Sanitation in Slums of Mumbai

View from the Field

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This report has been prepared by Dr. Padma Desai based on a qualitative study of slums in Mumbai to capture a view from the field on access to water supply and sanitation services. The study was based on studies in 10 slums in five wards of Mumbai. Dr Desai benefited greatly from discussions with the officials of the water Supply, Solid waste and maintenance Departments of P/N ward of MCGM, for willingly spending great amount of time. They also readily shared their insights and information. Most of all we acknowledge residents and natural leaders of numerous slums that were visited and local councilors for sharing their experiences and viewpoints. In the often hostile life that surrounds them, this easy acceptance of the prying questions gave priceless insights into their life and living conditions.

A detailed report titled 'Water and sanitation in the Slums of Mumbai: View from the Field' was prepared based on these studies. This paper has been prepared on the sanitation situation in slums in Mumbai. A similar paper on water supply services in Mumbai slums is also available.

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Background

Mumbai, a teeming megalopolis with over 12 million inhabitants, is the financial and commercial capital of India. The city's vision of achieving world-class status mirrored in the Bombay First–McKinsey Report (2003) as well as the Chief Minister's Task Force Report (2004) admitted to fundamental gaps and suggested wide-ranging interventions. Although plethora of large scale projects are under way via the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), Mumbai continues to grapple with acute service deficiencies on a daily basis. A task clearly made more challenging in its slums that house about 41 per cent of its population, due to the complex topographical, legal and eligibility issues that surround them. As stated by the Human Development Report of Mumbai, "the major reason for degradation of city environment in slum areas is improper waste management, sanitation and inadequate water supply" (2009: 7).

Both, water supply and sewage systems in Mumbai are finely calibrated operations with complex delivery networks. For instance, the sewerage system of the city, more than a century old, operated and maintained by the Department of the Chief Engineer (Sewerage Operations), is a massive system involving 53 pumping stations, over 1,500 km of sewers for collection and preliminary treatment of sewage and wastewater from seven zones before its final discharge into the sea and creeks (MCGM, DRRMP 2010). The storm water drain networks as well as the solid waste management services similarly reflect an intricate scale and logistics of operations. Placed within this scenario, the provision of basic services to the large slum colonies that dot Mumbai is indeed a challenge for city authorities.

Under the Performance Assessment System (PAS) Project, a detailed report titled 'Water and Sanitation in the Slums of Mumbai: View from the Field' was prepared for capturing the dynamics of water supply and sanitation services in slum settlements of Mumbai. The present paper is an abridged version of this report and concentrates on sanitation services. It analyses the sanitation scenario in slums – toilets facilities, waste water collection and conveyance, storm water drainage as well as solid waste management – as they actually exist on the ground. In doing so, it also captures the user group dynamics and the localised innovations that have evolved organically to gain accessibility to and assure sustenance of the sanitation infrastructure. The report covered 10 slums in five wards of Mumbai. Data was gathered via numerous site visits, field level discussions and unstructured interviews with user groups, natural leaders in slums and elected representatives. Additionally, discussions with officials of the Solid Waste and Maintenance Departments of P/N ward of the Municipal Corporation of Greater Mumbai (MCGM), as well as 'Slum Sanitation Program' (SSP) and 'Mumbai Sewage Disposal Project' (MSDP) were held. Desk review of literature connected to slum sanitation was also undertaken.

Introduction

Slums have been an integral part in the trajectory of Mumbai's growth. It was only in 1976 that the Government of Maharashtra (GoM) enumerated the number of slum pockets and hutments in Mumbai for the first time. It indicated 1671 settlements with 627,216 hutments housing a population of 2,864,000. Subsequently, no systematic data was compiled on a regular basis as slums continued to proliferate, with the result that different agencies reported different figures.

For instance, Census 2001, pegged Mumbai's population at 11.9 million of which 5.8 million (48.8%) were slum dwellers. YUVA and Montgomery Watson Consultants Report the same year recorded a total of 1959 slum settlements housing 6.25 million i.e. 54% of the total city population (ibid, 'Situational Analysis': 2). Contrasting these figures, the 'Environmental Status Report for 2002-03' of MCGM reported 2245 slum pockets in the city (HRD, 2009: 58). In 2010, another official document of MCGM noted slum population to be 55 per cent of total (DRMMP, 2010: 36). The present Census (2011) reports 41.3 percent of city population living in slums whereas the 'Inception Report' of MCGM's Draft Development Plan, observes that 'over 55 per cent' of the city population lives in slums (MCGM, DP 2014–2024: 62). Such irreconcilable figures, possibly arising due to definitional issues[1], have come under much debate and controversy[2].

However, the stark reality of widespread slums in Mumbai is hard to deny. Large and small slum colonies dot the entire city – close to marshes and garbage dumps, along creeks, mangroves, precariously balanced on hilltops or lining roads, railways lines and on open or litigated lands. Ninety-three per cent of these are notified, with 1995 acting as a 'cut off' date, implying secure entitlements under government programmes and safety against eviction.

Evolution of Programmes for Slums

A number of large scale programmes have been initiated in Mumbai to mitigate the problems of slums. The earliest 'Clearance and Relocation' policies of the 1970s that resulted in large scale city-wide demolitions and evictions of slum residents came under much criticism. In the 1980s, the approach gradually moved towards in-situ upgradation and sites and services, most decisively mirrored in the World Bank aided 'Bombay Urban Development Program' (BUDP). The BUDP made a strong case for granting land tenureship to and recovering costs from slum dwellers. A parallel 'Prime Minister's Grant Programme' (PMGP) included a plethora of objectives ranging from upgradation and relocation to dispersal of hazardous industrial activity and the recreation of a central industrial zone in the sprawling slum of Dharavi. The BUDP's upgradation component faced stiff opposition on its two core features – transferring land ownership to community-based organisations (CBOs) and recovering costs from beneficiaries; whereas the PMGP remained mired in fluctuating targets and approaches (Desai 1999; Desai 2001).

The 'Mumbai Sewage Disposal Project I' (MSDP-I), of the mid-1990s, aided by the World Bank, was geared towards augmenting and improving the overall city sanitation infrastructure and also included a 'Slum Sanitation Program' (SSP). Latrines built under the SSP had many innovative features: they set superior service standards and proposed partnerships between government departments, non-governmental organisations (NGOs) and beneficiary CBOs. Its demand-driven approach, expected to assure community buy-ins, envisaged CBOs as 'user-managers' of the provided sanitation resource and was to result in a sustainable urban sanitation intervention. Currently, as the MSDP-II continues with the same approach of its predecessor, the SSP forms the only model for sanitation delivery in slums.

At a parallel level, the latest 'Slum Rehabilitation Scheme' (SRS) heralds private sector entry into slum redevelopment, by introducing Floor Space Index (FSI) incentives and the concept of 'Tradable Development Rights' (TDR). The twin goals of the SRS are to redevelop slums, thereby releasing encroached land resources whilst simultaneously creating housing stock for the middle and higher income groups of the city. However, with a slow momentum, it continues to struggle with eligibility issues and procedural deadlocks (Desai 2009). A

[1]For instance, three definitions of slums – Notified, Recognised and Identified – are used to demarcate slums either according to specific statutes, physical habitation and service levels or size (60–70 households). However, National Sample Survey 65th Round has recognised a much smaller cluster (20 or more) as a slum, thereby including dispersed and/or smaller slum settlements in its ambit.

[2]Some scholars have cautioned against this elasticity in reporting slum figures and noting that underlying definitional shifts effectively exclude smaller-newer clusters and inadvertently smoothen out the increased vulnerability of evicted and displaced households (Bhan and Jana 2013).

snapshot of the major programme interventions for slums in Mumbai is presented in Figure 1.

Despite a plethora of such large scale city-wide programmes, their actual impact on the day-to-day living conditions of slum residents was limited as they continued their struggle for basic services.

Sanitation in Slums - A Macro View

For the MCGM, integration of slums under the city's massive sanitation infrastructure – a 'package' of services that include latrines, wastewater collection and conveyance along with storm water drainage and solid waste management – posed a complex challenge. There were multiple reasons for this: their location and topography, high densities, zigzag internal street patterns, unaffordability of slum residents to improved sanitation services and, most importantly, the highly contentious eligibility criteria.

The resulting deficiencies were clearly highlighted in a number of official reports. For instance, the 'City Development Plan' prepared by the MCGM had acknowledged that "only 2% of slum population is covered under pipe sewered network" (2005: 116), noting further that, only "about 17 percent have access to individual household latrines while nearly 72 percent depend on public toilets and five percent use a mix of arrangements" (ibid: 11–12). Six per cent of the city's slum population was estimated to be defecating in the open (World Bank 2006: 12). Indeed, with high usage ratios (sometimes climbing to 273 per seat), non-functionality of toilet blocks due to poor upkeep, indiscriminate discharge of sewage into nallahs and creeks as well as uncollected garbage – slum sanitation in Mumbai had painted a grim picture.

A dramatic turnaround in this scenario is indicated in the Census of 2011. For instance, out of the total slum households in the city, 70.73 per cent have their wastewater outlets connected to a closed drainage

Figure 1: Timeline of major programme interventions for slums in Mumbai

BUDP (1984) • World Bank funded • Policy shift from demolition to upgradation	Bombay Urban Development Program (BUDP). Main components: • Slum upgradation and sites and services; Trinity of affordability-cost recovery-replicability; Granting land tenureship to CBOs
PMGP (1985) • Origin in political arena • Parallel to BUDP • Shifting political alliances	Prime Minister's Grant Programme (PMGP) – announced by the Prime Minister during centenary celebrations of political party. Main components: • Slum upgradation, redevelopment; Dharavi redevelopment; Relocating polluting industries and creating central industrial zone; Meagre insistence on cost recovery
SSP (1997) onwards • World Bank funded • Participatory approach in sanitation	Slum Sanitation Program (SSP), a part of larger BSDP, aimed at: • Building community toilet blocks with higher standards • Creating partnerships between civic authorities, CBOs, NGOs and contractors • Stress on participative, bottom-up approach
SRS (2001) onwards • Entry of private sector in slum redevelopment • Via FSI and TDR incentives	Slum Rehabilitation Scheme (SRS) – announced in 1994 electoral campaign. Main components: • Redevelopment of slums by private builders/developers via land sharing concept • Open sale of housing units in market to cross subsidise free housing for slum dwellers
2005 onwards • JNNURM: Stress on reform and governance • Planned development • Efficiency in delivery mechanisms	Jawaharlal Nehru National Urban Renewal Mission (JNNURM). Main components of JNNURM in Mumbai: • Preparing CDP proposing improvements in key areas of transportation, housing, infrastructure and governance • Augmenting the present water supply and sewerage • Scaling up of service delivery through community participation under Urban Basic Service Delivery

system and 26.09 per cent to open drainage, whereas only 3.18 per cent have no accessibility to any drainage facility. This scenario for slum and non-slum households in represented in Table 1.

Similarly, overall accessibility to latrines also shows significant improvement with individual latrines within premises at 32.82 per cent, dependence on public latrines at 64.06 percent and open defecation halving to 3.12 per cent. Table 2 captures this scenario. The connectivity of latrine facilities within premises shows a wide range of typologies. Out of the total households (Hhs) having individual toilets in slums, 68.90 per cent are connected to piped sewer network; 19.06 per cent to septic tanks and 3.21 per cent have 'other system'. Further, 3.80 per cent have pit latrines; 3.65 per cent discharge in open drains and 1.35 per cent has service latrines where night soil is either removed by human or animal. These improvements are captured in Table 3.

Substantial improvements in the current Census estimates, which implicitly claim better accessibility of slum dwellers to basic services, have been challenged by some scholars. In the case of Mumbai too, apart from definitional shifts which are likely to slice off vulnerable groups by rendering them invisible to enumeration, such quantitative figures also do not reveal the actual, on-field modalities of accessibility as well as usage of the facilities. Indeed, increased accessibility, in all cases, should not be assumed to automatically imply optimal usage and functional conditions. As we now turn to the 'view from the field', such qualitative specificities come to light in the slums of Mumbai.

Sanitation in Slums: A View from the Field – Toilets

In most slums, the only sanitation option for majority of the residents are the community toilet (CT) blocks

built predominantly by the Maharashtra Housing and Area Development Authority (MHADA) under Local Area Development funds of local/state level political leaders. All such blocks, without exception, prominently display the political affiliation of the leader that facilitated its construction. This decades-

Table 1: Households by type of drainage connectivity for wastewater outlet

Greater Mumbai (M. Corp)	Total households (in million)	Wastewater outlet connected to		
		Closed drain (%)	Open drain (%)	No drainage (%)
Total	2.7	81.7	15.9	2.4
Slums	1.1	70.7	26.1	3.2

Source: HH - 9 : Households by Availability of Bathing Facility and type of Drainage Connectivity for Waste Water Outlet, Tables on Houses, Household Amenities and Assets, Census of India (2011)

Table 2: Accessibility of toilet infrastructure in Mumbai

Greater Mumbai Municipal Corporation	Total number of households (In millions)	Number of households with latrine facility within premises (%)	Number of households with no latrine facility within premises (%)	No latrine within premises: Alternative source	
				Public latrine (%)	Open (%)
Total	2.7	57.6	42.4	40.2	2.2
Slums	1.1	32.8	67.2	64.1	3.1

Source: HH - 8 : Households by Availability of type of Latrine Facility, Tables on Houses, Household Amenities and Assets, Census of India (2011)

Table 3: Type of latrine facility within premises

Greater Mumbai Municipal Corporation	Number of households having latrine facility within premises (in million) (%)	Type of latrine facility within premises					
		Flush/pour flush			Pit latrine(%)	Night soil in open drain(%)	Service latrine(%)
		Piped sewer(%)	Septic tank(%)	Other(%)			
Total	1.5 (57.6)	79.9	13.2	1.7	2.0	2.4	0.7
Slums	0.4 (32.8)	68.9	19.1	3.2	3.8	3.7	1.4

Source: HH - 8 : Households by Availability of type of Latrine Facility, Tables on Houses, Household Amenities and Assets, Census of India (2011)

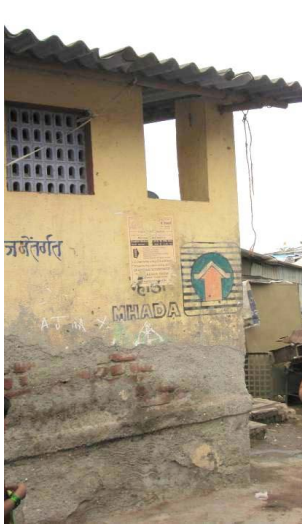
old infrastructure, having undergone repairs and retrofitting from time to time, currently presents an uneven picture. In some cases, such blocks are in good condition and, if enjoying locational compatibility, even connected to the larger city trunk sewers. Those in interior residential clusters are connected to aqua privies or septic tanks.

Unlike the 'Nal Committee' format adopted by the MCGM for water supply in slums,[3] the process of repair of CT blocks establishes no formal associative relationship between the ward office and users groups. As a result, the selection of blocks for renovation by political leaders, a result of a long

drawn, informal lobbying process by slum residents and its natural leaders, is often subject to the vagaries of important actors involved as well as circumstances. Within a dynamic slum reality, choices and decisions fluctuate too – such that some slum pockets enjoy frequent attention of political leaders whereas others remain excluded. Approvals for repair of CTs follow a prescribed procedure as indicated in Figure 2, although its actual construction on the ground has no participative component. Load bearing structures, upgraded CTs are usually 5 to 7 feet from the ground following a standard design of 10 seats with separate male and female sections, with no water or electricity connections. Ultimately, this sanitation asset, an arena for hectic negotiations amongst users, in most cases, creates a workable arrangement with clearly delineated turfs.

However, in some cases, such reconstructed blocks fall into disrepair within a few years owning to heavy use and/or poor quality of civil work as well as user apathy. Spillages of raw sewage from their septic tanks or aqua privies are noticeable, which either

(Left)Derelict CT Blocks and (Right) Overflows of sewage



collect on streets or flow in drains and nallahs. Ignored even by political leaders, such a derelict system continues to be the only option for slum residents.

Maintenance of Community Toilets

The actual operation and maintenance (O&M) of

[3] Under PAS Project an accompanying paper an on group water connections in slums was also prepared. This report documented the decentralised user collective format adopted by the MCGM to cover eligible slums under its water supply network. Refer www.pas.cept.in for full report.

CT blocks indicates a wide range of arrangements responding to specific contextual realities. For instance, at one end of the spectrum are well maintained blocks with active community involvement; at the other end are those with undefined user groups and in a state of complete neglect. In some cases cleaning is operationalised by MCGM conservancy workers; in others this is completely undertaken by user collectives with monthly contributions. Across this range, provision of water and electricity are a rare occurrence. We now turn to these arrangements that are found in Mumbai slums.

Relatively Well-Maintained Community Toilets Larger Blocks – Prototype of 10 Toilet Seats

In some slum clusters, although the outer structural shell of CT blocks, predominantly a prototype of 10 seats (five male and five female) is in a decrepit state, the toilets inside are found to be in acceptable conditions. This implies regular cleaning operation of such blocks, a group initiative, with households living in the vicinity and its regular users contributing a fixed monthly charge towards its maintenance. For instance, a user collective of about 250 households (about five to seven internal lanes) with a monthly contribution (Rs 30 to Rs 50) engage a cleaner for the toilets as well as to collect household waste. The same cleaner, as noted subsequently, also sweeps the internal streets.

Well maintained CTs with user involvement.

Usually found in inner, residential zones, locational characteristics of such CT blocks, along with informal vigilance of families closest to it, restrict indiscriminate (mis)use and despite heavy user ratio

(approximately 100 per seat) help in maintaining a relatively clean facility. Toilets inside CT blocks are not locked. This user collective, a need-based one, is not a registered CBO, and oftentimes may not exhibit close or continuous contact amongst its members, unlike the Nal Committee members for water supply.

Group Toilets

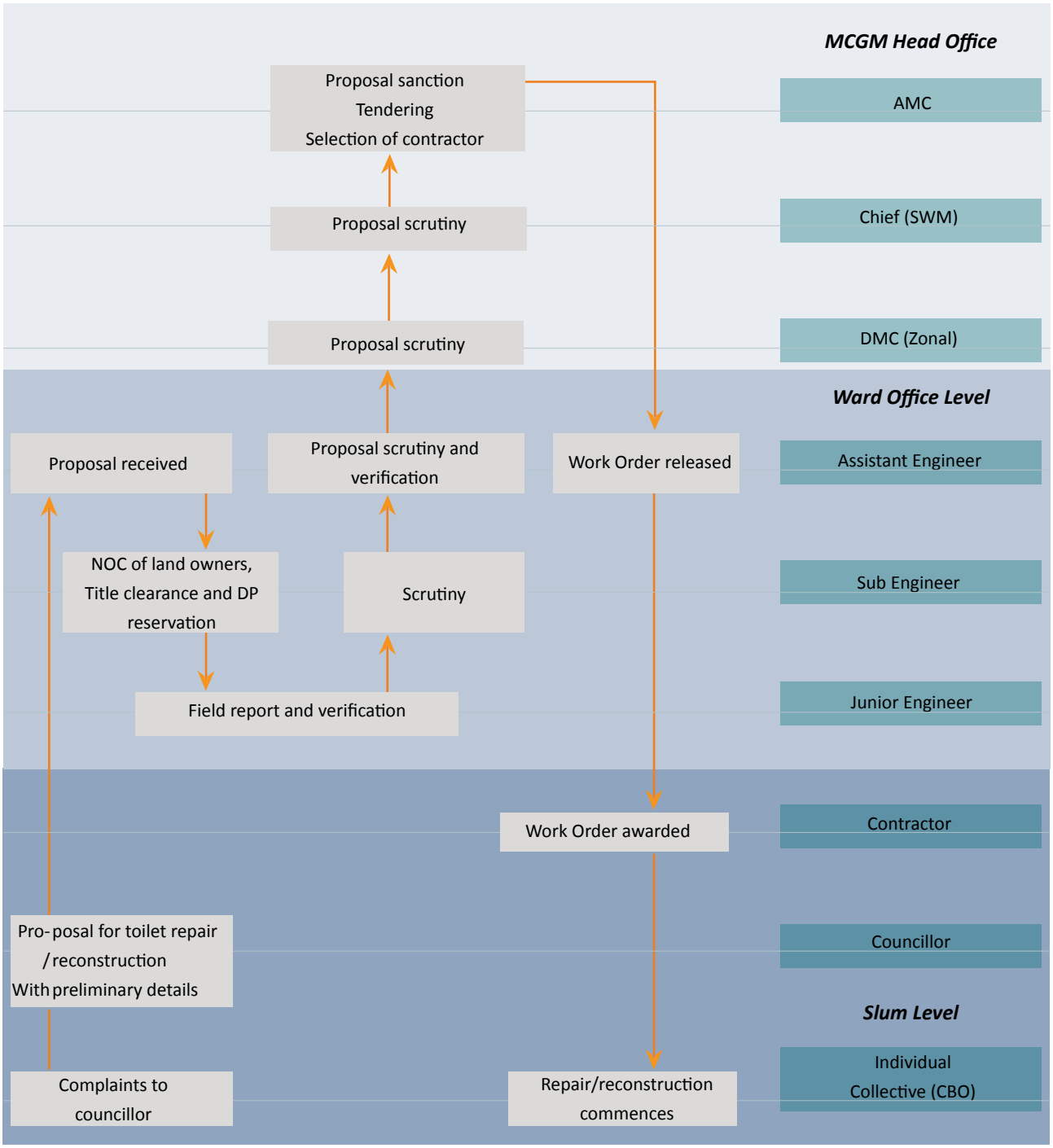
The above widely prevalent prototype of a CT undergoes a change with acute space constraints giving rise to smaller blocks (approximately about four seats) with a corresponding smaller user group (about 60 households). Situated in highly dense residential areas, its restricted user base is of those living in its immediate proximity. Member contribution ranges from Rs 100 to Rs 150 per

Well maintained Group Toilet.

month for engaging a sweeper. Much like the previous case, such toilets are not under lock and key, yet a very strong notional sense of ownership is evident amongst its users, thereby forbidding its indiscriminate use. Indeed, repeated use of the facility by residents outside the collective often leads to arguments, sometimes deepening the already existing conflicts amongst them. However, temporary use due to difficulties in their own areas by non-members is accommodated.

Another practical response to cope with inadequacy

Figure 2: Process mapping for toilet reconstruction



Locked toilets in the group system with restricted access to keys

is by converting CTs into group toilets by locking them. In some slum zones, such 'capturing' of seats, demarcates a fixed user group that is allowed exclusive accessibility via restricted circulation of its keys. A number of factors contribute to the workability of such an arrangement. Firstly, in densely packed slums with practically no open spaces such smaller blocks often share a common wall with hutments. This immediacy necessitates resident involvement, especially those sharing a common wall. Secondly, with many such smaller blocks, adequate toilet infrastructure is created in the neighbourhood. Thirdly, homogeneity amongst users that share a common socio-religious background supports collective action. And lastly, adequacy of seats aids in reducing pressure on the facility.

In one slum neighbourhood, this concept was taken to another level by locking the entire CT block itself (and not individual latrines within it as seen in the previous group arrangement), thus restricting entry of non-members that did not regularly contribute for its upkeep.

Although not widespread, discussions with ward officials revealed that this practice in another guise has external non-governmental organisations (NGOs) undertaking the O&M of CTs by collecting monthly charges from users. Such NGO-contractors, not necessarily appointed by user communities nor operating under any formal contractual agreement, nevertheless assure a clean facility due to its regular upkeep. In all the prototypes discussed so far, minor repairs are handled by the users by raising ad hoc contributions.

Slum Sanitation Program

The city-wide, World Bank aided 'Slum Sanitation Program' (SSP), currently being executed in the city approaches sanitation as a complete 'hardware' and 'software' package. With higher technical and physical standards (that is, double storied RCC

structures, separate male and female sections, urinals, bathing areas, a caretaker room as well as electricity and water), the SSP blocks outline a participatory and demand-responsive approach envisaging slum communities not merely as users, but 'managers' of provided sanitation services. Ultimately, such blocks are to emerge as vibrant interactive spaces for the entire slum cluster. Three SSP toilets were covered under this study. In the first case, discussions with residents in the vicinity revealed that mobilising the community for CBO formation had followed a somewhat volatile trajectory with rival resident groups unable to agree on critical programme components. Within this fractured slum environment, creating a unified user community, with shared priorities and choices was proving to be time consuming.

In another slum, a toilet block under the SSP had been constructed almost one-and-a-half decades ago. In its actual operation a number of aspects

came to light. There were three caretakers employed by the NGO overseeing the day-to-day operations. Although there was a dedicated user group, the majority preferred to pay Rs 2 per use with a small proportion preferring the monthly pass of Rs 30. The original 40 toilets (20 each for men and women) had, in reality, turned into a unique arrangement. In the mornings 20 toilets on the first floor, otherwise catering exclusively to women, were opened up for men. A simple iron door locked access of women users to the first floor in the mornings as shown. This practical system responded to overload in the morning by male users who needed access to the facility before proceeding to work.

The third case, a recently constructed SSP toilet, faced the challenge of synchronising the participatory processes with the technical and physical demands of the programme. At present, within an informal CBO set-up managed by slum leaders and local politicians, a caretaker is appointed for O&M of the block. Users are charged a one-time fee (Rs. 2) with two sweepers engaged to clean the toilets. The surrounding community, its regular user, shares this facility with a large floating population.

Officials with whom the above cases were discussed stressed that slum realities oftentimes posed peculiar challenges of rival claims by slum leaders and politicians as well as resident groups. In such a climate, the slow process of participation cannot always be smoothly orchestrated with the time frames and targets of SSP.

"Forming a CBO is not a smooth process. Some conflicts revolve around eligibility criteria; others emerge due to differences in socio-religious backgrounds; still others emerging form conflicting political alignments. It is not easy to reconcile these conflicts within the limited time frame. Many are also opposed to making upfront contributions".

Additionally, the MSDP does not maintain an ongoing operational control on blocks once handed over to the CBOs. Over a period of time, original CBOs actively involved in its formative years could make way for alternative combinations of slum leaders and their followers backed by different local councillors as internal as well as external allegiances change. Nonetheless, the SSP blocks do help in bridging severe deficiencies already existing in slums.

Individual Toilets

Census 2011 indicates that 32.82 per cent households have access to individual toilets in Mumbai slums. Definitely observed in some cases, such units were found both, outside (if internal lanes offered adequate space) or inside (usually built during the overall upgradation of the housing unit).

Proper discharge from such toilets depends on their locational characteristics. Some, if situated in close proximity, are connected to the city's underground

Left) Individual toilets outside and (Right) inside the dwelling unit.

drainage network. However, most were observed to simply release their contents into the nearest storm water drain or nallahs/creeks.

Dilapidated Community Toilets: Systems under Stress

Overall, the community latrine infrastructure described above often displays a rundown outer envelope containing reasonably well functioning internal toilets. Yet, in some occasional clusters, the entire system is observed to be under acute stress. Typically, such CTs found in public/semi-public areas, along main access roads or commercial outer rings in slums, imply a larger catchment area in additional to an undefined user group. These facilities found in a state of complete disrepair witnessed sporadic cleaning and upkeep. A number of factors appear to contribute to this derelict state –age, location, overuse, neglect, lack of timely repair/reconstruction and a disengaged user group, etc.

However, this scenario is surprisingly not widespread. Placed within acute scarcities, conditions of community toilets, considering the high ratios per seat, could be expected to be appalling and at breakdown point. Yet in reality, slum communities have come up with a wide range of practical arrangements that grant them access to a usable albeit inadequate toilet infrastructure. From large CTs managed by correspondingly large groups, to smaller group latrines under lock and key, the infrastructure in slums covered under this study was certainly under stress with ratios climbing to almost 100 persons per seat in some areas. Despite this, the overall accessibility and internal conditions were more or less acceptable, notably in instances where slum collectives displayed a sense of ownership and involvement.

Rather than the actual physical conditions of toilets, a far greater challenge observed in slums was of safe disposal of waste water.

Disposal of Wastewater and Storm Water

A city-wide sanitation survey by Yuva and Montgomery Watson (2001) had painted a grim scenario noting that the majority of toilets with aqua privies discharged waste in storm water drains. A similar dismal scenario vis-à-vis sewage disposal was also admitted by the 'City Development Plan' of Mumbai as well as the 'Disaster Risk Management Plan' proposed by the MCGM (CDP 2005; DRMMP 2010–2011). The on-field scenario for slums covered under this report, mirroring this, revealed many instances in which drainage, especially from individual toilets, was simply discharged into the nearest covered storm water drains, nallahs or creeks. Further, overflows due to choking of silt and garbage were also a widely prevalent sight in slums. The MSDP, funded by the World Bank with the special SSP was explicitly geared towards addressing such gaps and including slums in the city's sewerage network.

In Mumbai, following the natural topography, storm water drains discharge water into the Arabian Sea lining the west and in the intercepting lattice of creeks, rivers and their tributaries. This massive system is a hierarchical grid comprising "roadside surface drains (about 2,000 km mainly in the Suburbs), underground drains and laterals (about 440 km in the island city area) major and minor nallahs (200 km and 87 km, respectively) and 189 outfalls"

CTs in dilapidated conditions

Discharge from community/individual toilets directly into nallahs and overflows

(CDP 2005; 6.1.1). Two severe floods compelled the MCGM to prepare a master plan under its 'Brihanmumbai Storm Water Drain' (BRIMSTOWAD) Project. Currently, BRIMSTOWAD aims to augment existing drainage networks and outfalls as well as implement the 'Mithi River Redevelopment Project'.

Storm Water Drains in Slums

Laying technically sound storm water systems is a daunting task in slums situated on low lying or undulating land, with dense housing patterns and the ensuing maze of narrow internal streets. Thus, on the field, a wide range of possibilities emerge with some slum clusters having a covered network whereas others with open or even non–existent ones. Conversion from absent/open/kutcha drains to a covered network is a long drawn out process of persistent lobbying by residents with local councillors. This process is often facilitated due to number of factors: well entrenched community ties and organisation, a higher sense of entitlement, close contact with local leaders and active interest of the latter in slum affairs. A community initiative is also noted in engaging a cleaner, thus maintaining a well swept look within the interior lanes.

This contrasts with slum clusters not covered under a closed system, wherein wastewater from households finds its way either into existing open drains due to surface flow or accumulates as stagnant water if not adequately drained out. Oftentimes, water supply lines are overlaid on such open drains. In some cases, not just wastewater but faecal sludge from individual toilets or overflows from CTs too finds its way into the storm water drains and, if situated in close proximity, into nallahs and creeks. Consequently, storm water drains and nallahs have turned into channels for both grey and black water. A few slum neighbourhoods indicate a complete absence of both paved internal streets and storm water drains.

The 'stacked up' system of water supply pipes and storm water drains collapses in some areas as drain covers are pilfered or broken. In such cases, the drains turn into an indiscriminate dumping channel for household waste in addition to silt, plastic and construction debris.

In some other slum localities, typically extremely narrow, residual side lanes double up as open drains discharging grey and, at times, black water.

The cleaning of choked/overflowing drains is a community effort, especially from those residing

Contrasting Service Levels

Water supply lines overlaid on open drains

in its immediate proximity by raising a one time, ad hoc contribution to engage cleaners. Contents are simply emptied in the nearest nallahs/creeks or garbage bins close by. For persistent overflows due to problems in larger sewerage networks serving the entire city, the ward office is approached via different means – telephonically or representation by local councillors/slum leaders. The ward office claims to resolve such complaints in reasonable time frames depending on the gravity and complexity of the situation. Despite this, accumulation of overflows on access/interior roads is a common sight in some

Storm water drains as dumping channels

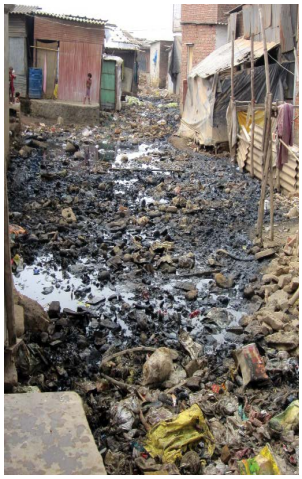
Storm water drains as dumping channels

A side residual lane doubling as an open sewer

clogged drains.

(Left) Cleaning operations in progress and (Right) accumulated overflows on arterial roads.

Access lanes as open drains, clogged with overflows and garbage



slums.

In some slums, acute deficiencies or overburdened sanitation services create unimaginably filthy environs. In part, this is also a result of topographical or locational features and unaffordability of residents to improved sanitation facilities. In such localities, backflows during high tides clog entire access lanes with garbage that has been thrown elsewhere. Such repeated flooding makes community initiatives counterproductive and often replaces it with resigned acceptance. Additionally, long-standing rivalries amongst residents, lower economic conditions and a history of confrontational demolition drives by authorities only exacerbate the situation further.

Entwined with the issue of storm water drains is clearly that of adequate coverage and collection of solid waste management services in slums.

Solid Waste Management: Swachha Mumbai Prabodhan Abhiyan

Mumbai generates about 9,000 metric tons of garbage, including construction and demolition debris. The MCGM's mandatory duty to mange this waste includes a colossal operation of street sweeping, collection, transportation, treatment and disposal. Anywhere between 15 to 20 per cent of this waste is collected via a door-to-door system and the remaining through community bins. The inability of the MCGM to extend these services in slums due to non-accessibility of garbage trucks in their narrow, winding lanes necessitated the design of a special programme called the 'Swacha Mumbai Prabodhan Abhiyan' (SMPA), a successor to the previous 'Dattak Vasti Yojana' (DVY).

The SMPA, a city-wide initiative under the Solid Waste Department (SWD) of the MCGM, attempts to involve NGOs/CBOs in regular cleaning operations in slums as well as collection of door-to-door garbage with active resident participation via information, education and campaigns (IEC). Each slum is divided into 'units' of 150 households (population: 750) with NGOs/CBOs allocated a minimum of five and maximum of such 18 units. A monetary incentive structure (Rs 600/one unit of 150 households) is sanctioned in addition to compensation towards equipment, protective gear for cleaners and IEC activities. Highlighting this as a significant motivating factor, the SMPA's official report states that participating NGOs/CBOs stand to gain a minimum of Rs 30,000 (five units) and a maximum of Rs 108,000 (18 units) per month, depending on field-level slum conditions. A procedure for selection as well as monitoring and supervision of the implementing agency is outlined within the programme framework. In the long run, the Abhiyan is expected to change the sanitation behaviour of slum dwellers and create a participative model of service delivery of solid waste management.

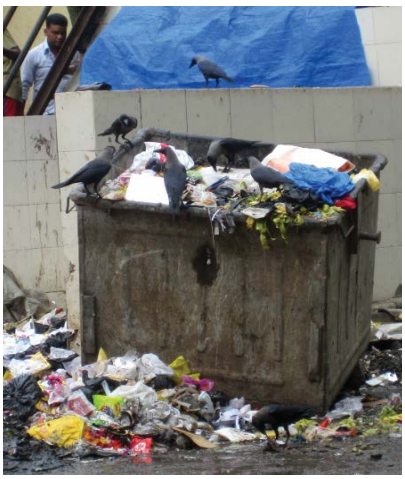
The actual implementation as observed in one slum covered under this report reveals some inconsistencies with these overall SMPA goals. For instance, only seven sweepers have been engaged for door-to-door garbage collection and cleaning of open gutters (the guidelines stipulate 15); and although mandatory, the CTs are not cleaned regularly. IEC activities have been undertaken from time to time. Synchronisation of dumping the collected waste at MCGM beat points is facilitated due to its close proximity. Regular monitoring and supervision from the ward office does not follow schedules proposed under the SMPA format. In the absence of this, a system for assessing performance based on specific parameters and consolidating weekly scores for penalty/reward is not in place. At the overall ward level such gaps are admitted by the SWD officials, noting that the SMPA is yet to "take off" and "catch momentum" despite being an extension of its predecessor – the DVY – in operation for more than a decade.

In this background, slum residents, faced with exclusion or inadequacies in the solid waste management services extended by the MCGM, create their own systems of regular cleaning and garbage collection.

Household Garbage Collection – A Community Effort

In almost all slums covered under this study, residents engaged a cleaner for door-to-door garbage collection as well as cleaning of internal streets and latrines, by raising monthly contributions. Thus, internal lanes in residential clusters displayed a well swept appearance. However, collected garbage is then indiscriminately dumped either on the periphery of slum neighbourhoods or in the vicinity of municipal bins. Common areas such as street ends, nallahs or open drains too turn into dumping locations. A clear notional hierarchy of engagement and 'turf' in thus noted, resulting in contrasting

Uncollected garbage from collection bins



visual images – internal residential streets lining hutments largely clean and garbage free whereas common entry points, cul-de-sacs, public spaces, water bodies and drains overflowing with household waste in addition to construction debris. Ironically, the MCGM's collection points – the garbage bins – often strategically placed adjoining the CTs overflow with waste, thus blocking their access.

Discussion with officials reveals the MCGM's inability to maintain hygienic standards, as captured in this statement:

"It is impossible for us to cover all localities with severe shortages of staff as well as equipment. We try to attend immediately to complaints of overflowing garbage and adjust our collection routes accordingly. But slum dwellers keep on dumping garbage virtually throughout the day and expect us to collect it. This is simply impossible. It is always easy to blame the ward office but they also need to adopt better practices and change their behaviour".

Uneven, contrasting scenarios in slums

Indeed, akin to toilets in solid waste too, an uneven, overlapping picture emerges –some slums display an adequate network of covered storm water drains, residents' involvement in keeping their immediate environs clean and self initiated cleaning operations for clogged drains; whereas others symbolise complete neglect and disrepair.

Sometimes, such contrasts are noted in the same sprawling slum settlement, with some relatively well maintained zones juxtaposed with those with abysmally filthy environs.

Census 2011 and Sanitation in Slums

As noted earlier, although the quantitative indicators as captured by Census 2011 indicate substantial overall improvements in accessibility of slum dwellers to sanitation services, the actual sanitation situation on the field is much layered and complex. As authors have commented elsewhere, Census data does not capture qualitative indicators such as high user ratios in community blocks, daily gaps in O&M and, more importantly, improper sewerage management. Similarly, exclusion of some families due to specific internal, cluster level 'control' mechanisms (as noted for 'group' toilets in some slums or informal restrictions by residents living in its proximity against use by others living far) remain unreported. Such on-field arrangements may create situations in which some facilities function under slightly lower user ratios, although not adhering to service level benchmarks (that is, those under active vigilance of user groups); whereas others are overburdened beyond their capacities (those that are of 'open', often indiscriminate, use). These facets – ease of access as well as operating mechanisms on the field – significantly determine the quality of

the facility. Indeed, increased accessibility does not automatically bring about better service delivery vis-à-vis adequacy, usage or appropriate functional conditions.

Somewhat reiterating the Mumbai observations, Satapathy's article notes that, "Open defecation may be much more than the statistics on access to latrine facilities. The use of such facilities by each member of a household is quite questionable" (2014). Even if demeaning, slum residents may prefer to defecate along creeks, marshes or railway lines, rather than stand in long queues for overstressed public latrines; but not necessarily admit to doing so during Census enumeration.

Similarly, many features of the sanitation value chain remain underrepresented. For instance, as per Census 2011, drainage connectivity in Mumbai indicates 70.73 percent coverage. This overall percentage hides the specificities found in slum localities. In some cases, as discussed above, it remains unconnected to the main drainage system of the city or remains clogged. Constructed incrementally by local politicians, these systems indicate intermittent investments that do not offer the best technical or topographical solutions at cluster level (as a result, slum households resort to raising their plinths to avoid back flows). Water supply lines also run parallel to open drains, increasing the risk of contamination.

Sanitation in Slums of Mumbai: Overview

Although showing improvements, Mumbai still struggles with gaps in sanitation and solid waste infrastructure at the entire city level. Slums, when placed within these gaps, depict an uneven picture. At one end of the spectrum are slums with higher user participation in the upkeep of CT blocks with monthly contributions from members, such that despite heavy usage, accessibility to an operational and clean sanitation resource is assured. Across slum clusters this creates a network of CTs, often with dilapidated outer shells, but relatively clean inner toilet seats. Sometimes, a strong sense of ownership in zones that have a good spread of smaller prototypes, turn these into a 'group' system with seats under lock and key, thus granting exclusive access only to user members. Minor repairs and cleaning of overflows/choking is undertaken by such sanitation collectives with ad hoc contributions. A small proportion of households also have individual toilets.

In contrast to this are slums with long queues and waiting times, overuse of inadequate facilities and low community involvement. Still others, although not widely prevalent, display severe stress with extremely filthy environs and sometimes open misuse. CT blocks with a well defined user group suggest higher involvement; those in semi public/ public areas accessed by unspecified/floating users or with a large catchment area often portray extensive dilapidation. Garbage bins placed at the entrance of the toilet blocks add to the filth and inhibit accessibility.

In the case of solid waste management a far stronger involvement is noted across localities, with slum households raising monthly contributions to engage sweepers for door-to-door collection of household waste as well as to sweep interior streets. Involvement of residents with their most immediate environs dissipates in common/public areas which turn into indiscriminate dumping locations. This strong notional hierarchy of 'engagement' creates contrasting visual images – with interior residential alleys largely clean and well-swept whereas street ends, open plots, cul-de-sacs, nallahs and open drains filthy and rundown.

Along with uncollected garbage in such areas, by far the biggest challenge appears to be that of disposal of wastewater from slums. The Census of 2011 indicates a marked improvement in accessibility of slum dwellers to both individual and common latrine facilities, underground wastewater connections as well as a reduction in open defecation. Despite this, the actual scenario on the ground is precarious on many fronts. For instance, most individual toilets continue to discharge waste into the nearest storm water drain/nallah/creek; overflows from CTs are common just as arterial and side roads become channels of grey and black water. The criss-crossing internal alleys in slum clusters and oftentimes difficult topography make choking and overflowing from drains a frequent occurrence.

Conclusion

In the kaleidoscopic reality of Mumbai slums, user groups coalesce around sanitation services coming up with innovative arrangements to maintain their accessibility as well as sustenance. Over a period of time, the symbiotic relationships that emerge help in creating an organically evolved working model for its usage and upkeep. This takes many forms – locking the assets (as seen in group toilets), keeping informal vigilance to forbid misuse, monitoring cleaning operations by engaging cleaners, and contributing monthly charges for the same as well as for minor repairs. Solidarity, maintained due to a variety of reasons (close physical proximity and commonality in socio-economic or religious backgrounds), help create strong internal allegiances – often used to negotiate collective benefits in an unstable slum reality.

In any case, a total collapse of services and/or user coalitions gives rise to a potentially crisis situation with limited alternatives or high costs. Thus, continuity and sustenance of such alliances is a matter of exigency to ward off severe hardships. In a few slums, their absence or collapse is often a result of non-favourable external conditions. For instance, NGO/CBO 'captured' CTs introduces an intermediary that controls accessibility between the service and its users often dissuading their involvement. Similarly, community unity in non-notified slums with a persistent history of demolitions appears to cave in, replaced with resigned acceptance or apathy. In addition, adequate disposal of wastewater from slums emerges as a serious concern. Indeed, along with eligibility and affordability issues, topographical features in slums pose a real difficulty in laying optimal sanitation infrastructure.

Faced with this reality, Mumbai's policy climate in recent times has decisively moved towards total slum reconstruction. For a land-starved city with spiralling land prices, decision makers are increasingly making a strong case for clearing rather than upgrading slums. Despite the Jawaharlal Nehru National Urban Renewal Mission's (JNNURM) continuance with the existing approach of service delivery in slums under its BSUP, the policy momentum is clearly shifting towards demolishing slums, relocating eligible residents in walk-up flats and releasing slum lands for housing other income groups.

As this policy approach gains credence, the sustainability of participative sanitation collectives that have devised informal mechanisms to manage and maintain the oftentimes severely deficient sanitation infrastructure in their localities, as captured in this paper, has an uncertain future.

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The Performance Assessment System (PAS) Project

The 'Performance Assessment System – PAS' is a five-year action research project, initiated by the CEPT University, Ahmedabad, with funding from the Bill and Melinda Gates Foundation. It supports development of appropriate tools and methods to measure, monitor and improve delivery of urban water and sanitation services in the states of Gujarat and Maharashtra. The PAS Project comprises three components of performance measurement, monitoring and improvement.

The PAS Project is supporting the development of City Sanitation Plans (CSP) to achieve open defecation free status for four small cities in Maharashtra, which are Wai, Hingoli, Ambajogai and Sinnar. These cities were selected by the Water Supply and Sanitation Department, Government of Maharashtra, and Maharashtra Jeevan Pradhikaran (MJP). A framework for city-wide assessment using the full value chain for urban sanitation has been developed, which is being used in developing these CSPs. Initial workshops were organised by the MJP with officials of these cities to discuss the CSP approach. Draft plans for these cities are ready and will be discussed with city officials.

p a s performance assessment system

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