

Informal settlements' vulnerability mapping in Kenya

FACILITIES AND PARTNERS' MAPPING IN NAIROBI AND KISUMU SETTLEMENTS



The Case of Mathare

June, 2020





An overview of Mathare slum, Nairobi, Kenya © Julius Mwelu / UN-Habitat

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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.

Presentation of Mapping Outputs

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



MATHARE SETTLEMENT

The Mathare informal settlement is the second largest informal settlement in Kenya after Kibera. It has a long history of existence and is currently home to 206,564 people according to the National Housing and Population Census (2019). The settlement is characterized by hundreds of structures, densely packed and laid out without adhering to spatial layout guidelines. Many residents in the settlement work in the informal business sector inside the settlement and also in the estates surrounding the settlements.

The settlement is largely classified into 13 villages, which are used as units of data analysis in this survey. The villages are Kiamutisya, Village 1/Mlango Kubwa, Kosovo, Village 2, Mathare 3A, Mathare 3B, Mathare 3C, Mathare 4A, Mathare 4B, Mashimoni (including Mashimoni Village 10), Kwa Kariuki, Gitathuru and Mabatini. For having poor access to sanitation facilities, affordable healthcare, sustainable job opportunities, residents

in the settlement are highly exposed to health, economic and social shocks caused by COVID-19.

In character, Village 1/Mlango Kubwa and Village 2 are different from the rest of the settlement in that they have shacks mixed with apartments, some of which have sanitation facilities and water points within the apartment blocks.



Figure 1: The Mathare settlement and its villages

1. Overview of all Facilities



From the 1,122 data points mapped, it was observed that, while the villages' population densities are almost even across the settlement, densities of facilities in the settlement vary, with Village 1 and Kosovo having the highest facilities' densities per area. Village 2, Mathare 3C, Mathare 4A, Kiamutisya and Kwa Kariuki have the lowest facilities' densities per area. As a result, some villages/communities are clearly underserved which shows the need for spatially targeted provision of services.

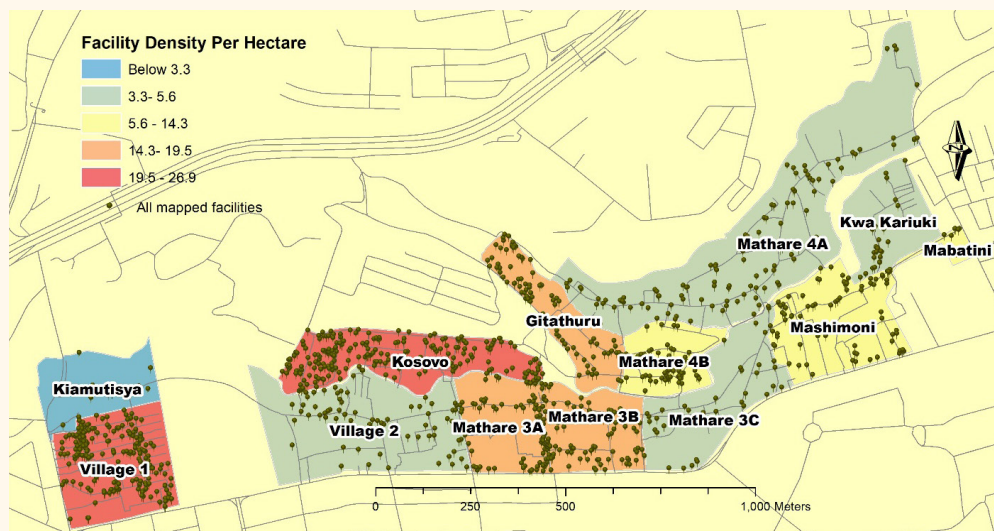


Figure 2: Facilities' densities by villages

Clustering of facilities is observed in certain localities, most of which are identified as locations of major human interactions. These locations are in Village 1 / Mlango Kubwa, which is a major entry point to the settlement from Juja Road, and Kosovo, also a major entry point to the settlement but from Thika Road.

Spatial analysis revealed that there are generally more facilities in close proximity to major roads, which are also locations of businesses and major human interaction. This implies better access to facilities by more people, but also a disadvantage to locations not fronting major roads.

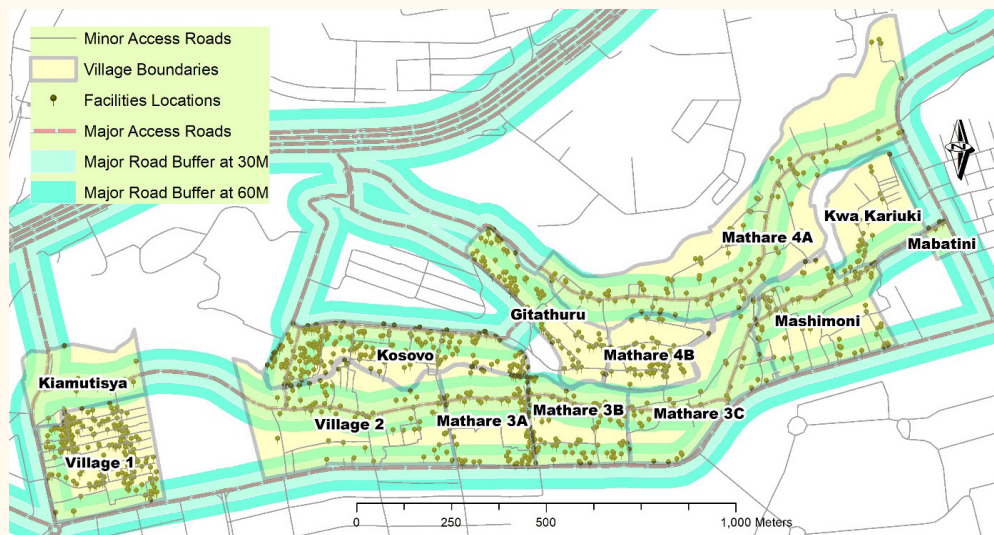


Figure 3: Locations of facilities relative to major roads in the settlement

MAPPED FACILITIES BY TYPE

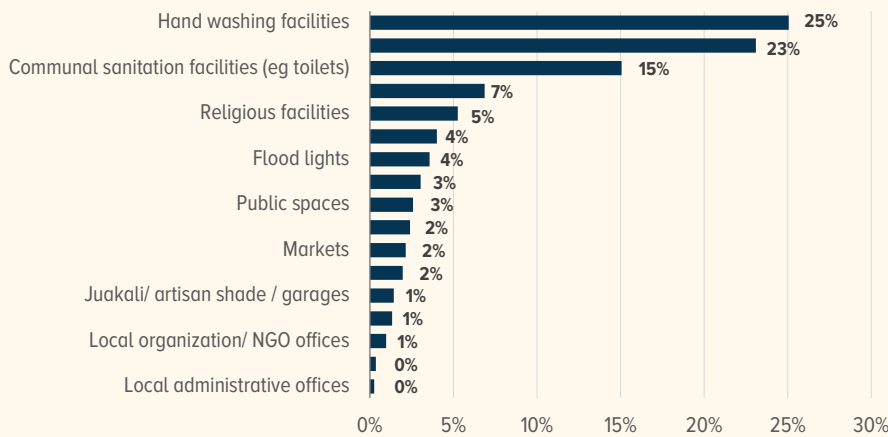


Figure 4: Mapped facilities by type

Majority of the facilities mapped are in the WASH (Water, Sanitation and Hygiene) category (hand washing, water points and sanitation facilities – toilets and bathrooms). This is an indication that service providers in informal settlements have put considerable efforts in improving WASH, which is a critical sector in maintaining healthy living.

FACILITY TYPES AND THEIR FUNCTIONALITY

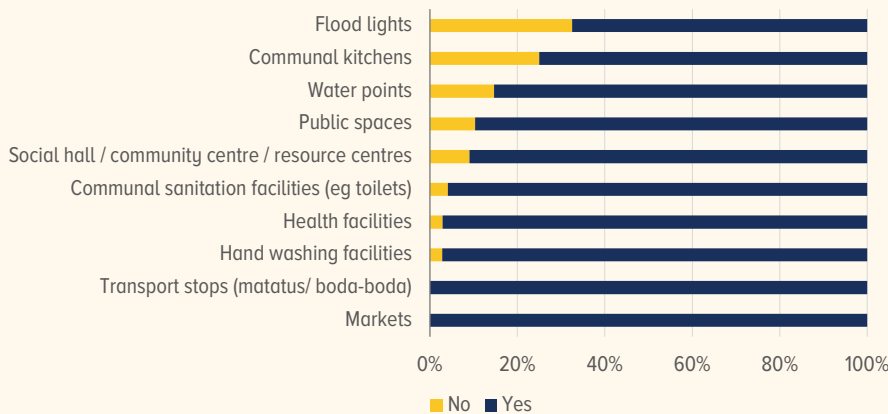


Figure 5: Facility types and their functionality

The survey established that existing facilities in the settlements are mostly functional; floodlights, kitchens and water points were identified as having the highest proportions of non-functional facilities; these are key action areas in prioritized intervention.

COMPARING RELIABILITY OF FACILITIES BY TYPE

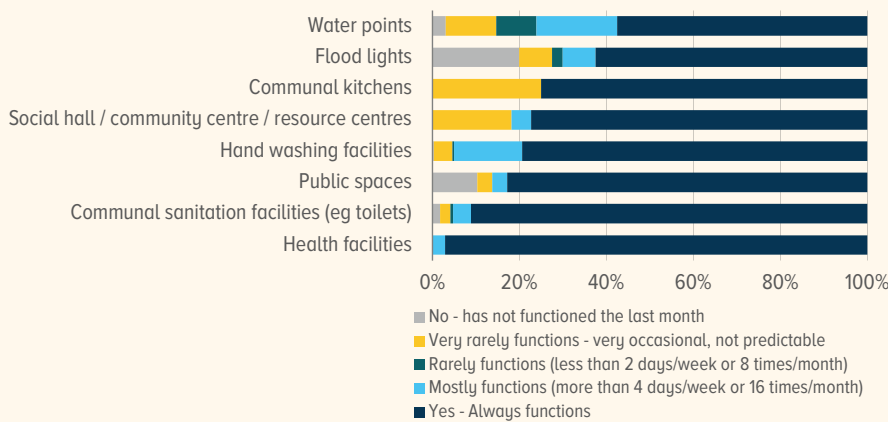


Figure 6: Comparing reliability of facilities by type

Additionally, water points and floodlights were identified as having lowest levels of reliability of all the mapped facilities.

COMPARING CONDITIONS OF FACILITIES BY FACILITY TYPE

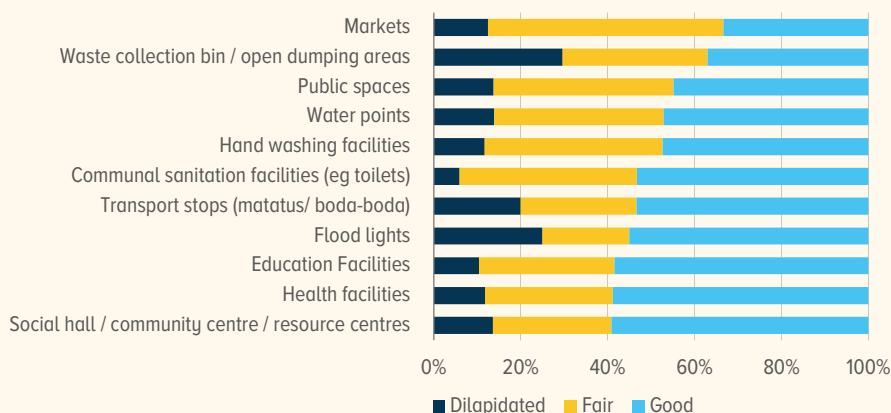


Figure 7: Comparing conditions of facilities by facility type

In terms of conditions, most facilities are in fair condition, with markets, waste collection areas, public spaces and water points having the least proportions of facilities in good conditions. The survey identifies gap and proposes a focus on hygiene improvement in market areas, public spaces and waste collection points.

FACILITIES AND MANAGING ORGANIZATIONS

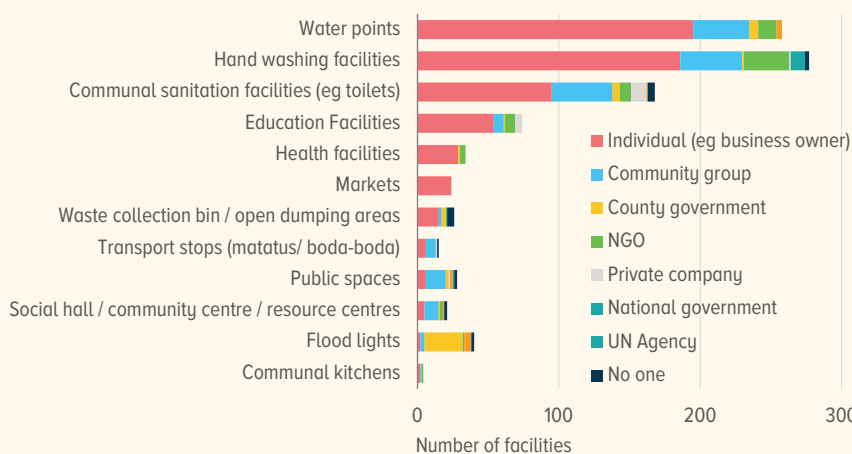


Figure 8: Facilities and managing organizations

There is noted to be a relationship between management of facilities, facilities' conditions and their reliability. Data shows that the private actors/ individuals have a huge role in the management of key facilities in the settlement. Key facilities mostly under private management include water points, sanitation facilities (toilets), education facilities, health facilities and markets. This has an implication on cost of services and –with informal settlements known to have predominantly low income earners – this understandably has an impact on affordability of services.

FACILITIES MANAGERS AND THEIR CONDITIONS

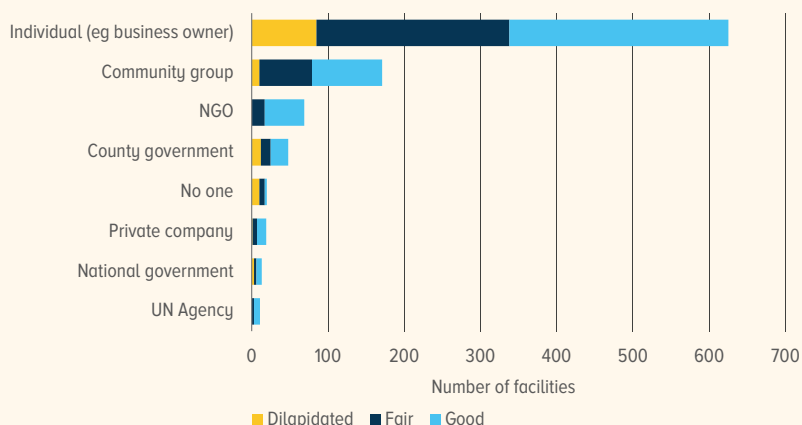


Figure 9: Facilities managers and their conditions

Organizations that have majority of the facilities they manage in good conditions include NGOs and private companies. Their facilities' numbers are however proportionally very small compared to facilities managed by individuals.

MANAGEMENT OF FACILITIES AND FACILITIES' RELIABILITY

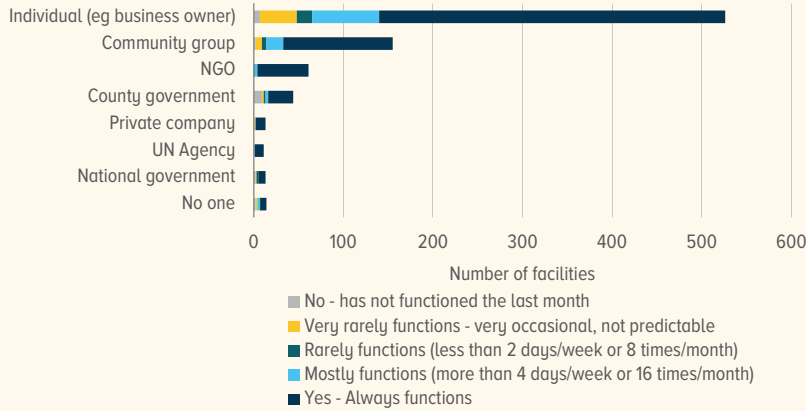


Figure 10: Management of facilities and facilities' reliability

In terms of reliability of facilities, the survey identified a significant number of unreliable facilities; apparently, a huge majority of mapped facilities are always functioning, with NGOs and community group managed facilities being comparatively more reliable.

NUMBER OF FACILITIES JOINTLY MANAGED

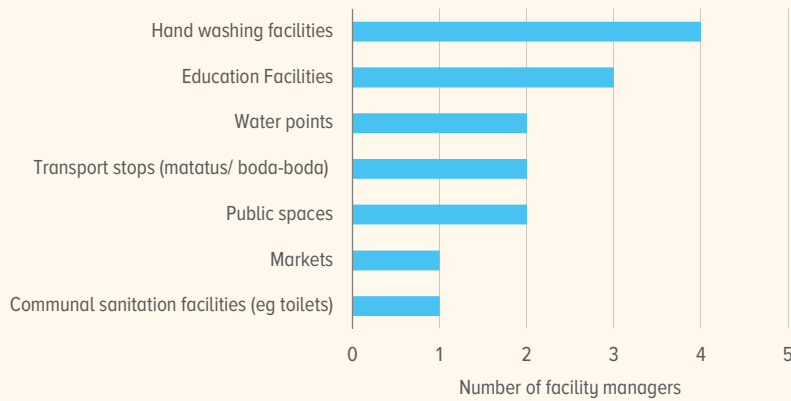


Figure 11: Number of facilities jointly managed

The settlement has a limited number (15, equivalent to 1.3%) of facilities being jointly managed (by more than one organization). Majority of them are in the WASH sector.

| Facility Types With Join Management | Organizations Collaborating in Management |
|-------------------------------------|--|
| Communal sanitation facility | Individual (eg business owner) Community group |
| Education facilities | Individuals, NGOs, Community groups |
| Handwashing | Individuals, community groups, UN-Agency |
| Public spaces | Community group, UN-Agency |
| Water points | Individual, community group, county government |

Collaboration is more among organizations managing education and WASH facilities. Partnership is observed among individual business owners, community groups and NGOs (see table).

Jointly managed facilities, despite being few in numbers, have better functionality than those managed by single organizations.

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

The settlement has a high water point density; access to water locations is good with over 80% of all settlement's locations being within 50 metres from a water point.

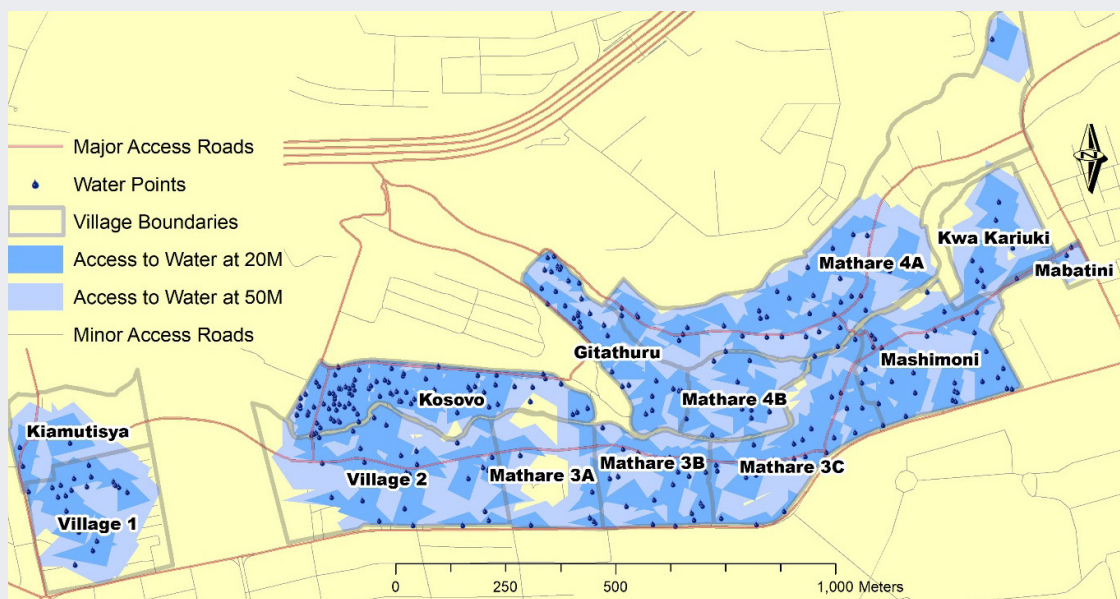
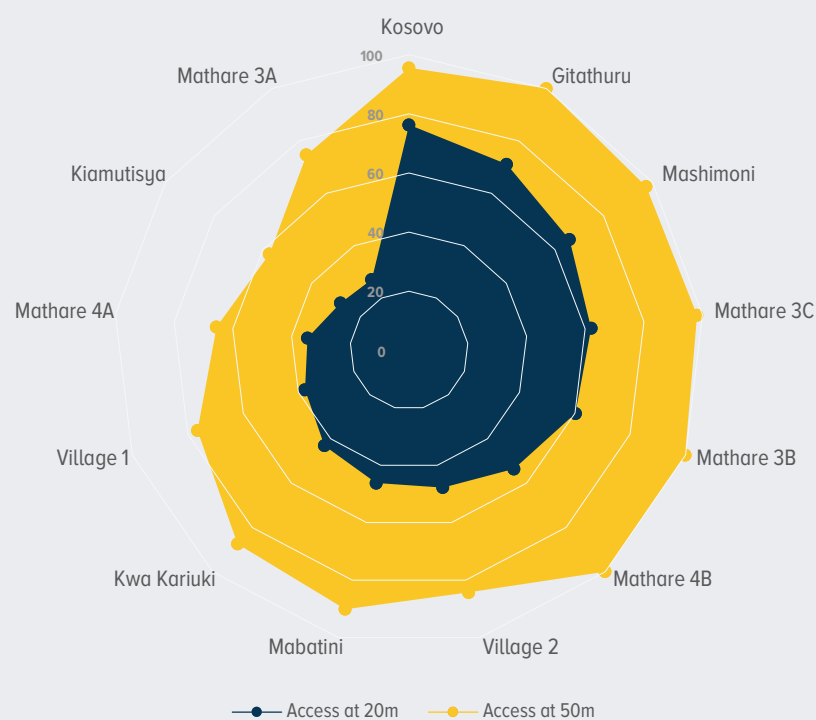


Figure 12: Locations of water points and access levels



Proportional to their built up areas, Mathare 3A, Kiamutisya, Mathare 4A and Villages 1 have the largest proportions of areas without access to water at 20M and 50 metres (Figure 13).

Figure 13: Access to water by villages at different distances

Kosovo and Gitathuru villages have the highest water point densities in the settlement. The survey has established that access to water points is generally not a challenge in the settlement; the challenge is in the reliability of water – survey outputs show that majority of water points do not function throughout the week (Figure 14). In effect, queues were noted at water points, creating hotspots of human interactions against social distancing guidelines.

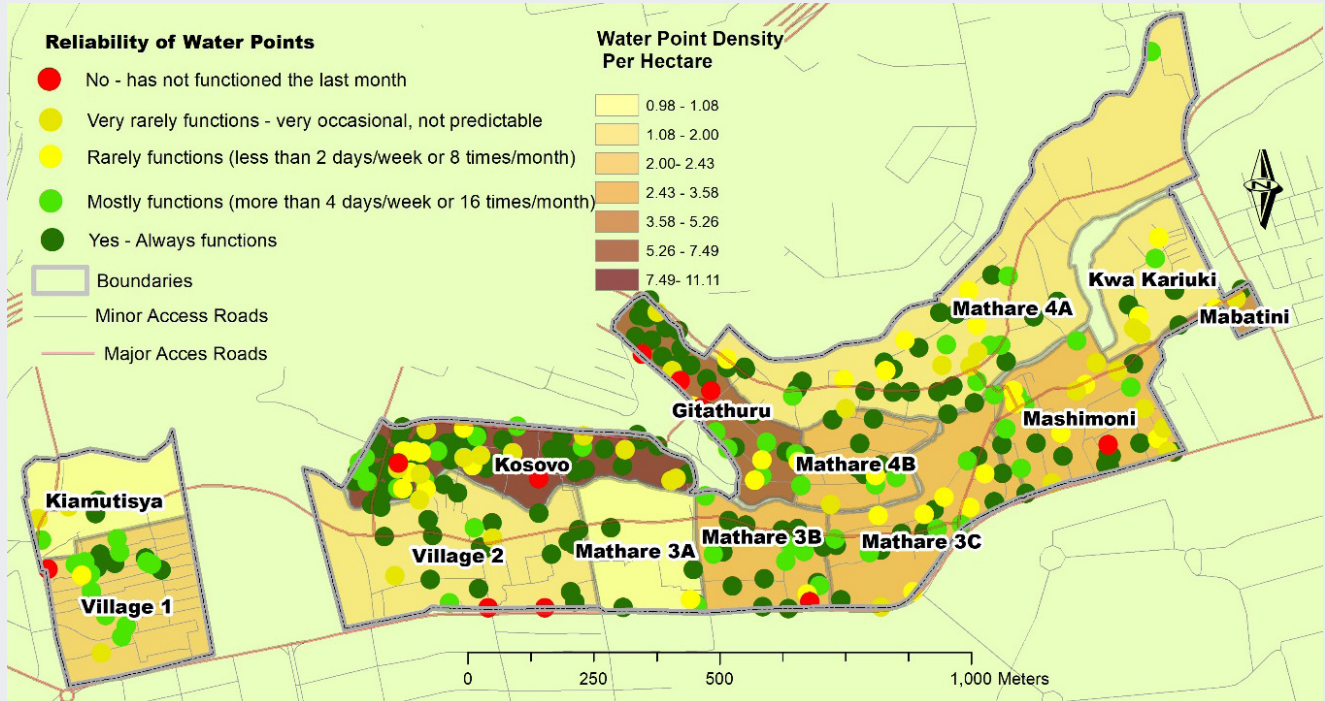


Figure 14: Water points and their reliability

The survey established that, while there are efforts by the government to supply water to informal settlements' areas at no cost, water is still acquired at a cost by a huge proportion of residents. The average retail price of a 20-litre container of water is between Kes. 2 and 10. High costs of water was noted in Village 2 and parts of village 1 where a 20-litre container has costs rising up to Kes. 20.

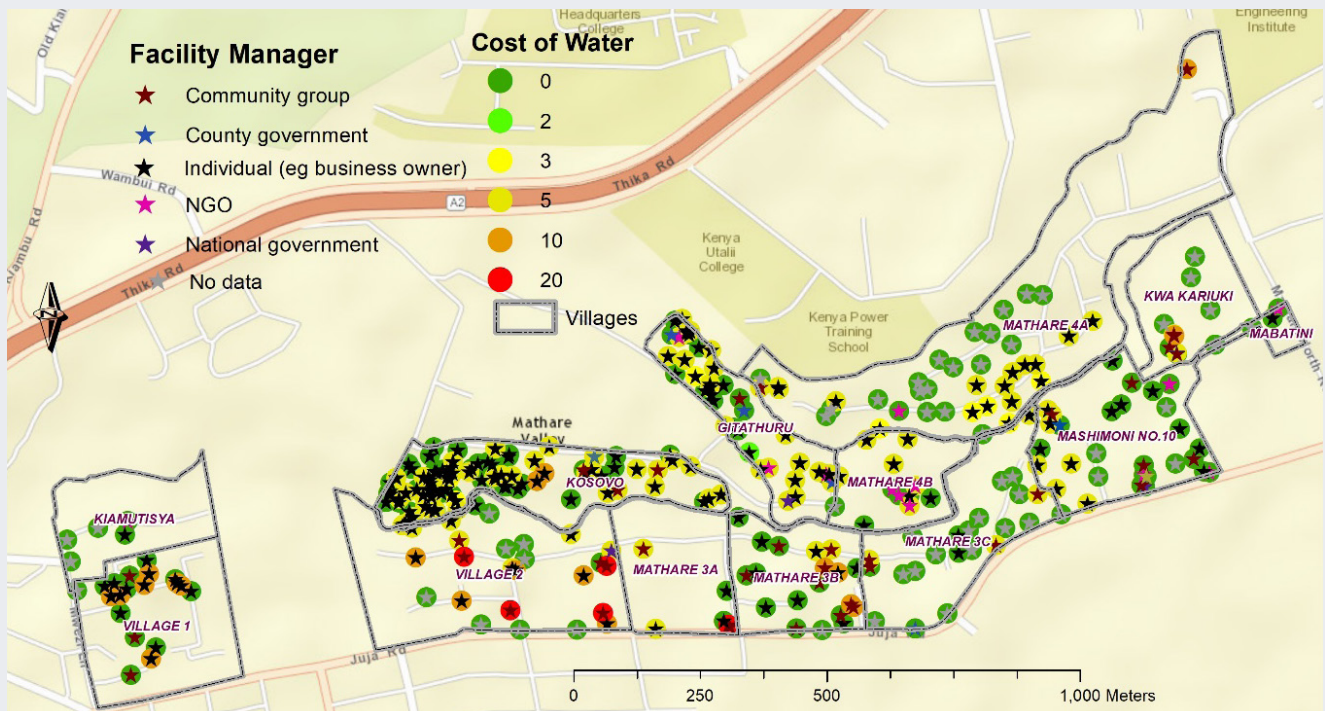


Figure 15: Comparing management of water points and costs

ii) Handwashing Facilities

The survey mapped 225 handwashing facilities in the settlement. Assuming an estimated population of 206,000 (KNBS), this translates into an average of about 900 persons per public handwashing facility; indeed, there are high variability among villages, but these statistics give an indication that there is a pressing need to establish additional handwashing facilities in the settlement.

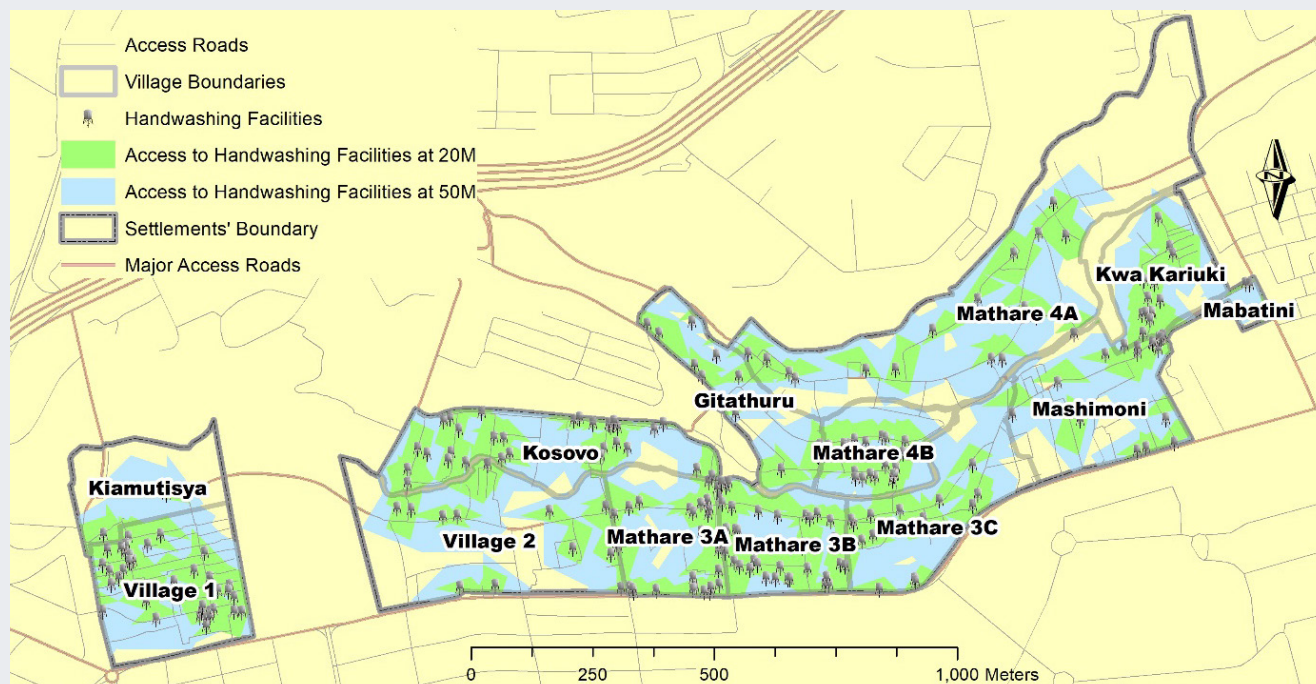


Figure 17: Access to handwashing facilities

Using spatial statistics, the survey established that more than 50% of the settlement’s locations can access a handwashing facility within 50 metres, but this number halves when distances are reduced to 20M. The need for more handwashing facilities near homes and business locations is emphasized by the fact that, unlike for water points, residents are unlikely to walk for distances longer than 20 metres to access handwashing facilities.

ACCESS TO HANDWASHING FACILITIES

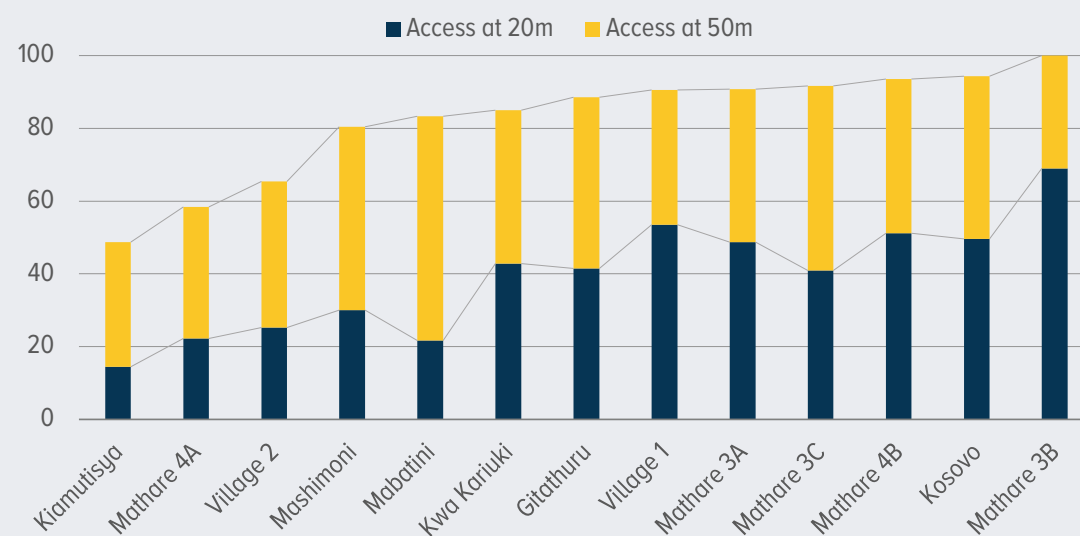


Figure 18: Comparing access to handwashing facilities by villages

It is notable that all mapped handwashing facilities were established in the year 2020, particularly in response to COVID-19. It is concerning that the numbers of new facilities established by months since March, 2020 are on the decline despite the growing need for more facilities, which is underlined by the growing numbers of COVID-19 infections. Additionally, the survey noted that at least 87% of handwashing facilities are manually fed with water, with no connection to piped water supply; this poses serious challenges of sustainability. It is further observed that, with all handwashing facilities established less than 4 months ago, it is concerning to have over 20% of them not having soap throughout the day.

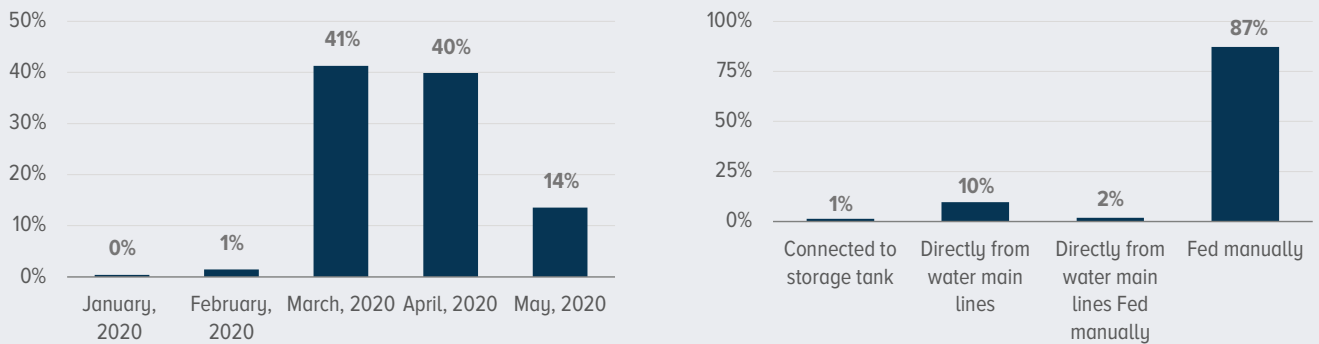


Figure 19 & 20: Temporal trends in establishment of handwashing facilities and their mode of water acquisition

Spatial analysis shows that most of business locations in the settlement front major roads, and there is notable clustering of handwashing facilities along these high human interaction areas (e.g. around village 1, Mathare 4B, Mathare 3A and Kosovo). This implies that handwashing facilities can be accessed by large numbers of people which is fundamentally desirable.

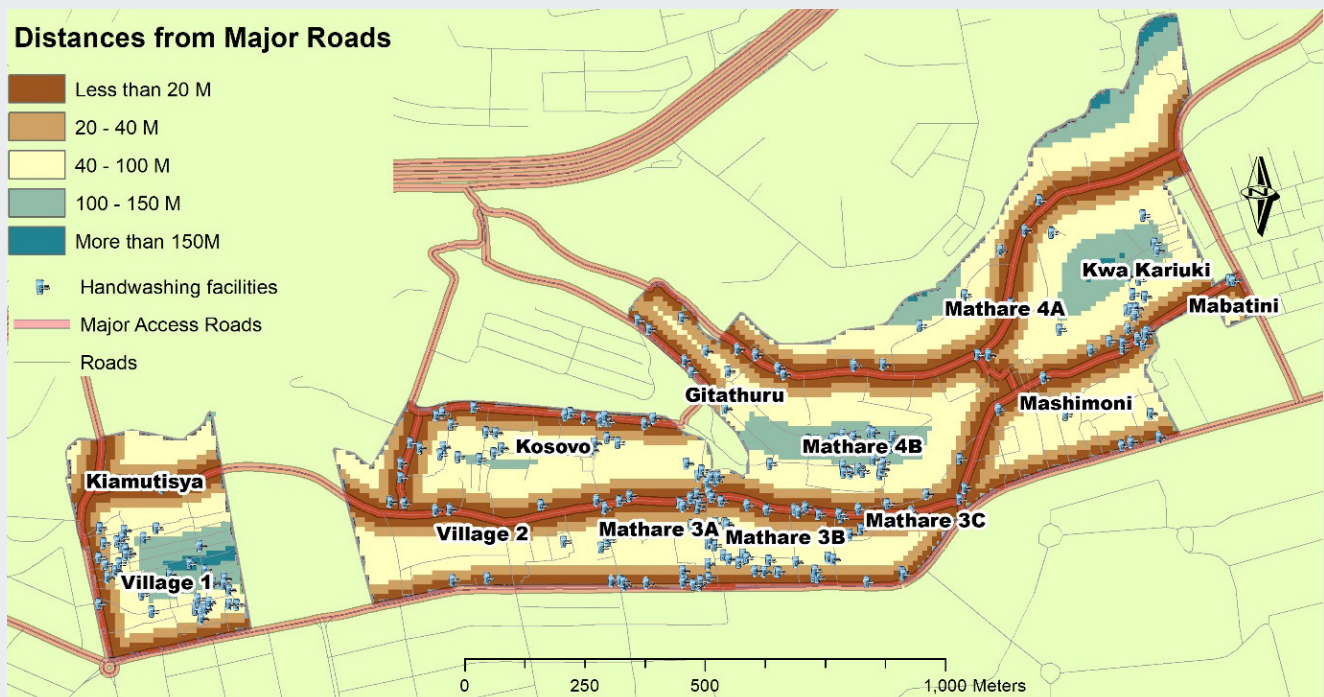


Figure 21: Location of handwashing facilities relative to major roads

it is notable that handwashing facilities serving huge populations of more than 100 people are mostly managed by NGOs, UN Agency, and also individuals. Most small-capacity facilities are managed by individual business owners, a factor likely to affect their sustainability.

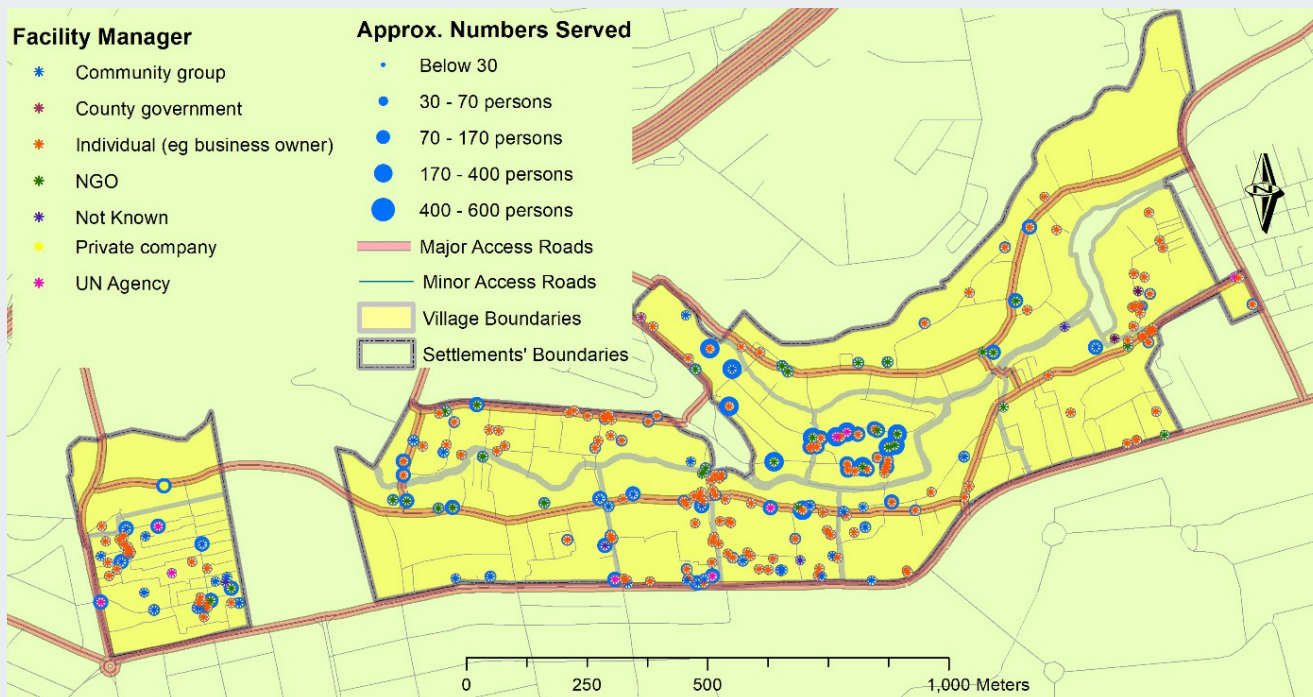


Figure 22: Location, sizes and management of handwashing facilities

iii) Communal Sanitation Facilities

Facilities mapped under this category include toilets and bathrooms. It is favourably noted that a huge majority of the sanitation facilities (90%) are functioning and in fair to good conditions.

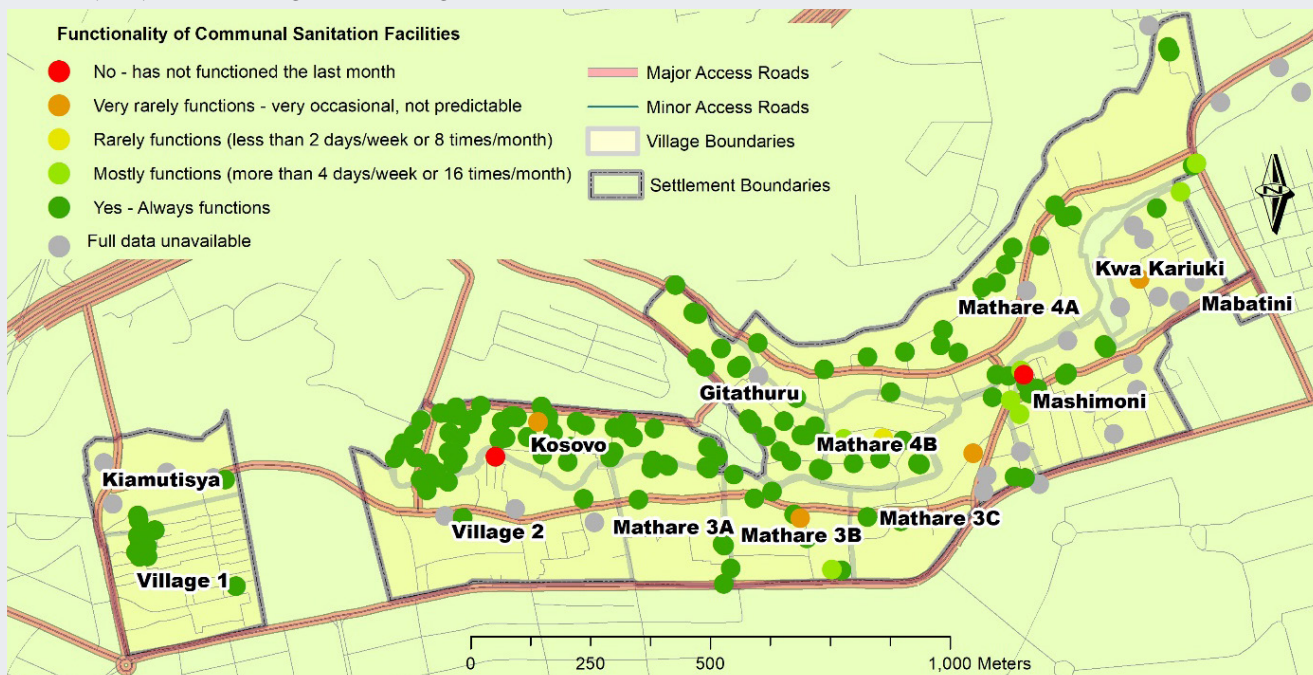


Figure 23: Conditions of sanitation facilities

Kosovo village has the highest density of sanitation facilities. The survey established that the low numbers of sanitation facilities mapped in Village 1 and Village 2 is largely associated with the fact that these areas have household/ neighbourhood toilets and bathrooms within apartments blocks.

Notable location with fewer facilities included Mathare 4A, Kiamutisya, Mathare 3A and 3B. Lack of sufficient sanitation facilities in informal settlements is often associated with open defecation and use of 'flying toilets' which is unhygienic and discouraged.

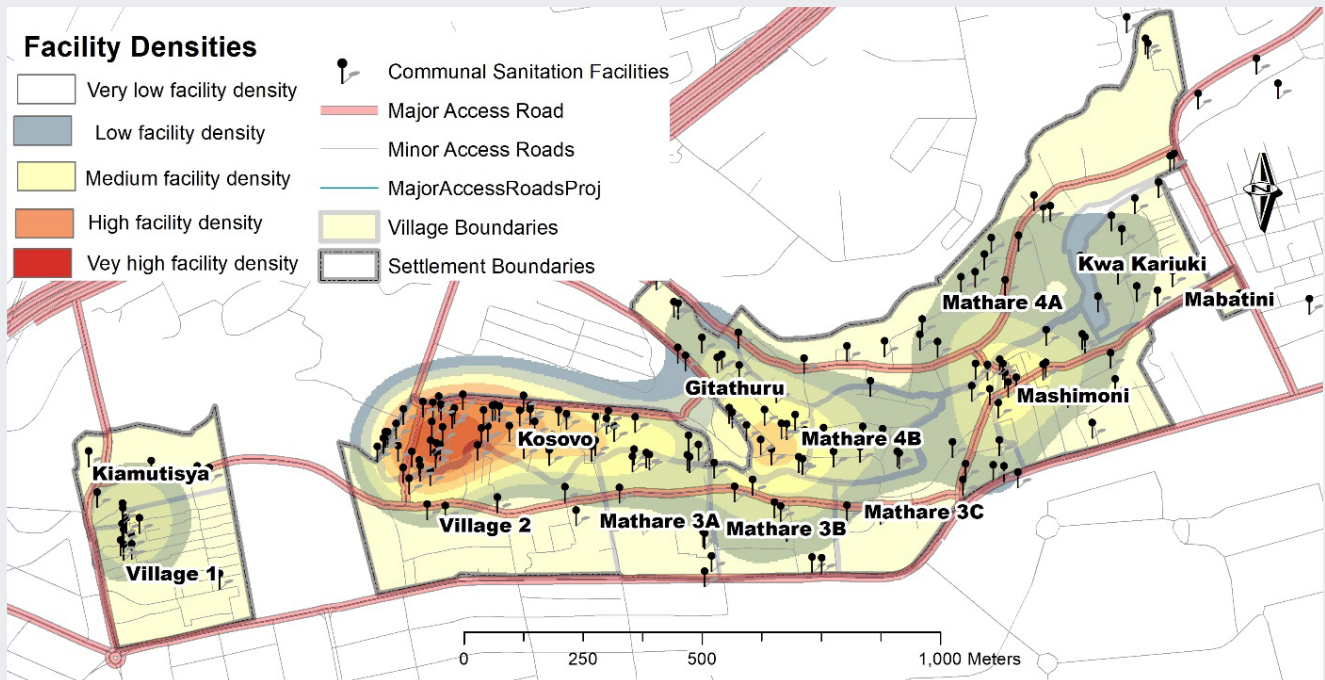
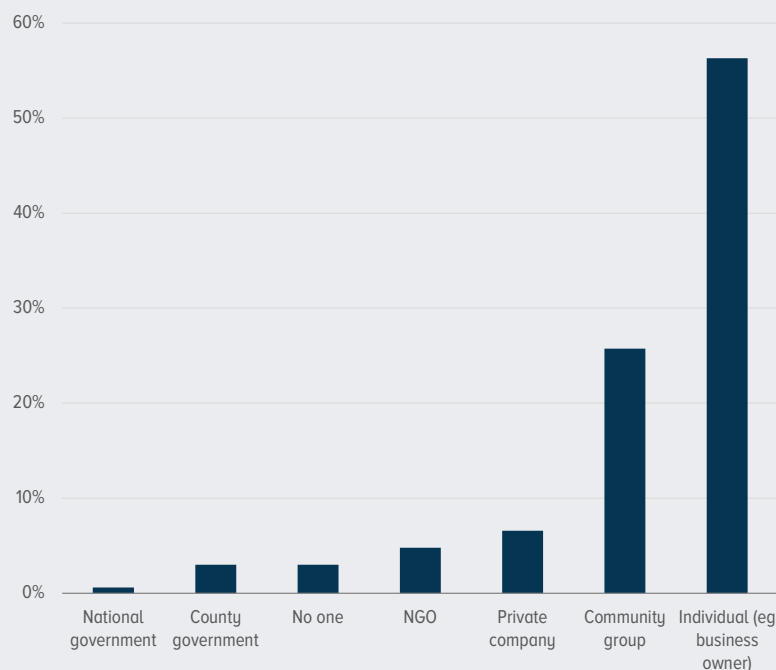


Figure 24: Sanitation facilities densities

ORGANIZATIONS MANAGING SANITATION FACILITIES



Management of sanitation facilities is majorly in the hands of individuals, followed by community groups and private companies.

Figure 25: Organizations managing sanitation facilities

iv) Solid Waste Management

The settlement has generally a poor system of solid waste management. Mapped waste disposal and collection points were few and in dilapidated conditions. Over 70% of them exist in the form of open dumping. The survey established that there are at least 15 organizations involved in waste collection and management, and there is need for their coordinated action and common strategy in waste management.

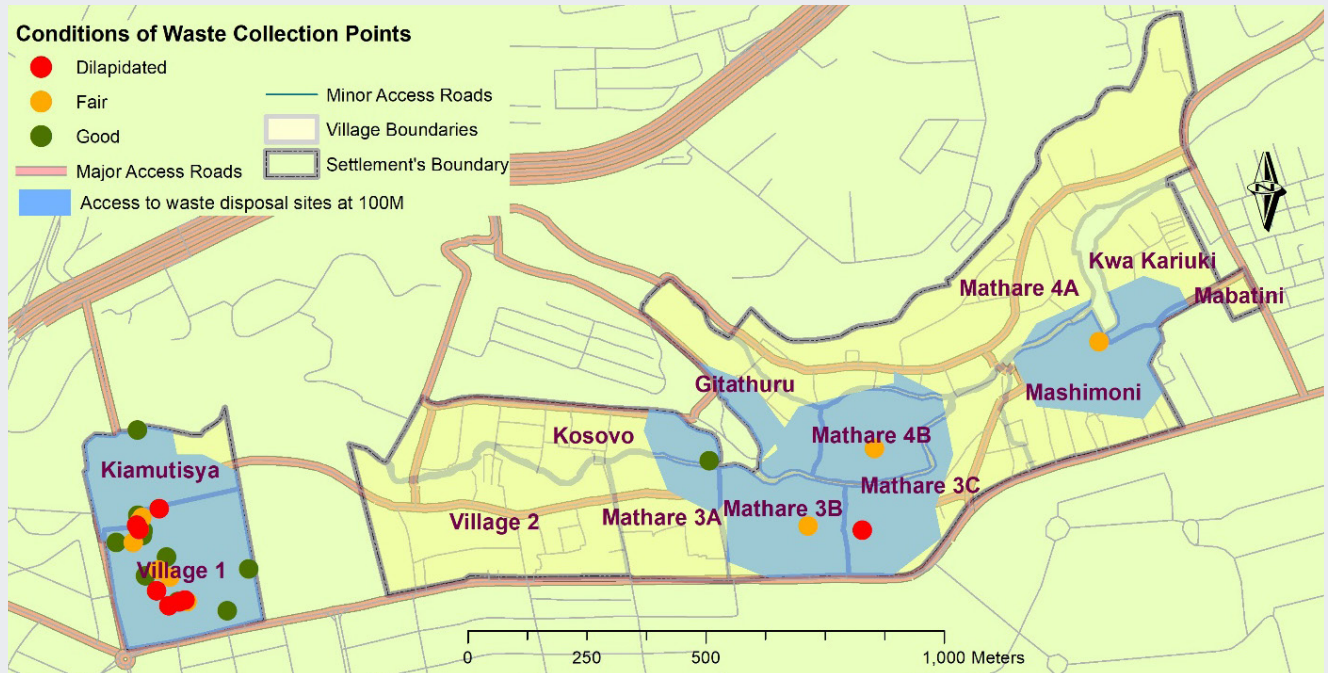


Figure 26: Waste disposal / collection points and their conditions



3. Access and State of Health Facilities



A total of 31 health facilities were mapped in the settlement, over 70% of them being clinics and dispensaries. Data shows that management of most health facilities is in the hands of individual business owners, which may be associated with high cost of services and reduced healthcare affordability. A survey on capacities of health facilities and costs of accessing health services is required in designing targeted interventions.

MANAGEMENT OF HEALTH FACILITIES AND FACILITY TYPES

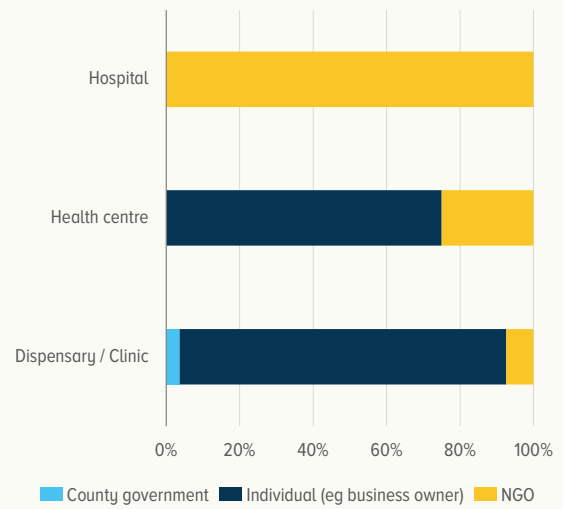
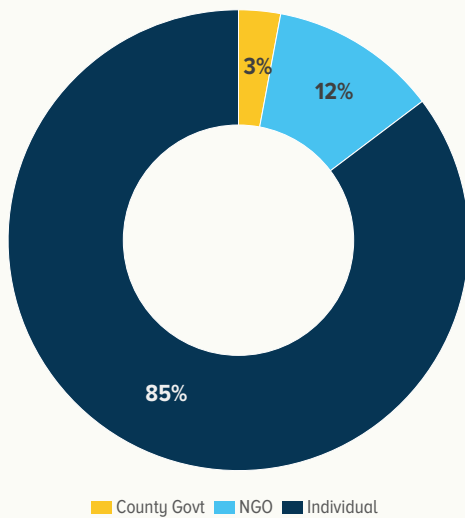


Figure 27 & 28: Management of health facilities and facility types

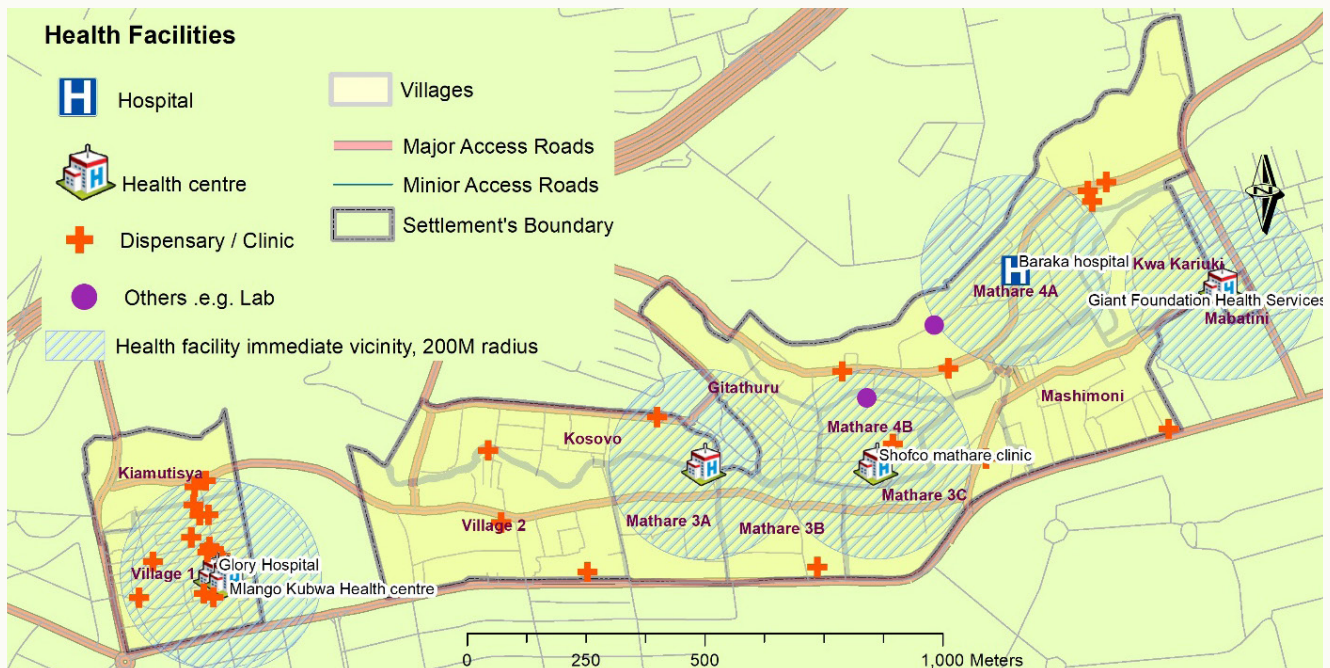


Figure 29: Location and levels of health facilities

4. Access and State of Education Facilities



The settlement has a high density of education facilities (70 facilities mapped). Kiamutisya, Kwa Kariuki and 4A villages have the lowest per area coverage of facilities. It is notable that facilities for primary school level and lower account for over 80% of the mapped facilities.

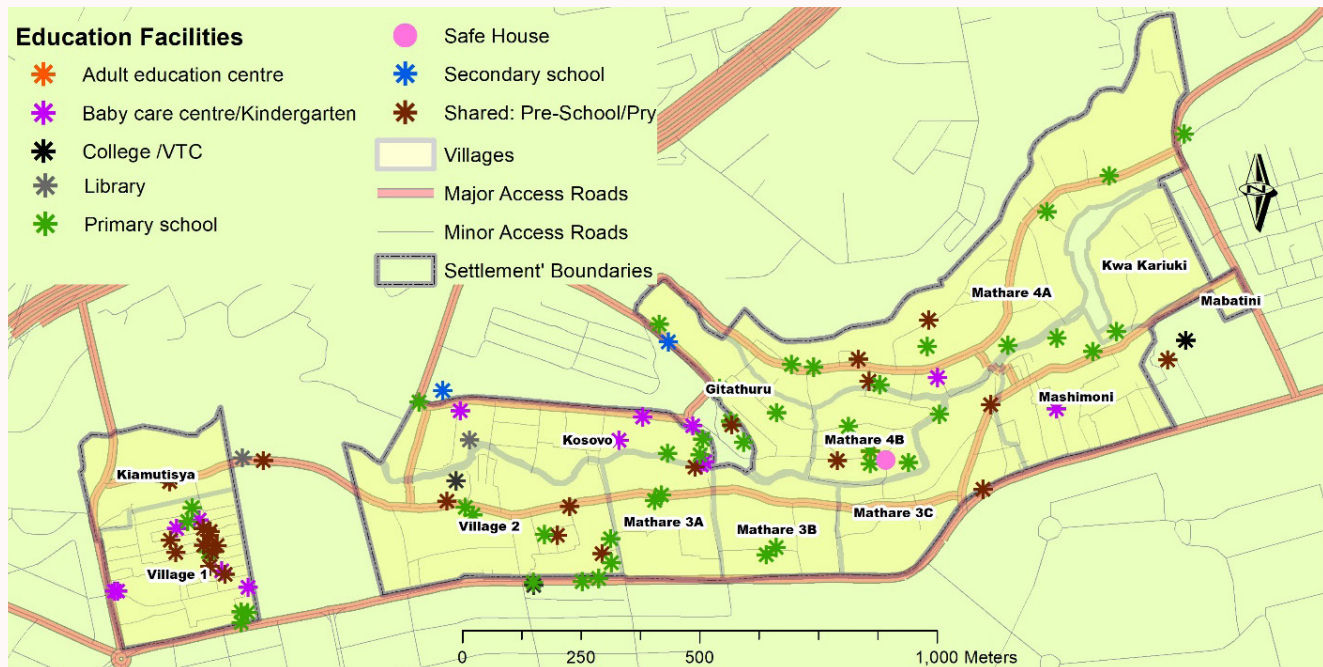


Figure 30: Location and levels of education facilities

The mapped education facilities exist within congested built up spaces, and do not meet space requirement for schools, with most lacking even a basic playfield. It is particularly concerning that social distancing guidelines require increased space per learner while the current facilities are far below these standards. The mapping identified this as requiring urgent action and coordinated efforts.



Figure 31: Location of education facilities on satellite image



5. Access and State of Social / community Halls

The survey mapped 23 social halls, 20 of which are functional and in good conditions. Majority of the halls are managed by community groups.

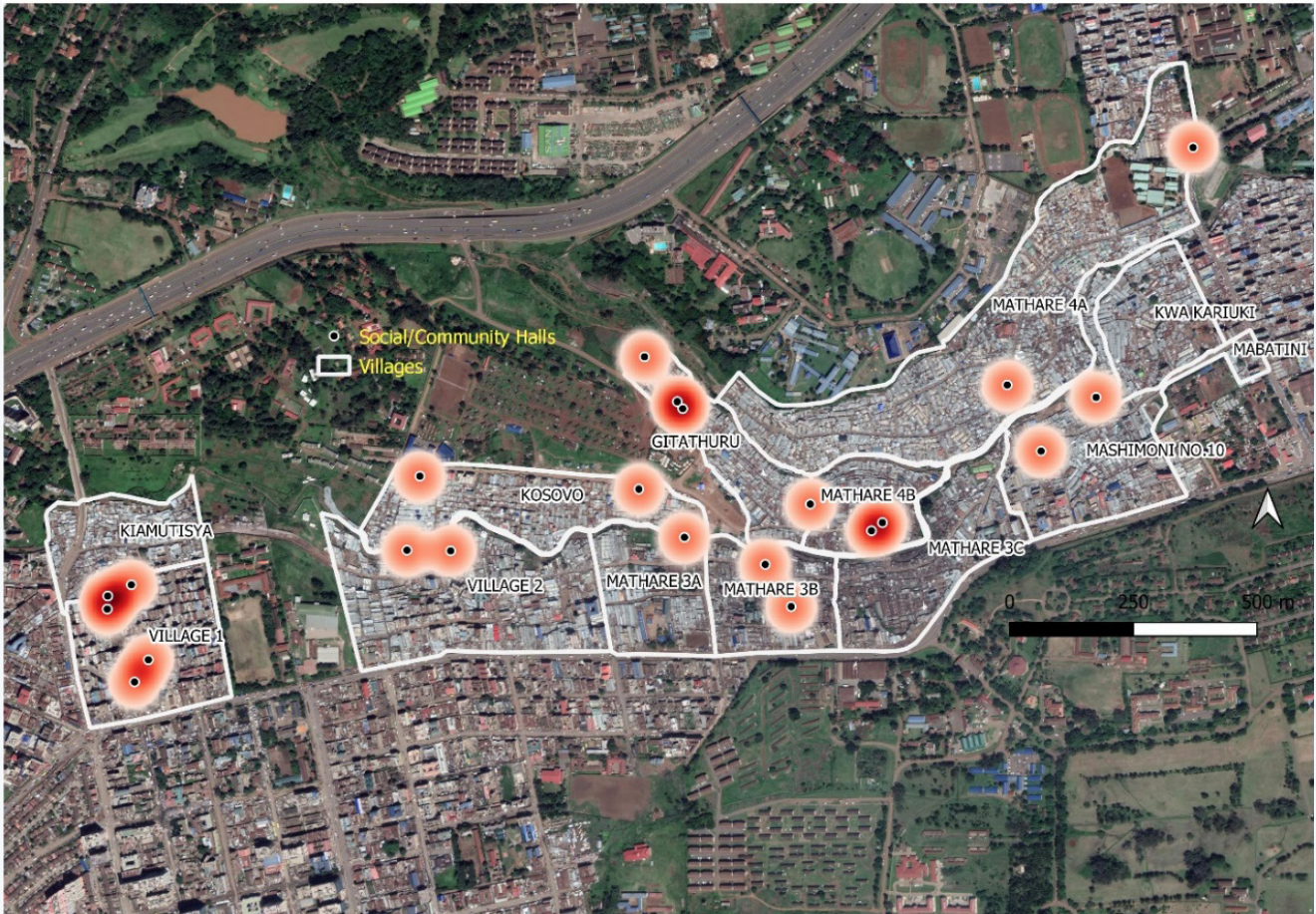
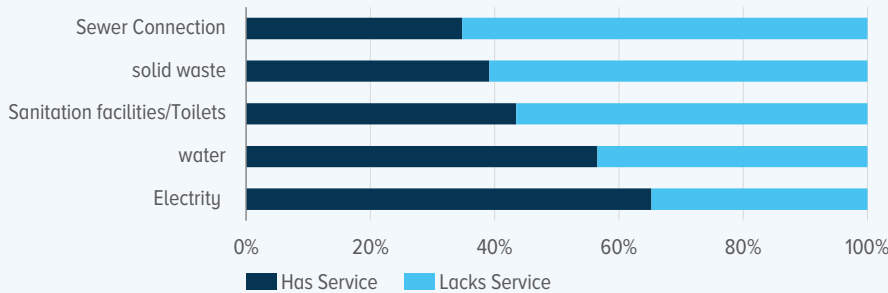


Figure 32: Mapped locations of social/community halls

SERVICES AVAILABLE IN SOCIAL/COMMUNITY HALLS



The community/ social halls in the settlement are not fully equipped with support services, with at least 50% of them lacking solid waste management systems, connection to sewer and connection to water supply.

Figure 33: Services available in social/community halls

The survey identified an urgent need to have more public facilities connected to water systems, and equipped with sanitation and solid waste facilities. The current state of access to services within facilities requires community facilities' users to transport water (including water for handwashing) to the facilities (e.g. halls), a model that is not easy to sustain with efficiency.



6. Access and State of Public Spaces

The settlement has an acute shortage of public spaces; the settlement has less than 2% of its land area under public spaces. This is against the recommended 20-25%.



Figure 34: Mapped public spaces in the settlement

AREAS OF OPEN SPACES AND PROPORTIONS BY VILLAGES

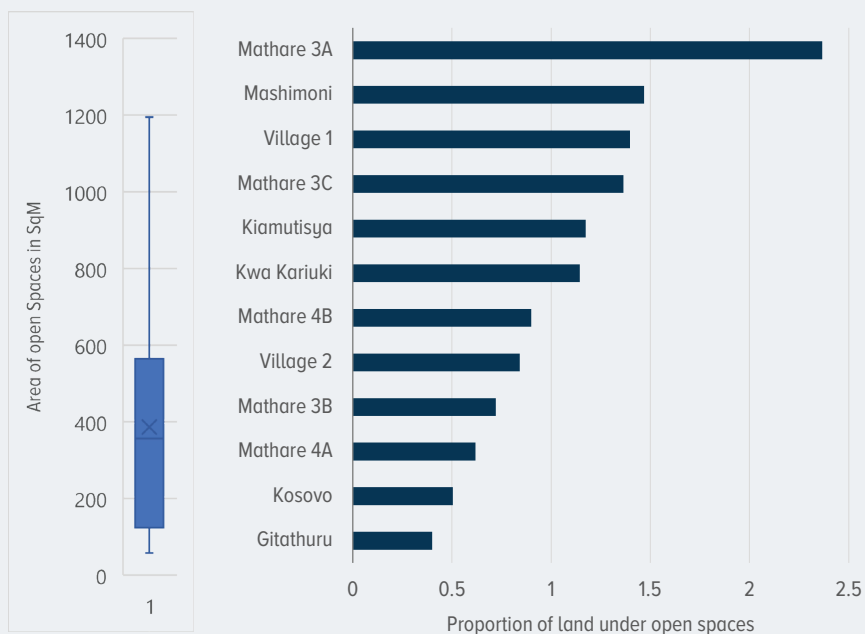


Figure 35: Areas of open spaces and proportions by villages

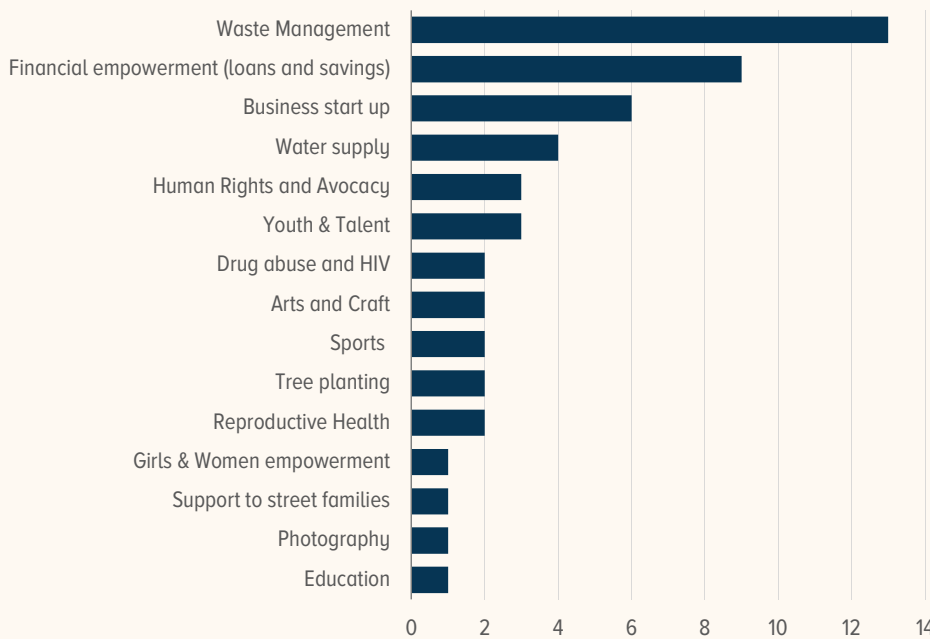
At the villages level, all have less than 2.5% of their land area under public spaces.

The public spaces in the settlements are small in size with the largest being about 1,200 M². The average size of public spaces is 350 M², which is about the size of a volleyball pitch. This translates into challenges by the community in maintaining social distances during outdoor interactions, and increased exposure to COVID-19.

7. Assessment Development Partners Operations and Reach



The survey mapped 7 organizations with offices within the settlements (in 6 villages), including Loving Concern, River Youth Group, Mysa, Ghetto Foundation, SHOFCO, Transformer Group, and Slum Children Education and Art Centre.



The survey also detailed 37 organizations with programmes in the settlement (Annex 1), including those that do not have offices within the settlement. The organizations mapped have a wide network of partnership with 30 of them reporting to work in partnership with other organizations. Majority of the mapped organizations are involved in the WASH sector. From water points data, 45 organizations were identified as being involved in management of water points (below). Additionally, over 25 organizations and 35 individuals were mapped as donors of water facilities

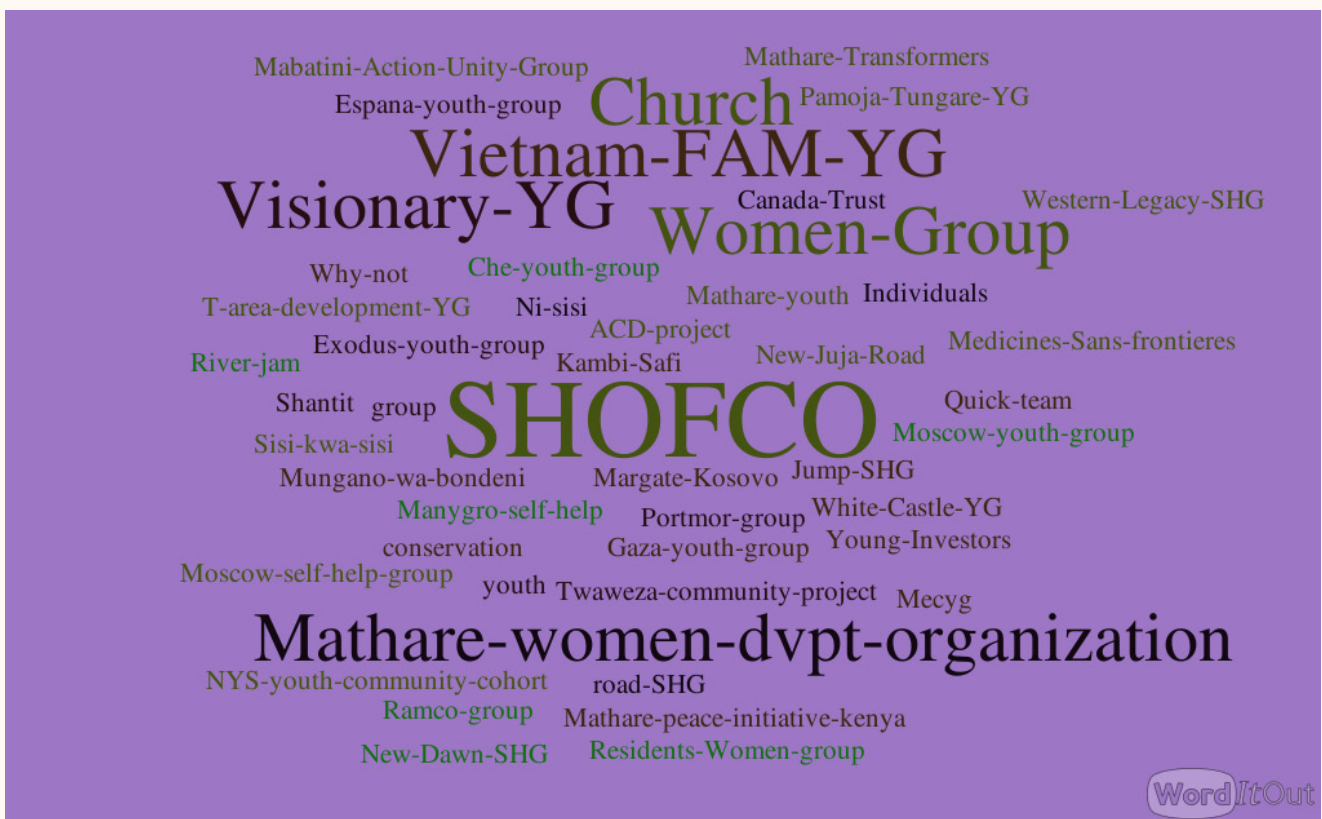


Figure 36: Organizations involved in water supply

A review of development partners' activities within villages show that some villages have more partners' activities than others; for example, an assessment of partners with programmes not covering the entire settlement shows more partner activities in Kiamutisya and Kwa Kariuki more than in other villages (map below).

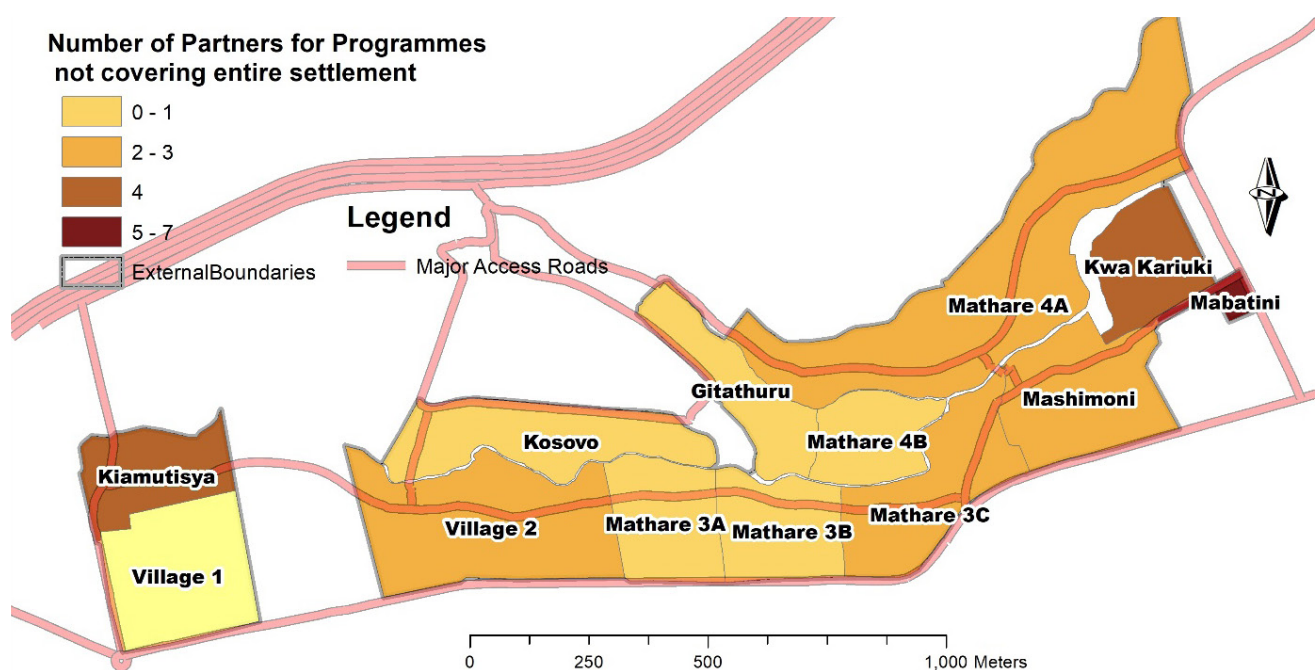


Figure 37: Partner activities in villages

Key observations

The following are key observation from the mapping:

1. The facilities' densities analysis points to villages that are potentially underserved and need location focused actions, including Mathare 4B and Mashimoni.
2. Facility types with less than 50% of facilities in dilapidated or fair conditions include floodlights, water points and public spaces; intervention is required.
3. Facilities managed by NGOs and community groups are more reliable than those managed by county government and individuals; their absolute numbers are however few and need boosting.
4. There is only limited partnership in the management of facilities; expectedly, data shows a positive relationship between partnerships and increased efficiency in service provision; partnering organizations include individuals, NGOs, community groups and UN Agencies. More partnership and actors' coordination is key.
5. Access to water points is high, but water points reliability ranges from poor to moderate. Despite programs supporting free water supply in the settlement, the survey established that water in most villages is still acquired a cost, and is largely in the hands of individual business owners. More partners' action to improve access and affordability is required.

6. While majority of residents in the settlements are able to access handwashing facilities within 50 metres of any settlement's location, the average population per facility is extremely high (about 900 persons/facility). More facilities are required, particularly near homes.
7. Handwashing facilities are mostly manually fed with water which impacts on their sustainability; there is need to connect major facilities to the piped water network for sustainability.
8. Despite handwashing facilities not being evenly distributed in the settlement, there is a concentration of facilities on major business activity nodes/ interaction areas which is helpful for their purpose.
9. Sanitation facilities have higher densities at Kosovo; their average functionality in the settlement is however good. Some villages have notably fewer facilities and are exposed to risks of open defecation.
10. Only a few solid waste disposal areas were mapped by the survey. Majority of them are in poor conditions despite numerous partners being engaged in environmental clean ups and waste management. This points to a need to have a change of approach from managing dumped waste to controlling dumping.
11. The health sector, like the WASH sector, has a huge private sector control; there is need to investigate service affordability under the private sector and its impact on health care in the settlement. The survey has noted that the settlement has very high population per health facility ratios.
12. While schools are accessibility within short walking distances, the facilities are sandwiched in dense human settlements areas and lack recreational spaces for learners. These densities expose the learners to risks such as fire and easy spread of infectious diseases. e.g. COVID-19; new school regulations may require the schools to reduce the learners' populations or think about acquisition additional land spaces. Such is currently unavailable, and early stakeholders' discussion on the issues is key.
13. The settlement has an acute shortage of open spaces; there are very few open spaces (less than 5% of the land areas for each village). Long term planning to improve settlements layout and space standards (including through encouraging vertical development) is required.

