

Informal settlements' vulnerability mapping in Kenya

FACILITIES AND PARTNERS' MAPPING IN NAIROBI AND KISUMU SETTLEMENTS



The Case of Kibera

June, 2020





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OVERVIEW

Globally, cities are and have recorded the highest number of covid-19 cases. In sub-Saharan Africa and many other developing regions with more presence of slums in cities, covid-19 is likely to spread faster and also take longer to control once it crosses into the slum and informal settlements' populations. With high tenure insecurity, low-quality housing, limited access to basic services, and poor sanitation, informal settlements offer the perfect settings for risk factors to accelerate the spread of any infectious disease. Informal settlements are also classified as highly vulnerable to numerous risks including climate change impacts, disasters, and socio-economic shocks. This is because they are densely populated, and households have inadequate access to water and sanitation, little or no access to waste management, public transport and limited access to formal employment and health care facilities.

In Kenya, informal settlements vary in size, character and their levels of need vary among and within settlements. Governments and numerous agencies work in informal settlements, each addressing a specific felt need in line with its organizational goals, often with little coordination. Consequently, access to services has not been evenly distributed across settlements, resulting in pockets of spatially disadvantaged communities.

In this mapping exercise, the UN-Habitat sampled 3 settlements in Nairobi and 7

in Kisumu and comprehensively mapped all the key facilities and development partners operating in those informal settlements. This was done with a goal to identify gaps and limitations in service provision, access to services and support by development partners. The mapping outputs identified critical gaps that can be helpful when planning for responses to covid-19 or any other emergency response in these slums. The newly collected data on sample of informal settlements advances the discourse and policy dialogue on how to improve the lives of people who live in informal settlement, and ensure that no one is left behind in COVID-19 response.

The mapping approach

The mapping exercise, which was carried out between 20th May and 10th June 2020, involved field data collection on more than 18 facility types, including water and sanitation facilities (water points, handwashing facilities, solid waste disposal sites, communal toilets, and bathrooms), health facilities, including chemists and pharmacies, community spaces (halls and public spaces) and institutional spaces such as schools, local NGO offices, administrative offices and religious institutions.

Data collection utilized a mobile phone application hosted on an open source data collection toolbox (KoboToolbox).

Field data collection was done by youth community volunteers, who were trained by UN-Habitat experts over a period of one day. Community volunteers were drawn from the targeted slums which allowed them to work longer hours and require no transport costs to undertake data collection during the strict covid-19 lockdown. In addition, UN-Habitat ensured that there was gender-balance among the volunteers who participated in this exercise.

Survey limitations

The survey focused on communally shared facilities; therefore, facilities within the settlement that are accessed at the household level (e.g. toilets and water points), if any, are not included in the survey. Such facilities exist in some mapped settlements such as Kawangware in Nairobi and Manyatta in Kisumu. These settlements exhibit mixed formal and informal characters, and for any survey generalizations to be made on them, there is need for complementary household level data collection. Data collection for this survey was at the community level rather than at the household level.

Survey limitations

The mapping outputs are presented in 4 parts, each presenting settlement specific findings. This report presents findings for the Kibera informal settlement in Nairobi.



KIBERA SETTLEMENT

Kibera is the biggest informal settlement in Kenya and arguably in the Africa continent. Its population is estimated at 250,000, and has the highest settlement density of any settlement in Kenya. Facilities in the settlement such as WASH (Water, Sanitation and Hygiene) facilities are shared, and this makes the settlement highly vulnerable to numerous risks, including spread of COVID-19. The

residents of the resettlement largely earn their livelihoods from the informal economy, and there are numerous organizations in the settlement supporting livelihoods.

The settlement is made up of 18 villages which are used in this study as units of data analysis. The villages are Makongeni, Mashimoni, Makina, Raila, Soweto East,

Soweto East, Kianda, Lindi, Laini Saba, Kambi Muru, Silanga, Olympics, Toi Market, DC Village, Karanja, Anyany, Kisumu Ndogo and Gatwekera. Anyany and Olympic and Karanja Estates have mixed formal and informal areas, and are therefore not included in some surveys as part of the Kibera informal settlement (Figure 1).

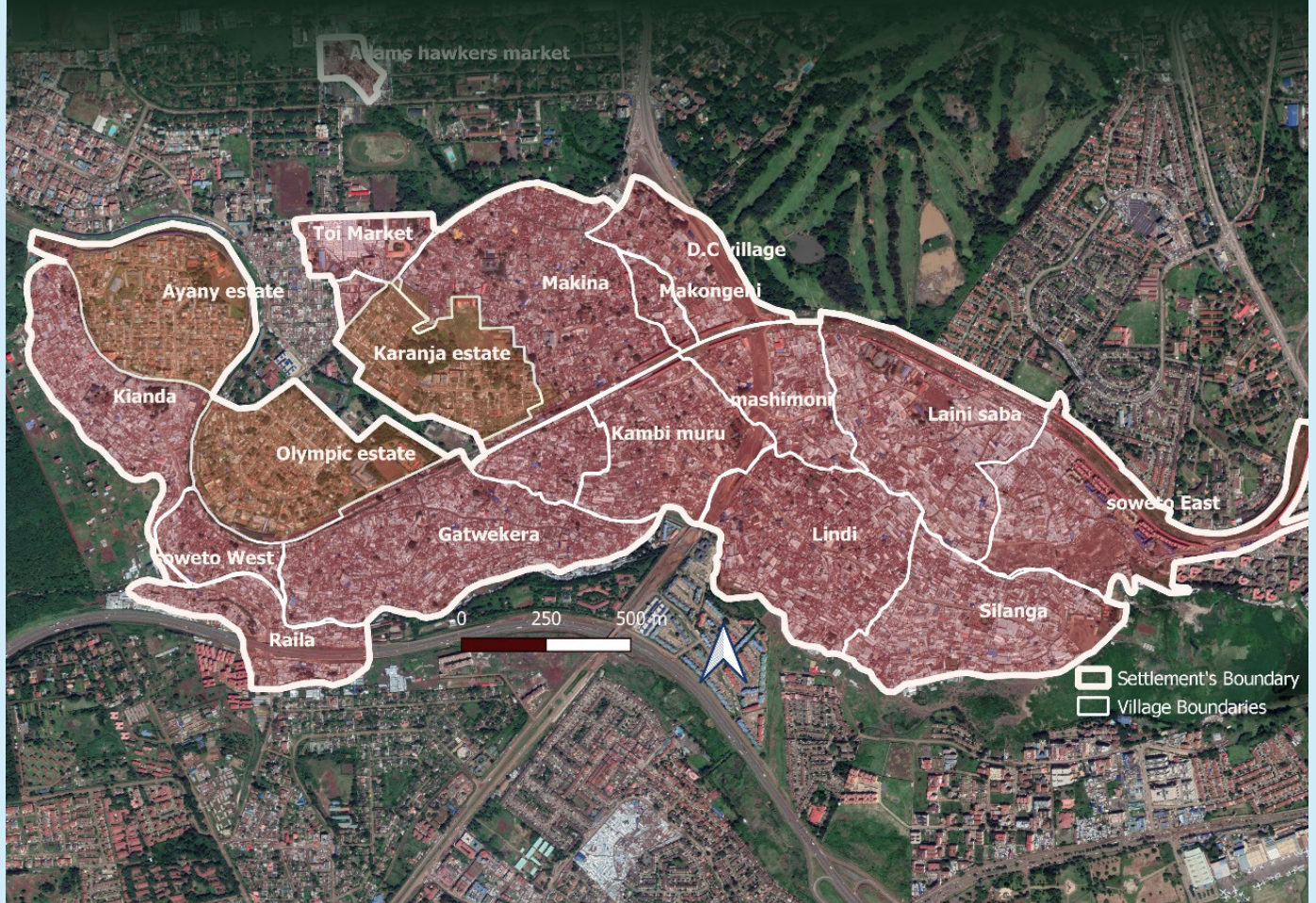


Figure 1: Kibera Settlement, its villages and settlement densities

1. Overview of all Facilities

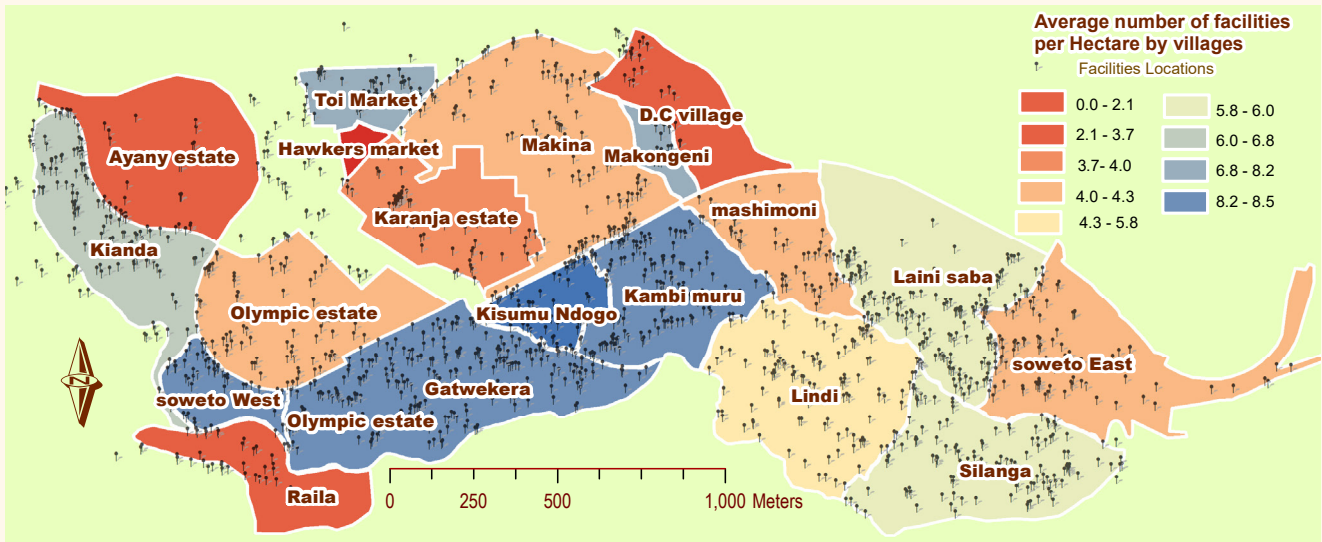


Figure 2: Facilities densities in the settlement

The settlement has a wide range of facilities and their distribution is not even across the villages. The central part of the settlement has the highest per area facility density.

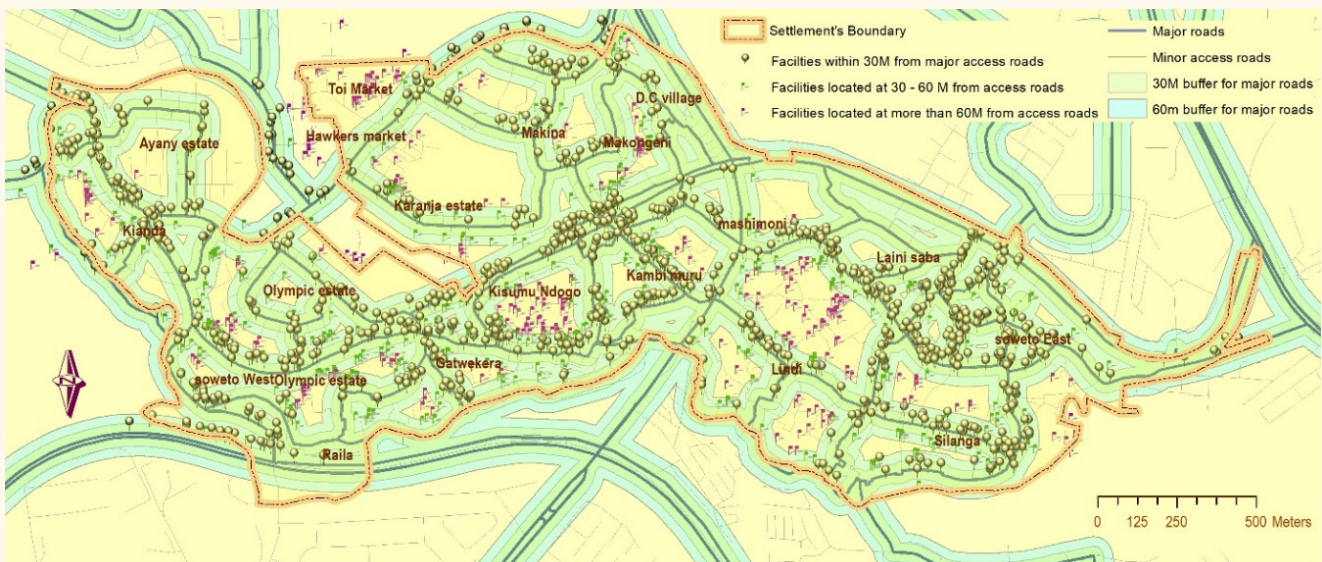


Figure 3: Locations of facilities relative to major roads

The survey data shows general clustering of facilities along major access roads with locations fronting major access roads having better access to key facilities such as floodlights, handwashing facilities and transport stops. While this is desirable for the fact that locations fronting the roads have more businesses and human interaction, it also implies disadvantage to locations not fronting the streets. Handwashing facilities, for example, near residential structure are considerably fewer than near business areas.

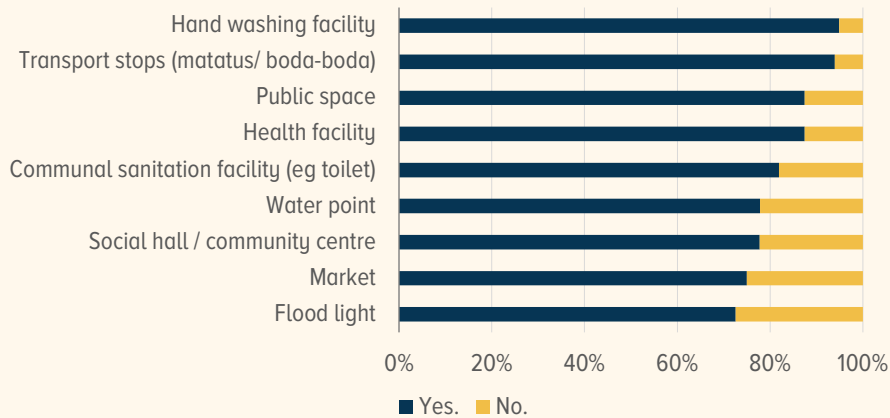
MAPPED FACILITIES BY TYPES



Water and sanitation facilities constitute the highest number of facilities in Kibera, accounting for 51% of all the mapped facilities.

Figure 4: Mapped facilities by types

FIGURE 5: FACILITY TYPES AND THEIR FUNCTIONALITY

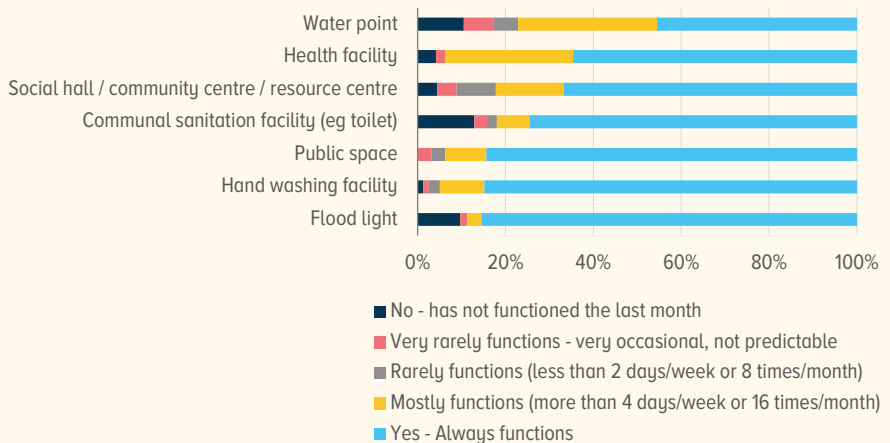


Generally, over 70% of all the mapped facilities are functional.

Facility types with high proportions of non-functioning facilities (with at least 20% of facilities not functioning) included floodlights, markets, resource centres/community centres and water points.

Figure 5: Facility types and their functionality

FACILITIES AND RELIABILITY LEVELS



With the exception of water points, at least 60% of all mapped facilities were reported to be always functioning. Low reliability of facilities was noted in water points, health facilities and social centres. This implies that these facilities may not provide a timely service in 30 – 50% of the times a resident requires it.

Figure 6: Facilities and reliability levels

FACILITIES AND THEIR RELATIVE CONDITIONS

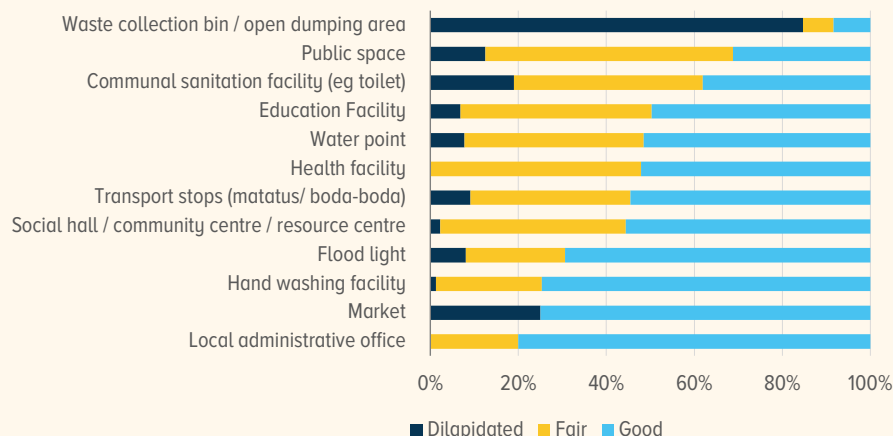


Figure 7: Facilities and their relative conditions

It is noted from the survey that waste collection areas are in concerning conditions, with only less than 10% identified to be in good conditions.

Other facilities are largely in fair conditions, key ones requiring attention being public spaces, communal sanitation facilities and water points.

FACILITIES AND THEIR MANAGING ORGANIZATIONS

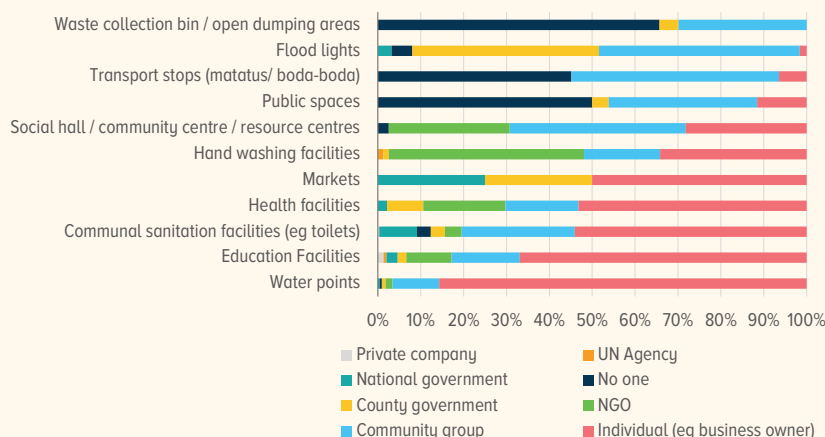


Figure 8: Facilities and their managing organizations

There is noted to be relationship between management of facilities, their conditions and reliability.

Private actors/ individual business owners have a huge role in the management of facilities in the settlement. Key facilities under private management are water points, sanitation facilities (toilets), education facilities and health facilities.

FACILITIES MANAGEMENT AND CONDITIONS

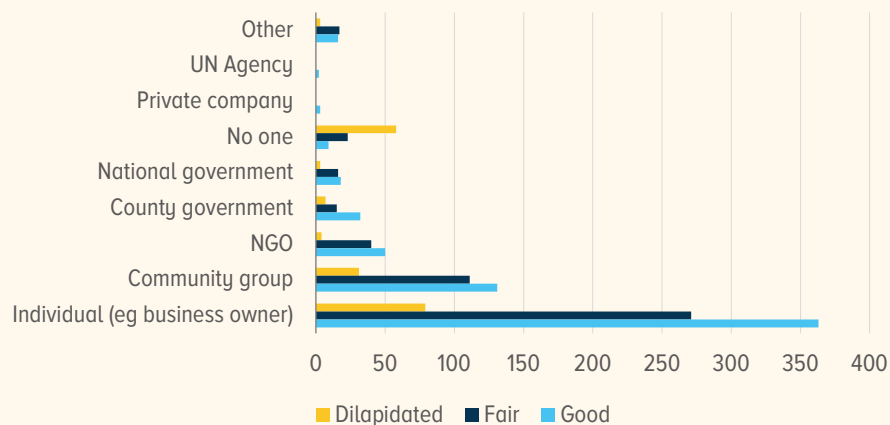


Figure 9: Facilities management and conditions

As privately run facilities are essentially businesses and profit oriented, this has implication on cost and affordability of services.

Additionally, it is noted that conditions of facilities have a relationship to their management.

Facilities with 'no one' directly in charge of their management, such as waste disposal areas and public spaces, are generally in poor conditions; facilities managed by individuals are in fair to good conditions.

FACILITIES THAT ARE JOINTLY MANAGED

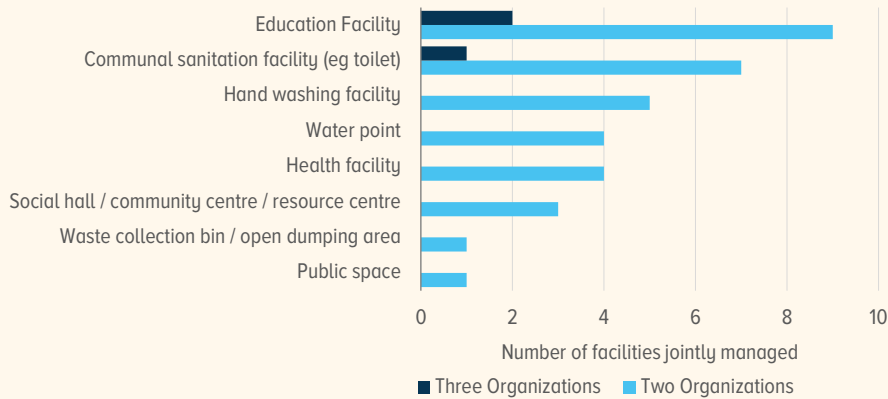


Figure 10: Facilities that are jointly managed

The settlement has a limited number of facilities (2.8%) being jointly managed – by more than one organization.

Collaboration is more among organizations in the management of education and WASH facilities.

Facility Types With Join Management	Organizations Collaborating in Management
Communal sanitation facility (e.g. toilet)	Individuals / business owner & Community group
Education Facility	NGO, Individuals / business owner & Community Groups
Hand washing facility	Individual, Individuals / business owner & Community group
Social hall / community centre / resource centre	Community group & NGO
Water point	Individuals / business owner, County government & Community Groups

Partnership is observed more among individual business owners, community groups and NGOs.

COMPARING PERFORMANCES OF SINGLE AND JOINTLY MANAGED FACILITIES

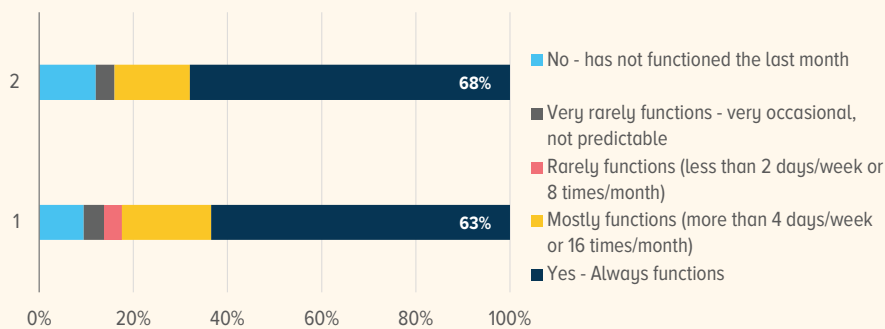


Figure 11: Comparing performances of single and jointly managed facilities

Jointly managed facilities perform slightly better in functionality than those managed by a single organization.

2. Access and State of WASH Facilities



Surveyed wash facilities include water points, handwashing facilities, communal sanitation facilities (toilets and bathrooms), and waste disposal locations. The four are discussed in this sub-section:

i) Water supply

There is a huge gap between access to water points and convenient access to water.

Water points density in Kibera is high, with over 60% of its settlement area having access to water points within 50 metres walking distance, and over 80 having access to water points within 100 metres.

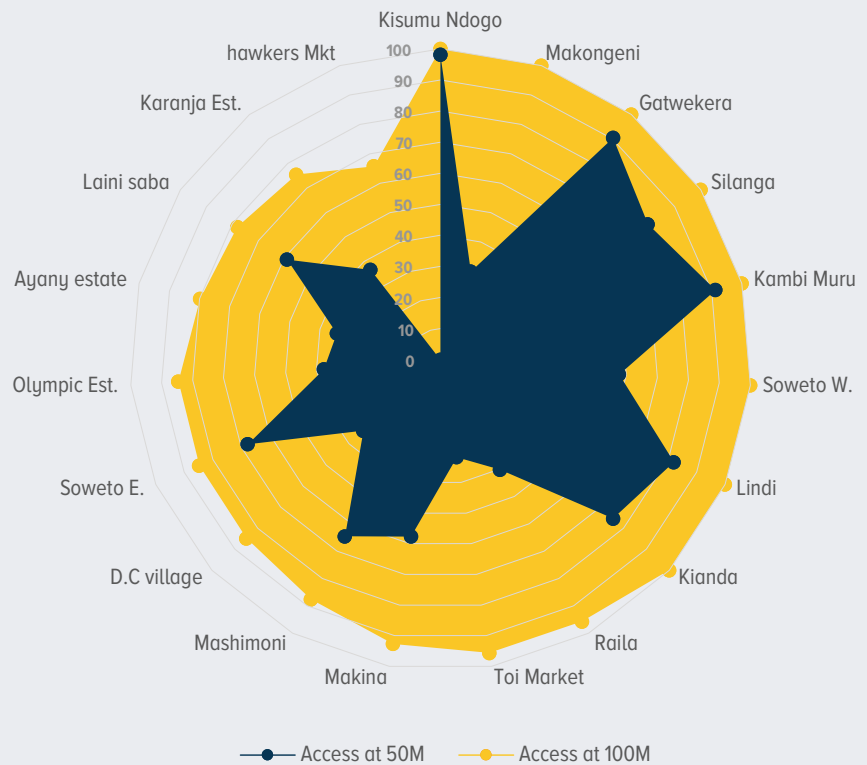


Figure 12: Access to water from settlement locations

Villages with poorer access to water points include Toi Market, Soweto West, Makongeni and DC Village. For these villages, establishment of additional water points is necessary.

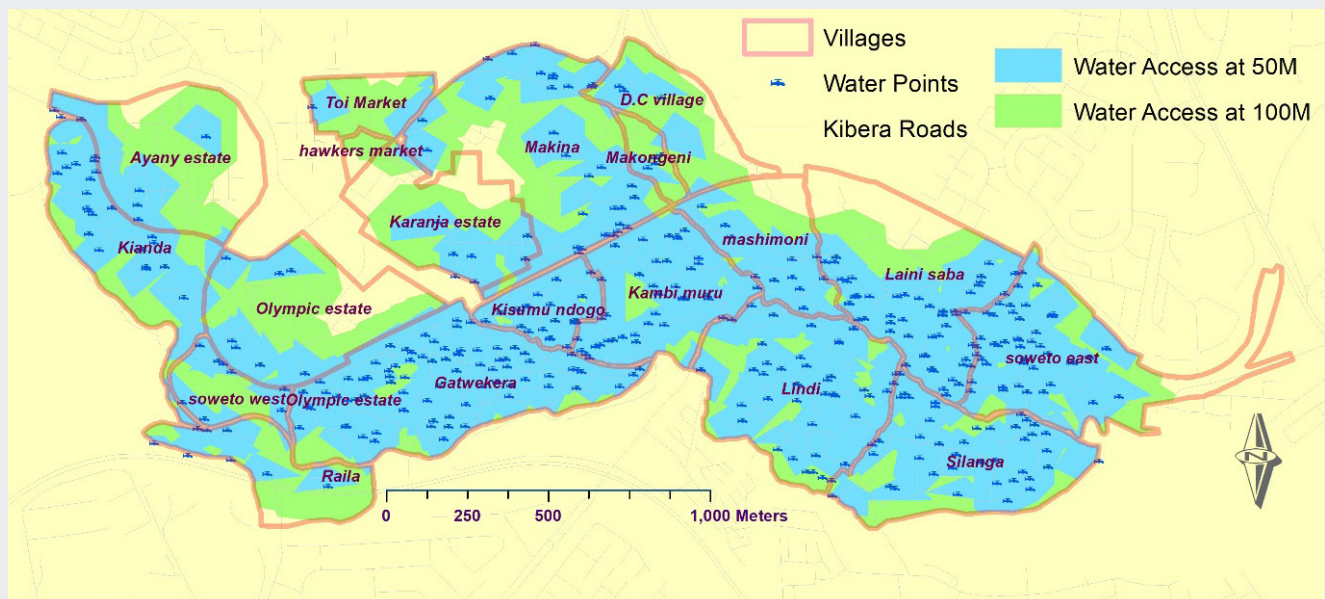


Figure 13: Locations and access to water points

The biggest challenge around water supply in the settlement is reliability, with about 50% of water points experiencing rationed supply in at least 3 days a week. The existing water points are in fairly good condition, with 8% being dilapidated.

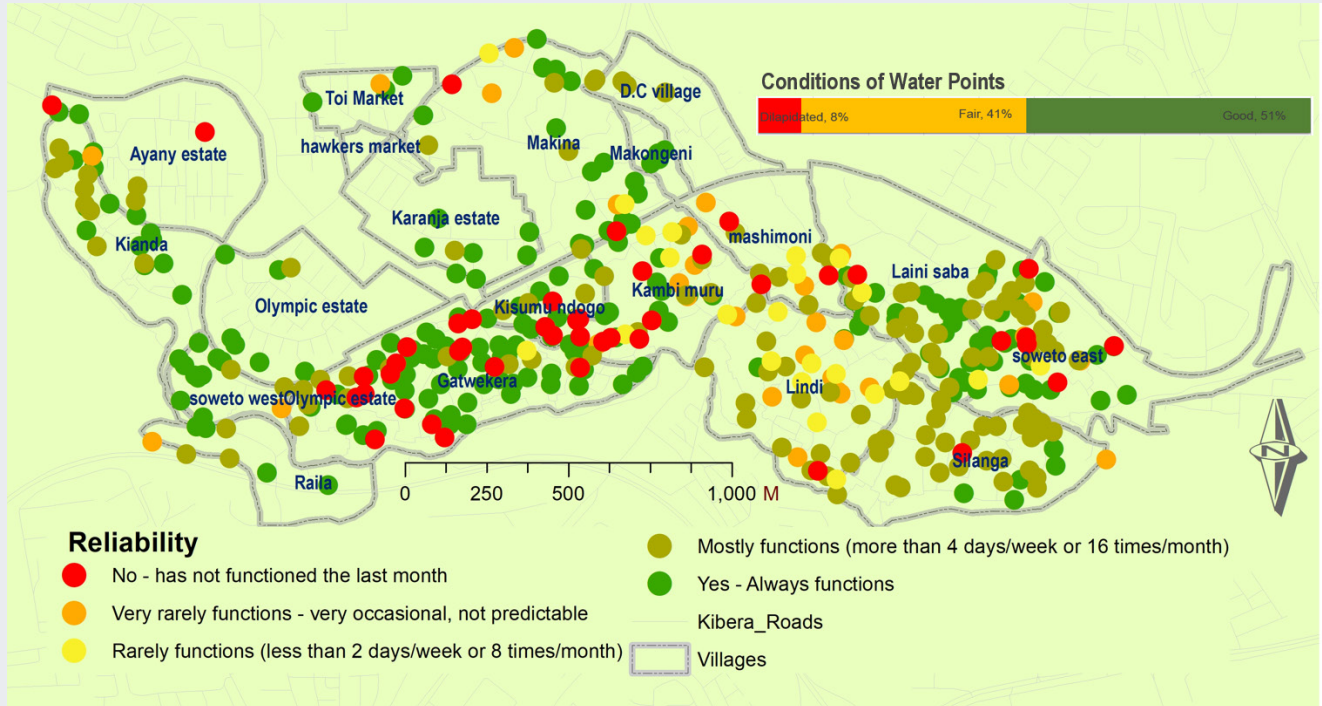
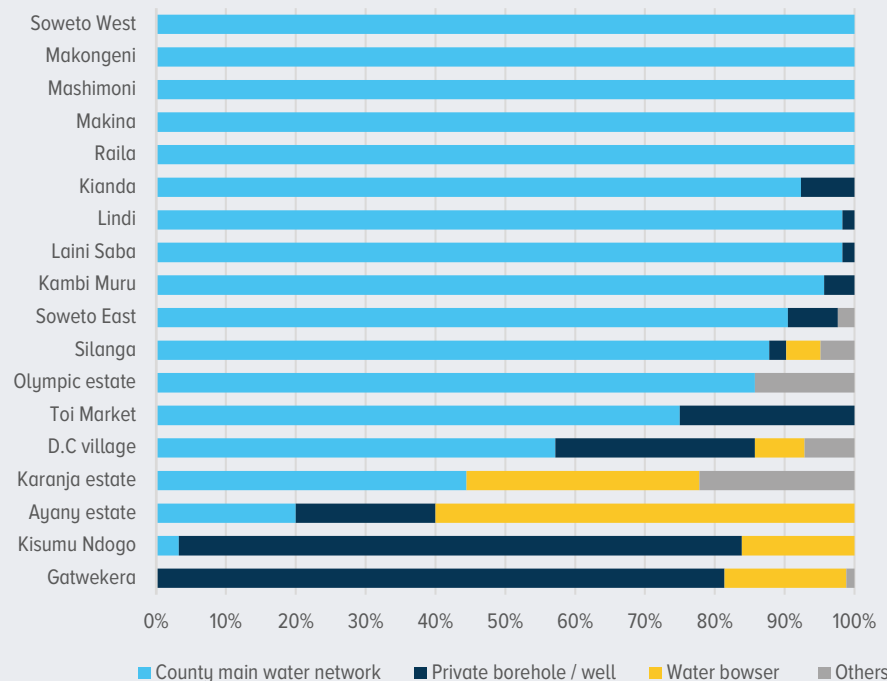


Figure 15: Locations and reliability of water points

FIGURE 16: WATER SUPPLY IN VILLAGES BY SOURCES

Water to the settlement is majorly sourced from the county main water network (Nairobi City Water and Sewerage Company). The villages of Gatwekera, Kisumu Ndogo, and Ayany are majorly supplied with water from a private borehole.



The survey mapped 43 actors involved in management and donation water in Kibera; the government and Athi Water Works Development Agency are major actors, with notable impact on Soweto East and Laini Saba villages. SHOFKO, an NGO, is also major actor in water supply, sourcing water from a private borehole. Majority of other actors are private individuals.

ii) Handwashing Facilities

A total of 79 handwashing facilities were mapped in the settlement. With the settlement having an estimated population of 250,000, this roughly translates into a population of over 2,000 persons per public handwashing facility. This is a clear indication that there is need to establish more handwashing facilities.

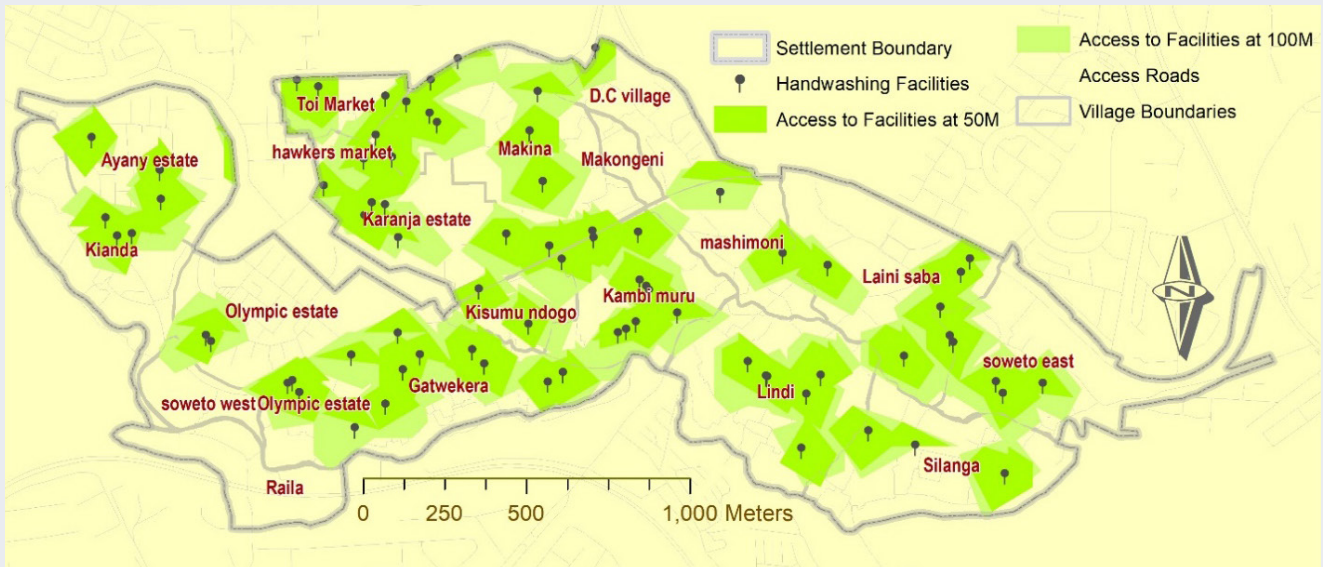
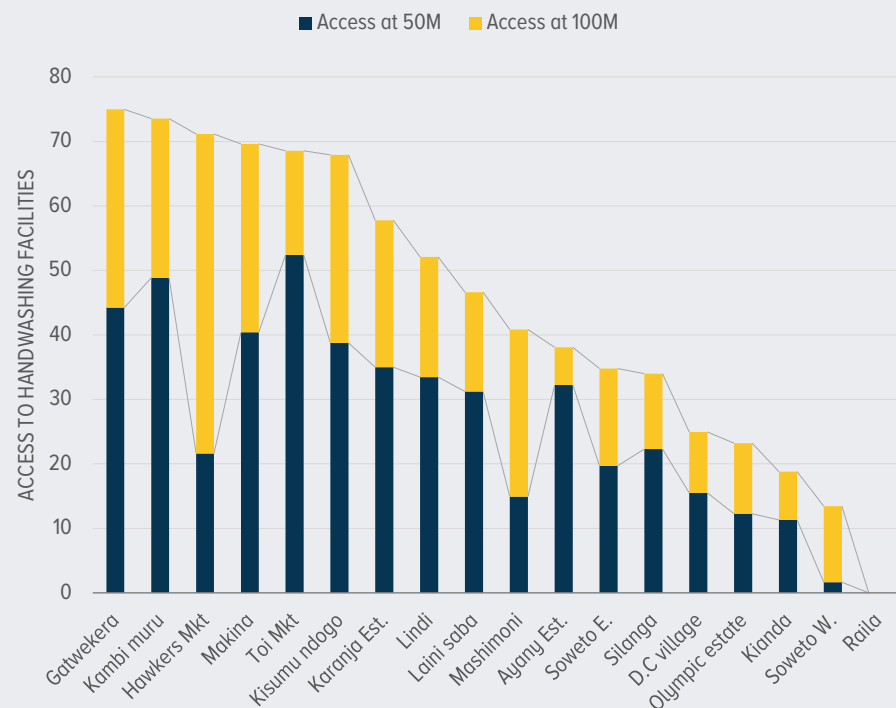


Figure 17: Locations and service coverages of handwashing facilities.

COMPARING VILLAGES' ACCESS TO HANDWASHING FACILITIES



Using spatial statistics, it is established that majority of the settlement's locations cannot access a handwashing facility within 100 metres. This proportion increases significantly at 50M, despite the fact that residents are unlikely to walk for 50 metres with a primary goal of accessing a handwashing facility.

This increases significantly at 100M, despite the fact that residents are unlikely to walk for 100 metres with a primary goal of accessing a handwashing facility.

Figure 18: Comparing villages' access to handwashing facilities

It is concerning that handwashing facility are generally not connected to piped water supply, with over 70% of them being manually fed. The settlement had the first handwashing facilities installed on February, and this increased through April, but declined in May. The decline in May is not desirable when data shows that many more facilities are required to satisfy the settlement's demand.

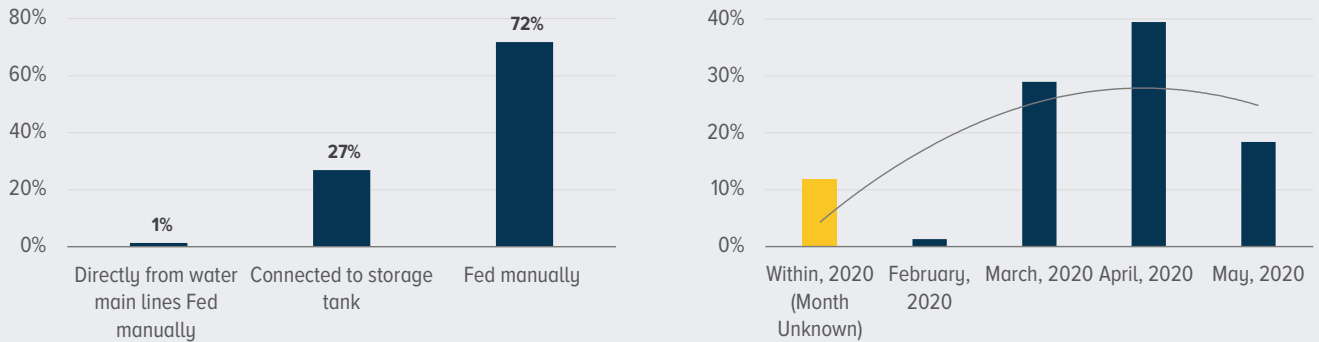


Figure 19 and 20: Water sources for, and number of mapped handwashing facilities

It is further noted that already 20% of the mapped handwashing facilities do not have water throughout the day, and 15% do not have soap throughout the day. These figures are high considering that most handwashing facilities have only existed for less than 3 months.

Mapping shows over 70% of handwashing facilities being located in close proximity to major access roads. These areas are predominantly business location, and having facilities near them implies more people are able to access the facilities. However, this also translates into proportionally fewer facilities on areas not fronting major roads, which are mostly dwelling areas.

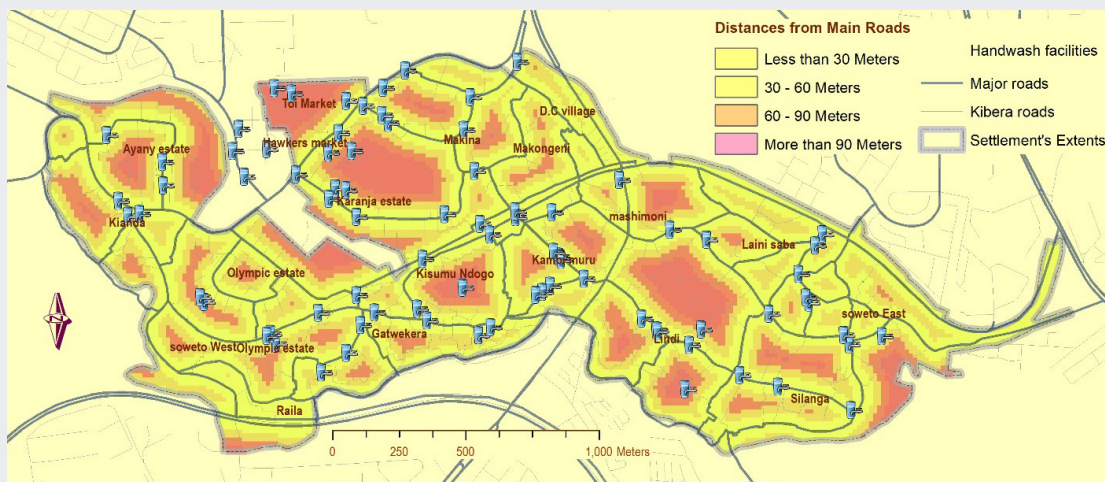


Figure 21: Facilities locations relative to major roads

Handwashing facilities serving huge populations of between 100 and 500 persons per day are mostly managed by community groups, NGOs. Location of high capacity facilities show evident spatial inequalities with Kianda, Raila, and DC villages lacking high capacity handwashing facilities.

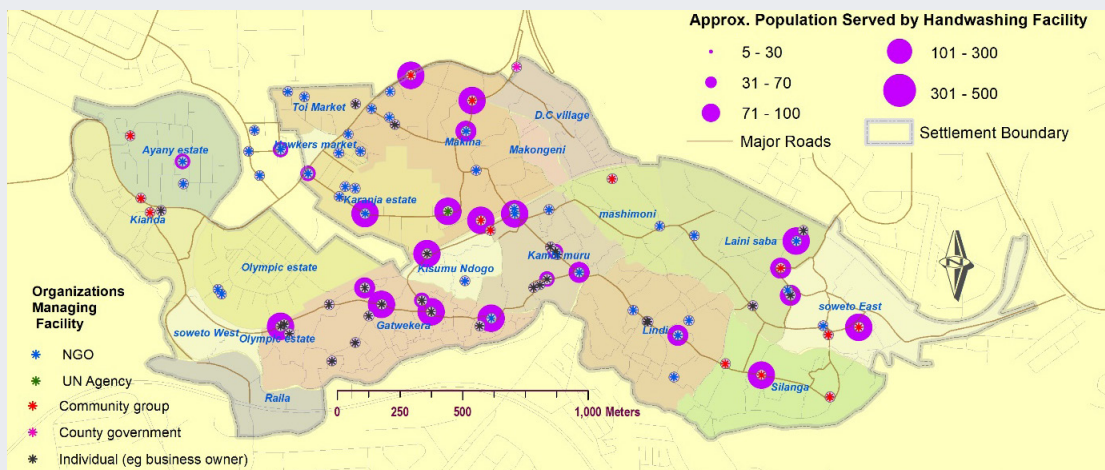


Figure 22: Locations, sizes and management of handwashing facilities

iii) Communal Sanitation Facilities

Facilities mapped under this category include toilets and bathrooms. Spatial distribution of sanitation facilities is skewed, with notable huge concentration of facilities around Gatwekera and Kisumu Ndogo. The settlement's fringe areas are poorly served.

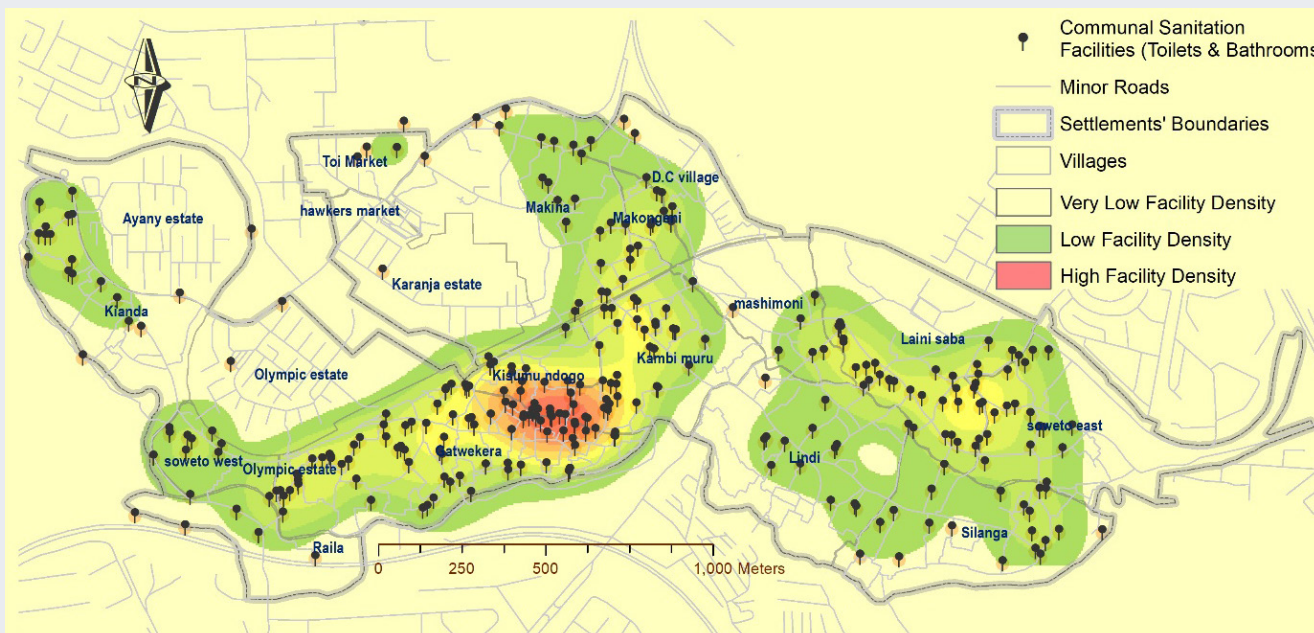
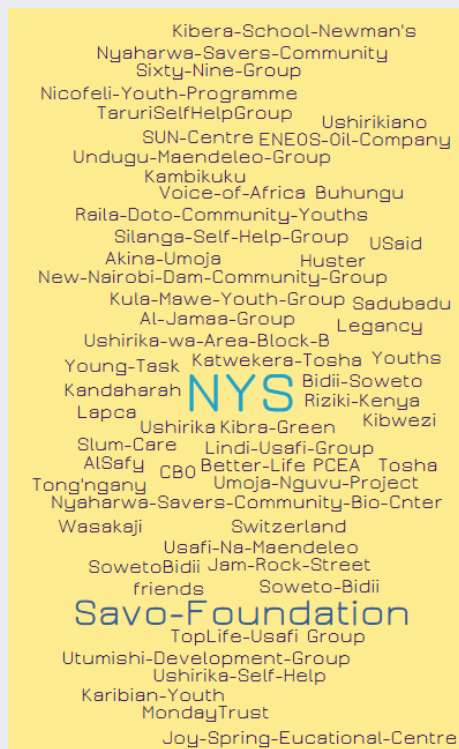


Figure 23: Locations and distribution of sanitation facilities

Management of sanitation facilities is under individual business owners (54%), community groups (26%), and the national government (9%); the rest is under NGOs and County Governments (each with about 3%). Facilities managed by individuals charge a fee of between Kes. 2 and 10 per facility use. This impacts on affordability of services and may be associated with open defecation and presence of 'flying toilets'.

The settlement has more than 55 organizations managing sanitation facilities and over 50 donors, half of the donors being individuals. It was however noted that, despite having numerous organizations operation in the settlement, there are spatial inequalities in service provision, pointing to gaps in partners' coordination.

Organizations Managing Sanitation Facilities



Sanitation Facilities Donors



Figure 24 and 25: Organization involved in the management and donation of sanitation facilities

While over 80% of sanitation facilities are functioning, only 38% are in good conditions, the rest being in dilapidated to fair conditions. Gatwekera and Lindi leads in facility density, but have also the highest number of non-functional facilities.

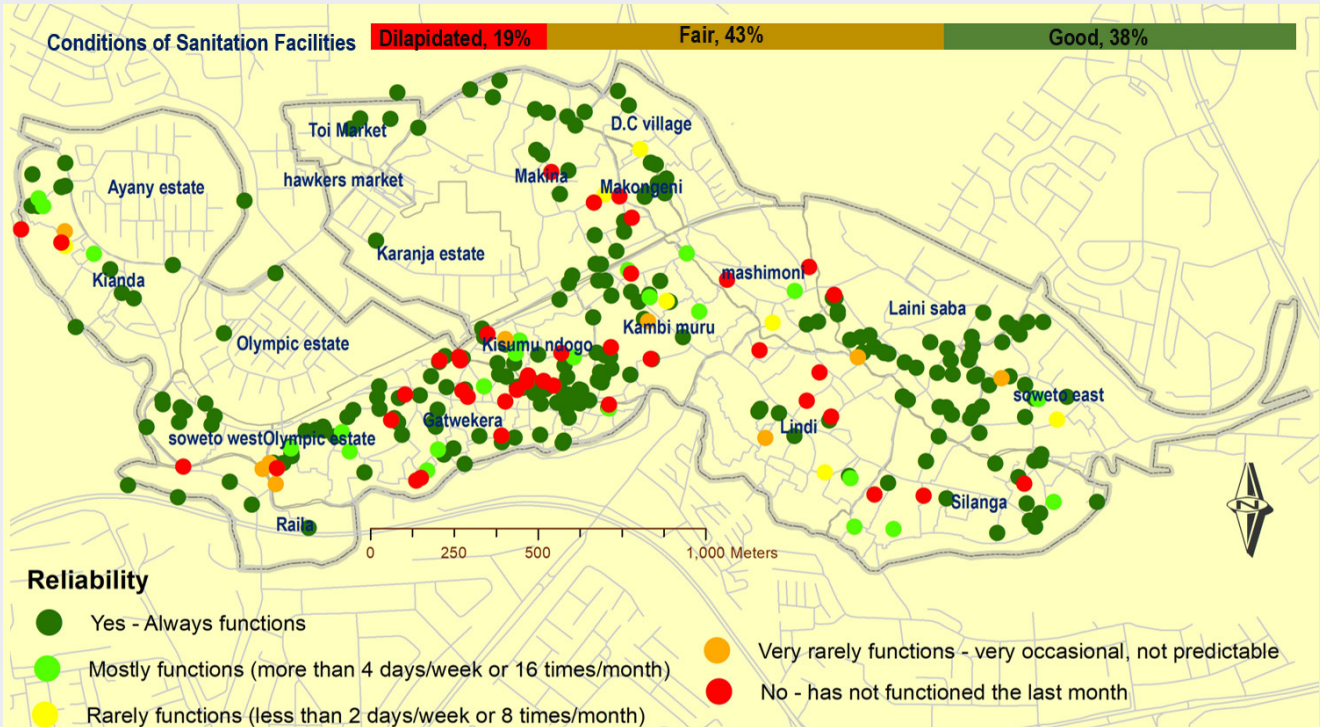


Figure 26: Locations, reliability and conditions of sanitation facilities

iv) Solid Waste Management

The settlement has generally a poor system of solid waste management with more than 85% of the solid waste locations mapped being in dilapidated states. The nature of most of the facilities use is open dumping, which includes waste dumping on roads, the Nairobi river and the railway reserve.

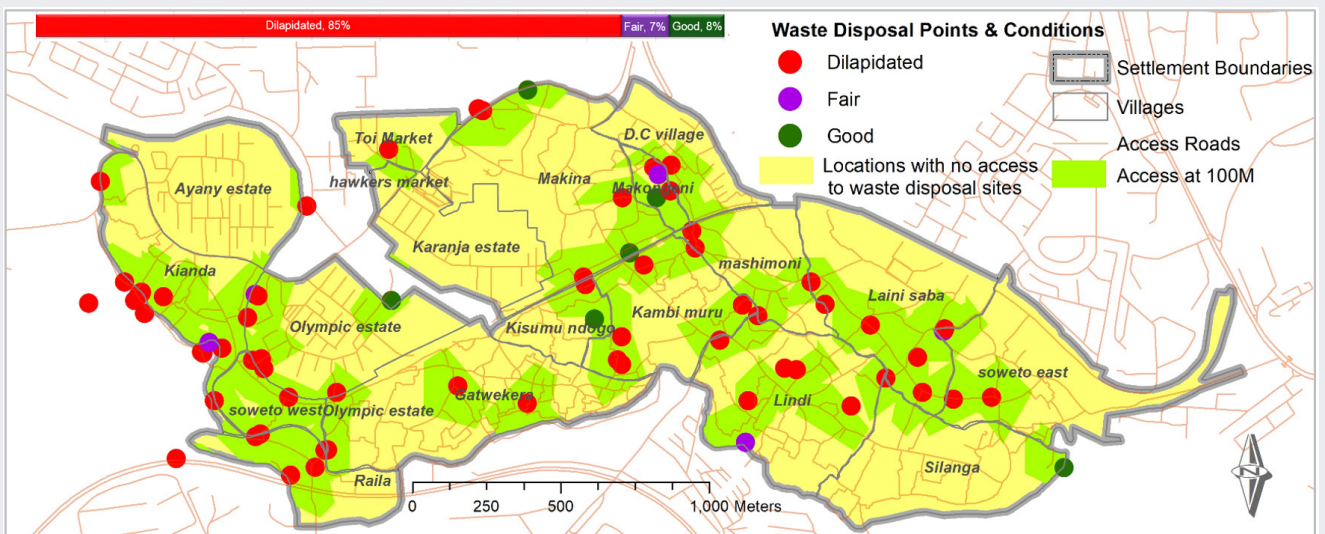


Figure 28: Location, state and conditions of waste management facilities

3. Access and State of Health Facilities



The survey identified 34 health facilities, 6 of which are health centres. The health centres are spread out across the settlement with the furthest distance from any village location being 700 metres. Forty-six (46) chemists were mapped, with their concentration being along major access roads.

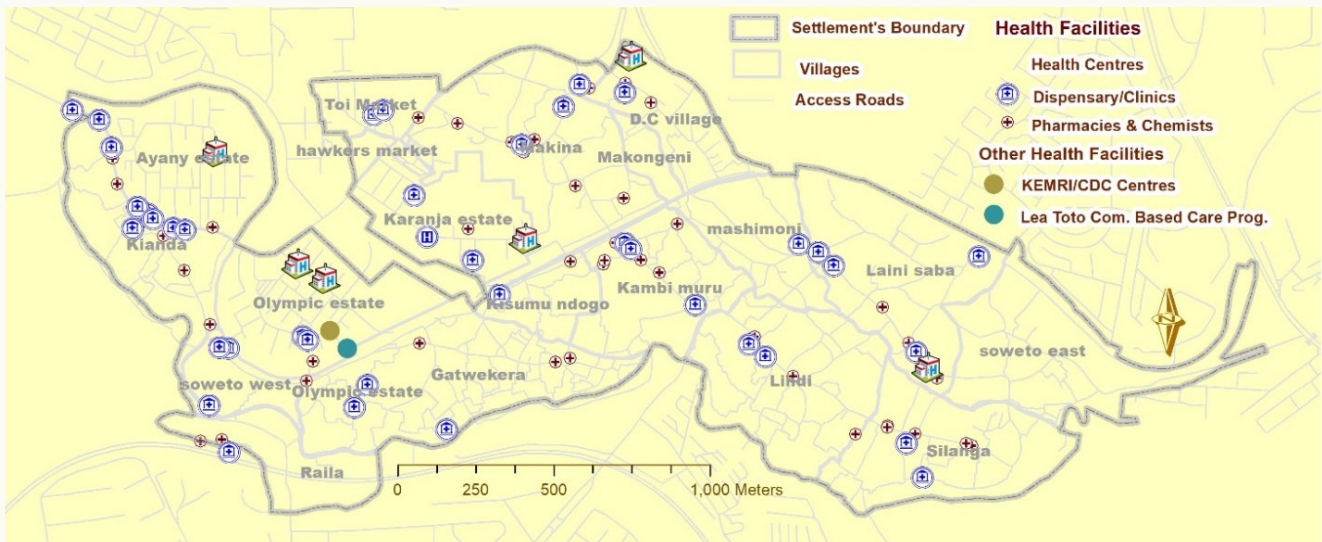


Figure 30: Locations, levels and distribution of health facilities

It is notable that management of the health services in the settlement is largely in the hands of the individual business owners. Despite the fact that existing facilities are too few for the settlement’s population (with population per health centre ratios of up to 50,000 people), cost and affordability of services are affected by the fact that access to health services is managed by the private sector.

HEALTH FACILITY LEVELS AND THEIR MANAGEMENT

It is notable that management of the health sector in the settlement is largely in the hands of the individuals business owners.

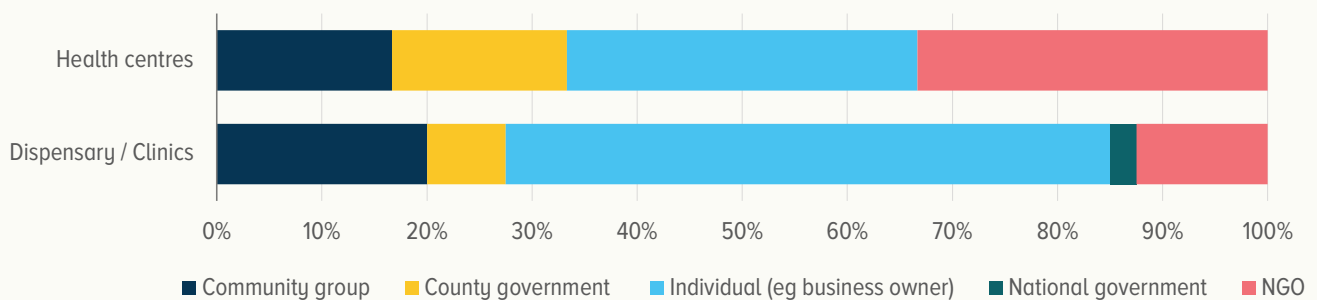


Figure 31: Health facility levels and their management

4. Access and State of Education Facilities



The settlement has a high density of education facility, and populations generally need to walk for short distances to access an education facility. In total 35 baby care centres, 43 kindergartens, 106 primary schools, 18 secondary schools, 2 vocational/ technical centres, 2 children’s centre and 2 libraries were mapped. No adult learning facility was mapped.

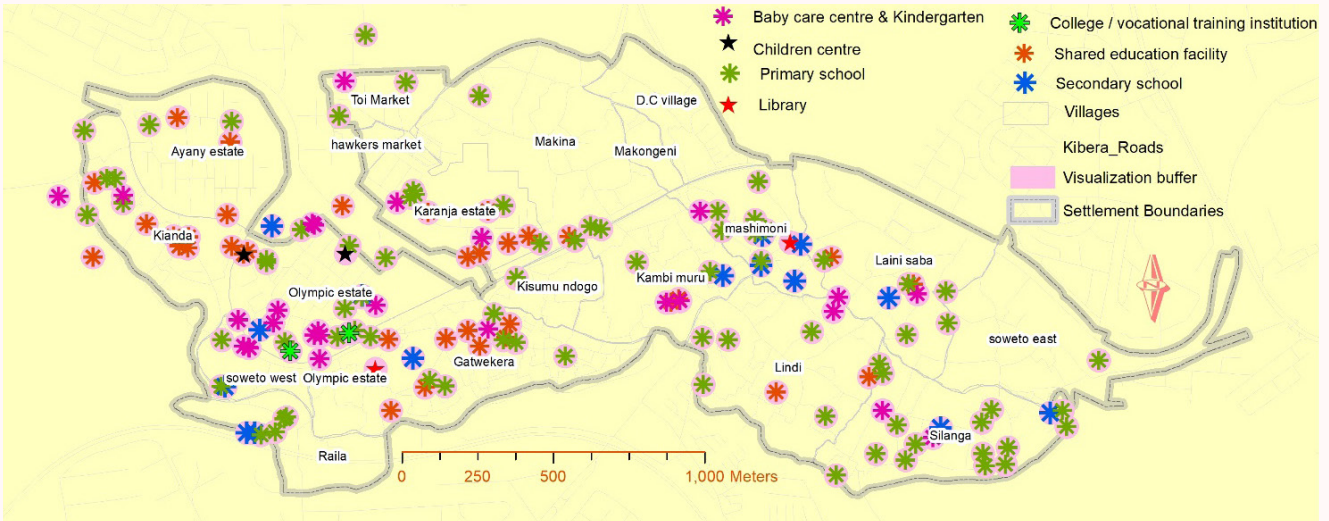


Figure 32: Locations and levels of education facilities mapped

Beyond access to facilities, it is noted that the settlement is compact, and over 90% of the education facilities are in cramped spaces that do not meet general space standards for schools. This is evident for their lack of green areas and at least a standard sports field. With the introduction of new space standards in schools – in response to COVID-19 – the settlement inevitably requires additional spaces which is currently not available. There is need for early and wider stakeholders’ discussion to address this concern.

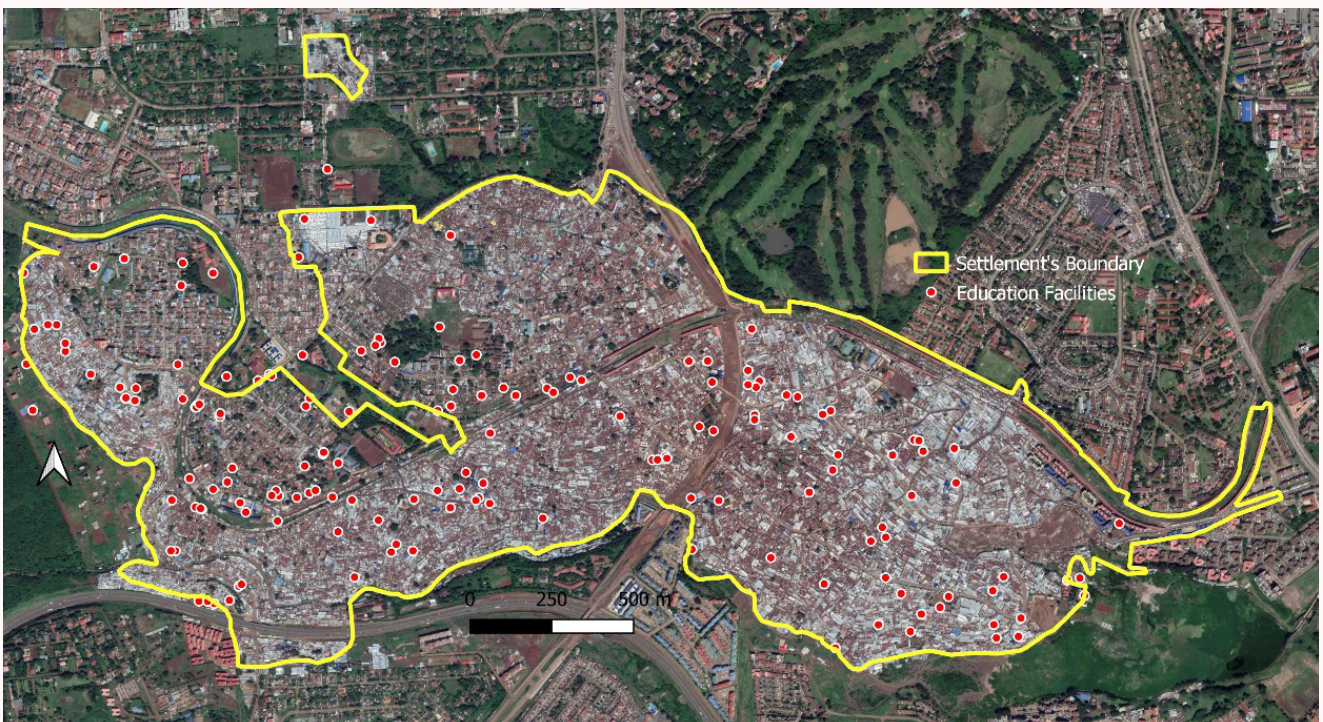


Figure 33: Assessment of locations of education facilities against space availability



5. Access and State of Social / community Halls

The survey mapped 46 community/social halls. Some villages have better access to hall facilities than others. While Kianda and Gatwekera villages have numerous halls within the villages, Soweto West, Lindi, mashimoni and D.C. villages do not have access to community halls within the villages. Similar to education facilities, mapped community halls are in congested spaces, and may on average only accommodate 30 persons when recommended social distances are observed.

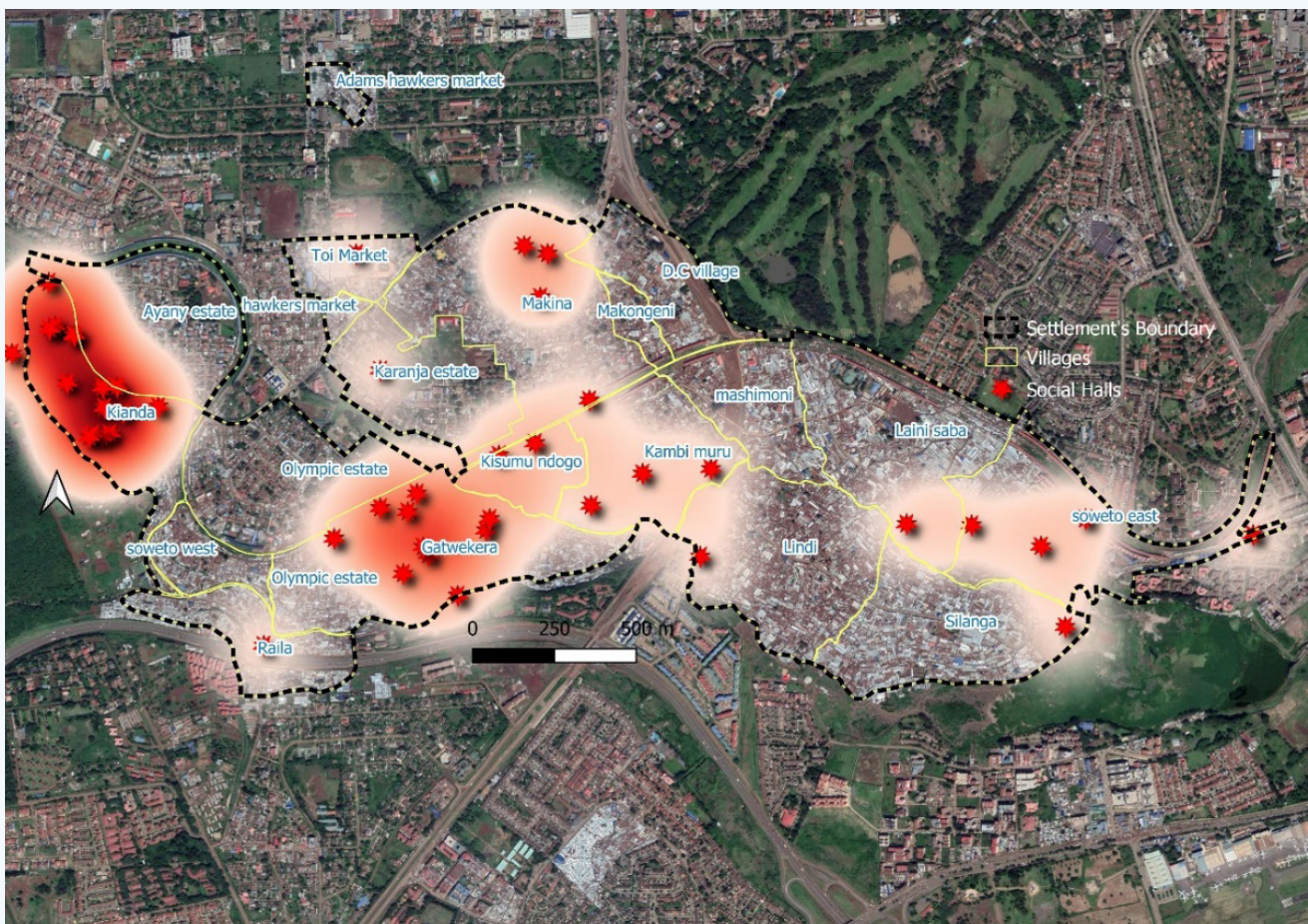


Figure 34: Locations of social halls

Survey show that halls lack access to essential services with at least 80% of them lacking solid waste systems and sewer connection, 60% lacking water connections, 40% lacking toilets and 30% lacking electricity.

ACCESS TO SERVICES IN SOCIAL HALLS

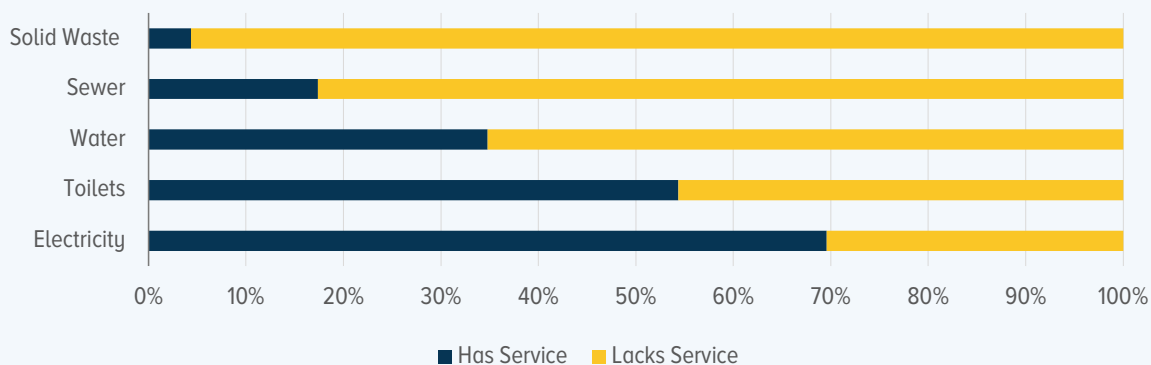


Figure 35: Access to services in social halls



6. Access and State of Public Spaces

The settlement has an acute shortage of public space, with only 1.92% of its land area being under public spaces.

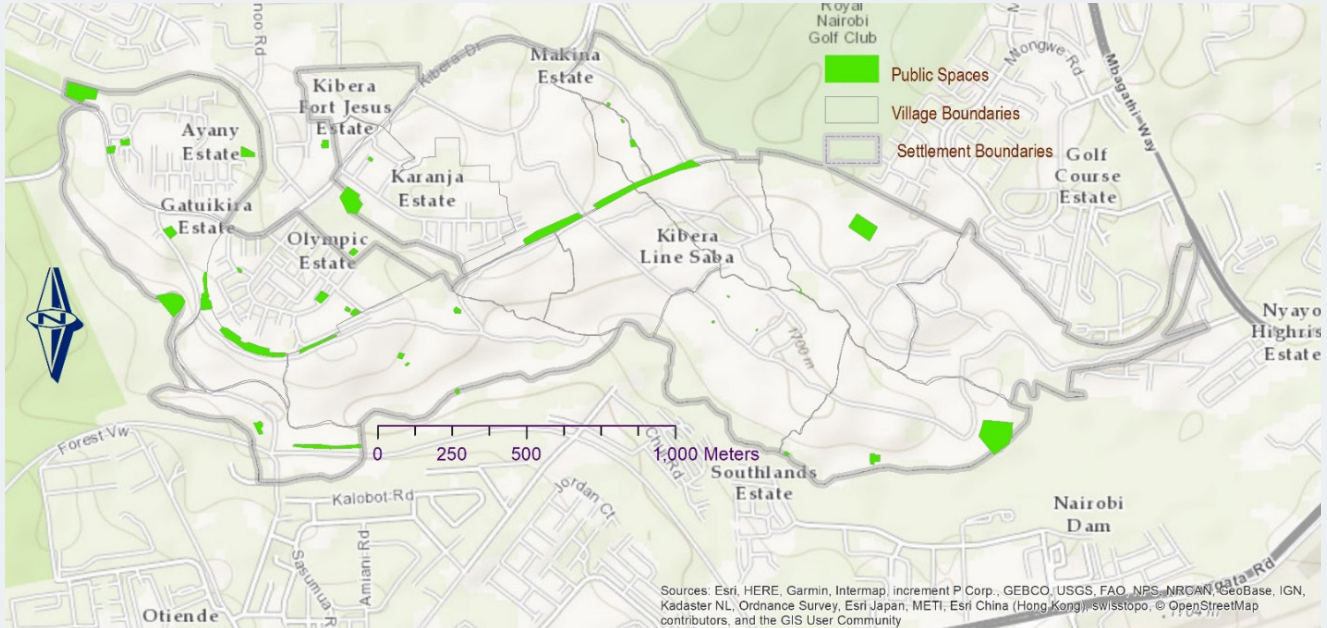


Figure 36: Locations of open spaces

The settlement has an acute shortage of public space, with only 1.92% of its land area being under public spaces.

PROPORTION OF SETTLEMENT UNDER OPEN SPACES BY VILLAGES

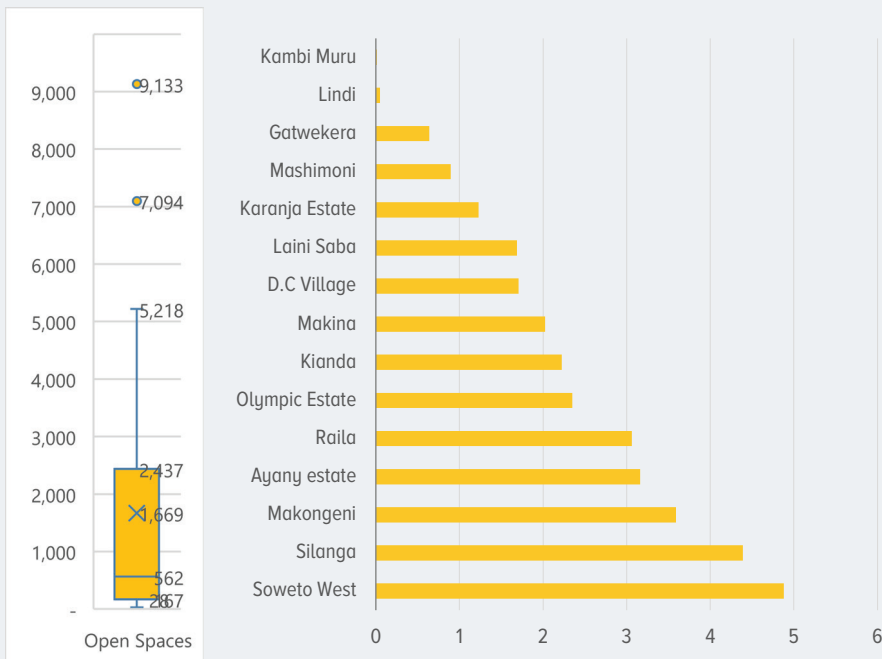


Figure 37 and 38: Sizes of public spaces and distribution by villages

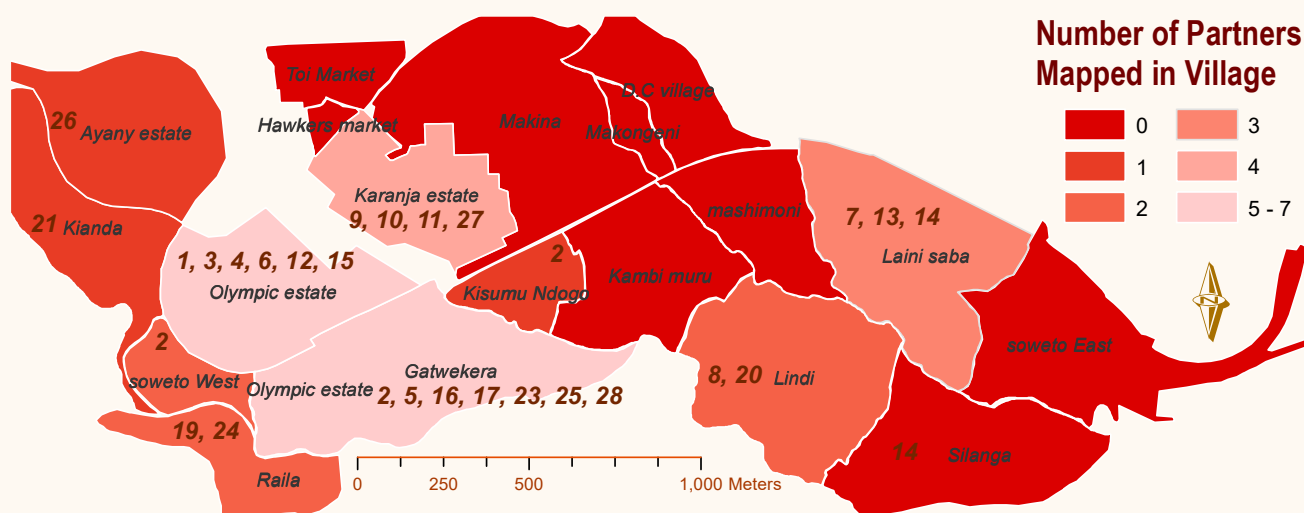
The public spaces in the settlements are small in size with the largest being about 9,000 M2. The average size of public spaces is 562M2, which is about the size of a volleyball pitch.

7. Assessment Development Partners Operations and Reach



The survey identified at least 75 organizations with programmes within the settlement, out of which 23 have offices with the settlement. Majority of the organization have at least one component of WASH in the programmes. About 60 organizations were mapped as being involved in the management of either water points or sanitation facilities. There are equally numerous facilities donor in the settlement, majority being individual businessperson and/or politicians.

A key observation from partners' mapping is that organization in the settlement operate in their preference localities, with some areas having more actors than others. This could explain the reason some locations appear underserved while other appear overserved.



Key observations

The following are key observation from the mapping:

1. The settlements of Kibera is considerably at a higher risk of disaster and infectious diseases spread because of its high built up and population densities.
2. Distribution of key facilities is not balanced in the settlement, and there is need for spatially targeted interventions.
3. There is concentration of facilities such as handwashing points and security lights along major access roads; while the major access roads are activity hotspots, there is need to extend services to the fringe areas of the settlement.
4. Generally, facilities that are jointly managed by organizations are more reliable; while joint management of facility is desirable, the settlement has only a few jointly managed facilities.
5. The settlement has numerous WASH facilities as well as agencies supporting them; however, there are still water accessibility challenges because of low facility reliability. There is need for action in improving water reliability.
6. The settlement has a high population per handwashing facility ratio. More facilities are required in the settlement, and with over 70% of the facilities being manually fed, a sustainability plan would involve connecting major handwashing facilities to the piped water network.

7. There is a huge action gaps in solid waste management for Kibera; more than 70% of waste collection sites are in dilapidated conditions and under no one's management.
8. While the settlement has numerous education facilities, the schools are located in congested spaces with over 90% of them lacking standard recreational/sports spaces.
9. Partners operating in the settlement have more activities in a few villages; in effect, some villages are clearly underserved while others are overserved; partners' coordination is key in this regard.
10. The settlement has an acute shortage of open spaces with only two sites being bigger than 5,000 M2. To meet recommended space standards, there is need for stakeholders' dialogue, with a strong focus on long term settlement planning.
11. It has been noted that the community in the settlement would wish to have COVID-19 isolation places within the settlement; however, data shows that the settlement lacks spaces that meet isolation standards. In this regard, there is need to sensitize the community on isolation centres standards and implications of isolation outside the settlement.

