

# Informal settlements' vulnerability mapping in Kenya

FACILITIES AND PARTNERS' MAPPING FOR INFORMAL SETTLEMENTS IN KENYA

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The Case of Kilifi Town Settlements

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October, 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 settlements in Nairobi,

Kisumu, Nakuru and Kilifi town/cities 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

This report focuses on the study findings for the informal settlements in Kilifi town. The mapping exercise was carried out between 21st and 26th September, 2020 and involved field data collection on two aspects: - households and facilities. For the household survey, the mapping sampled households within the study informal areas and sought to establish the levels of access to services and costs associated to service provision, particularly on WASH aspects.

For facilities mapping, the survey collected data 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 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 for extended hours. In addition, UN-Habitat ensured that there was gender-balance among the volunteers who participated in this exercise.

### Survey Limitations

Like most informal settlements in Kenya, the informal settlement areas of Kilifi are well known by authorities but have not been spatially demarcated. Delimitation of the boundaries for use in the study as units of analysis was therefore done using GIS technologies with the support of local experts. It has been noted that there are formal areas within informal areas and vice versa which has limited generation of spatial statistics exclusive to informal settlements.

# THE INFORMAL SETTLEMENTS OF KILIFI

Kilifi town, which is the county headquarters of Kilifi County, is a Kenya coastal town, 56 kilometres northeast by road of Mombasa. The town lies on the Kilifi Creek and sits on the estuary of the Goshi River.

The town has a population of 122,899 (KNBS<sup>1</sup>, 2019) and while the proportion of its population in informal settlements is not officially documented, estimates during the field survey shows that the number could be above 50%.

With the help of key informants, this survey identified, 11 informal settlement areas within the town, namely:

Kisumu Ndogo, Mibiyu Saba, Makao, Mabirikani, Baya Magonza, Kibaoni, Viwandani, Ukombozi, Mtaani, Kalolo and Shingilia (Figure 1).

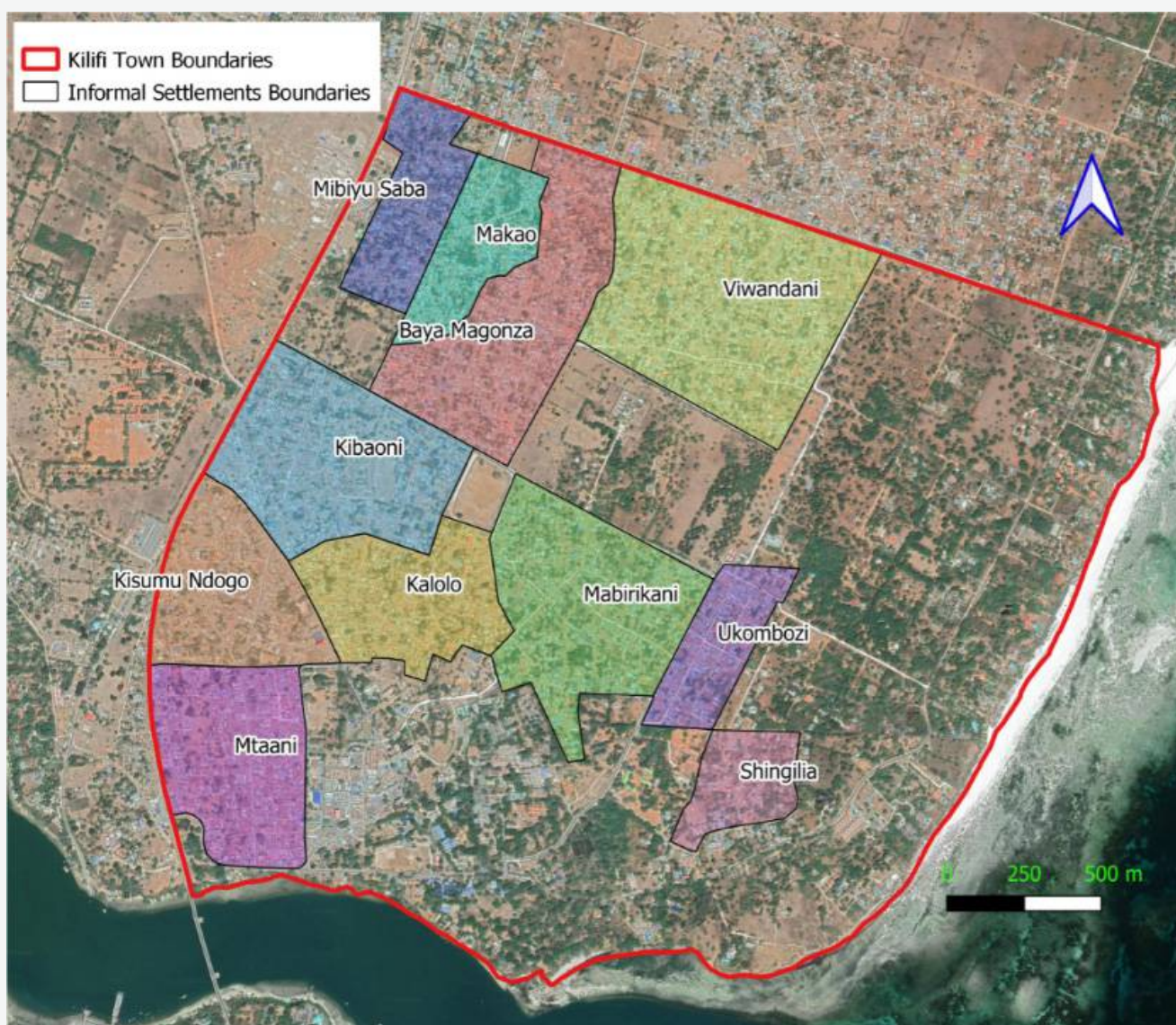


Figure 1: Informal Settlement areas of Kilifi

1. Kenya Population and Housing Census, Vol II (2019).

# THE SURVEY AND STATE OF SETTLEMENTS

The survey mapped 1,261 data points, 827 of which covered household data. The rest of the data points covered shared community facilities (Figure 2). Application of High Resolution Settlement Population Layer, 2019<sup>2</sup>, revealed that population densities are higher in Kibaoni,

Kisumu Ndogo and Kalolo (estimated at 13 persons per grid of 900m<sup>2</sup>) (Figure 3).

From the sampled households, the average household size is 7.5 persons, which is significantly higher than the

average family sizes in Kenya. An assessment of housing structures shows that there are huge variations in settlement typologies, with range from thatched mud houses to row stone-walled housing (Figure 4).

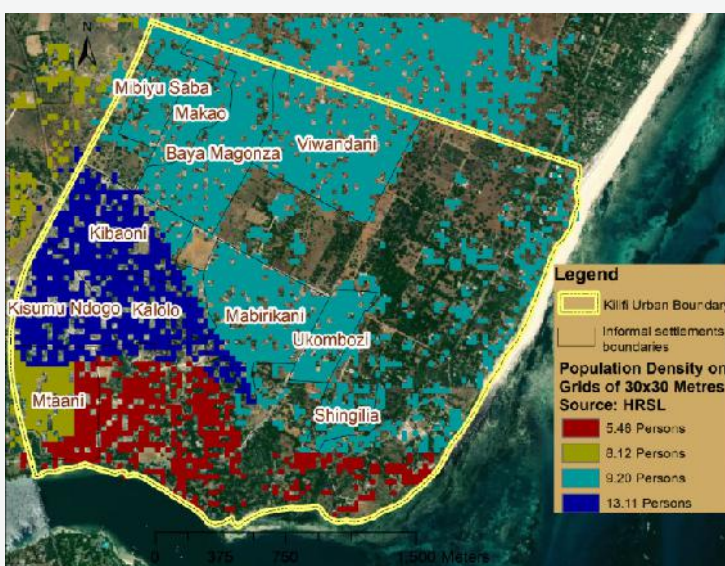
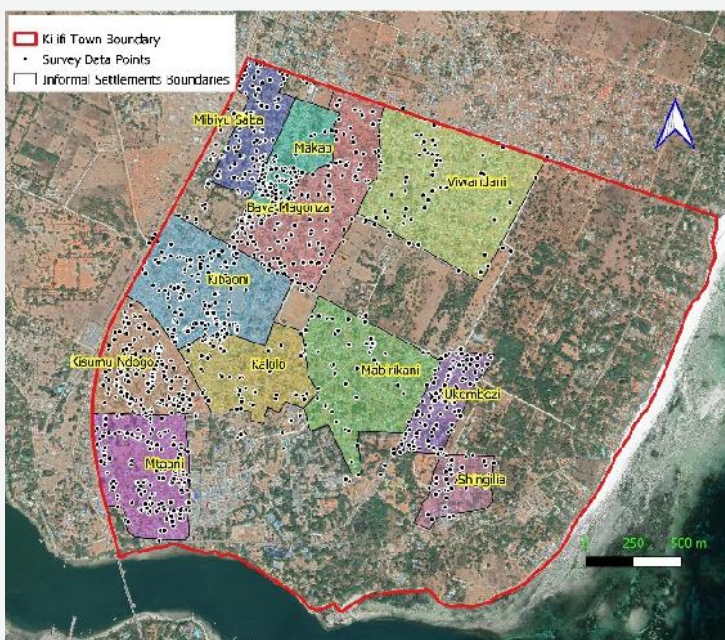


Figure 2 and 3: Data points and population distribution in settlements



Figure 4, 5 and 6: Variations in Kilifi's informal settlements' housing typologies

2. Data.humdata.org

# 1. State of WASH



## i) Access to Water

The challenge of water supply in the settlements was evident during the survey. While the survey established that majority of the households are connected

to the main water supply managed by Kilifi-Mombasa Water and Sanitation Company (KIMAWASCO), the settlements

have numerous boreholes which complements the county water supply (Figure 7 to 11).

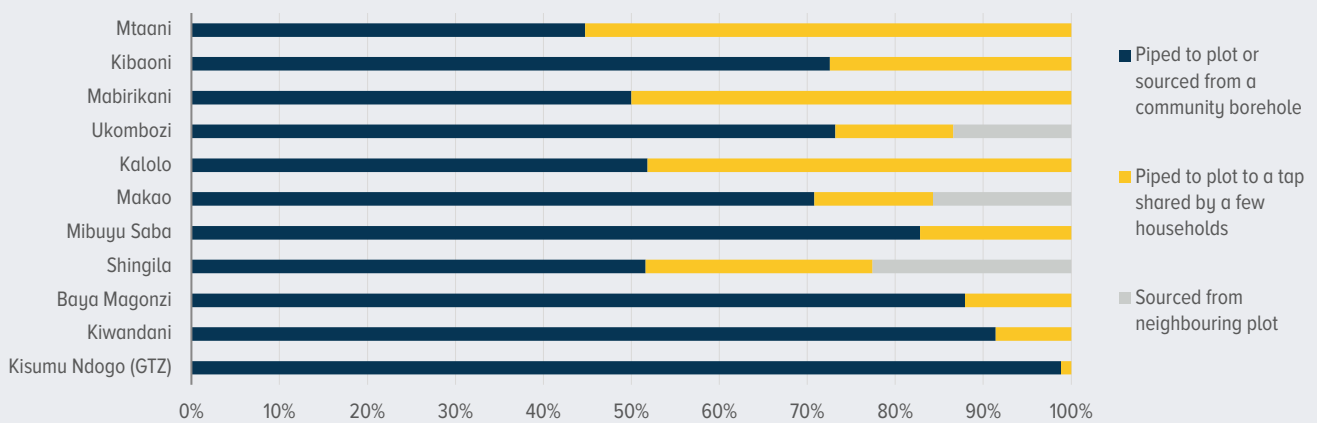


Figure 7: Sources of water by settlements

Majority of the water points are in poor conditions (Figure 8, 9 and 10), and majority of households rely on 20 litres' plastic containers to transport and store water (Figure 11).



Figure 8 – 11: State of water supply in the settlements

Water points in the settlements are generally within convenient distances to households; only 10.3% of the surveyed households source water at more than 100 metres from their homes (Figure 12).

These households are majorly in Kibaoni, Mabirikani, Mtaani and Kalolo (Figure 12).

Ninety-one (91%) of household pay for water, with the average cost of water being Kes. 5 per 20 litres gallon, or about Kes. 700 – 1000 per month. The main water supplier to settlement is County Government through the KIMAWASCO (Figure 13).

While access to water points is not a major problem, water reliability is; on average, water from different sources is accessed 4 days a week (Figure 14).



Figure 12: Access to water points for households within 100 metres

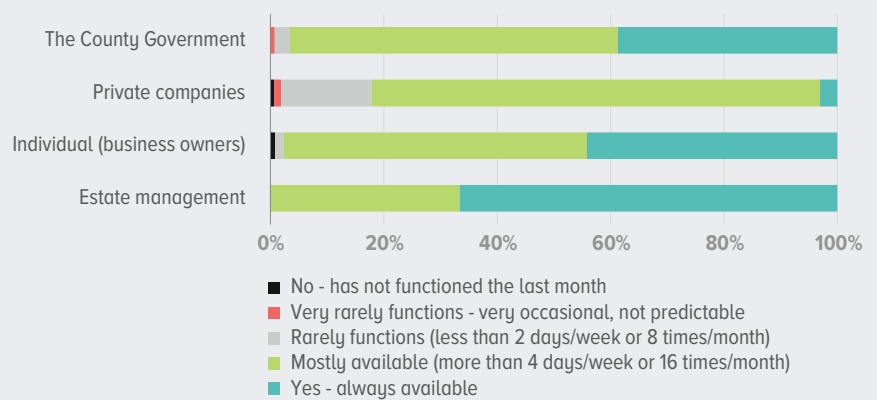
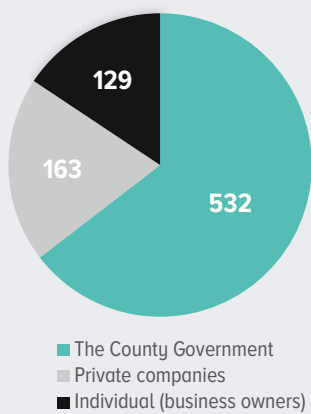


Figure 13 and 14: Water suppliers and reliability of Water

There is need for the actors managing piped water supply to increase supply time. The desired levels of hygiene during the COVID-19 period require regular access to water by households --- at least for a number of hours every day.

### ii) Access to Handwashing

The survey mapped 41 handwashing facilities across the settlements. Only 20% and 50% of the settlements population are able to access these handwashing facilities within 50 and 100 metres from

their homes respectively (Figure 15 & 16). Despite the fact that the settlements in the eastern part of town are closer to market locations (along major tarmac

road) and therefore justified to have more facilities, there were no facilities mapped at the settlements of Ukombozi and Singilia, which is a significant action gap.

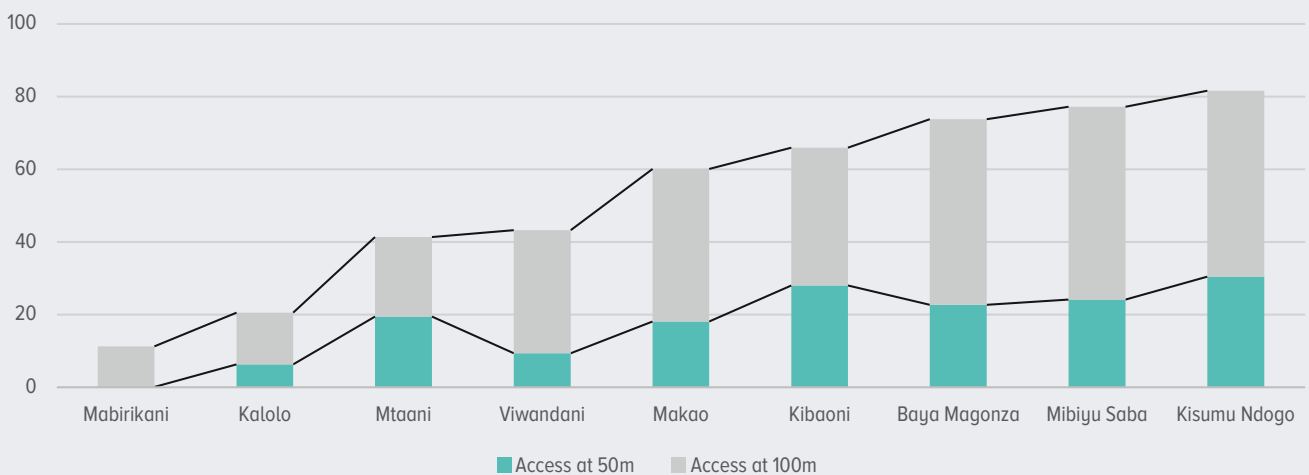


Figure 15 and 16: Access to handwashing facilities within 50 and 100 metres respectively



It was noted that the existing facilities are largely under the management of individuals/ private entities, which implies that their sustenance is dependent more on individuals and less on the government (Figure 17). A good number of facilities are under ‘no ones’

management, which could imply that they were left unmaintained after their installation by donors.

It is also notable that the number of new facilities has been reducing over time, with the month of March having the

most facilities installed, and the Month of September having the fewest facilities (Figure 18). This is a pointer to the need for renewed efforts at increasing the facilities coverage, especially in the settlements without any facilities.

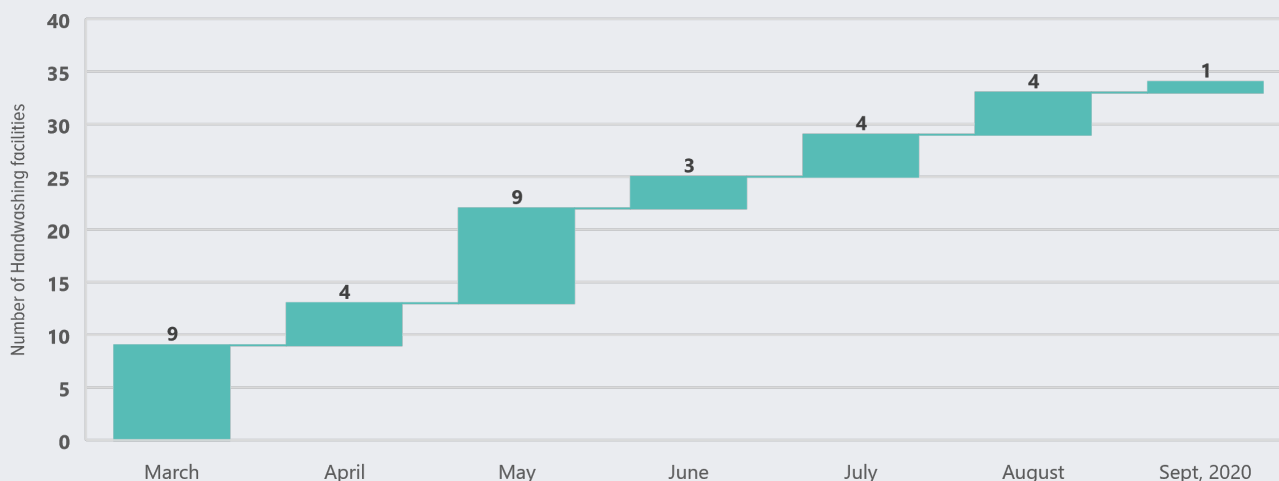
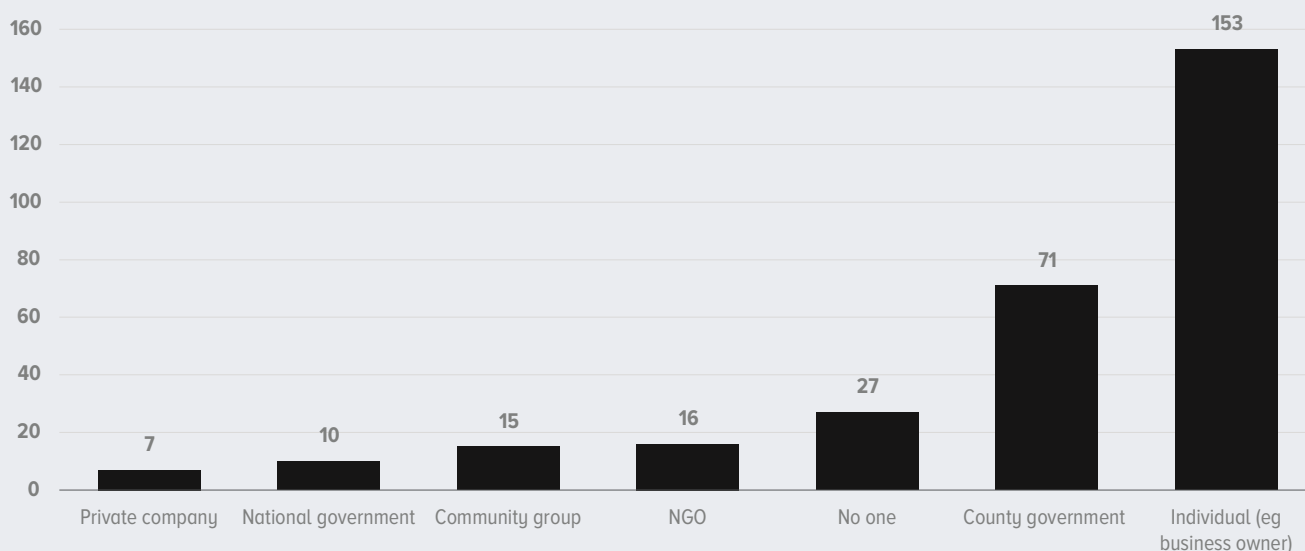


Figure 17 and 18: Management of handwashing facilities and number of new facilities by months

It is concerning that 90% of the mapped handwashing facilities are manually fed with water; this could impact of their sustainability because most of the facilities have small storage capacities

(about 20 litres containers), and keeping them usable require regular refilling. To ensure facilities’ sustainability, there is need to ensure full time availability of

water and soap at all facilities; currently, only 38% and 75% of facilities have soap and water respectively throughout the day.

### iii) The State of Sanitation

The settlements have mixed sanitation facilities, with a huge majority of households using either household

toilets or toilets shared by a few families. Settlements where there are more shared toilet facilities include Mtaani and Kisumu

Ndogo. Mibiyu Saba has the highest number of communally shared sanitation facilities (Figure 19 and 20).

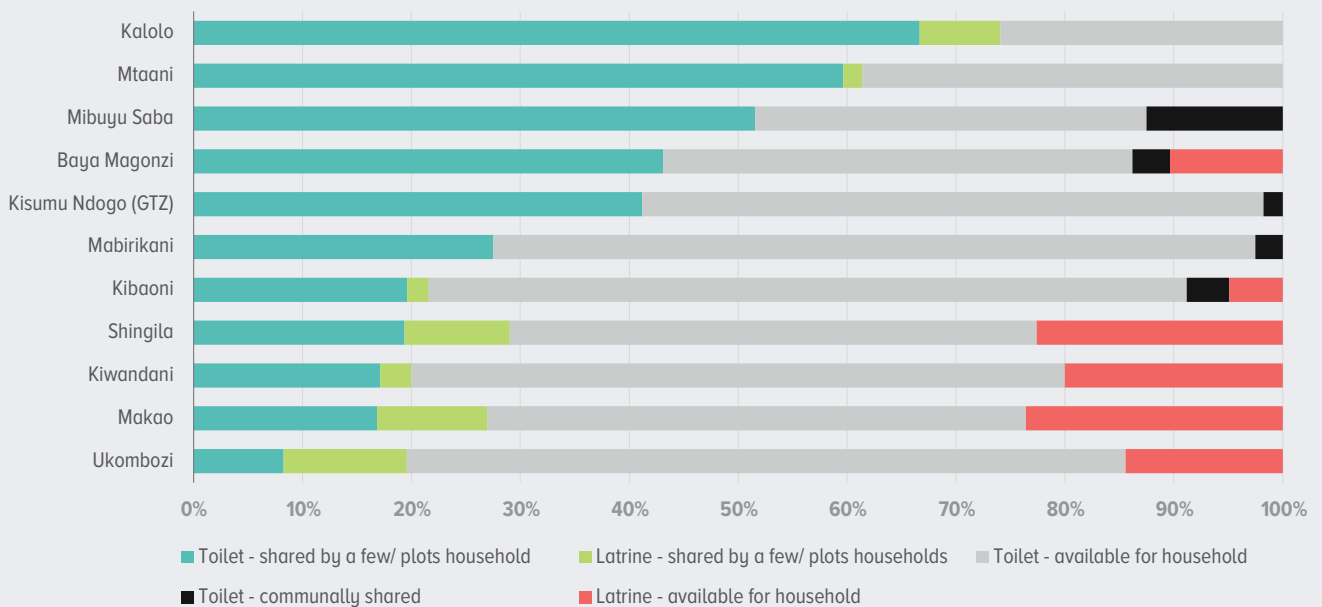
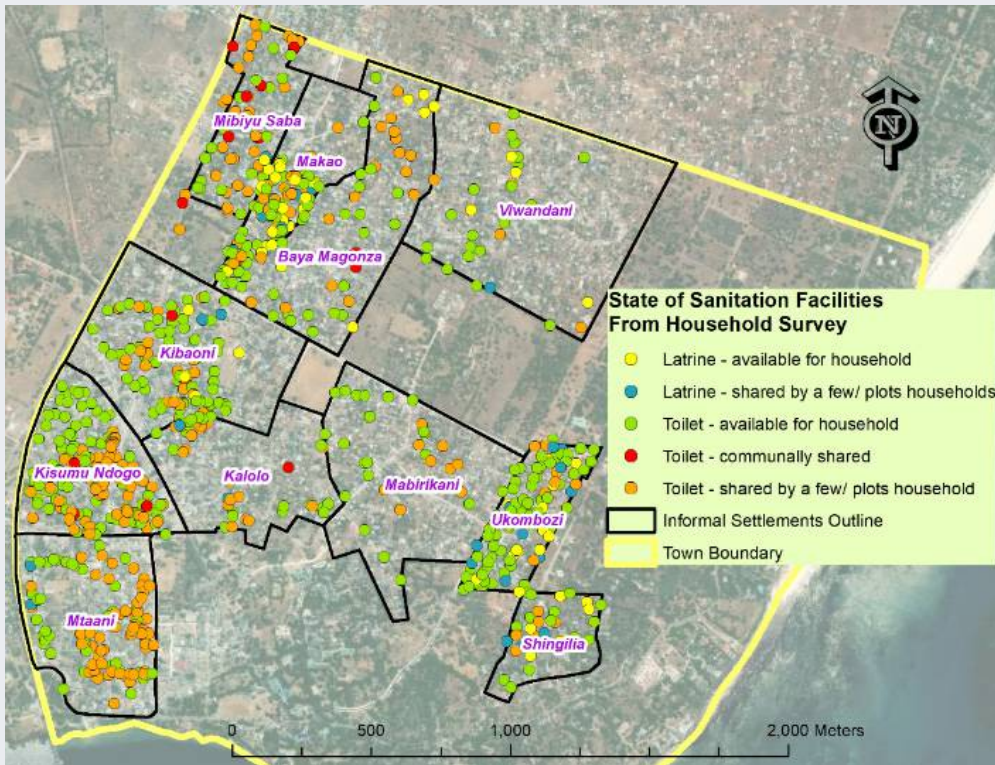


Figure 19 and 20: Sanitation facilities by settlements

A key challenge to hygiene identified by the survey is lack of water and soap at the sanitation facilities. This particularly affects toilets and latrines shared by a group of households (Figure 21).

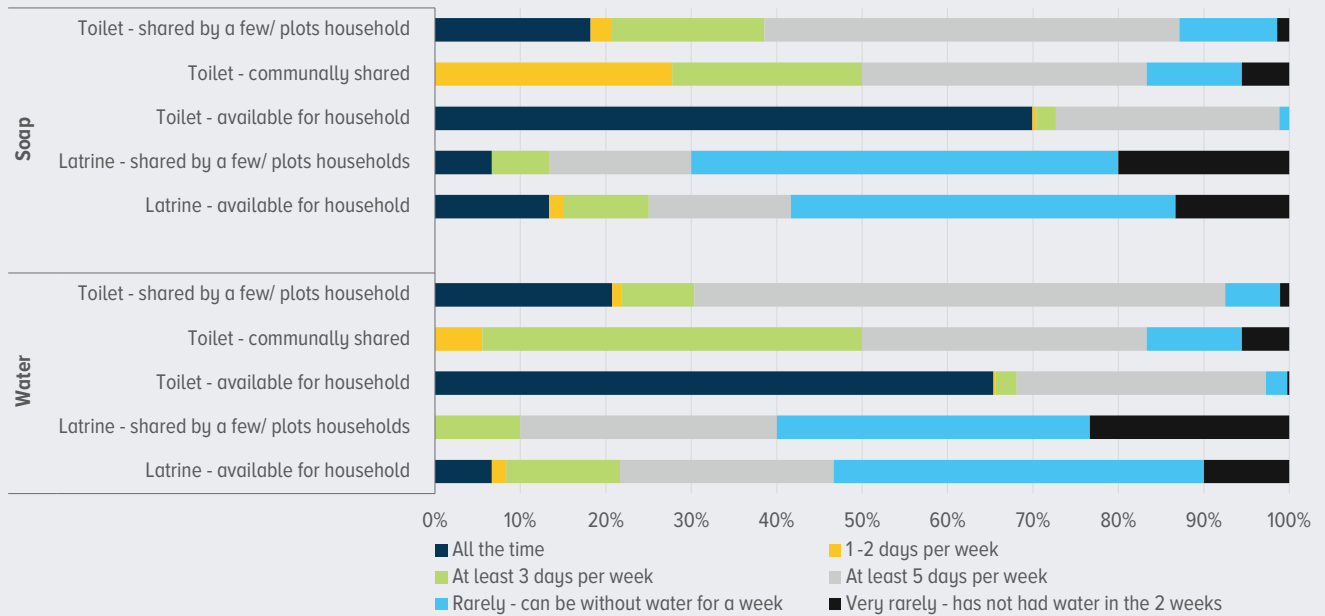


Figure 21: Availability of Soap and Water at sanitation facilities

Communally shared sanitation facilities are in fair to dilapidated conditions, with most of them requiring renovation, equipping with handwashing facilities and drainage work.



Figure 22 and 23: State of communal sanitation facilities

#### iv) Solid Waste Management

A total of 77 solid waste collection points were mapped, out of which only 14 were bins, the rest being open dumping locations. A huge majority of waste collection points are in poor conditions (Figure 24- 26).

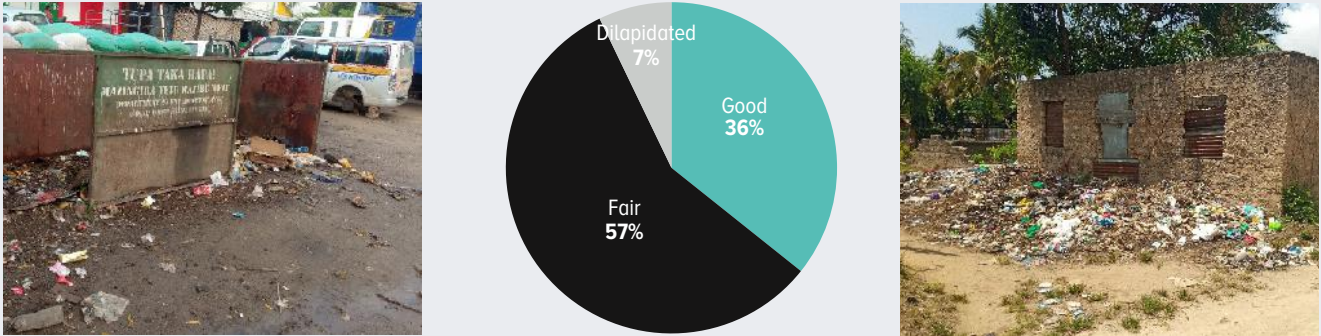


Figure 24-26: State and condition of solid waste collection sites

Households that reported to have their waste disposed on designated locations or collected from plots or households are at Mtaani and the southern parts of Kisumu Ndogo. Majority of the other households burn, or dispose waste in undesigned locations (Figure 27 and 28).

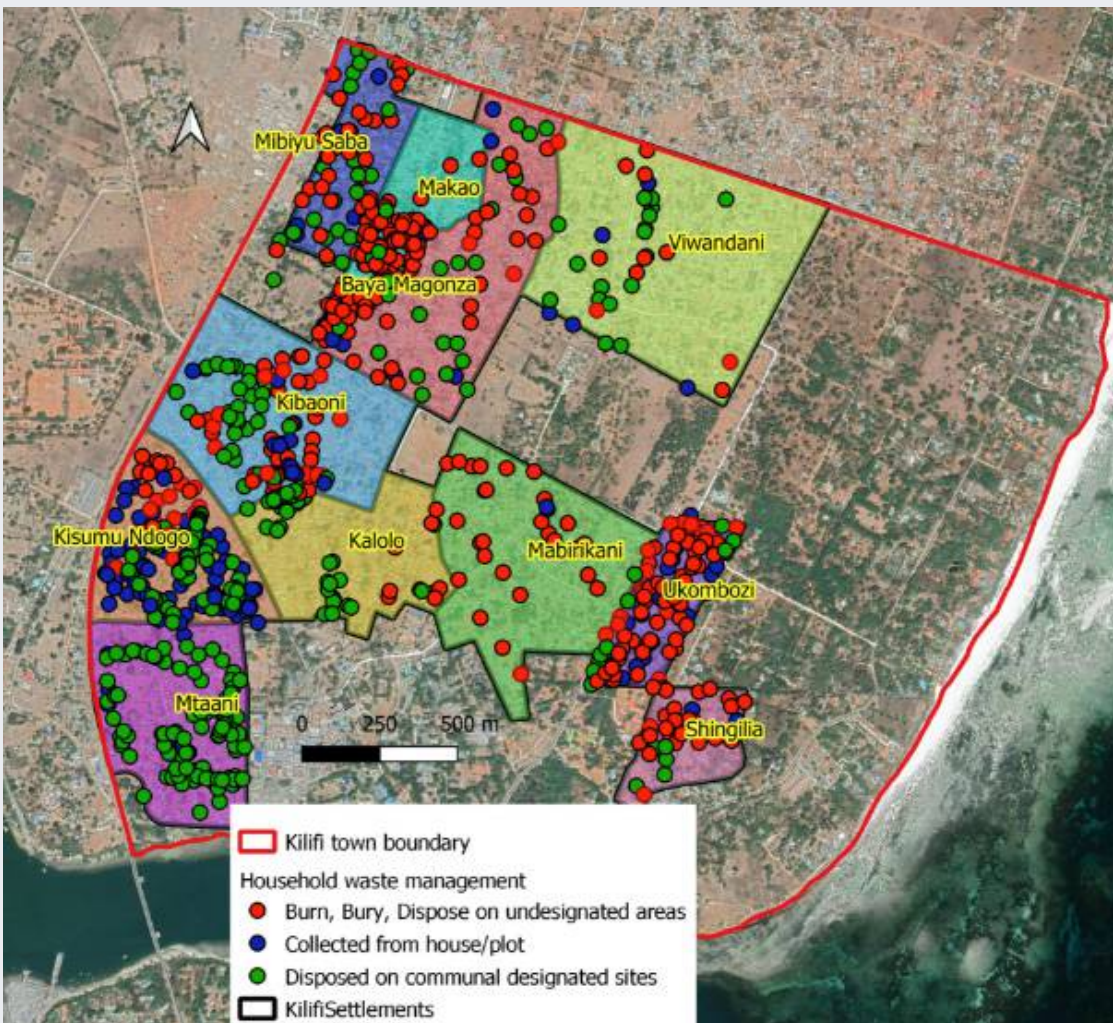


Figure 27: Solid waste collection points and nature of solid waste management by households

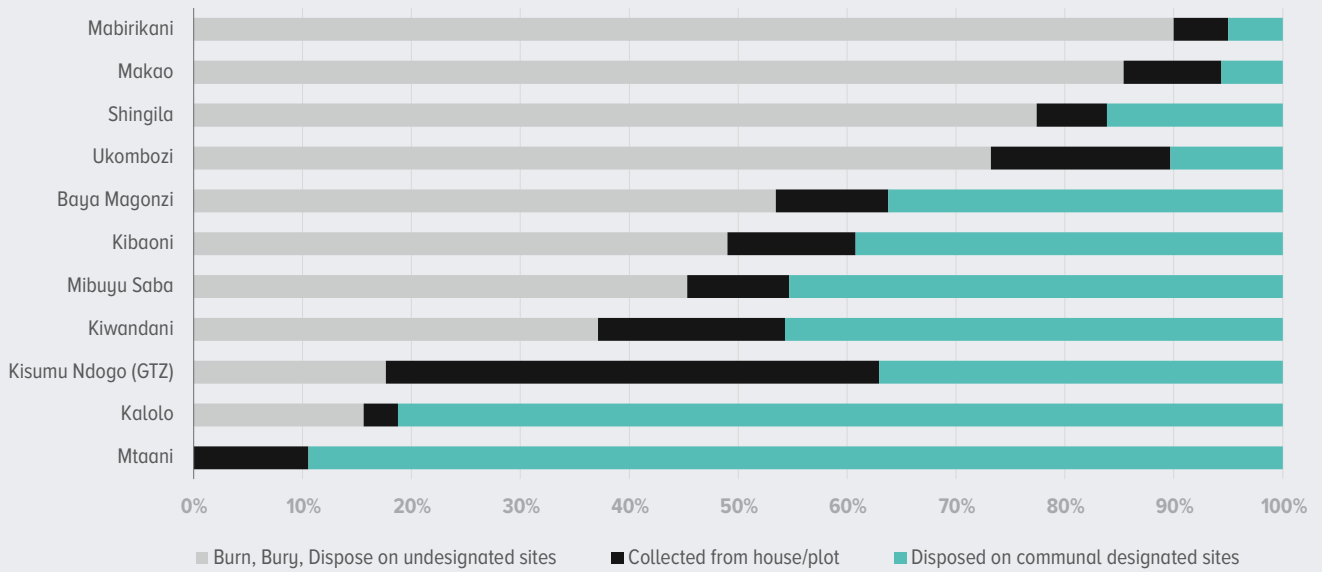


Figure 28: Solid waste collection points and nature of solid waste management by households

The government is currently managing less half of the generated waste (Figure 29). Solid waste is a health hazard, especially during the wet seasons (Figure 30).

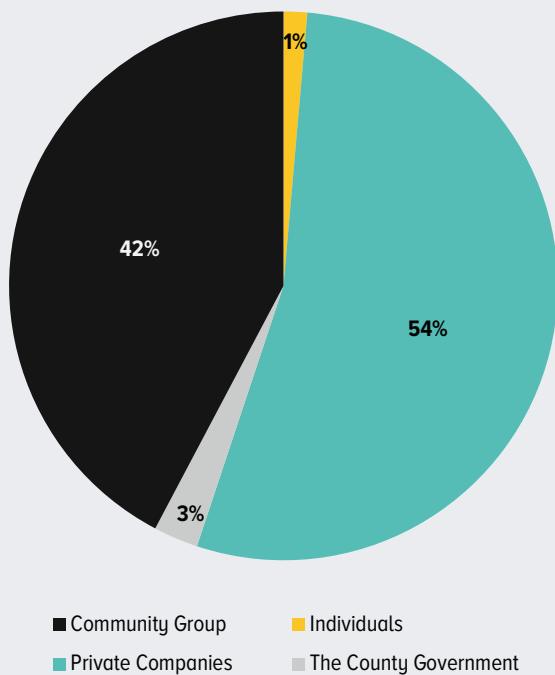


Figure 29 and 30: Organizations managing solid waste and solid waste blocking drainage channels

## 2. Access to Health Facilities



The survey mapped 10 health facilities: 2 hospitals, 4 health centres, 4 clinics/dispensaries. These facilities are largely accessible to most homes within 500 metres (Figure 31). Settlements that have at least 30% of their population unable to access a health facility within 500 metres are Viwandani, Mibiyu Saba, Ukombozi and Shingilia. Except the COVID-19 Kilifi Hospital, other health facilities within the settlements are privately managed. Incidentally, all the mapped health facilities are equipped with essential services (Water, Electricity, Sanitation, Solid waste management, Sewer Connection), except for 3 which lack connection to sewer. Observations during field survey showed that social distancing measures are observed in major health facilities, and access to handwashing facilities has been ensured (Figure 32).

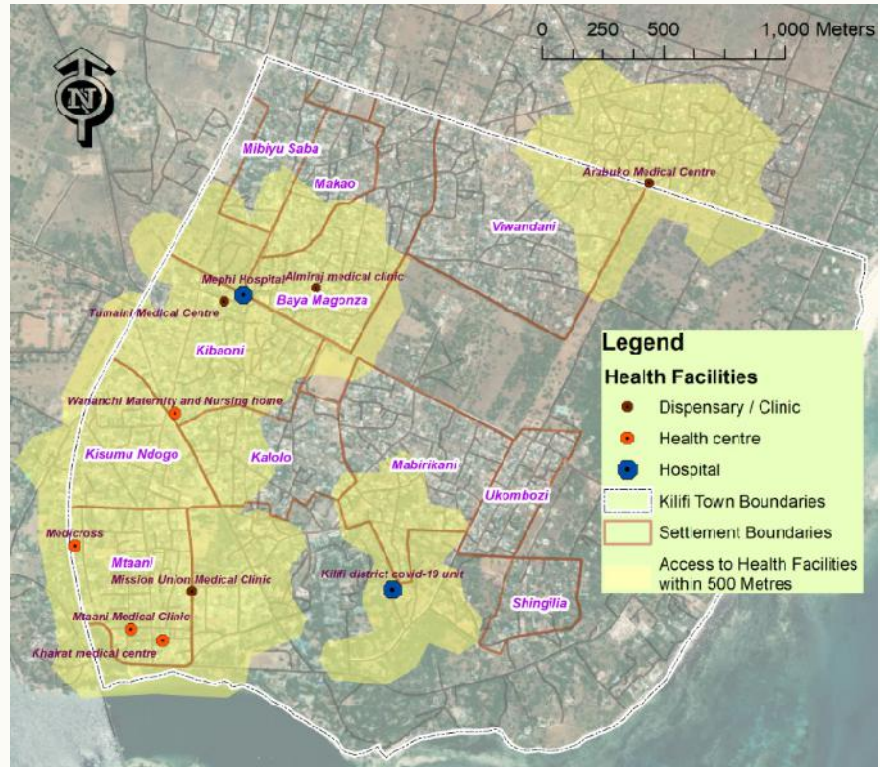


Figure 31 and 32: Location of health facilities and a health facility in the settlements respectively



### 3. State of Education

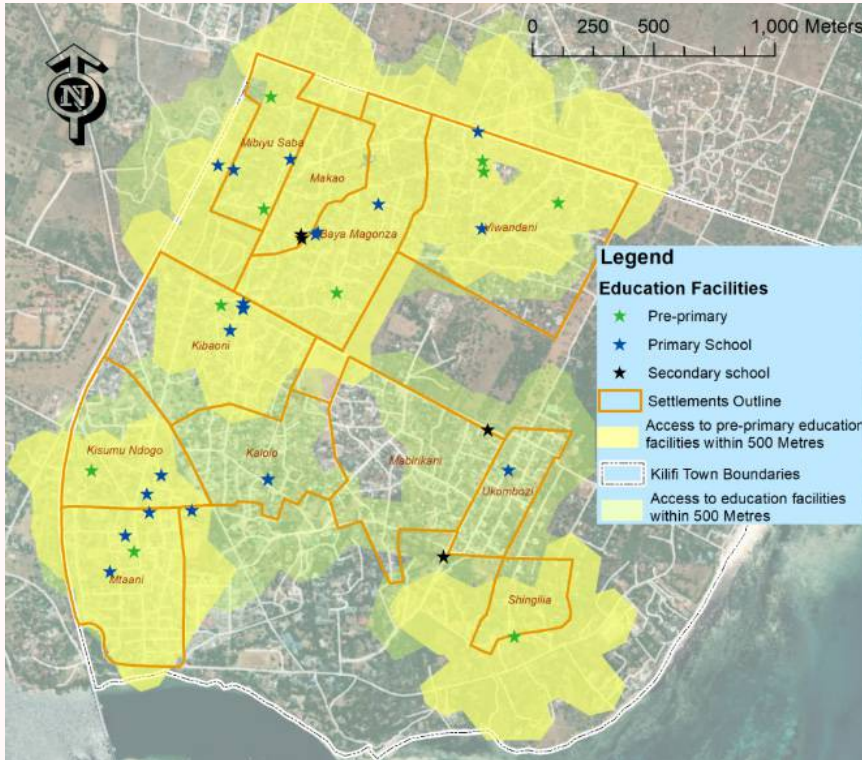


Figure 33: Location of education facilities and access service areas within 500 metres

Thirty-five (35) education facilities were mapped, their levels being pre-primary, primary and secondary schools. There are no tertiary institutions located within the informal settlements areas, but the institutions are accessible at the settlements vicinity.

Majority of the homes within the settlements are located less than 500 metres from the nearest education facility. An assessment of distances from homes to pre-primary schools shows that Ukombozi, Mariakani and Kalolo have majority of pre-primary pupils walking more than 500 metres to access an education facility. There is need for additional facility in these areas (Figure 33 and 34).

It is notable that at least 60% mapped education facilities are privately owned and run (Figure 35). The facilities are however largely equipped with most key services, with only a few requiring sewer connections.

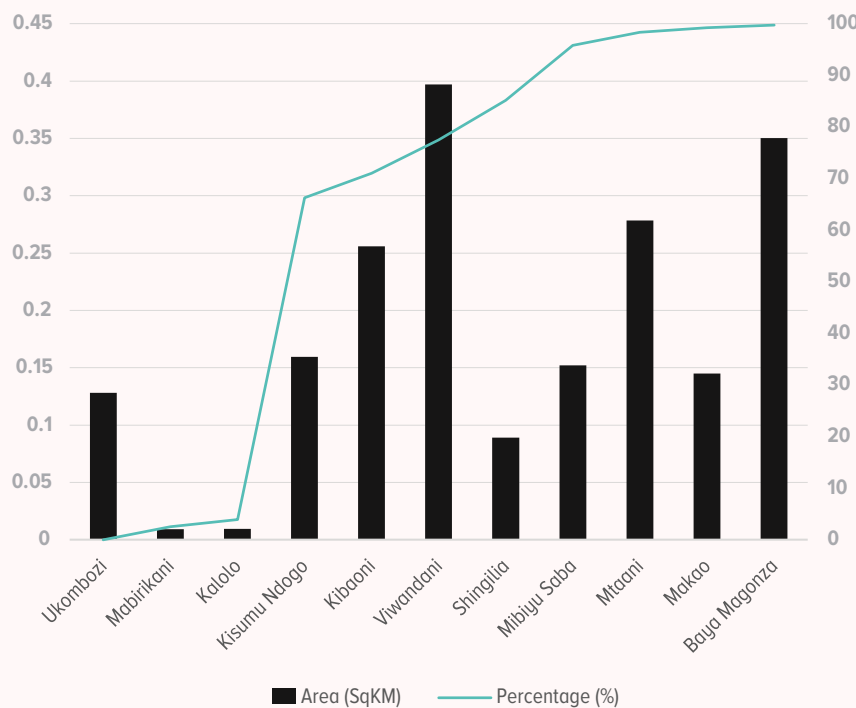


Figure 34: Location of education facilities and access service areas within 500 metres

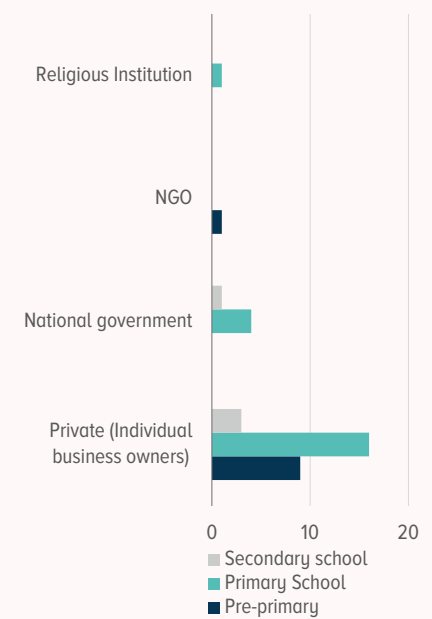


Figure 35: Management of education facilities



## 4. State of Social Halls/ Meeting places

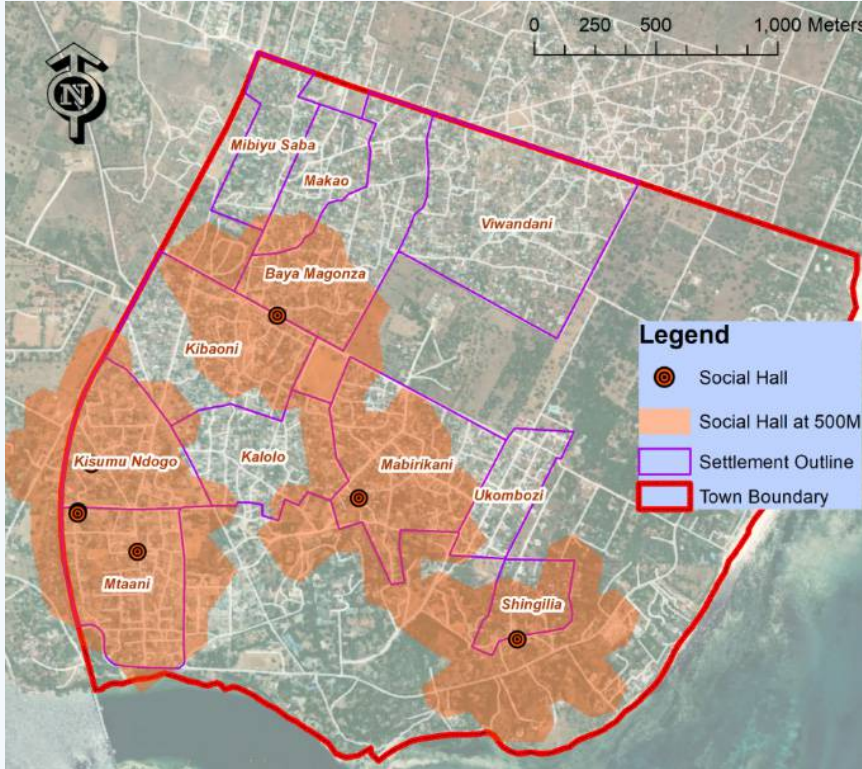


Figure 36: Access to social halls at 500 metres

A total of 7 social halls were mapped. The halls are open for all, and using spatial analysis, the survey established that over 50% of the homes in the settlement can access the halls within 500 metres. All the halls are in usable conditions, and settlements with poor access to halls include Viwandani, Mibiya Saba and Ukombozi.

The study has further revealed that social halls and religious facilities lack solid waste management systems and connections to the sewer system. Religious facilities have better access to water, electricity and sanitation services than social halls – while only about 15% of religious facilities lack the three, this figure is at 30% for social halls (Figure 45 and 46).

Halls are generally in good conditions and are accessible to the residents; 11 out of the 14 mapped halls are accessed for free while the rest charge between Kes. 500 to Kes. 3,000 to users per day.

The mapped halls are well equipped with the necessary infrastructure, with only 2 lacking connection to the sewer, 1 lacking connection to water and 1 lacking solid waste management system.

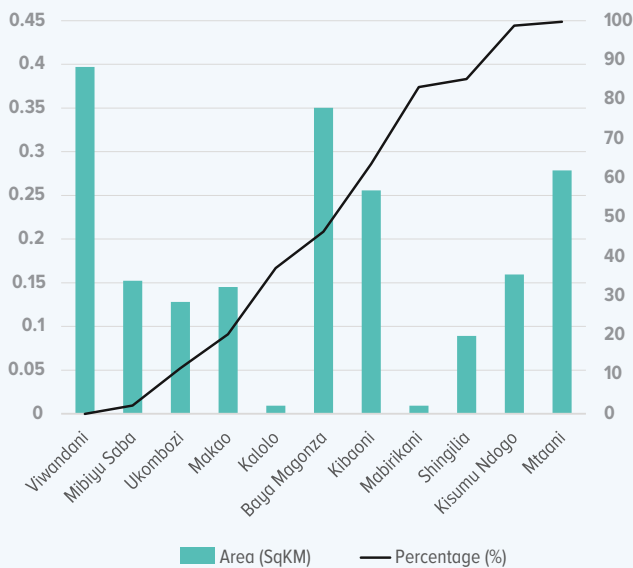


Figure 37: Access to social halls at 500 metres

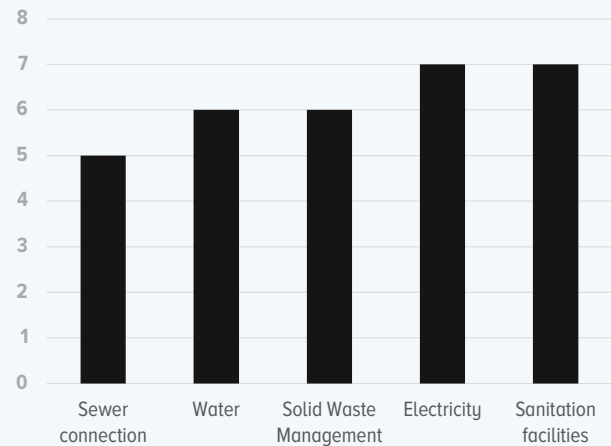


Figure 38: Access to services from social/community halls





## 5. Access to Public Transport

The settlements, being near the Kilifi urban core, have generally good access to public transport. Spatial analysis shows that over 90% of all residents in the settlements can access public transport within 500 metres from their homes (Figure 39 and 40). Figure 39 show the specific areas in Shingilia, Kalolo and Viwandani requiring improved connectivity to transport (Figure 39).

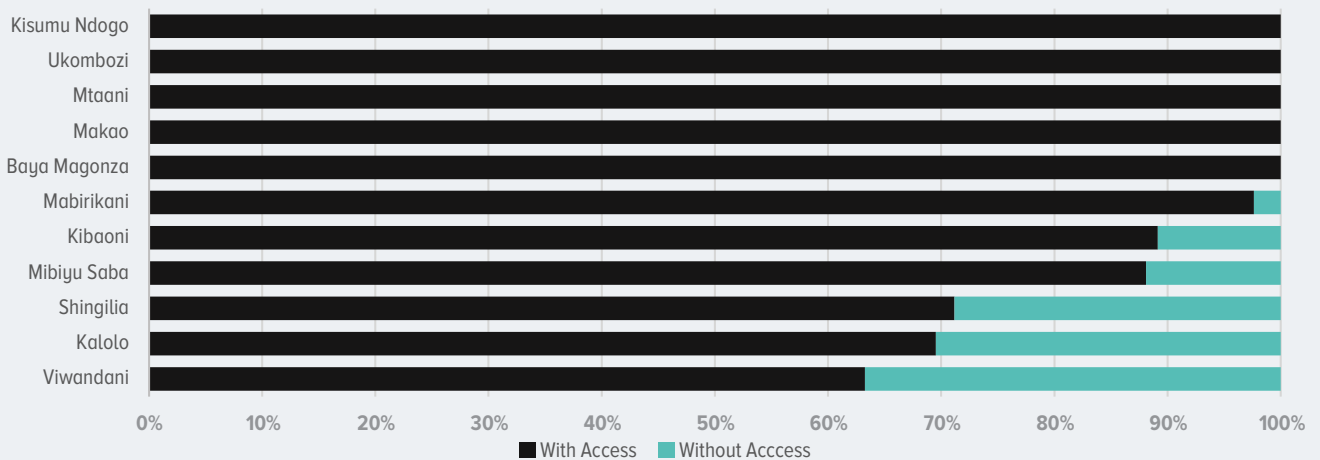


Figure 39 and 40: Access to public transport within 500 metres form households

An area of further investigation identified by the survey in respect to public transport is on the convenience of public transport, traffic congestion, road sizes, biking areas, drainage, and quality of intersections.



## 6. State of Public Spaces

Public spaces are a key component of the urban fabric. In Kilifi, field data shows that, informal settlements have greener spaces than most informal settlements in bigger towns (Figure 41 and 42).



Figure 41 and 42: Green areas fronting a settlement cluster and boda boda waiting area under a tree

Spatial analysis shows that all informal settlements homes' can access open spaces within 400 metres. Public spaces which are accessible for all are however small in sizes, accounts for less than 5% of the total settlements areas (Figure 43 and 44). Largest settlements with less than 2% of their land areas under public open spaces include Viwandai, Baya Magonza and Kibaoni.

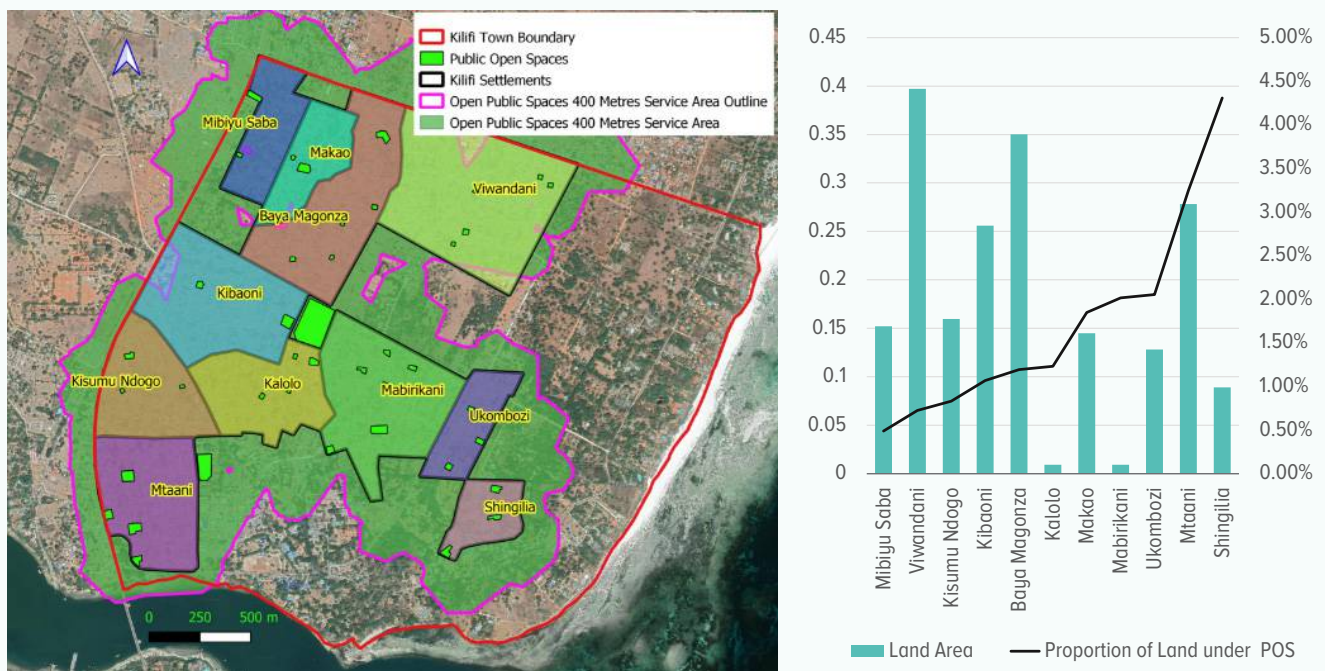


Figure 43 and 44: Access to public spaces within 400 metres from homes

## 7. Organizations Supporting in Service Provision



The survey identified at least 25 organizations with programs in Kilifi informal settlements. The major ones are in Figure 45. The sectors they cover

include provision of basic food and non-food items, support to vulnerable families, youth and adolescent girls support,

sports, girls and women empowerment HIV/AIDS awareness, peace building, and family planning.



Figure 45: Major organizations operating the settlement

It was noted that there is more support provided by organizations in social transformation compared to support in provision of infrastructural services and utilities Under the WASH category, 5 facility managers were mapped, including, the County Government, Ajay Industrial

Cooperation, UAE Red Crescent and Water for Life Program. Water point facility donors includes the County Government, and about 10 private institutions and individuals. For handwashing support, majority of the facilities are managed by private individuals, with major ones

(especially those with storage capacities of beyond 20 litres) being managed by non-profit organization (e.g. Imarika Foundation, Plan International and Shujaaz), in collaboration with the County Government.

## Key observations

The following are key observation from the mapping, and their associated action areas:

1. The informal settlements of Kilifi town have a mixed housing character, and includes traditional mud houses with thatched roofs, modern stone walled houses laid out as row housing, and clusters of joined rooms occupied by multiple families.
2. While about 90% of the residents are able to access a water point within 100 metres from their households, the settlements experience water supply challenges, with the water supplied by the water company, MAWASCO, being insufficient to meet the settlements demands. The residents use borehole water to meet water demand, but this water has to be pumped from the boreholes and transported to the households.
3. For handwashing facilities, the settlements have numerous facilities, most of which are privately owned by individuals and business owners. The number of new facilities has reduced over time since March, 2020, and most facilities (about 90%) are manually fed with water, which is not a sustainable model for handwashing facilities.
4. The survey established that shared sanitation facilities are generally in fair to poor conditions, and there is need to equip them with handwashing facilities – there is also need to ensure that the facilities have water and soap throughout the day.
5. The state of solid waste in the settlements is poor, with open dumping being evident across the settlements. A solid waste management system, coupled with awareness on solid waste management, are desired. During the rainy seasons, solid waste block drainage channels, and openly dumped waste become a health hazard.
6. Majority of residents are able to access a health facility within 500 metres. Investigation into the quality of service provided by the facilities is required to map any gaps in service provision.
7. For education, the survey established that some settlements have a challenge accessing pre-primary education facilities. There is need to ensure settlements such as Ukombozi, Mabirikani, Kalolo and Kisumu Ndogo have sufficient access pre-primary education facilities.
8. The settlements in the northern part of the town have poor access to community halls; social halls at Viwandani, Makao, Kalolo and Mibiyu Saba are required to improve access to community halls. Existing halls are in good conditions and generally well equipped with essential services.
9. While the residents of the settlements in Kilifi have better access to open spaces than most informal settlements in large towns and cities, public open spaces in the settlements are few, accounting for less than 5% of the total settlements areas. There is need to raise this proportion to at least 15%.
10. The survey further notes that there are numerous organization working in the settlement, but the organizations have not given attention to all sectors of development. As such, the survey recommends stakeholder coordination, and spatially targeted intervention.

## SUMMARIZING THE MAPPING

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This survey has established that while informal settlements in Kilifi are not characterized by acutely congested housing units, they lack proper access to essential services such as water and sanitation. This report identifies different areas for stakeholder's intervention, and is recommended for use in guiding interventions, including spatially targeted interventions.