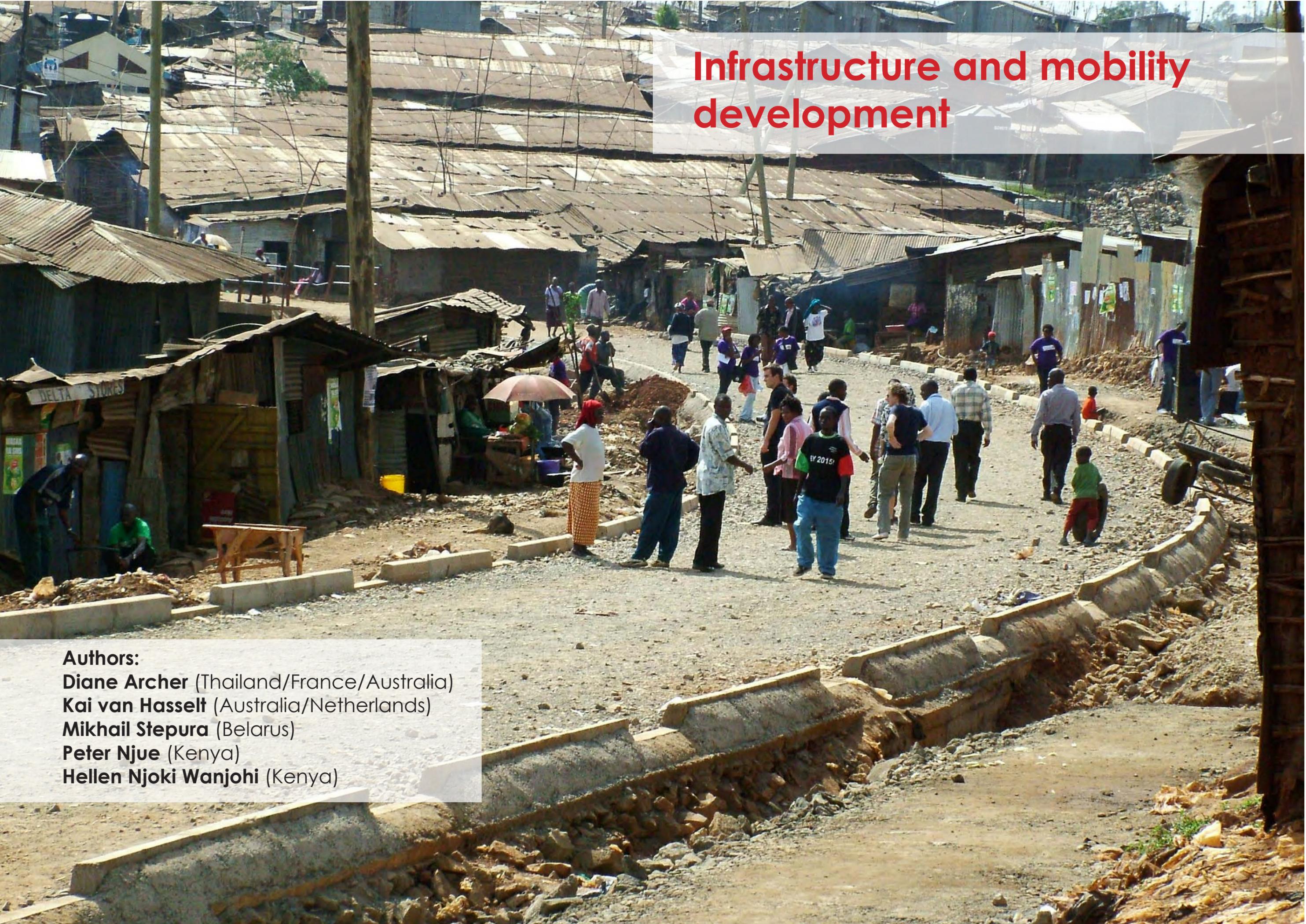
**Diane Archer** (Thailand/France/Australia)

**Kai van Hasselt** (Australia/Netherlands)

**Mikhail Stepura** (Belarus)

**Peter Njue** (Kenya)

**Hellen Njoki Wanjohi** (Kenya)



# Infrastructure and mobility development

## Introduction

Kibera faces many challenges when it comes to its basic infrastructure, both with regards to sanitation and utilities such as water and electricity, and transport. Infrastructure developments are often problematic due to the huge financial and physical capital required to implement them. However, this report suggests a number of simple, small-scale upgrading solutions which can be implemented with immediate environmental and health benefits, as well as longer-term solutions to ensure Kibera residents are well-connected to Nairobi.

### Existing infrastructure conditions in Kibera

It is generally agreed that the minimum level of basic services for human settlements should include:

- all-weather roads
- access to safe drinking water
- area-wide storm-water drainage
- hygienic toilets
- hygienic disposal of domestic waste water
- all of the above services are sorely lacking in the Kibera area.

The access road network in Kibera is in poor shape. So far, only the first 500 metres of the access road have been completed, by the government and UN Habitat. The spatial organisation of the structures is haphazard, resulting in footpaths that are very narrow and winding in nature. These paths are also difficult to use during rainy seasons due to the mud and open sewers which spill onto them.

The exception is the main road into Kibera that has recently been opened up but is yet to be completed. The Kenya-Uganda railway traverses the slum. The railway reserve however (30 meters on either side of the railway line) faces serious encroachment by structures and open air businesses.

Approximately 28% of all house structures in Kibera and an estimated 40% of all commercial structures are located along this reserve. This can present a serious health and safety risk to the persons along the railway.

There is no official method of solid waste disposal and the residents mainly use open sewers or dump wastes into the rivers. 75% of the residents use pit latrines at a fee of Ksh. 3 for use but these toilets are inadequate, forcing some residents to resort to using

polythene bags for human waste disposal (flying toilets). This lack of sanitation poses serious consequences for the health of the residents of Kibera, particularly for children who may play in the midst of the waste.

The majority of residents (98%) of Kibera buy water from water points or water vendors for use in their households. This water is sold at an average cost of Ksh. 3 for a 20 litre jerrican.

Due to the high cost of formal electricity connections, the majority of the structures have illegal electricity connections. These connections illegally tapping electricity from the formal electricity lines are extremely dangerous and therefore increase the risk of fire within the informal settlement. Therefore, the existing conditions in Kibera are far from meeting the desirable minimum standards for a healthy and safe living environment.

### Opportunities for infrastructure improvement in Kibera

Despite the dire conditions of infrastructure facilities in Kibera, particularly regarding to sanitation, there are many opportunities to take simple steps to improve these conditions while at the same time offering economic opportunities to the residents of Kibera. Listed below are existing "features" of Kibera which could be better exploited for the benefit of the slum residents:

- the Kenya-Uganda railway line
- the main access road currently under construction
- the Ngong River
- the existing sewerage system
- solar energy
- waste as a resource.

### A community-driven approach to change

One of the most effective methods of improving infrastructure conditions is through community-driven approaches, which can at least guarantee quick results without waiting for government or international agencies to offer top-down assistance. Community-driven approaches also offer the benefit of addressing exactly the community's needs, as a demand-driven approach which can specifically target key areas as identified and prioritised by the residents themselves.

Additionally, by taking action for themselves, the community will also have proven solutions to demonstrate to funding bodies and government

agencies, for the further scaling up of activities. Community-driven approaches can be kick-started by organizing the residents into savings groups. Savings groups are an effective method of building trust within community groups, as the savers collectively manage their group's savings together.

It is important that savers save with a goal in sight, such as to build a communal toilet, so that there is a purpose and motivation for saving. Additionally, by pooling their resources, the members will be better able to leverage additional funds from other agencies, such as the Pamoja Trust, SDI, and the Umande Trust.

Savings group members can also form a network of savings groups within Kibera, to share ideas for activities in the slum, as well as create liaisons with savings groups outside Kibera, as a federation of savers. This federation has greater negotiating power in the face of authorities than individual groups would have.

## Innovative solutions to the problems in Kibera

### Small-scale upgrading, in anticipation of future development

The short term solutions proposed below can be implemented by well-organised communities, at a relatively low cost which could be fully or partially financed by community savings, or with leveraged finance.

### Internal accessibility within Kibera

As highlighted earlier, while a main access road is under construction, there is little by way of clean, flood-resistant pathways for pedestrians inside Kibera. Paths generally snake alongside open sewers. The proposed solution is to enclose the existing sewers and storm drains using concrete paving slabs, as illustrated.

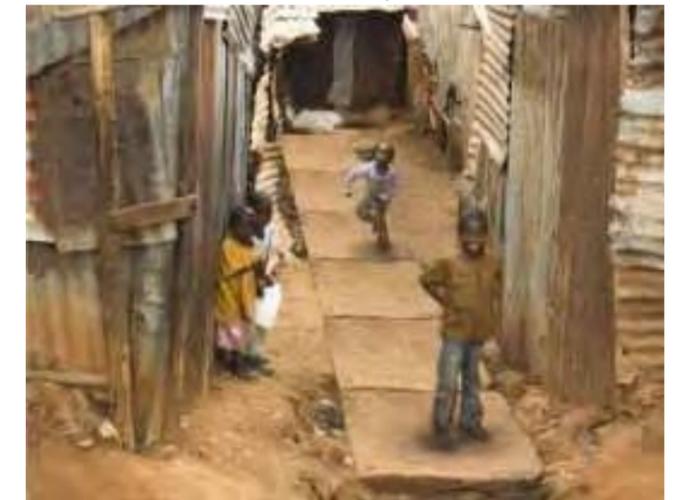
The paving slabs can easily be made and laid by the slum residents themselves, with a little training in the use of raw materials. If a number of savings groups gather together to implement this plan, they can buy raw materials in bulk and thus at a lower cost.

The proposed solution also offers the added benefit of saving space by combining pathways and sewers in one. This solution would need to be combined with raising awareness of proper rubbish disposal in order to avoid clogging of the enclosed sewers with plastic bags and other materials. The outcome is improved sanitation conditions as sewers are enclosed, with environmental benefits for the reservoir into which sewage drains, and less rubbish will contaminate the waste water. Accessibility and mobility also improves, for the overall benefit of Kibera residents.

Finance: The cost of purchasing the raw materials for making concrete slabs can be lowered by bulk purchases by a number of savings groups together. The residents can make the slabs and lay them by themselves, thus keeping the cost of the whole process very low. This solution would also provide a possibility for CSR for concrete-producing companies – they could provide the raw materials to the savings groups, and could also include the company logo in the concrete slabs.



Before enclosed sewers and internal paths



After enclosed sewers and internal paths

### Sanitation and energy

As highlighted above, 75% of Kibera residents rely on pit-latrines for which they have to pay to use. Alternatively, they may use "flying toilets". Many community residents rely on illegal electricity connections in order to power their homes.

The proposed solution is to combine pit latrines with power generation, by installing a greater number of communal bio-toilets with solar panels. UN Habitat and the Umande Trust have already installed community-run bio-toilets which serve as energy centers in certain locations in Kibera, and the key is to make them more widespread. The energy generated by biogas by solar panels can be used to power community generators and/or community kitchens.

A small fee can be charged for the use of the toilets, as well as for the use of cooking gas or power generated by the centre, and this centre can be communally managed by local residents.

The outcome is that household clusters will be able to access clean pit latrines, as well as a clean energy source for cooking or power generation.

This also has environmental benefits, and in the long term could generate funds for community projects. Ideally, the location of these communal energy and sanitation centres will take into account future redevelopment plans for Kibera, so that they can be located next to planned markets, for example.

Finance and implementation: as with the existing bio-toilet facilities, NGOs and international agencies could facilitate the construction of further facilities. The use of community labour can help keep construction costs low, whilst also providing the labourers with construction skills.

As the toilets and kitchens will charge a pay-per-use fee, the facility would eventually become self financing.



Example of an existing bio-toilet facility

### Integrating waste collection and access

Currently, the main access road of Kibera is only 500m long and has yet to be completed by the Government of Kenya. Additionally, the Kibera area has no waste collection facility, which means that the area is strewn with rubbish.

The lack of waste collection is not facilitated by the poor access into the area. The proposed solution is to integrate the completion of the access road with a municipal waste collection service.

If the access road is complete, garbage collection vehicles will be able to enter the area and pick up waste from designated collection areas, points at which residents will deposit their waste for collection. These waste collection areas would be semi-enclosed hubs, built of concrete, for easy hosing down when necessary.

It will be necessary for Nairobi City Council to make waste collection in Kibera part of its service, and this

waste collection service could be integrated with a youth employment scheme for Kibera youths, hence creating a source of livelihood.



The outcome will be that Kibera benefits from a proper access road, allowing vehicular access for waste collection services as well as emergency services, such as fire engines and ambulances. Additionally, the access road will be lined with a number of waste collection points where residents can deposit household waste for collection by the municipality, leading to a more sanitary living environment within Kibera.

Finance and implementation: the completion of the access road needs to be hastened. The City Council could try attracting private finance, for example by selling bonds, while using community labour in order to provide a source of income for local residents. It is inevitable that the completion of the planned access road will lead to the displacement of a number of local residents, and appropriate solutions need to be found to re-house them, through regular and sustained talks with the local communities. Without the understanding and support of the local residents, the access road risks facing opposition from residents, and so understanding needs to be built up between both parties. Those displaced by the construction could perhaps be given priority access to construction jobs on the road.

### Integrated area development and area capture

One of the problems facing Kibera is that it is not regarded as a priority area for investment, as it is regarded as a poor "ghetto" and too big a problem to tackle. However, if this opinion continues, the residents will never face major improvements in their infrastructure, apart from the small improvements they can make themselves through their collective actions. The lake nearby to Kibera was used as a leisure centre up until a few decades ago, when the water quality deteriorated.

The proposed solution is to build upon the small-scale upgrading solutions implemented by residents, and the consequent improvements to the environmental quality of the nearby lake, in order to transform the lake into a leisure destination.

By attracting big-name, high-end investors, such as a luxury hotel brand, the necessary infrastructure improvements will follow. The lake environment could be returned to its original form, making it a pleasant place for Nairobi residents to enjoy leisure activities such as sailing and biking. The proposal is that the area be developed as a socially responsible resort, with the possibility of an adjoining hospitality school which could provide training to the residents of Kibera, while the hotel could employ staff from Kibera.

The outcome: this proposed solution is a method of capturing the value of the investments made by Kibera residents in their infrastructure and environment, with its consequent beneficial impacts on the environment of the nearby lake.

It will also provide employment opportunities for local residents, while attracting large-scale infrastructure improvements as part of the hotel and leisure area improvements.

Finance and implementation: it will be possible to capture predicted future profits of the hotel through private bond and equity placements to pay for the infrastructure and lake upgrade. This project will be a large-scale investment and therefore would be a longer-term proposal for the area.

### Pro-bike transport solutions

The majority of Kibera residents rely on walking as their main method of transportation, with cars being financially out of reach as well as impractical due to the lack of roads within Kibera. However, bicycles are also used by a large number of Kibera residents, and bikes should be promoted as a faster method of transport for Kibera residents to reach their work places.

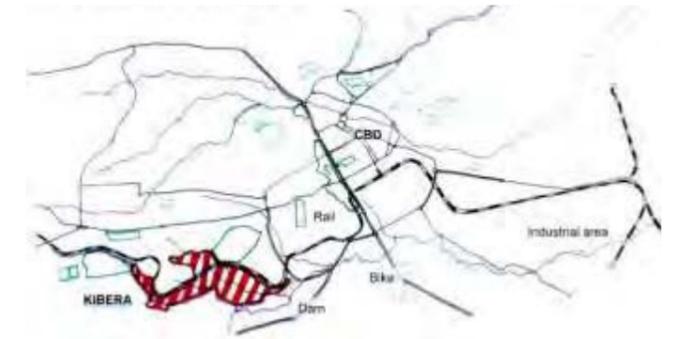
The proposed solution is to make use of existing transport infrastructures (road, rail and river) to connect Kibera residents to the city and vice versa. It is proposed to develop a bike and footpath along the river and the bypass road to connect Kibera residents to industrial areas and city centre where many residents seek employment on a daily basis.

On a policy level, it would be necessary to reverse the existing ban on bicycles within the CBD, and instead adopt a no-car approach, with a bike-for-hire scheme. In the long run, it is hoped that there would be a bike network stretching from North to South Nairobi, for both commuting and leisure purposes.

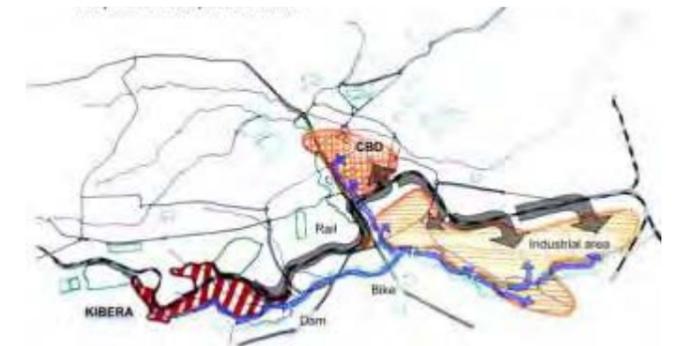
The outcome would be improved access for the residents of Kibera to the city and its job opportunities, as well as areas for leisure cycling. Nairobi would become a model city in terms of its approach to pro-poor transport and green transport, for the benefit of all the city's residents, not only those of Kibera.

Finance and implementation: political will on behalf of the city's government to take this innovative and bold step to become a bike-friendly city will be vital. With this political will, it will be possible to find the necessary finance to develop the necessary bike infrastructure. Again, Kibera residents could provide a source of labour in the construction of the bike path.

Existing transportation network



Proposed transportation network



## Challenges to infrastructure improvement in Kibera

The suggestions outlined above may be regarded as over-ambitious, and there are a number of sticking points which can delay but not necessarily prevent implementation of the above suggestions.

- Finances
- The scarcity of land
- The area has been earmarked for redevelopment
- The high cost of formal electricity connections
- Corruption
- Gridlock between tenants, structure owners and the Government of Kenya
- Difficulty to formalize the land titles due to land tenure issues
- The unintended consequences of top-down approaches to planning
- Lack of community involvement/ initiatives.

The list above is daunting, but not insurmountable. The key to implementation is that the residents of Kibera be well organized into small groups, ideally savings groups, thus empowering themselves financially and giving them a measure of independence from the schedules of top down investment. Through organized community residents, it is then possible to hold talks at the community level to find solutions to the issues listed below, and then present the proposed solutions in negotiations with city authorities and possible other interested parties. Investment will be much more forthcoming when it is clear that those on the ground are not just passive recipients but are actively involved in bringing about improvements in their own lives, and able to act as key partners in bringing further changes for their benefit as well as for the city as a whole.

## Conclusion

It is hoped that this report has demonstrated that it is possible to apply innovative approaches to finance with a focus on the impoverished, to allow small scale upgrading in the short run, and large scale and environmentally friendly infrastructure in the long run. Partnership between key actors (the local community, the local government, private investors and local and international agencies) will help endender innovative solutions that improve the lives of the slum residents while empowering them financially and giving them vital life skills and employment, as well as improving the overall environment of the city of Nairobi.



# Enhancing environmental sustainability in Kibera

## Authors:

**Nigel Downes** (Germany/United Kingdom)

**Jeroen Matthijssen** (Netherlands)

**Samuel Mugo Marwa** (Kenya)

**Daniel Mungai Ng'ang'a** (Kenya)

**Daniele Vettorato** (Italy)



# Enhancing environmental sustainability in Kibera

## Introduction

The challenge of enhancing environmental sustainability within the informal settlement of Kibera, the largest slum in Nairobi and the second largest slum on the African continent, requires a multifaceted problem-solving approach. The informal nature of the development with its lack of basic infrastructure as well as the high population density, has led to the current underlying environmental conditions. The slum can be defined as an environmentally deteriorated area. Unfortunately for the residents of Kibera, all circumstances have been historically allied against them, causing environmental deterioration of the site and its surroundings. This paper presents an integrated approach for the environmental development and upgrading of the informal settlement in a sustainable manner. The paper identifies the current problems and barriers to environmental enhancement and focuses on initiatives for a stepped environmental upgrading plan to establish immediate long-lasting benefits.

## Spatial SWOT analysis

As a starting point the current state of the Kibera environment is analysed in a systematic way. A spatial SWOT (strengths, weakness, opportunities and threats) analysis was carried out (see figure below). The current strengths for the Kibera site were

identified as the strong sense of community and the residents awareness of the current environmental problems, and their general open attitudes to initiatives. Furthermore the presence of several current non-governmental organisation and UN-Habitat projects as well as the strong awareness of and relations to the current urban administrative and governance hierarchy can be seen as strengths. The current weaknesses of the Kibera site are evident in the lack of drainage and sewage infrastructure and insufficient waste management. Furthermore, there is a vivid lack of open and green spaces for the residents. These weaknesses have obvious social and health impacts, but also negative and direct impacts of soil contamination and soil erosion, and down-slope lake eutrophication of the Nairobi dam area.

In order to improve these conditions, a number of opportunities were identified. One of them concerns the underlying topography of the settlement on a gently inclined slope. The slope has allowed waste and contamination to be transported down-slope away from the settlements and deposited in the Nairobi dam area. However the existence of the Nairobi dam as an undeveloped, green open area adjacent to the densely build slum together with the large number of residents open for involvement and open for participation in upgrading activities can be seen as opportunities. The threats to environmental sustainability within the Kibera settlement are is-

ues related to governance decisions, uncontrolled future demographic growth and the uncertainty related to the future impacts of climate change.

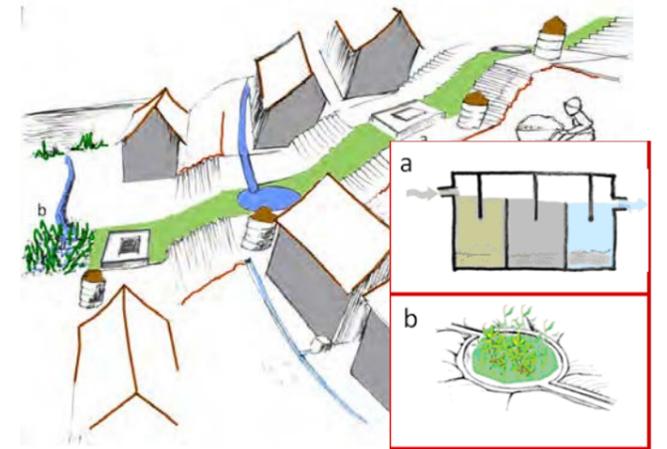
## Mitigating current up-slope conditions

The SWOT analysis documents represent the inherent characteristics of Kibera. Key to the current environmental conditions in Kibera is however, the conditions up-slope. These are characterised by:

- waste dumping
- open sewage
- flying toilets
- lack of water supply and unregulated
- lack of runoff and erosion control.

Here water and more specifically runoff is the dominate transport medium for pollution, waste and sewage through down-slope informal settlements and finally to the Nairobi dam area. This has lead to severe siltation, pollution and contamination in the once navigable Nairobi dam. As a result, the priority for a first step to enhance the environmental sustainability of Kibera has to be the control and management of up-slope water and water services. These are crucial to short-term and long-term interventions. Our approach to enhance the environmental sustainability of Kibera focuses on a triple bottom line. First of all the main components of the system are identified; the up-slope informal settlements and the down-slope Nairobi dam area. By closing the current cycle of wastes and nutrients between the two components, agricultural products and economical activities will be provided and the environmental sustainability will be reached. A plan which proposes to gradually upgrade Kibera will provide environmental enhancement and landscape recovery of the Nairobi dam area. It can be expected that social enhancement and economic prosperity will surely follow.

ways and corridors bringing much needed green into the current slope area.



Sketch of intended slope interventions. a; depicts septic tanks b; depicts the installation of heliophyte basins.

## Nairobi dam redevelopment “Kibera Hills” and down-slope interventions

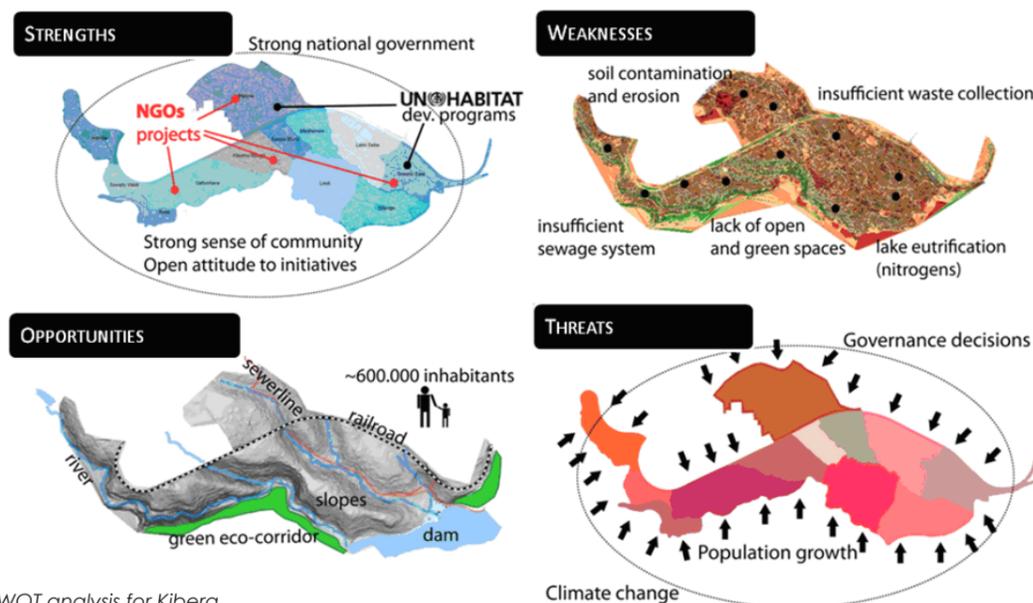
The second phase of the redevelopment will focus on the down slope section and the Nairobi dam area itself. In the figure above, the up-slope interventions previously outlined can be seen. In this phase the dredging of the dam will take place, deepening the water body, making it once again navigable for small pleasure boats and fishing activities. The dredged sediments will be used to construct a series of terraced hills in the middle of the dam. The hill developments will provide space for the residents of Kibera and they are envisaged to become local landmarks. The hills will become landmarks for the wider community reflecting the community togetherness, strengthen the already strong sense of community and reflect the willingness for an improved future. The redeveloped Nairobi dam area will consist of mixed uses by the community with sustainability as the over-arching principle. Parts of the area will be reserved for community space. Segments of the hills and surrounding land will be used for farming, with vertical sack farming occurring on many hill terraces.

In a further step it is hoped that within the Nairobi dam area, sustainable agricultural and environmental training will be offered to the community.

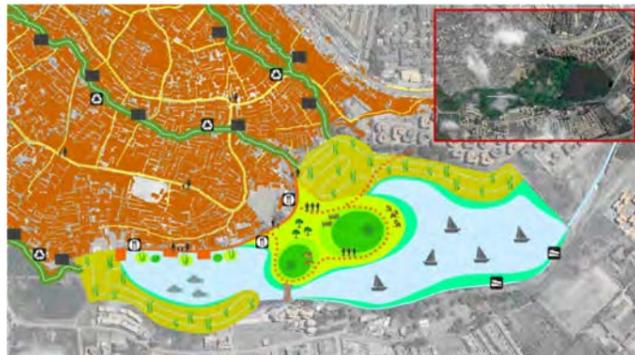
This step leads towards an improved environmental awareness and improvement in public health, as well as maximization of social participation in planning and implementation.

## Nairobi dam redevelopment slope interventions

In an initial step for the redevelopment of the Nairobi dam, the current up-slope conditions will be addressed (Fig. 2). Walkways will be developed, where basic septic tanks and heliophyte basins will be installed at regular intervals to deal with the current sewage issues. In order to control runoff, rainwater harvesting will be implemented at rooftop sources and drained to nearby retention/ detention ponds. Furthermore, to control the down slope flow of organic waste, collection points are to be installed. The collected valuable waste can be used for animal feed. The whole slope interventions are designed for minimal disturbance to the current residents while providing enhanced environmental safeguards. The walkways will act as green walk-



The Spatial SWOT analysis for Kibera.



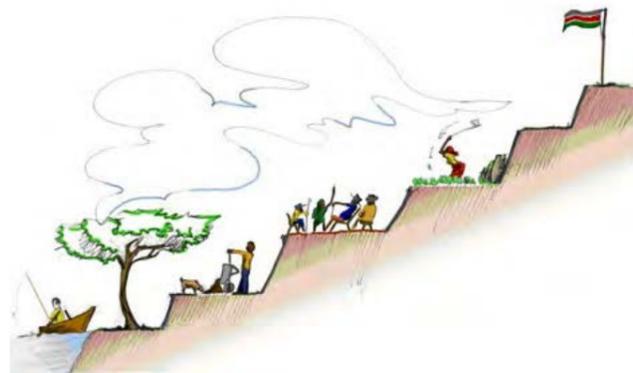
Plan for the redeveloped Nairobi dam "Kibera Hills"

At the centre, the dredged water body will act as an economic magnet and as such a shoreline promenade will be constructed. This will turn existing backyards into shop fronts. Along the promenade restaurants will open that serve the food produced on the hills and in the water. Also, restaurant and service training will be offered for disadvantaged youth from the settlement. These activities should be promoted as wide as possible and be included in future editions of well known tourist guidebooks for Kenya. The main water body will also act in part as the final heliophyte purification basin, with the upstream heliophyte basins acting as inlets.



Artist impression of the Nairobi dam redevelopment "Kibera Hills" (looking west). The connections and integration into the wider community through walkways, bridges (to adjacent Lang'ata area to the south) and green corridors can be seen. Also the promenade and community owned restaurants can be seen. The hills and the heliophyte basin provide essential services to the community.

In general the recovered green and blue large open space will be multifunctional. It will connect to the existing protected Ngong Forest to the west of Kibera and the Nairobi River riparian zone to the east to form a much wider green (eco) corridor. In this way, not only the residents of Kibera, but also the wider community of Nairobi will benefit. Furthermore connections with neighbouring areas will be strengthened by providing green walkways in the dam and bridges to the Lang'ata area and adjacent sailing club. As a result Kibera gets fully integrated with the surrounding community.



Artist impression of activities on one of the Kibera Hills. A number of activities can be seen. These include; small fishing activities, boat docking, orchids for fruit production, goats feeding on collected organic waste and in turn their waste used as fertilizer in farming, community meeting area, vegetable sack farming and vertical farming activities.

## Conclusion

The approach presented here for the sustainable development of Kibera allows also for the environmental enhancement of the existing settlement and its wider integration with Nairobi dam and surrounding settlements. As such the approach highlights the implicit hierarchy and utilises the interactions of the natural system, social system and economic system to their full current potential. Without a fully functioning natural environment, the achievement of social and economic sustainability will always be hindered. Therefore, environmental sustainability should be viewed as a cornerstone to upgrade the Kibera informal settlement for overall sustainable development.

Within our plan, the landscape recovery and enhancement will have wider social and economical benefits including environmental protection, social advancement and economic prosperity. Furthermore our vision would implement and integrate outcomes through the integration of the natural, social and economic components of the Kibera system. These included the much needed infrastructure to control or reduce the environmental pressures and loads. Think about runoff control mechanisms, wastewater and sewage management, the generation of large open green and blue spaces, employment, community space, environmental education, tourism, agricultural production and economical diversification and further community initiatives.

Hence sustainability would be advanced on several fronts to achieve green, just and economical benefits for Kibera. This paper has demonstrated that a careful planning and redevelopment of the up-slope interventions and the Nairobi dam area will create synergies and provide mutually reinforcing solutions. Moreover this will promote sustainable advancement on every front and as such bringing sustainability to Kibera should be seen as an achievable solution.



# Creating economic opportunity from connectivity

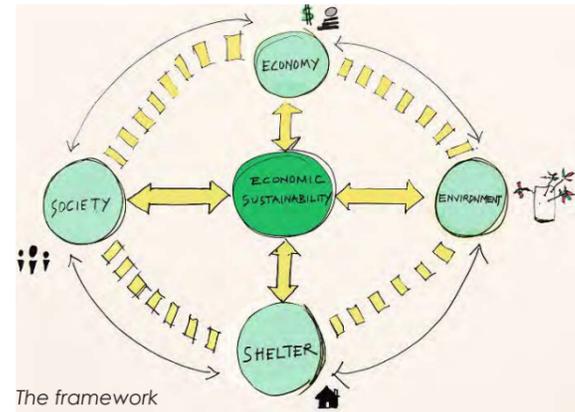
**Authors:**  
**Komollo Fawcett** (Kenya)  
**Yvonne Mosefi** (Kenya)  
**Kristy Revell** (United Kingdom)  
**Natalie Rosales** (Mexico)  
**Tine Segers** (Belgium)  
**Nicholas Tirop** (Kenya)  
**Joyce Wambui** (Kenya)



# Creating economic opportunity from connectivity

## A vision for Kibera

It is proposed that to increase economic productivity in Kibera there is a need to connect Kibera with the rest of Nairobi. Presently Kibera remains a ghetto with both physical and social barriers that prevent the community integrating fully with the rest of the city. Through improved connectivity we propose that Kibera can become more commercially viable and consequentially, more economically productive. Through the creation of streets, local trading is promoted. Through traffic brings business with it and greater prosperity, negative perceptions about Kibera slowly begin to become broken down and integration raises the aspirations of residents of Kibera. The provision of street lighting allows longer trading hours and reduced night time crime, both positive contributors to the local economy.



During the construction process water and sewage mains and other services such as electricity can be installed to bring sanitation and a clean water supply to Kibera. The creation of streets also allows for easier waste collection and emergency vehicle access, when necessary. Pedestrian and cycle priority streets promote sustainable modes of transport and give residents greater mobility allowing those that work outside Kibera to reach their destinations more easily and efficiently whereas improved access to the local markets offers new trading opportunities for those that buy and sell goods within and beyond Kibera.

Overall, increased connectivity within and beyond Soweto East and Kibera to the surrounding neighbourhoods and greater Nairobi brings both greater prosperity and improved integration of all communities within the city.

## Skills and opportunities

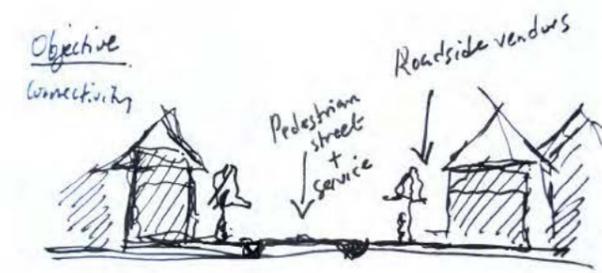
Kibera has many skills and assets. The community consists of skilled construction workers and tradesmen. Entrepreneurs exist on almost every street corner. Capacity building within the community can be improved further through education and training, which must be freely available for all. While a large number of residents may not be skilled the residents of Kibera are willing to work and want to work, they just need to be provided with the tools to achieve these aspirations. Micro finance and cooperatives have a role to play in assisting both skills and economic development in Kibera.



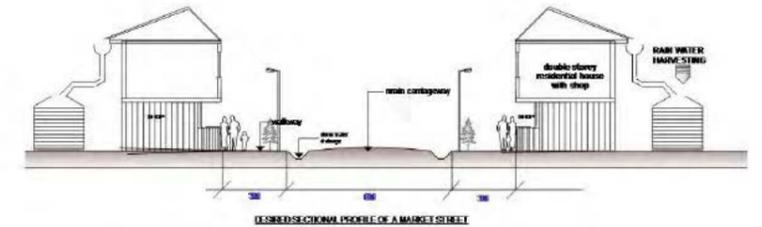
Existing Situation:



Concept Proposal:



Concept Development:



Street Market: Existing situation, concept proposal and concept development



home based enterprises



productive projects



commercial activity



home based enterprises



youth enterprises



community centres



financial services



home based enterprises  
The present opportunities



building community capacity



building the road

## Conclusion

The expansion of the streets requires the creation of space. Initially, properties will have to be displaced to make way for the new streets. The use of local labour and materials is essential.

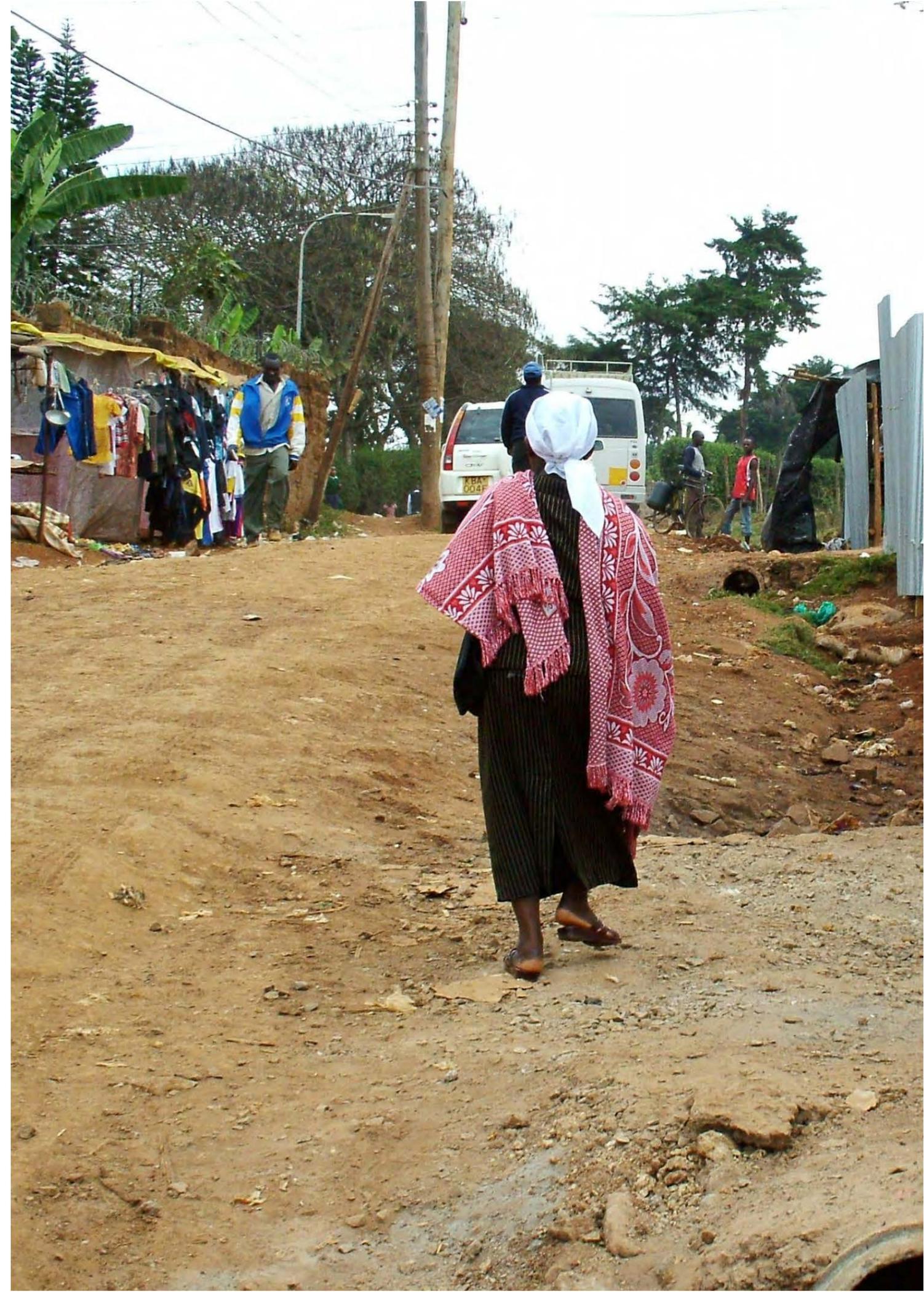
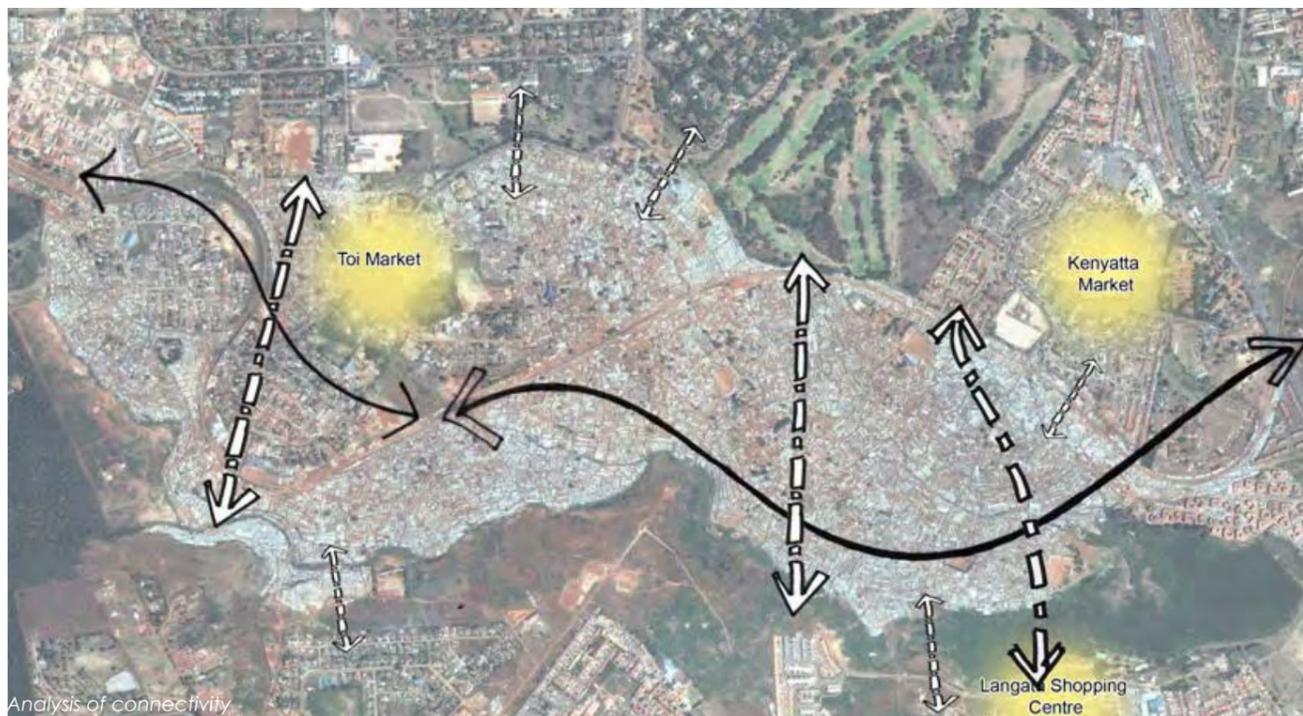
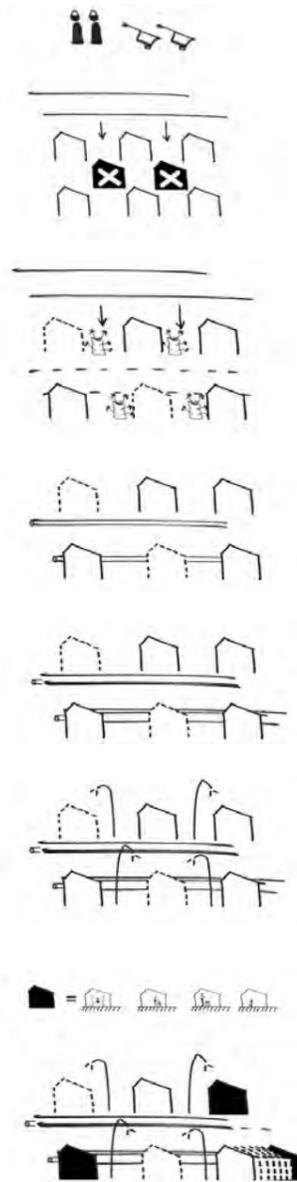
Plots left vacant after relocation and before construction should be utilised for community uses, such as urban agriculture.

Prior to the construction of the road, services should be laid. This should include essential services such as water supply, sewage and electricity.

Once services have been laid, the construction of the road can then be completed, with full drainage.

Street lighting along all routes is essential to allow for longer trading hours which will in turn reduce crime.

Along the main streets more 'formal' structures are proposed at intervals of approx. 100m. These 'adaptable' structures will be utilised for community uses, such as sanitation, education, etc.



# Low rise pilot cluster for Kibera slum upgrade

**Authors:**  
**Muhammad Adeel** (Pakistan)  
**Millicent Gitu** (Kenya)  
**Odegi John O** (Kenya)  
**Mary-Rain O'Meara** (USA)  
**Jaya Devi Ramlal** (Trinidad)  
**Sinisa Trkulja** (Serbia)



# Low rise pilot cluster for Kibera slum upgrade

## Background

This report describes key issues and possible interventions in Kibera Slum Area resulting from Young Planning Professionals (YPP) Workshop held in Nairobi University, Kenya during the 15th – 18th of September 2010. The workshop had a theme of “integrating urban communities for sustainable cities” with a case study of Kibera Slum Area in the outskirts of Nairobi City.

The work was carried out by YPP Group 1 under the thematic area of ‘Shelter’ with the objective; “To tap the opportunities for shelter improvement by influencing a range of factors including economic, spatial, ecological, technological, and socio-cultural aspects”. The group carried out a critical study of various elements of Shelter in the study area to come up with more workable solutions of shelter improvement.

## Data and sources

The primary data collection consisted of reconnaissance surveys, unstructured interviews in the study area and digital photography of the important dimensions of shelter. Secondary data regarding design and redevelopment of Kibera Soweto East (Zone A) was obtained from Ministries of Housing and Land of Kenya and used for assessment of proposed standards and design features. Data gaps still existed about the study areas which were filled with available map data and internet information.

Other notable data used in the study included satellite images of the area, master plan of SE Zone A, detailed design details of proposed housing and various facts about of shelter conditions (both quantitative and qualitative) and related case studies throughout the developing world provided over internet by NGOs like UNHABITAT, UNDP and Asian Council of Human Rights, etc.

## General methodology

For the purpose of shelter improvement, the work was divided into two distinctive phases. First phase titled ‘Shelter appraisal’ and the second one titled ‘Assessment and proposal of improved shelter opportunities for the study area.’

In the first phase of appraisal, the group analyzed the existing condition of the study area, made a couple of interactive site visits and unstructured field discussions with the resident community and their

elected representatives. Existing shelter conditions were then analyzed in the studio which provided a base for the assessment of possible improvements in second phase. For this phase, salient features of proposed housing improvement in SE Zone A were analyzed with respect to different ‘Elements of Shelter’ and some other workable shelter alternatives were suggested based on data analysis.

## Guiding principles

Guiding principles followed in the study included looking at what was financially feasible, technically sound, environmentally sustainable and socially acceptable in terms of unit size and the sharing of facilities like cooking, playing, cleanliness and lavatory.

## Appraisal of existing conditions

Kibera is the largest informal settlement of 13 villages in the city of Nairobi covering nearly 225 hectare land. It is a place of residence for nearly 500,000 multi-ethnic people where population density is reaching over 2000 per hectare. This informal settlement is occupying government owned land with no services and poor conditions of shelter. Although there is no land tenure, 95% of residents are tenants of a structure owner who resides either within or outside Kibera.

For slum upgrading, Kibera has been divided into six different zones (Zone A to Zone E) under the KENSUP Program. Slum upgrading of Zone A is underway in the first phase. For this purpose, the housing is being removed and multistory apartments will take their place per the proposal of the master plan. Residents of these shacks have been temporarily shifted in apartments at a decanting site in Kibera. A working definition of shelter was established to assist in the analysis. This definition includes characteristics of shelter such as a place of security, privacy, freedom, exclusivity, protection from the environment, and access to services. The group performed two kinds of analyses for site appraisal and the findings of each analysis are given below.

## External environment

The site is located in a low lying area located 10 minutes drive from the main Langata Road. The area is accessible within 30 minutes of drive from the CBD and high accessibility makes it even more

vulnerable to expansion. The Kibera settlement has spread in available space bounded between the railway line and major roads in the area. It is surrounded by developed land on one side, Nairobi.

## Internal environment

Kibera is residence for low waged laborers working in and around Nairobi. Shelter structures are made of metal sheets (mainly of low quality), wood and local indigenous mud. Within the structures, a suitable cut in the metal sheet provides air and light in the building. A structure is normally comprised of 6 living units of normally 3x3 meter square.

## Provision of improved shelter: pilot cluster upgrading

After analysis of the proposed high rise upgrading project for Section A, it was decided that provision of low rise buildings has several benefits.

### High vs. low rise upgrading

Pros	Low	High
	Sense of Community	High Density
	Adaptability	Communal Spaces
	Aesthetics	Long Term Services
	Community Involvement	Easier to police
	Immediate Solution	
	Access to Services	
	Rainwater Collection	
	Potential to harness solar energy	
	Cheaper construction	
	Sense of ownership	
	Security/ Community Policing	
	Adaptability to family size	
	More tenure security	
Cons	Low	High
	Sprawl is inevitable	No Sense of Community
	Low Density	Alienation
	Extra Infrastructural Costs	
	Increased transportation Costs	

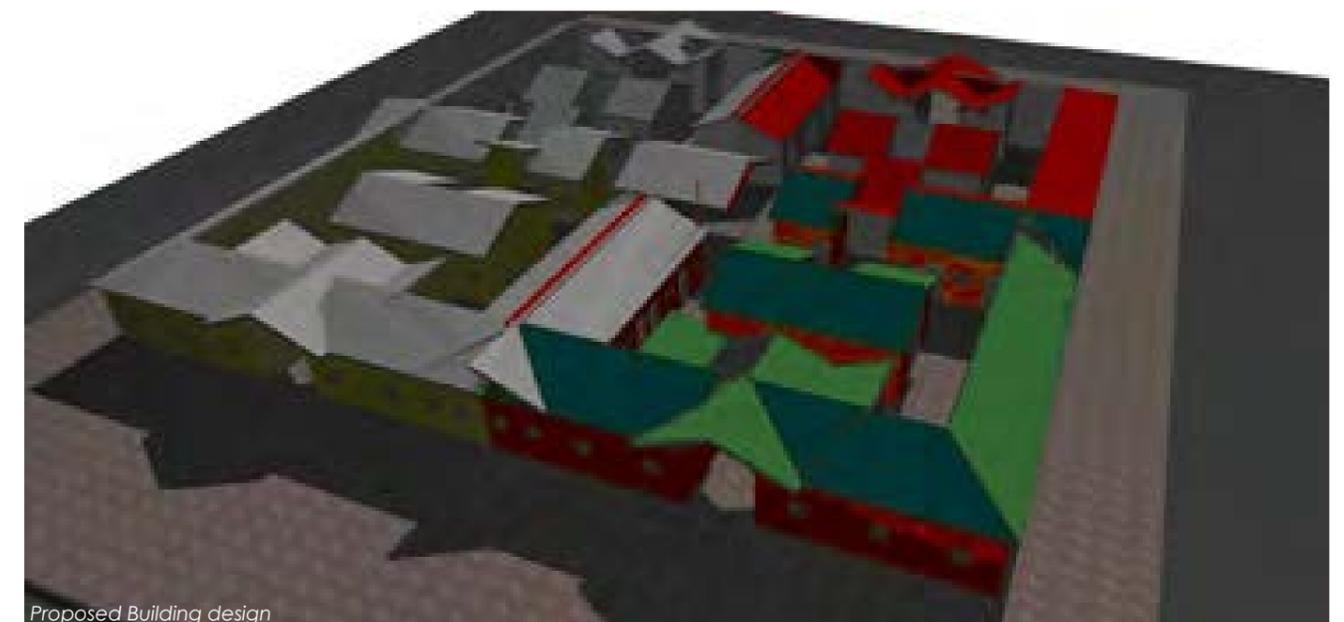
Using UNHABITAT design parameters provided by provision of toilet facilities in the current layout in Kibera, the following guidelines were established: 100 units for a cluster of 10 structures, each with 6-15 units.

Services in these clusters include a communal kitchen fueled by garbage waste, shared bath and toilet facilities, improved open spaces and shared laundry services. Additional improvements include rain water harvesting, increasing natural lighting, including a space for installation of solar panels, and earthen brick building materials.



Proposed cluster layout

The cluster layout uses the current density levels found in Kibera Soweto East as 0.9 ha for 100 units of 3x3m each. This space parameter was utilized in the improved cluster design proposed in this project. The new cluster layout was designed considering the improvement of circulation and communal open space, ability to accommodate infrastructure upgrades, and the maintenance of existing scale and building types.



Proposed Building design



Proposed Kitchen facilities

The building design considers the use of earthen block materials for affordable and sustainable construction. These blocks also enable rapid and easy construction, for example, a 50 meter building can be constructed in 2-3 days. This construction method is also a potential opportunity for economic development if local residents can be involved in the manufacturing process.

Amenity improvements to the cluster include: communal kitchen facilities (garbage burning), communal laundry facilities shared bath and toilet facilities, solar lighting for external and internal electricity and improved open spaces.

These amenities were designed considering the most pressing basic needs for the people of Kibera, and by looking at models already in place and successful in the community or larger city area of Nairobi.

The kitchen facilities are modelled after the "Community Kitchen" of Kibera, designed by a Kibera resident to burn paper waste as fuel for the cooking stoves and ovens. This kitchen also provides economic development opportunities to residents by allowing a space to bake breads and other foods to sell within the village.

The bathroom facility is modelled after the UN Bathroom compounds already being provided in Kibera, and is only slightly modified by the addition of a rainwater collection and gray-water recycling functions.

## Conclusion

In conclusion, sustainable shelter opportunities can be realized in Kibera through affordable and incremental structure upgrades, providing communal facilities and ensuring land tenure for tenants.





# Strategic partners, tutors and participants of the YPP workshop 2010

The 2010 YPP workshop was jointly organized, by UN - Habitat, Government of Kenya, City council of Nairobi, Architectural Association of Kenya, University of Nairobi and ISOCARP.

Special thanks are due to Dr. Mary Kimani, Arch. Karisa Dadu and Arch. Waweru Gathecha of the Local Organizing Committee for organizing the workshop. Thanks are also due to the YPP coordinators Dr. Zeynep Meray Enlil, Ir. Martin Dubbeling, Ir. Bert Smolders, Ir. Saskia Spijkerman and Niels Kropman MA BSc. The Nairobi YPP Workshop is associated with the "Sustainable City Developing World" International Congress promoted by ISOCARP and UN - Habitat.

Very special and warm thanks are due for Linus Sijenyi (Member Executive Committee Kibera), Francis Omondi Ombuoglor (Secretary SEC Soweto East Village) and Walter Hongo (Committee member SEC Kibera - Soweto East Village).

## Young Planning Professionals

Francisco Achwoka (Kenya)

Muhammad Adeel (Pakistan)

Diane Archer (Thailand/France/Australia)

Njeri Cerere (Kenya)

Nigel Downes (Germany/United Kingdom)

Komollo Fawcett (Kenya)

Bruce Githua (Kenya)

Millicent Gitu (Kenya)

Kirsten Hackenbroch (Bangladesh/Germany)

Kai van Hasselt (Australia)

Odegi John O (Kenya)

Martina van Lierop (Netherlands)

Margaret Macharia (Belgium/Kenya)

Jeroen Matthijssen (Netherlands)

Yvonne Moseki (Kenya)

Samuel Mugo Marwa (Kenya)

Daniel Mungai Ng'ang'a (Kenya)

Peter Njue (Kenya)

Mary-Rain O'Meara (USA)

Jaya Devi Ramlal (Trinidad)

Kristy Revell (United Kingdom)

Natalie Rosales (Mexico)

Tine Segers (Belgium)

Ceren Sezer (Turkey)

Mikhail Stepura (Belarus)

Nicholas Tirop (Kenya)

Sinisa Trkulja (Serbia)

Daniele Vettorato (Italy)

Joyce Wambui (Kenya)

Hellen Njoki Wanjohi (Kenya)

Liang Zheng (China)

