

Rubbish, Resources and Residues - Field Report 03 (September 2022)

An overview of solid waste management systems in the city of Karachi: past and present

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Glossary of terms

Afghan Basti: Residential area of Afghan refugees in Karachi.

Afghan: People from Afghanistan. The majority of them have refugee status in Pakistan and have to carry an 'Alien Card'. They were first allowed in Pakistan after the invasion of Afghanistan by the USSR and were placed in refugee camps. With time they dispersed all over the city and the country to earn a livelihood. A large number got involved in waste picking and then the waste dealing and recycling business.

Itinerant waste buyer: This is person who roams the streets and calls to people to sell their recyclable materials or useable objects that are no more in use. They usually have a pushcart, which contains a weighing machine. They buy weigh and pay as per standard market rates by the kilogram. In other cases, they offer a rate, and a bargain may take place before finalisation of the sale. The IWB sells on the collected goods to a Kabari. In Karachi, they are also called 'paper batlee wala (person dealing in paper and bottles).

Kabari: A kabari is a mid-level recyclable waste dealer. Usually, the IWB sells their recyclable waste to a kabari. The kabari usually has a shop, with a warehouse attached to hold the separated recyclable waste materials until it is enough to fill a vehicle and send to city level dealers. These days, the kabari can also be an employer of IWBs, who collect waste for the kabari by roaming nearby areas.

Katchi Abadi: Informally developed settlements.

Katchra Kundi: A local term for neighbourhood-based secondary level storage area for household waste, also called a communal bin. The sweeper or collector of waste dump the waste from houses in katchra kundis. These are usually placed at walkable distances from collection zones, so that the garbage collector may take fewer trips. They are ideally located at places where the vehicles of the SWM company can also access them to remove the waste.

Nala: Open drainage channels, either naturally existing or constructed creeks, originally meant to carry water due to rains. They now also carry the sewage of the city. In other local literature, it is also written as nullah.

Pathan: Pushto speaking people belonging to the northern areas of Pakistan are locally termed Pathan or Pashtun. Residents of Afghanistan also speak Pushto, but the word Pathan is usually applied to Pakistani citizens. Many Afghan refugees would introduce their ethnicity and citizenship as Pashtun but might be asked for their National Identity Card, since Afghan refugees cannot get a permanent resident status.

Punjabi-Christians: Punjabi Christians are the Punjabi speaking population who migrated to Karachi from the central part of Punjab Province in Pakistan. Historically, they belonged to lower caste Hindu regions of the sub-continent, but converted to Christianity during colonial times.

Qing-qi: A Chinese term, pronounced ching-chee. Meanings include 'light cavalry' and 'light motorcycle'. It refers to a three-wheeler vehicle made by attaching a motorcycle to a flat carrier to hold stuff. This process used to be done informally but now branded Qing-qi are common. These are not only used for the movement of goods, including waste materials, but also have been used for passenger movement as a small scale shared public transportation. In this case hooded seats are added instead of an open flat platform carrier.

Sindhi: Pertaining to the province of Sindh. A resident, a language and an ethnicity.

Town: Second tier of administrative boundary as per SLGO 2001, a three-tiered local government system having Union Councils as the lowest tier. Karachi had 18 towns as per the system. A town can be considered as the equivalent to a Tehsil in rural contexts.

Abbreviations

AC: Assistant Commissioner.

CCB: Citizens Community Board.

CDGK: City District Government Karachi.

DC: Deputy Commissioner.

DHA: Defense Housing Authority.

DMC: District Municipal Corporation.

GoS: Government of Sindh.

GTS: Garbage Transfer Station.

IWB: Itinerant Waste Buyer.

Jl: Jamat-e-Islami, a religious political party.

KATI: Korangi Association of Trade and Industry.

KBCA: Karachi Building Control Authority.

KCCI: Karachi Chamber of Commerce and Industry.

KDA: Karachi Development Authority.

KEC: Karachi Electric Company.

KMC: Karachi Municipal Corporation.

KPK: Khyber Pakhtoonkhwa Province.

KPT: Karachi Port Trust.

KSDP2020: Karachi Strategic Development Plan 2020.

KW&SB: Karachi Water and Sewerage Board.

LDA: Lyari Development Authority.

MDA: Malir development Authority.

MQM: Muttahida Qaumi Movement, previously, Muhajir Qaumi Movement – They claim to represent the Urdu speaking community of Karachi.

MSWM: Municipal Solid Waste Management.

NoC: No Objection Certificate.

PPP: : Pakistan People's Party – Led by the well-known Bhutto family.

PTI: Pakistan Tehreek-e-Insaaf Party – Led by the well-known cricketer Imran Khan.

SBCA: Sind Building Control Authority.

SCP: Supreme Court of Pakistan.

SITE: Sind Industrial and Trading Estate.

SLGA: Sind Local Government Act.

SLGO: Sind Local Government Ordinance.

SSWMB: Sind Solid Waste Management Board.

SW: Solid Waste.

SWM: Solid Waste Management.

UC: (For urban areas) union committee, lowest unit of Local Government as per Sind Local Government Act 2013 (SLGA 2013). (For rural areas) union council, as per SLGA 2013 and Sindh Local Government Ordinance 2001, used between 2001 till 2013).

ZMC: Zonal Municipal Corporation.

1. Introduction

Karachi is the largest metropolitan city of Pakistan with an official population of approximately 16 million (Government of Pakistan Census 2017) and an unofficial estimated population of 36 million.¹ Karachi is the commercial hub and the largest port city of the country and located in the Southern province of Sindh, with its traditional ports and fish harbours. Karachi is also known as ‘mini-Pakistan’ due to its diversity and its ability to provide livelihoods to people migrating from different parts of the country. Yet according to the Economist Intelligence Unit liveability index (EIU 2017), Karachi has been ranked 136th out of 140th among the world’s least liveable cities of the world due to failing on various indicators like environment, health, liveability, education, and security.

Improper management of solid waste is a contributory factor, causing the spread of infectious diseases and environmental pollution, including regular waves of Dengue fever (SSWMB, 2020) and rising events of intense flooding. In a 2018 report on Karachi entitled ‘Transforming Karachi into a Liveable and Competitive Megacity’ the World Bank highlighted that over 50 per cent of the city’s waste remained uncollected and was simply discarded in open dumpsites without any prior treatment (World Bank 2018). It also pointed to institutional fragmentation and a complex political economy as the main culprits for the dismal state of solid waste management in Karachi.

2. Situational analysis

Ali, 1997; and is still without proper disposal sites. There is poor collection coverage in low-income areas, waste dumping in stormwater drains, and resulting flooding. The city does not have any strategy for waste reduction or recycling, information on industrial waste is not available, and it has no system to take care of industrial and healthcare waste.

Since 2014 waste management has been a provincial responsibility in Sindh; this happened after the 18th

amendment in the 1973 constitution leading to devolution of more powers to the province, including deciding about the system of local government as a result Sindh Local Government Act 2013 was approved giving limited powers to the local government (Naseem and Mahmood 2021). In the absence of any approved national guidelines, provincial governments have adopted their own varied institutional arrangements to manage solid waste in their cities. In 2014, the Sindh Solid Waste Management Board was formed under the ‘Act of Sindh Assembly’ to manage and control the refuse system (GoS 2014). Previously, Karachi’s solid waste management fell under the domain of the Karachi Metropolitan Corporation (KMC) and thirteen other agencies.

The Sindh Solid Waste Management Board (SSWMB) is a government department responsible to the provincial government of Sindh. It was formed to take the responsibility for strategic waste management operations and initiatives and to support other municipal institutions, for example, district governments in waste collection and transportation. Karachi Metropolitan Corporation and its district metropolitan units, which were traditionally responsible for managing solid waste at the city level, now have a marginal role in overall solid waste management at the city level. SSWMB has also outsourced waste transportation services to international companies.

The provincial political environment is complex and risky to some civil society organizations that have raised their voice against the poor level of basic services. These organizations have taken this to the Supreme Court of Pakistan, which resulted in a report from the authority. It suggests major changes in the working of SSWMB and its leadership (SCP, 2017). This is further discussed in section four of this report.

Karachi, like many other large cities in developing countries, faces a number of challenges in managing its waste. Studies provide different information about the waste quantities and collection rates. For example, 20 years ago, solid waste generation was

¹ Karachi’s official population census are challenged in a court case by political parties and civil society organisations (Ashfaq 2020).

reported to be 6,450 Tons per Day (TPD), with present estimate of 12000 tons/ day due to population increase, changes in lifestyle and the introduction of packaging. Increased plastics and food wastes have changed the composition of waste. It is estimated that out of the amount of 12000 tons/ day, only up to 10,000 TPD of solid waste is collected and the remainder dumped into open spaces such as roadsides, rainwater drains, pavements and empty plots (Sabir et. al., 2016; SSWMB, 2020). Waste collection in low-income areas is negligible. Sometimes the residents in such areas burn this waste to get rid of this, without realizing the risks involved in such practices (KCCI, 2018). There are little data available about the industrial waste, commercial waste and import of waste from other cities and countries.

Waste composition and quantity in Karachi varies by income group and season. It is estimated that the average per capita waste generation is 0.44 kg/day (UNESCAPE, 2007). Per capita waste generation in low-income areas is estimated at 0.224–0.371 kg/day, but more recent studies indicate that this figure has increased to 0.8 kg/day (Ahmed 2019, Ahmed 2009). Other studies find that the average waste generation of low-, middle- and high-income groups was 0.19, 0.29 and 0.84 kg/c/d respectively (UNESCAP 2007).

Solid waste in Karachi is categorized as organic, inorganic, and hazardous waste. According to the estimates of SSWMB, indigenous waste lying open at the landfill sites of Karachi is 54 per cent organic in nature, while the remaining waste comprises recyclable waste including paper (11.5 per cent), plastic (10 per cent), glass (7 per cent), metal (4.5 per cent) and other inorganic waste (10 per cent), while hazardous waste constitutes about 2 per cent of Karachi's solid waste (KCCI 2018).

Traditionally, Karachi City governments employed large number of municipal sweepers, although, the appointment of any new municipal sweepers was stopped 15 years ago. Now self-employed sweepers, also known as 'Afghan Sweepers' serve the majority of low-income areas and some middle-income areas. Waste pickers operate on the streets of Karachi and at final disposal sites. Traditional separation at source is still common and thousands of itinerant waste buyers (IWB), still operate on the streets of Karachi to buy separated waste. The key challenges facing the

solid waste system in Karachi can be summarized as follows:

1. No agreed and operational system of primary collection of solid waste;
2. No alternative after the removal of Katchra kundies, no space for Katchra kundies and no containers – transfer blockage;
3. Transport services are inadequate and thinly spread, much less than the required capacity, waste disposed of at many points;
4. Traditional sweepers' role is redundant and there is no strategy on where they fit;
5. Focus on waste transport – but no focus on final disposal, recycling, primary collection and secondary storage;
6. No planning on future disposal sites and no satisfactory system of final disposal.

2.1 Actors involved in SWM and the evolution of their roles over time

Karachi has an extensive network of informal collectors and recyclers (Ali 1996, Beall 1997). The Karachi Chamber of Commerce and Industry report (KCCI 2018) indicates that several informal ways of garbage collection have been in action since the urban population has increased, as municipal institutions have poor capacity and waste quantities have increased. Low-income communities residing in squatter settlements usually develop their own services through self-help efforts. Such schemes include solid waste disposal, with the aim of placing household and other kinds of waste outside the locality from where it can be removed by municipal authorities. This minimalist system ensures cleanliness and basic upkeep in the community area. The system normally utilizes a sweeper and basic waste-collection tools, such as a wheelbarrow improvised for waste collection, hand tools and collection bins used by households for routine collection (Ahmed 2009).

The sweepers and sanitary workers, who are often employed by municipal authorities, belong to Hindu and Christian religious minorities. Some percentages of Muslims also work as sanitary workers (Department of Development Studies 2019). In both the cities, the informal sector consists of self-employed individual collectors or scavengers who are often Afghan youth and children. According to

BOX 1

Mudassar was a young itinerant waste buyer (IWB) in Manzoor Colony. His cart was still empty at mid-day, but he was trying his best. He starts at seven in the morning and continues until six or seven at night. He collects around 500 kg of waste, and his target income is Rs 500/ day (US \$ 3.5 and US \$ 75 per month). This is close to the poverty line of US \$ 2/ day. His father was impacted by COVID-19 and he had to take a loan from the Kabari or middle tier waste buyer. Now Mudassar has started work to return the loan, and his father also works. The Kabari run the itinerant waste buyers (IWB) and have two sources. Carts belong to the Kabari and they arrange a fixed place for the selling of waste. Though traditional IWBs (many are Punjabis and Mohajirs) are under intense pressure from Pathans with whom they have a cart or Qing-qi arrangement. Afghans/Pathans have regular collection arrangement with source separators of waste (scavengers) and they target large generating areas such as shops, restaurants etc.

estimates, about 90,000 scavengers are involved in this sector in Pakistan. The informal sector is able to operate profitably because it uses an efficient door-to-door collection method within local districts, thus limiting transport costs. The scavengers then sell recyclable materials for economic returns (Moten and Rehman, 2000).

Afghan/Pathans dominate in recycling, with control over the operations of Qing-qi. These vehicles cost from Rs 75000 (US \$ 500) to 150,000 (US \$ 1000) each and require capital outlay. Pathans now operate many waste dealers' shops within residential areas. They are very nervous of government intervention and efforts to remove them as part of the recent Nala widening Anti-encroachment drive.² Many properties were damaged, and evictions took place of informal waste recycling operations along the Nalas. One reason this took place was to control the unregulated disposal of waste in Nalas and the Pathan dealers were most at risk, their business being based on waste sorting and recycling along these Nalas.

Some new actors are also identified – e.g., transporters, who seems to work independently of the bigger dealers and roam around with a vehicle.

² From 2017 onwards Karachi has seen above average rains during monsoon season, while in August 2020 Karachi received record breaking monsoon rains, leading to urban flooding which was largely blamed on the choke Nalas (natural flood drain channels, or creeks which have now turned into sewage drain channels) of the city. While majority of such Nalas have witnessed development of informal settlements since there was no formal development allowed, leading to shortening of width of the Nalas. While the

They also purchase recyclable materials from dealers and sell to the recycling industry. They come, offer a price, pay cash and go. They probably play a key role in assessing the quality of the waste material on offer.

Afghan/Pathans who own Qing-qi reach out to the sites where waste is already being sourced and separated. They have a technological advantage. Separation is done by a range of people from domestic workers, guards, or householders themselves. They bring all of this to the dealers themselves.

Now in some areas, door-to-door collection has started up, with waste collectors using Qing-qi. One reason for this is that the Katchra kundies were removed from the whole of the city without any alternative sites being provided. As a consequence, waste has to be transported far, which needs a vehicle. Transfer stations were developed but they are only partly working because of the large gap between the generation of waste and the secondary transportation capacity of SSWM contractors. In some cases, nearby residents challenged the operation of the transfer stations. When large quantities of waste smell, then

biggest issue is the dumping of solid waste in the Nalas, apparently by the residents along these Nalas. This has led the provincial government to run anti-encroachment drives along these Nalas leading to eviction of thousands of people and destruction of houses for the widening of these Nalas. A detailed research report is available in the following weblink: <https://karachibachaotehreek.org/docs/gujjar-orangi-nala-housing-survey.pdf>

citizens objected few have actually used violence to stop the trucks arriving at the transfer stations.

Many stories circulated about the elimination of the Katchra kundies – including suspicions of a land grab to add to the commercial properties in Shah Rasool Colony.

Over the years, there have been changes to the people involved in SWM:

1995-2001

The human resource involved during this time period were limited to minority groups including Punjabi Christians and Hindus who held the formal KMC jobs or were hired privately by neighbourhood societies, cantonments or who worked privately in commercial enterprises. In this period, the Afghan refugees remained limited to the role of waste pickers/scavengers and to some extent as localized sorting agents for the recycling industries. The hiring of religious minorities remained limited to the Punjabi Christian and Hindu sanitary workers in the KMC. They were basically involved in handling solid waste, street sweeping and cleaning sewage and other drains. Staff involved in other roles, including the drivers involved in SWM and supervisors of the sanitary workers, could be from any religious affiliation. In 1996 an estimated 12000 sweepers were working for the KMC. However, there has been no new hiring of permanent sanitary workers in the KMC since 1996, although they have been hired as daily wage workers on a need basis or on short term contracts.³ Cantonment areas, defence housing societies and industrial areas were not covered by KMC and they hired their own contractors.

2001-2009

The human resource situation in the formal SWM and sweeping, in this period, continued as before. Sweepers formal relationships with the town level government and their informal relationships with the households they collected waste from, remained unchanged.

³ Probably this happened after the separation of Water and Sewage Management functions from the KMC to form KWSB, since then permanent sanitary workers are not hired in the KMC, however there is

After the 9/11 attack and the ‘war on terror’ a new war began in Afghanistan. Pakistan also experienced fallout from this, including violence. As a result, the movements of Afghan refugees in the cities were questioned and it impacted their work as waste pickers, recyclers and those who were also working as self-employed sweepers in Karachi.

2009-2013

The situation remained the same in terms of human resource limitations. However, the Sindh government had formally banned any new permanent hiring in government departments including KMC.

2013-2020

With the rise of SSWMB and the contracting out of SWM functions, Sindhi workers working for the contractors also entered the human resource stock of the city. The sub-contractors had also hired Afghans, who brought their male family members, to do door-to-door collection of solid waste and take it to the nearby dumping sites using their donkey carts. The formerly protected Christian and Hindu religious minorities continued to work in the formal domains of the public and private sectors as well as informal domains.

This period also saw huge number of firings of KMC *ad hoc* workers (The News 2014, Samaa 2013). Despite the government of Sindh nullifying any attempt by the KMC to hire new staff on various occasions (Makhdoom 2017, Express Tribune 2019) there have been allegations of political hiring (Baloch 2018). These hiring and firing steps symbolized some of the power politics between the local Karachi and Sindh Provincial Government.

The gaps in human resource needs have been largely filled by informal service providers, with cooperative societies and gated communities hiring Afghans for door-to-door collection. They charge 150-200 Rs (0.65-0.85 GBP) per month per household, with further income coming from the sale of recyclable materials. Services are not provided in low-income

no document found yet, only the KMC employees mention that and the fact that there has been no permanent employment for the sanitary workers since then.

areas where households cannot afford them, and recyclable materials are limited.

Given this chaotic SWM context, integration in Karachi will not occur through policy decree. The SSWM board does not have policies on recycling or waste reduction, though it sometimes supports media or civil society campaigns. Furthermore, the board has limited responsibilities, confined mostly to transferring waste from designated bins to the transfer stations and then to the city's final dump site. Apart from in a small area of the city, there is no focus on primary collection.

However, there are some initial signs of integration at lower levels of governance. For example, some Union Councils are piloting door-to-door collection and the SSWM Board is providing Qing-qi to waste collectors to extend better coverage to low-income areas. However, they are doing so without looking at and learning from existing services. This has led to reports of conflicts between the SSWMB and Afghan workers.

Most of the informal waste collection and recycling activities run in parallel to the formal system of waste collection and in substitute in areas where municipal services are not available. Informal activities in Karachi have expanded significantly and include the use of advanced technology without any support from government. As such the opportunity to include informal services in the SWM system has not been raised by those satisfied with the service. As a result, there have been no public benefits deriving from these positive recycling efforts.

2.2 Environmental challenges related to SWM

More than 600 million gallons of sewage finds its way to sea waters in Karachi. With a combination of high tides, drains blocked by waste and high intensity rains as shown by the recent floods in mid-2022, sewage flows back into the residential areas of Karachi. Flooding has been an increased and major challenge in the last few years. In 2020, many areas of the city were severely flooded. First time residents of high-income areas demonstrated against the impact of flooding to the Defence Housing Authority (DHA), who planned the housing and delivers key services. According to one senior politician of Sindh, DHA

(the army) are 'the real owners of Karachi' but have not improved the situation nevertheless.

2.3 SWM Services in low-income areas

Low-income areas are always in the background when it comes to SWM and constitute a big challenge on various levels. Given that SSWMB services are mainly motorized, so these services face limited access routes into and around informally developed areas, either due to terrain or morphology and hence they are excluded from the service. DMC based sweepers are limited in number and don't come regularly. Just like other parts of the city, privately hired sweepers work in those informally developed areas where people are able to pay and hire such sweepers. The Afghan door-to-door workers usually do not work in informally developed localities as they complain that the waste does not contain any recyclable materials and thus any extra income to be derived. The majority of the informal settlements that abut Nalas are considered responsible for the waste blocking the Nalas. In the absence of alternative collection or disposal, the Nalas usually get choked, and during monsoon seasons urban flooding takes place. Karachi has experienced eviction of thousands of people and the demolition of houses, without any rehabilitation plans, along three major sewage nalas of Karachi, i.e., Gujjar Nala, Manzoor Colony Nala, and the Orangi Nala.

3. Various SWM models prevalent in the city

The existing solid waste management in the city comprises the following stages and varies according to the contextual conditions that may be explained in each section of the stage.

1. Door-to-door collection to Katchra Kundi;
2. Katchra Kundi to intermittent transfer or permanent transfer station;
3. Transfer station to landfill/dumpsite.

3.1 Door-to-door collection to Katchra Kundi

This stage of the MSWM varies across the city according to income group, jurisdiction of the land-owning agency, typology of the housing i.e.,

bungalow vs apartment type, gated vs non-gated communities and private vs. government housing societies.

As mentioned in the section dealing with land owning agencies in the city, it is reiterated that around thirteen various land-owning agencies exist in Karachi, out of which six are cantonment boards, which are usually gated communities.

The cantonment boards have their own system of solid waste management including door to door collection and transferring it to the Katchra Kundi or to the transfer station of that particular district, however, no cantonment board takes their MSW to the land fill site. The cantonment boards have their own permanent staff, salaried or on daily wages or both, along with the required machinery. From the transfer stations onwards, the SSWMB takes care of the dumped waste, and probably the SSWMB do not charge a penny to the cantonment boards for that. As per KSDP 2020 (CDGK 2007) cantonment boards cater to almost 20 per cent of the municipal solid waste generated in the city. The cantonment boards charge the residents for the service as part of their overall service charges which are paid per month and include charges for water, sanitation and MSWM including sweeping and other amenities and services.

There are areas other than cantonment boards that are considered gated private communities, including gated apartment buildings. They are responsible for the door-to-door collection of waste within their boundary walls. Such communities, if private, develop their own society's unions, which are elected by the residents and are responsible for running systems of water supply and SWM in their gated community. The residents pay a maintenance fee on monthly basis. The union hires private sweepers who collect door-to-door and dump the waste at the nearest Katchra Kundi. From here the SSWMB vehicles pick up the waste. In districts where the SSWMB (in coordination with the District Municipal Corporation (DMC), has contracted out the work, the contractor provides large bins inside and outside the gated community. The bins are filled by the community sweeper/waste collector and the SSWMB vehicles mechanically pick up the bins, which are compactor vehicle friendly. The human resources involved in private waste collection in these gated communities are largely Punjabi Christians, both male and female. In some cases, the whole family

works including the children. In other cases, the resident's unions have hired Afghans, usually young males, who do door-to-door collection and then take the waste to the nearby Katchra Kundi or dump it into the SSWMB provided bins. The SSWMB vehicles then take the MSW to the transfer station and from there it is taken to the landfill/dumping sites of Jam Chakro or the Gond Pass.

The areas that are under public land-owning agencies and are not gated, are the responsibility of the DMC and the SSWMB caters for their needs. As mentioned earlier, only three of the seven districts have outsourced their MSW to contractors, while districts without contracting out arrangements remain the responsibility of the DMC.

It is reported in some of the areas that men going to their offices in the morning on their bikes, toss the waste bags in the open Katchra Kundis located on their way. Similarly, domestic workers, usually females, are given the household waste bags on their way home and toss the waste into the Katchra Kundis, or in open drains, on empty plots or simply leave it at the corners of streets.



Figure 1. Waste collection from bins installed by Clifton Cantonment Board near Zam Zama Park DHA-V.

3.1.1 The contractors

The contractors have invested in compactor vehicles and the bins that the compactor vehicles can empty mechanically. These bins are placed throughout the district and local people and the informally hired sweepers in the locality are required to dump their garbage within these bins. The vehicle staff do not cater for any garbage outside the bin. The garbage collection vehicles usually come in the morning to empty the bins. More recently, the SSWMB contractors have started a door-to-door garbage collection service, with its salaried employees provided with three-wheeler small loader type vehicles. However, this has not been very successful in many areas as they face resistance from the people already working there, especially the Afghan workers who claim to have paid a rights fee to the union committees and to have obtained official No-Objection-Certificate (NOC) recognition.



Figure 2. SSWMB collects the waste from the bin placed near the road using their loaders.

3.1.2 The KMC/DMCs

In other areas, where work has not been contracted out, they are the responsibility of the DMCs, organized at the UC level. The majority of the areas are under staff, and the staff (originally KMC employed) are only responsible for the sweeping of

the area and collection of garbage from the streets. There is no formal door-to-door collection, which is not the responsibility of the DMC sweepers. The DMCs are usually understaffed and the staff working for them are ageing. They do work informally, providing a door-to-door collection system, for which they charge 150-200 rs monthly. The collected garbage is then transferred to the nearest Katchra Kundi. These individuals are largely blamed for the dumping of waste in the open sewage channels (Nalas) and for burning of waste, as the Katchra Kundis are at a far distance. In addition to being older, their equipment comprises non-motorized wheelbarrows. These DMC employees have brought in their sons to do the work informally as they can earn from the door-to-door collection opportunities in addition to earning from separating some recyclable waste items before dumping the waste at the Katchra Kundis.



Figure 3. Sweepers from KMC/DMC's collecting the waste from the doorsteps and sweeping the street in the morning time.

3.1.3 The Afghan refugees and immigrants

Afghan refugee workers have become the dominant group working in MSWM in the city. They started as scavengers in the city, but since KMC/DMC employees aged and KMC was prevented from hiring new workers, the Afghan refugees filled the gap. They have been hired by many gated communities and apartment complexes to do the door-to-door collection and take waste to the nearby Katchra Kundi. In other cases, the Union Councils (UC) had the possibility of contracting out MSWM and door-to-door collection, for which they did through a competitive process, although it is reported that usually NoCs were granted without any competition. The amount of money paid for a NoC varied as per interview, from 10,000-25000 Rs per month. This could not be triangulated with the UC offices, who claimed to have no knowledge about it.

The Afghan workers have brought innovation into the working, as they first brought donkey carts to travel from their areas of residence and to carry the MSW. Later, since Afghans generally live on the outskirts of the city, they used Qing-qi (pronounced Ching-chi), flat platforms connected to the back of motorcycles or three-wheelers, to collect solid waste. They dump the non-recyclable waste at the dumping sites and take the recyclable waste to sort at their localities. Afghan entrepreneurs have established recyclable waste shops and small factories in their residential localities. These actors buy recyclable waste from other door-to-door collectors and buyers of recyclable waste. The factories compact the waste and sell it on to operators in the recycling industry.

The following categories of Afghans are informally involved in SWM in Karachi:

- a) Contractor: Influential individuals through their connections get door-to-door collection contracts from the UCs. They then sub-contract the work to Afghan waste workers, deducting a monthly amount from what they receive from households. The waste workers earn on their own account by selling the recyclable waste they retrieve.



Figure 4. Afghani waste collector's Qing-qi carrying recyclable waste.

- b) Recycler: middle-tier recyclers, usually with Qing-qi loaders that they lend under certain conditions, to waste collectors. The latter are bound to bring and sell the waste to the contractor or work on daily wage for them. The middle-tier recyclers are usually found along the nalas where they have sorting space and provide accommodation for their waste collectors/pickers as well.



Figure 5. Recycler's junkyards at the embankment of Gujjar Nala.

- c) Waste picker: free floating individuals who carry bags through the streets and can be found at the Katchra Kundi (waste dumps) where they collect waste and sell it to the middle-tier recyclers. They may get

accommodation at the recyclers yard or live freely in one of the two Afghan basti or neighbourhoods.



Figure 6. Afghani waste pickers collect waste from bank of Nala.

- d) Independent door to door waste collector/sweeper: these individuals make their way into an area and start working, sometimes by paying a local influential person who ensures their access to a nearby Katchra Kundi and offers protection. They charge households and earn from selling recyclable materials.



Figure 7. Afghani Sweeper collects the waste from households.

3.2 Katchra Kundi to intermittent transfer or permanent transfer station

Katchra Kundis are the secondary level storage after the house level storage. The door-to-door collectors of waste takes the waste to these temporary storage

spaces, which are nearby so that the waste collector can do multiple trips to the place emptying their wheelbarrows, donkey carts, or the Ching-Chi. Also, these are at places where the trucks can access the waste, to take it away. Katchra Kundis are emptied by the larger trucks using excavators. Depending on the capacity, some are emptied daily, others after two days, a week or when the residents complain about it. At these Katchra Kundis pickers are found and they further spread the waste while searching for recyclables. Katchra Kundis are of several types:

- i. A formally developed Katchra Kundi is an allocated small space in certain gated communities, provided as per town planning byelaws. Other formally provided Katchra Kundis are outside gated communities and are marked by a low height (2-3 feet) wall enclosure, with one side open for the entry of vehicles or excavators.



Figure 8. Formally developed Katchra Kundi in Korangi and DHA. (Source: DC office Korangi).⁴

⁴ Retrieved from:
<https://pbs.twimg.com/media/efoble2w4aape9e.jpg>

- ii. Another type of formally developed Katchra Kundi are the large bins or containers placed by the authorities at locations usually along roadsides, on sides of service road, in connection with open plots, so that these can easily be serviced and taken away by the authorities.



Figure 9. Waste bins and Containers installed by SSWMB functioning as Katchra Kundis.

- iii. In other cases, the open plots, corners of the streets, along rainwater drains (Nalas), sides of playgrounds become de-facto Katchra kundis. The waste is then taken to the intermittent or permanent transfer station. An intermittent transfer station is an informally developed transfer station but is large enough to cater to the large incoming waste and can be accessed by the larger trucks and excavators. Waste from Katchra Kundis is then brought to the dumping site on open trucks and compactors trucks.



Figure 10. Informally developed Katchra Kundis at Open plots, corners of the streets and outside wall of public playground.

As per SSWMB, each district has a formally developed GTS, where the MSW from the Katchra Kundis is taken by trucks.

3.3 Transfer station to landfill / dumpsite

Larger trucks, or dumper trucks as they are locally termed, are used to take the garbage from the GTS to the final disposal sites of Gond Pass or the Jam Chakro. Usually, a GTS process 400-600 tons of waste daily. The dumper truck service is contracted out separately and is above and beyond the contracting of garbage collection within the districts.

Final waste disposal has always been a challenge for Karachi. According to Karachi's Master Plan 2020, the defunct CDGK used to collect 84 per cent of the total generated waste and transport it to the designated operated landfill sites of Deh Gondpass and Deh Jam Chakro. These two sites were designed as proper landfill sites but are still being operated merely as dumping sites. The allocated area for each was 500 acres, but due to encroachment by land mafia, less than half, i.e., 200 acres, is available for solid waste management. CDGK collected solid waste from 4085 designated Katchra Kundis (neighbourhood dumping sites), using 567 vehicles and the waste is then transported to the above landfill sites. According to the Karachi Master Plan 2020 (CDGK, 2007), approximately 50 per cent of the total waste generated is collected by city municipal services department using lifter, dumper, loader and tractor trolleys. The remaining waste is disposed of on the streets, in drains and open spaces. There are 11,843 staff members employed in waste collection while a staff of 11,974 is employed in waste management in total. It is estimated that the cost of solid waste collection and transportation from various parts of city is approximately Rs.294/ton. Currently resource recovery and the 3R approach – reduce, reuse, recycle - is not practiced formally (Tahir, 2018; UNESCAP, 2017).

The Jam Chakro site has recently been privatized. CDGK now pays the Jam Chakro operator by the truckload to use the site. Gondpass may reach its full capacity and close in the near future.

Jam Chakro and Gond Pass are both technically garbage dumping sites, rather than engineered land fill sites. The garbage dumped at the site, goes through process of scanning by the pickers who (a) run magnets in the waste to get iron metal, (b) burn waste to get other metals, (c) empty polythene bags to search for paper, plastic or other sellable materials and eventually the garbage dump is burned. Thousands of families reside at the Jam Chakro site, who earn their bread and butter off the dumping site. A small market of mid-level buyer and sellers of recyclable waste materials also exists at the site.



Figure 11. SSWMB trucks dumps the waste at GTS located Mauripur Gate no. 06.

3.4 Segregation and recycling

It has been established that Karachi's municipal solid waste undergoes informal separation, sorting and the itemized separation of recyclable items for purposes of selling from the very source i.e., at household level (Ahmed, 2019). Individuals are involved in the direct selling of recyclable/resalable materials, usually directly to waste collectors who collect waste from individual houses. These informal collectors and middle dealers sell these recyclables as a commodity to recycling dealers for the recycling industries. Another stream of recyclable material is separating

out recyclables from the municipal solid waste stream at the transfer stage, from household to Katchra Kundi or community bin and street level. Here much of the recyclable materials are removed by the waste collection service providers themselves and street pickers who then sell them onto the recycling industry through the middle dealers. Finally, the smallest amount of separation of some waste items, mostly metals, takes place at the GTS and then at the dumpsites through open burning. This is a cause of environmental deterioration and degrading air and water quality, particularly at the dumping grounds (Imam & Khalid, 2013).

The process of recycling, in this report, largely covers the separation of useable, saleable and recyclable waste from the mixed municipal solid waste. The process of recycling can be understood according to the flow of municipal solid waste from the house to the final land fill site.

There is no practice of segregation of waste according to category at the household level in Karachi. However, there is a trend of separating saleable waste in low- and middle-income households. In low-income areas, sweepers and door-to-door collectors of garbage informed us that there is a very low possibility of getting saleable waste, as the households themselves collect and sell it to itinerant waste buyers. In middle- and high-income areas, the domestic workers of the house usually collect and sell the more valuable recyclable waste items. However, considerable saleable waste is segregated by the door-to-door collectors, including plastic bottles, paper, cardboard boxes etc. Many households do not throw stale bread in the garbage. It is dried by themselves to sell or by the domestic help. Excess food waste is usually given to domestic workers or fed to the birds and animals.

The door-to-door collectors carry out a second level of segregation before dumping the waste at the Katchra Kundi. The KMC/DMC sweepers and waste collectors, Afghan waste collectors and others involved in the door-to-door collection of waste all informed us that they scan through the waste from the houses while placing it in their waste carrying equipment and immediately separate larger recyclable waste. These DMC/KMC informal door to door collectors sell the recyclable waste to nearby stationed itinerant waste buyers or to nearby recyclable waste buyer shops and then go back home with the

money. The Afghan door-to-door collectors organize the waste according to types at the end of the day and store it in their sacks and (a) if he is on foot, sells it to nearby Afghan waste collectors, who are mostly stationed at open drain channels (b) if he is mobile and uses either donkey cart, bicycle or Qing-qi bike, he takes it to his place of residence where they have a whole market of recyclable waste buyers.



Figure 12. Dumping stations at Manzoor Colony Nala developed by Afghani recycler.

Waste at the Katchra Kundi is an attractive point for the Afghan scavengers. Nowadays, most of the pickers at the Katchra Kundi are young Afghan children, with magnets tied to a rope and a sack on their backs. These pickers roam through areas to collect waste from the streets, roadsides, shops, the SSWMB or private bins in the streets, construction sites and the Katchra Kundi. At the Katchra Kundi they are usually seen removing waste from the polythene bags in which the households usually dispose of their waste. Many Katchra Kunds are also dotted with cows and other animals eating the organic waste dumped at the Katchra kundis.



Figure 13. Afghani scavengers collect the recyclable materials from the Katchra kundi at Orangi.

These pickers are either working for middle tier Afghan recyclers or buyers who are usually placed at the open areas along open drain channels in the city where they also provide living facilities for their workers. The workers are supposed to sell their finds to them alone. These middle tier recyclers/waste buyers also have Qing-qi loaders that they lend under certain conditions, to collectors. The latter are bound to bring and sell the waste to the contractor or work on a daily wage for them. The middle-tier recyclers, who are usually found along the nalas have sorting

spaces and provide accommodation for their waste collectors/pickers as well.



Figure 14. Afghani recyclable waste junkyards along with the shelter space at Gujjar Nala.

Itinerant waste buyers have been working throughout the city for a long time and well before the arrival of Afghan refugees into the waste management and recycling trade. The most usual itinerant waste buyer is an individual, sometimes two persons in which one is a helper or a child, who moves around with a pushcart in an area, and calls loudly asking people to sell their recyclable waste. The pushcart has a manual scale along with weight. There are fixed prices for metal, paper, plastics and other stuff, which is generally paid for by weight of the material. People call them, and they weigh the material and pay the calculated amount on the doorstep. Sometimes households also sell old items such as bicycles or utensils over which bargain takes place. The IWB usually see what various materials can be separated from the larger product if it is not in working condition, e.g., a broken bicycle will be calculated on the basis of the weight of the metal, tyres, the plastic on it, which the itinerant buyer will separate before selling it on to the middle tier

recyclable waste buyers or Kabari. Iterant waste buyers fall into two types; (a) those who have their own cart and do the business on their own account and are free to sell their material to any middle tier waste buyer in the city; (b) those are sponsored by the middle tier waste buyer or Kabari.

The Middle Tier Waste Buyers or the Kabari are the buyers of recyclable waste that are not part of Afghan network of waste management, and they are to be found in a shop along with a waste storage space. These Kabaris are relatively new in the residential areas and have grown in numbers over the last 25 years. These Kabaris buy recyclable waste from the IWBs, segregate it, store it till a considerable quantity of each material is reached so that a truck load of material can be sold to the larger recyclable waste traders who are usually placed in the Sher Shah area of the City.



Figure 15. Shops of recyclable waste buyers (Kabari) in the low- and middle-income localities.

Sher Shah is the largest market of the city which deals in buying and selling of used material of all sorts, local or imported, from car parts to the water suction pumps, from electric wires to e-waste. The recyclable waste traders in the Sher Shah buys large quantities of recyclable material and sells it, locally, in other parts of the country or internally to the industries who then recycle it as products.

Another recycling business is the traders in Sher Shah Market sell composite materials to other traders, who then invest and segregate various materials to further add-value to the recyclable materials. In this case, many such traders were identified stationed in the Macchar Colony area of the city, where they have go-downs and can easily process and even burn these composite materials to extract the desired material. One example is plastic-coated wires, which are bought by these recyclers by lot, a term usually used for a Suzuki pick-up or truck load of material. They bring it to their go-down where cheap labour is employed to segregate the two materials and then the two materials are resold as per their prices in the market.



Figure 16. Recyclable waste junkyard at Macchar Colony.

The Afghan refugee residential areas or locally called Afghan Basti have also transformed into marketplaces for recyclable waste materials. The Bastis have storage space for recyclable waste at the household level, where the door-to-door buyers bring the recyclable waste to store, and separate the material until it is of a quantity sufficient to be sold to larger dealers and to fetch a better price. A second type are equivalent to Kabari and have shops where they purchase the material brought by pickers and door-to-door collectors who sell the material on a daily basis. These Kabaris then store, segregate the material at their storage space until they are able to sell it to the larger dealers. Some Kabaris have become larger dealers of certain materials e.g., paper, and have installed compressing machines. They gather large amounts of material until it becomes equal to a truck load and then sell it on to the industries.



Figure 17. Recyclable waste market at Afghan basti near Superhighway.

4. Institutional evolution of SWM in Karachi

The institutional evolution of municipal solid waste management (MSWM) in Karachi can be broadly categorized into four phases over the last 25 years; from 1995 till 2001; from 2001 till 2009, from 2009 till 2013; and from 2013 onwards. We found that the institutional infrastructure has been directly connected with changes in national level politics, which in turn have been largely influenced by regional politics. Thus, discussion includes the evolution of national and regional aspects to better explain their impact on local service provision.

1995-2001

From 1995-1998 democracy prevailed in the country. This was followed by a military coup in 1999 led by the then Chief of Army General Pervez Musharraf, which significantly impacted the local government system and related functions to a great extent. The military government liked to develop a robust and participatory local government system, so a number of reforms were done.

This time period is characterized by the Karachi Municipal Corporation (KMC) as the sole organization responsible for the SWM in the city. The City was divided into five districts, called Zones. It was a period of history where cities fell under appointed administrators. The Administrator Karachi (equivalent to an appointed mayor of the City) headed the KMC, while Zonal Municipal Commissioners and Chairmen looked after the Zones. The budget and equipment were decentralized. Zonal Municipal Committees (ZMCs) were delegated the responsibilities of waste collection and transportation until the tasks were taken over by the five District Municipal Corporations (DMCs) in 1996 (Ahmed, 2010). Within central KMC, a small team comprising the solid waste department, was responsible for international projects and procurements. At this time an Asia Development Bank project was beginning. Responsibility for the final disposal sites and the planning of Garbage Transfer Stations (GTS) remained the responsibility of KMC.

ZMCs, working under the KMC, were responsible for street cleaning and the collection of solid waste and its transportation to the GTS, while further processes

leading to the final disposal sites were taken care of by the KMC. Door-to-door collection was not part of the duty of the KMC or its sanitary workers. However, they did it informally as per request by the household, for which they would charge a monthly amount. In some cases, the sanitary worker would also be asked to clean toilets, sweep the front of the house etc. This was also undertaken informally against a monthly fixed amount (Ali, 1997). The sanitary workers were provided one-wheeler, hand driven trollies or wheelbarrows to carry the waste from households to nearby neighborhood level secondary storage stations or the Katchra Kundi or to the KMC provided trucks and mountable and moveable containers. The KMC truck would come to mount the container and take it to the Garbage Transfer Station (GTS) or the landfill site. KMC was, at that time, still in search of a designated final disposal site. Contracting out was not part of the strategy. For area councilors waste collection was an important aspect of their responsibility, sometimes with innovation. Citizens knew their councilors, their offices and the sanitary staff. They were able to access them fairly easily, that is, in middle- and high-income areas.

2001-2009

The military regime continued with the above system until 2001, when a new system of local government was announced throughout the country. In Sindh, it was launched with the legal cover of an ordinance named Sindh Local Government Ordinance 2001 (SLGO 2001). According to the SLGO 2001, Karachi was made a City District, with eighteen Towns and with each Town⁵ further divided into Union Councils (UCs) based on the size of the population. This replaced the previous Karachi Division based on five Districts (GoS, 2001). The new three-tiered elected local government was termed the City District Government Karachi (CDGK) and was headed by an indirectly elected Nazim (Mayor) who was supposed to be the head of the local administration. The town administration, headed by the Town Nazim, was to work under the directives of the City Nazim, and look after the affairs of the Town administration with the help of the elected Union Council (UC)

administration, which operated at grass roots level (Gayer, 2014; Alam and Wajidi, 2013).

A new concept was introduced called Citizen Community Boards (CCBs) as part of a devolutionary process in which citizens could register a CCB in any UC (GoS, 2004). Through the CCB they could propose and, if accepted, undertake development works. The members could be up to 25 persons working in collaboration with the local government. Although almost 14,000 CCBs were registered throughout the country, only 37% of them submitted proposals, of which half were accepted (Latif, 2006). The presence of strong political parties and their conflicts kept the citizens at bay, preventing them from involving themselves in these CCBs.

The pre-2001 KMC was made part of the CDGK, while the Zonal Municipal Councils (ZMCs) were rearranged under the eighteen Town administration. The CDGK was to perform SWM related functions at various levels ranging from UC up to City Level under SLGO-2001 (Alam and Wajidi, 2013). CDGK transferred its waste vehicles and staff to the level of towns.

The CDGK enjoyed full control over the SWM functions during this period. The first tenure of the local government led by the Nazim of Jamat-e-Islami, saw the MQM boycotting the first round of elections. However, funds were available, and a lot of infrastructural projects were carried out. Many of the sweepers interviewed called it the best period of their tenure. When the local and the provincial governments were formed during the second tenure of the CDGK from 2004-2009, there was no shortage of funds. The MQM which represented the Urdu speaking majority of the city, was now in power and was well placed in relation to the federal government during that time period (Ahmed, 2016).

2009-2013

After the end of the second tenure of local government, as per SLGO 2001, elections did not take place. This was the result of political changes that took place at the federal level. General elections, under the de-facto military government, took place on 18th February 2008, as a result of which the

⁵ Equivalent to Tehsil. Tehsil was used in rural areas.

political scenario changed in the province as well as at the center. The Pakistan People's Party (PPP) formed governments in the province as well as at the center, while General Pervez Musharraf, the then Chief of Army and the head of the country became the president of the country. After a short while he had to resign and leave the country to avoid impeachment.

The departure of President Musharraf changed the whole scenario for local government in Karachi. General Musharraf was the proponent of the SLGO 2001 while the PPP, now leading both the center and the province, was a staunch opponent of the SLGO 2001. It was also the political rival of the MQM in the province of Sindh and especially in Karachi. The third round of local government elections was due in the city and the country in 2010. These were postponed and did not take place until 2015. During the interim period, the city remained in flux without elected local bodies for almost six years.

During the same time period, in 2010 the Eighteenth Amendment of the Constitution of Pakistan was promulgated. The federal government and the provinces agreed to the devolution of power from the center to the provinces. As a result, several functions and revenue sources were transferred from the center to the provinces and a new formula for revenue distribution was agreed upon, the National Finance Commission (NFC) award. According to the 18th Amendment, as was before, local government formation was up to the province, but the provinces were required to devolve powers.

This led to a stall in the local government elections based on the SLGO 2001 and the provincial parties kept deliberating on the delimitations and the possible form local government might take, until an agreement was reached on the form of local government. First, in 2012 'The Sindh Peoples' Local Government Act 2012' (GoS, 2012) was approved. It was short-lived and taken back within six months (Dawn, 2013). Later the Sindh Local Government Act 2013 (SLGA 2013) was approved, which described the future form of local government in the city and the province. In the meantime, the province continued to take over various functions of the KMC; Karachi Building Control Authority (KBCA) was

taken over by the province in 2011 to make it Sindh Building Control Authority (SBCA)⁶ and in 2014 Sindh Solid Waste Management Board (SSWMB) was formed by the Provincial Government of Sindh (GoS, 2014).

Between 2009 and 2015, when the local government elections took place as per SLGA 2013 and the new local government came in power, the appointed administrators kept the local government system working as outlined by the SLGO 2001, in the form of Town administrations and the CDGK. Although during this period uncertainty prevailed as the Sindh Government claimed that the local government system should work according to SLGO 1979 and issued orders accordingly. In reality these were times of confusion as the Town Offices and administrators (as per SLGO 2001) kept working while the commissioner and the Deputy Commissioners were also re-instated as per SLGO 1979, while the UCs remained dysfunctional. The MQM workers at the grass root level kept working informally to address the issues of people in their areas of influence. It should also be noted that from 2007 till 2013 Karachi remained a hotbed of ethnic violence, mostly attributed to conflict between the various political parties. Control over city government and its resources had been one of the reasons for the violence and this situation hampered the municipal functions of the city during this period (Ahmed, 2016).

2013-2022

After a gap of six years, party-based local government elections took place in Karachi as per SLGA 2013 (GoS, 2013). SLGA 2013, abolished the powerful centralized three-tiered urban city district government with its mayor at the top of the administration and established instead, a six-district based decentralized three-tiered system of local government, called the Karachi Municipal Corporation (KMC) headed by a Mayor coming under the Sindh Local Government Department.

KMC functions are distributed at the district level under the six District Municipal Councils (DMCs). They are autonomous in terms of finances and are responsible for the sweeping in the city, which in turn is managed at the Union Committee (UC) level in

⁶ SBCA website: <https://sbca.gos.pk/history.php>

urban areas. While a District Council exists for the rural Union Councils (UCs), in the city it works similarly to the DMCs. As a result, solid Waste Management was no longer the responsibility of the KMC under the SLGA 2013. Sindh Solid Waste Management Board (SSWMB) was established in

2014 through an act of the provincial assembly Sindh (GoS, 2014). It was tasked with taking care of the municipal function of solid waste management within the provincial territory of Sindh, having three regional offices including a head office in Karachi.

Table 1. The administration of Karachi.

Divisions	Administration	Local government
Karachi division (urban + rural)	Commissioner Karachi. + Metropolitan commissioner (appointed chief executive of the council, looks after the municipal functions of the city) Officer in charge of the Corporation administration.	Karachi Municipal Corporation (KMC) headed by an elected Mayor and deputy mayor. Heads the Municipal council comprising of chairpersons of all the Union Committees) in the city. UC chairpersons in the council elect the Mayor and the Deputy Mayor. In council, reserved seats to the extent of 22% for women members, 5% for non-Muslim members and 5% for labourer or peasant members, to be indirectly elected by the members elected by the chairmen of UCs. Although, mayor is given more powers over the chief executive (metro commissioner) but the responsibilities and functions given to the mayor and the chief executives are vague (Murtaza and Rid, 2017).
Six districts	6 Deputy Commissioners responsible for the admin. Of the districts.	6 District municipal corporations (DMC), headed by elected Chairperson and vice chairperson DMC. Chairperson is elected by the Vice Chairpersons of the DMCs. District Council – comprising of representatives of the union councils (rural UCs). One District Council in Karachi.
Union committees (urban) Union councils (rural)	A government officer of grade-16 is appointed in the UCs to represent the administration as the secretary of the council.	Each district comprises of Union Committees (UC) by elected UC Chairperson and vice Chairperson. The Local government elections directly elect the UC chairmen/vice chairmen panel and the 4 ward members of each UC. Other seats are reserved for women, non-Muslim minorities, youth members and labours in a Union Committee all of which are indirectly elected by the direct election of chairman/vice chairman panel. In Rural areas, UC is termed as Union council.
Finances	<ul style="list-style-type: none"> • Provincial finance commission (to provide finances to the KMC) • Local Government Commission (to monitor the working, to guide and to do planning) 	

Table 2. Timeline of SWM responsibilities in Karachi.

Year	SWM roles and responsibilities
1995	<ul style="list-style-type: none"> - Benazir Bhutto announced Karachi package and Garbage Train Project. - KMC has four districts called Zonal Municipal Corporation (ZMCs). Waste collection and transportation is the responsibility of ZMCs. 226 councilors of Karachi are part of ZMCs. KMC has a small emerging SWM department mainly for international projects and procurement, planning of landfills and transfer stations.
1996	<ul style="list-style-type: none"> - Zonal Municipal Committees (ZMCs) were delegated the responsibilities of waste collection and transportation until 1996, the tasks were taken over by the five District Municipal Corporations (DMC) in 1996 (Ahmed, 2010). While the final disposal sites and planning of Garbage Transfer Stations (GTS) remained the responsibility of KMC. - A new administrator was appointed (Mr. Faheem Uz Zaman Siddiqui, 1994-1996 and then Anzar Hussain Zaidi April – September 1996, and then Sibghat Mansoor September 5 to November 11, 1996) - Water and Sewage management functions were taken away from KMC and Karachi water and sewerage board was formed. This took away a number of employees from the KMC. - No formal permanent hiring of solid management staff since 1996.
1998	<ul style="list-style-type: none"> - New administrator KMC appointed (Syed Arshad Ali August 28, 1998, to August 11, 1999.) - Military takeover of the country.
1999	<ul style="list-style-type: none"> - New administrator KMC appointed (Mushahidullah Khan August 11, 1999, to October 12, 1999, and then Iqbal Ahmed Zubaidi October 13 to October 29, 1999)
2001	<ul style="list-style-type: none"> - Implementation of Sindh Local Government Ordinance 2001. - The pre-2001 KMC was made part of the CDGK, while the Zonal Municipal Councils (ZMCs) were rearranged under the eighteen-town administration. The CDGK would perform SWM related functions at various levels ranging from UC till the City Level under SLGO-2001 (Alam and Wajidi, 2013). CDGK transferred waste vehicles and staff at the level of towns. - Local government elections took place and J.I lead govt. led the CDGK headed by the City Nazim (Mayor) Naimat ullah Khan Advocate (Aug 2001-June 2005).
2005	<ul style="list-style-type: none"> - Second term elections for the CDGK. Mustafa Kamal of MQM took over.
2010	<ul style="list-style-type: none"> - Local government system, as per SLGO 2001 was abolished. New elections did not take place. - Federal level 18th amendment took place, provinces were empowered, and local governments establishment was provinces responsibility. - Administrative system returned to the city, while de-facto town administrations kept working as a legacy of CDGK. - UCs became non-functional. - Appointed Town administrator was responsible for the town functions under the KMC administrator.
2012	<ul style="list-style-type: none"> - In 2012 ‘The Sindh Peoples Local Government Act 2012’ (GoS, 2012) was approved which lived short and was taken back within six months. The act had support of both MQM and PPP.
2013	<ul style="list-style-type: none"> - Sindh Local Government Act 2013 (SLGA 2013) was approved that described the future form of local government in the city and the province. - 6 Districts were restored; 18 towns were abolished. - KMC would be the local government. - District Municipal Corporations (DMCs) were the second tier of KMC. - Union Committees (UCs) were the lowest tier, having the councillors, UC Chairmen and Deputy Chairmen and other elected responsible individuals at the UC level.
2014	<ul style="list-style-type: none"> - Formation of SSWM Board through the Provincial assembly legislation. - SWM functions taken away from the KMC.
2015	<ul style="list-style-type: none"> - Local government elections took place according to the SLGA 2013. - For six months after the elections, no mayor was appointed, and local government remained stalled. SWMB looked after the SWM.
2016	<ul style="list-style-type: none"> - District South Municipal Corporation signed contract with Chinese first to hand over responsibility of waste collection in the district. District east also followed the policy.
2017	<ul style="list-style-type: none"> - District Malir (District Municipal Corporations) and District West, signed contract with Chinese first to hand over responsibility of waste collection in these districts.
2020	<ul style="list-style-type: none"> - SSWM Board has majority of planning and implementation responsibilities. 2 Chinese Contractor working. Districts also outsource collection and transportation. KMC has a small budget for small waste related projects. - Sindh Government announced 7th district by dividing the district west, making “Keamari District”

The SSWMB is responsible for all the solid waste management in the territory of Karachi. It has distributed its work according to the DMC boundaries. Four of the DMCs have entered into contracts with Chinese firms to collect solid waste from street level (Express Tribune, 2016; Mansoor, 2017). The Chinese contractors have provided the waste collection machinery (vehicles) which picks up waste only from the machine operated bins provided on streets and at neighbourhood level. The secondary storage comes at a cost of US \$26 per ton of solid waste. In other DMC areas, local sub-contractors work for SSWMB using the traditional method of door-to-door collection against a fixed monthly amount per house. The sub-contractors are responsible for delivering the waste to local area secondary storage sites. It is from here that the SSWMB vehicles collect the waste and take it to the GTS or the landfill site

5. Current administrative structure

Pakistan is a federal republic, having three tiers of government, i.e., federal, provincial and local governments. There are five provinces and federally administered tribal areas. Sindh province lies in the south, abutting the Arabian sea, while Karachi is the provincial capital of Sindh and, as per the Sindh Local Government Act 2013, it is a division subdivided into seven districts.

Each province is headed by a politically elected Chief Minister, who is the chief executive of the province, and has a secretariat having Departments (equivalent to ministries in the federal government) headed by provincial ministers (Provincial cabinet). Each Department works under the supervision of provincial ministers and the appointed secretaries. The Local Government Department is one of the major departments that looks after the affairs of the major institutions including local governments in Sindh.⁷

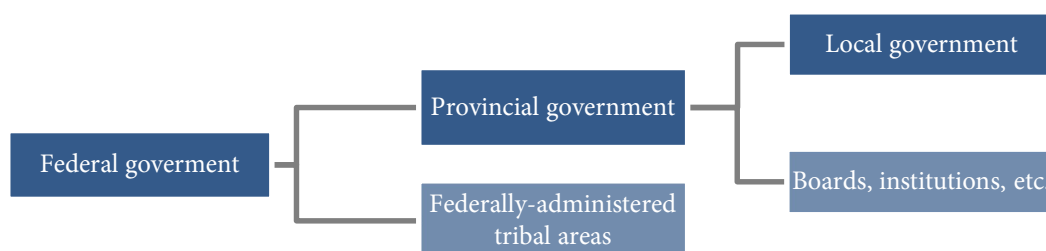


Figure 18. Three-tiered governance system.

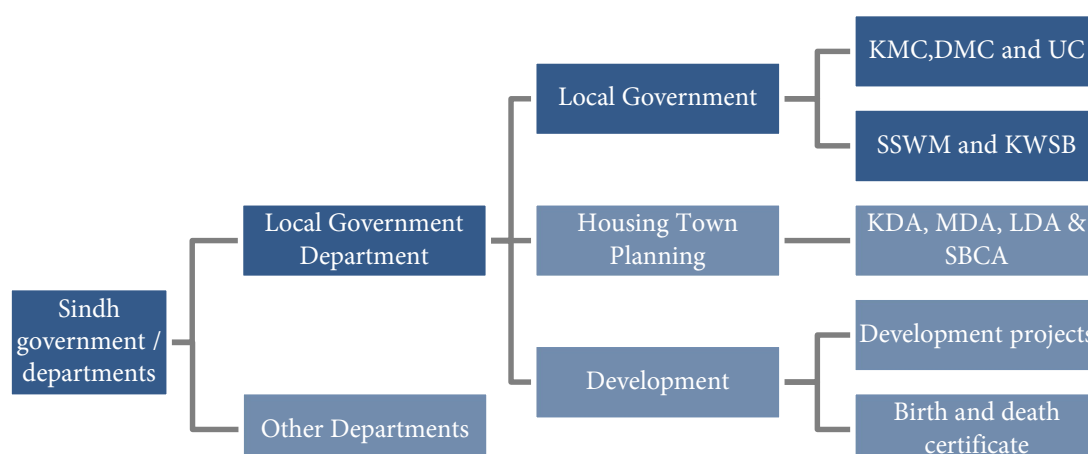


Figure 19. Provincial government hierarchies.

⁷ Retrieved on 9 November 2021:
<https://www.lgdsindh.gov.pk>

The Local Government Department has three wings, i.e., a) Local Government, b) Housing, Town Planning and c) Development. Local government heads the Karachi water and Sewerage Board (KWSB), Sindh Solid waste management board (SSWMB) and other institutions, apart from that, the major task is to manage the affairs of the local government system, approve budgets, appointment municipal commissioners and other strategic decisions, which are the prerogative of the Local Government Department. The Local Government or the KMC has various line departments responsible for discharging various services such as the fire brigade service, Department of Katchi Abadis Up-gradation (DKAU) etc. The other two wings of local government look after other organizations, especially the three land owning agencies i.e., the KDA, MDA and LDA, that work for the city’s management and service provisions.

The local government of Karachi follows a metropolitan governance system and is a three-tiered system according to the Sindh Local Governments Act 2013 (GoS 2013). The top tier, i.e., the metropolitan entity called Karachi Metropolitan Corporation (KMC), is a city-wide entity headed by an elected mayor and a deputy mayor. District Municipal Corporations (DMC) forms the second tier and are headed by elected chairmen and vice-chairmen. While the third tier is the Union Committee (UC) headed by the chairmen and vice-chairmen in urban areas. The KMC and the DMC share various responsibilities and are supposed to function independently in discharging their municipal functions. For the KMC these are, for example, major roads and city-level infrastructure, large public amenities, parks and public spaces, and major health care facilities. Numerous municipal functions are the mandate of DMCs, such as solid waste management, street lighting, and community services (Shehri 2018).

Specific to solid waste management, Sindh government created the Sindh Solid Waste Management Board in 2014 with a mandate to manage municipal solid waste in the province generally and in Karachi specifically. The board has contracted out collection of waste from street level

and its transfer-to-transfer stations located at the district level. From here solid waste is transferred to the city level land fill sites in Jam Chakro located in the northern part of the city, and Govind Pass located in the west (SWEEP n.d). SSWMB has an estimated budget of Rs. 8 billion for the financial year 2021-22.⁸

Land owning, development and management agencies

In Pakistan, land is a provincial responsibility and the Board of Revenue (BoR) of the Province is the custodian of lands. All other land owning and development agencies, including federal, provincial and private, obtain land for development from the BoR.

There are thirteen land-owning agencies in Karachi, from federal to provincial government (Raza 2012). Out of these thirteen, three development authorities are public sector entities, namely KDA, MDA and LDA.

A number of corporate organizations are also important stakeholders in terms of the land holding share of the city. Sindh Industrial and Trading Estate (SITE), Korangi Industrial area, represented by Korangi Association of Trade and Industry (KATI), and North Karachi Industrial zone, represented by the North Karachi Association of Trade and Industry are some worth mentioning. The infrastructure of these industrial estates is serviced by the KMC, Karachi Water and Sewerage Board (KWSB) and the privately-owned K-Electric, and Sui-southern Gas Company directly.

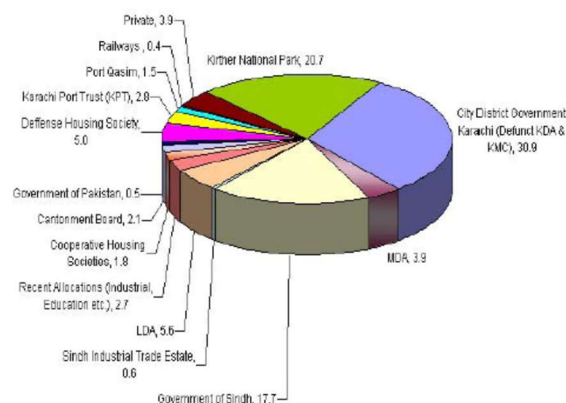


Figure 20. Land Owning Agencies in Karachi. (Source: KSDP 2020).

⁸ Retrieved from: <https://www.urdupoint.com/en/pakistan/sswmb->

[approves-rs-8-billion-budget-for-fy-20-1281804.html](https://www.urdupoint.com/en/pakistan/sswmb-approves-rs-8-billion-budget-for-fy-20-1281804.html)

There are a number of Federal government land-owning and development agencies that plan and develop and, in some cases, manage the infrastructure of these lands, for example the Karachi Port Trust, Pakistan Railways, Civil Aviation Authority etc. There are housing authorities that work under the Federal Ministry of Defence like the Defence Housing Authority and gated communities like Askari Housing, initially designated for retired and active military personnel, and almost six cantonments are currently providing housing to the military staff, retired officers and the civilians. The lands falling under the military establishments have their own mechanisms of services and maintenance, which may or may not overlap with the larger local government of the city. They can limit the scope of the public sector agencies within their jurisdiction, which leads to difficulty in the planning and management of the overall city.

6. Political hierarchies and tensions

Since the introduction of a three-tiered governance system in settled areas of Pakistan, political relations have played a vital role in the functioning of government machinery, including service provision. For governance to be swift and coordinated, political consensus is a prerequisite, and, in the case of Pakistan, all three tiers ideally should be governed by the same party or parties acting in coalition.

Since its inception, Pakistan has been led by democratically elected governments except that for half of this period, military regimes were in power. This had a direct bearing on local government systems. Until 2015, none of the politically elected federal governments adopted politically elected local governments. It was appointed administrations that ran the system. However, during periods of military rule, the majority of local governments were elected, starting with the 'basic democracies' of 1960 during Field Marshall Ayub Khan's era. The last one started in 1999 and continued until 2009, with a relatively popular local government system being established in 2001 under local government ordinances in each province during General Pervez Musharraf's military government.

In 2015, after a delay of almost six years, the elected provincial governments organized local government

elections under the strict orders of the Supreme Court of Pakistan. The tenure of the last local government ended in 2020, but local government elections are still pending.

The political situation in Karachi has always been tense and has impacted governance and service provision. Karachi has been dominated by the Muttahida Qaumi Movement (MQM), which enjoys the support of the majority of the Urdu speaking population, people whose forefathers migrated from India at the time of partition. More recently local politics have also been dominated by the Pakistan Tehreek-e-Insaaf Party led by the well-known sportsman Imran Khan. By contrast, provincial government is dominated by the Sindhi majority representative political party, the Pakistan People's Party (PPP) traditionally led by the Bhutto family. Provincial and city government relations in Karachi have never been good, excepts during Gen. Pervez Musharraf's time (2001-2009) when there was a unity between the three tiers under the military rule. These provincial-local government tensions have impacted service provision over the years and most especially since the SLGA 2013 in which the local government of the city became subservient to provincial government.

There are several quotable examples of the impact of province-local government tensions. In 1996, the apex public sector landowning and land developing and planning agency, the Karachi Development Authority (KDA), was bifurcated and two new agencies were created with the names of Malir Development Authority (MDA) and Lyari Development Authority (LDA). The MDA and LDA inherited all the undeveloped land while the KDA was left with the already developed land. In addition, MDA and LDA jurisdictions had more PPP supporters. Building control authority fell to the KDA, which was made the controlling body of the master planning offices of the KDA but eventually building control authority was also taken away from KDA and given to the Sindh Building Control Authority (SBCA) making it a provincial body rather than falling under local government. Along similar lines and as mentioned earlier, the KMC was previously responsible for solid waste management in the city. This was taken away from KMC after the passing of the SSWMB in 2014. More recently, many of the local government medical facilities such as

maternity homes have also been brought under provincial control.

Given the background mentioned above and the limited resources at the KMC's disposal, local government in Karachi has limited influence over solid waste management in the city. Waste system in the city of Karachi is a hybrid system, which includes

many different stakeholders, working for their own purposes. This is a crude and in-depth account of the waste scenario in Karachi. There is a possibility that many large cities of low-income countries operate in a similar way. More applied research and support to knowledge and learning may continue to reveal more about the real systems of waste in large cities.

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