Working Paper Series

#2017-026

Sanitation challenges of the poor in urban and rural settings: Case studies of Bengaluru City and rural North Karnataka

Manasi Seshaiah, Latha Nagesh and Hemalatha Ramesh

Maastricht Economic and social Research institute on Innovation and Technology (UNU-MERIT)
email: **info@merit.unu.edu** | website: **http://www.merit.unu.edu**

Maastricht Graduate School of Governance (MGSoG)
email: **info-governance@maastrichtuniversity.nl** | website: **http://www.maastrichtuniversity.nl/governance**

Boschstraat 24, 6211 AX Maastricht, The Netherlands
Tel: (31) (43) 388 44 00

UNU-MERIT Working Papers
ISSN 1871-9872

Maastricht Economic and social Research Institute on Innovation and Technology
UNU-MERIT

Maastricht Graduate School of Governance
MGSoG

UNU-MERIT Working Papers intend to disseminate preliminary results of research carried out at UNU-MERIT and MGSoG to stimulate discussion on the issues raised.

Paper presented at UNU-MERIT external event "Pathway to the SDG: Micro to Macro perspectives" 19-20 November in New Delhi.

Sanitation Challenges of the Poor in Urban and Rural Settings

- *Case studies of Bengaluru City and Rural North Karnataka*[1]

Manasi Seshaiah, Latha Nagesh, Hemalatha Ramesh

Abstract

Bengaluru city faces severe challenges in providing sanitation infrastructure for the urban poor. Similarly, we have villages in North Karnataka that encounter problems of toilet access and related challenges. This paper addresses concerns both in city and rural contexts. We surveyed 400 respondents across 20 slums and 500 respondents in six districts of North Karnataka through survey instruments and focus group discussions (FGDs) to understand the problems with respect to toilet access and usage. Open defecation (OD) prevails in spite of several interventions made. In the urban contexts, lack of usage was largely due to technical discrepancies, behavioural concerns, space issue, water scarcity and poor maintenance of toilets. In the rural contexts, apart from water scarcity, restricted space, poor maintenance, cultural habits and financial constraints dominated non-usage of toilets. This paper captures these issues in-depth and provides some options in technologies and improved governance based on study findings and review of case studies. In the urban areas too, the topography of the slum location, operation and maintenance and apt technology plays an important role while in the rural areas, promoting education and awareness creates a positive impact on usage of toilets. Also, institutionalising the process of construction with transparency and accountability at various stages matters to ensure proper construction of toilets.

E- mail addresses: manasi@isec.ac.in, latha@isec.ac.in, hemalatha@isec.ac.in

Affiliations

Associate Professor, Centre for Research in Urban Affairs, Institute for Social and Economic Change, Bangalore.

Senior Research Assistant, Centre for Research in Urban Affairs, Institute for Social and Economic Change, Bangalore

Senior Research Assistant, Centre for Ecological Economics and Natural Resources, Institute for Social and Economic Change, Bangalore

Key Words: Toilet Access, Urban Sanitation, Rural Sanitation
JEL Classification codes: Q01, Q59, R10, O18

[1] This paper is drawn from a larger study, 'Pathways to Sanitation: Growing Challenges and Access to Urban Poor - A Study of Bangalore City', supported by HUDCOs Human Settlements Management Institute, New Delhi and 'Towards Improving Rural Sanitation in Karnataka, Understanding the Institutional Dynamics, Performance and Benefits of Constructing Private Toilets under Infosys Foundation Assisted Project – Parishudh Initiative', supported by Infosys Foundation and carried out by Centre for Research in Urban Affairs and Centre for Ecological Economics and Natural Resources, Institute for Social and Economic Change, Bengaluru. Authors acknowledge all team members of the study.

Introduction

The 2030 Agenda has emphasised 'Water and Sanitation' as an important component by devoting Sustainable Development Goal (SDG) 6 for water and sanitation, besides linking it to other goals on health, food security, climate change and many others. In sum, SDG 6 demands a clear vision to ensure universal access to drinking water and sanitation while addressing issues pertaining to quality, supply and improving water management to protect ecosystems and build resilience. So far, several agencies have worked on providing safe water and sanitation across the globe including UNICEF, the Bill and Melinda Gates Foundation, Water Aid, World Vision, WASH. Meanwhile, smaller start-up companies like Synergy, BlueEnergy, SeeSaw, have all initiated several projects. Additionally, we have several governments and NGOs that have taken action to ensure safe water and improvised sanitation infrastructure. However, achieving complete access to safe water and sanitation amenities remains a distant dream.

The ill effects of poor sanitation access have been serious so far, poor sanitation and practice of open defecation have serious impact on environment, health and economic ramifications on affected communities. It is estimated that a combination of poor sanitation, water, and hygiene would lead to around 700,000 premature deaths every year, and loss of approximately 443 million school days due to consequential diseases (The World Bank 2014). Long term impacts of economic productivity on both individuals and society due to lack of sanitation and increased health system costs are estimated at US$ 260 billion every year (The World Bank 2013). Besides, women safety is a matter of concern, public defecation may cause sexual harassment (The World Bank 2014).

India has also been afflicted from these problems and several studies have indicated them, time and again. 48% of the total Indian population defecates in the open and India ranks among the first 12 countries practicing open defecation (Krishna Prasad, 2014). Despite significant public investment in urban sanitation, over 37 million people in Indian cities resort to open defecation. The 2011 Census of India provides some startling results. Nearly 12% of urban households resort to OD and another 8% use public or shared toilet facilities. The conditions are far worse in smaller cities (population below 100,000), with OD rates around 22%. As per 2011 Census of India, only 30.7% had toilet facility compared to 81.4% urban households indicating the gravity of the rural circumstances.

Several initiatives have been taken in India but we have the problem still on. In India, water and sanitation is a state subject under the Indian Constitution. However, the national policy is set by the Indian government and also provides financial support to state level programs. Water Supply and Sanitation Collaborative Council 2010 states that operation and maintenance as well as execution of such plans have to come through State Departments of Public Health Engineering or Rural Development Engineering and State Water Boards (Water Supply and Sanitation Collaborate Council, 2010). But in practice, the local government authority leaves it to either the village or district level panchayats in rural areas (Panchayat Raj Institutions) or to municipal governing bodies in urban areas (Urban Local Bodies) (Leavens and Derksen-Schrock, 2010).

With the failure of past reforms, the Government of India came up with the National Urban Sanitation Policy in 2008 that aimed to "ensure and sustain good public health and environmental outcomes for all citizens with special focus on hygiene and affordable sanitation facilities for urban poor and women" (Dasra 2012). It is to be noted that emphasis

was not only on infrastructure but it included behavioural change, continual operation and maintenance, proper disposal, treatment and reuse of wastes and state involvement through state and city sanitation plans (Nivedita, 2010). This policy was monumental on two fronts – there was a separate recognition of urban sanitation and also there was set planning and implementation targets for states and cities to be achieved (Dasra 2012). To achieve these targets, the mandate was to create a City Sanitation Plan (CSP) that would be run by a City Sanitation Task Force to formulate a State Sanitation Strategy with members from government agencies, key experts, businesses, non-profits, worker unions, elected representatives and ULB among others and all CSPs. The Ministry of Urban Development will provide support financially for national-level awareness generation and for monitoring and evaluation knowledge management and capacity building.

Another observation has been that, urban sanitation was comparatively less focused upon compared to water supply, besides, bulk of the finances were allocated towards water infrastructure. Besides, more emphasis was also on rural sanitation as rural areas had relatively less number of toilets compared to urban areas. However, in spite of having more number of toilets, it is not that urban areas are exempt from open defecation for varied reasons. The recent Swachh Bharat Abhiyan aims to clean India by 2019 and focuses on two submissions – rural and urban. The urban component will be initiated over a five year period and within 4041 statutory towns with an expected total cost of Rs. 62,009 crores with 14,623 crores contributed by government. SBA's goal for urban India includes elimination of OD, transition towards pour flush toilets, removal of manual scavenging; behavioural change regarding sanitation practices (Diligent Media, 2014). We also need to understand that challenges vary across the rural and urban contexts, for instance, land tenure or proliferation of slums that are not notified or recognised by government is applicable to cites only.

It has been emphasised that it is crucial for effective governance in achieving efficiency in delivery of services. Good governance is expected not only to advocate judicious exercise of governmental authority but ascertain other forms of collective decision making, formal and informal, participatory and representative, centralised and decentralised and national and local (Harpham and Kwasi Boateng, 1997). Nelson Ekane et al 2015, emphasises the need for multilevel governance analysis to understand the challenges in the sanitation sector and stresses that demand-driven strategies and private sector involvement is vital for establishing sanitation paradigms and socio-technical regimes. The state, in governance terms, should be closer to society through better representation. While, Ana Hardoy et al (2005), suggests that providing water and sanitation services to the poorest areas is likely to happen only if all the actors involved – the public sector, private company, regulator, NGOs and communities are committed to working together towards a solution.

Technology is another significant component in revolutionising systems and maximising efficiency in delivery of services. Across the world, results of technological change are apparent everywhere. However, still the greatest struggles encountered by mankind have been not with the sword but with ideas that diffused into their daily lives and emerged as cultural changes (Reed, 1961). Four essential elements in diffusion of any idea is – (i) the innovation (ii) its communication from innovation to another, (iii) in a social system and (iv) over time (Rogers, 1965). Thus diffusion of technologies is still a serious challenge. Innovation is required in technology types as well as governance approaches/models for achieving sustainable development goals. Shyama et.al (2012) in her paper has observed that pro-poor innovations like toilets face greater challenges in comparison to the demand boom for cell phones, as intended beneficiaries perceive neither a need not a want for them. In

response, social entrepreneurs catalyse demand for such pro-poor innovations through a variety of schemes before and after provision of the new product. Pro-poor innovations, their creation and diffusion, have not received the attention given to mainstream innovation by economists and management science experts. So, strategies for the diffusion of pro poor innovation should be based on actual field practices of sanitation entrepreneurs in India was shown by indicating that the sanitation entrepreneurs have to begin by ascertaining the community's perceived value for the innovation through multi-purpose socio-economic surveys, which serve to initiate relations with the target community. This needs to be followed up by appropriateness of technology, demand through educational workshops, house to house visits and focus group discussions, thus constructing a closed-loop delivery mechanism that involves monitoring, accompaniment and resolution of problems after provision of the innovation.

Similarly, there are other concerns. For instance, issue of tenant rights and tenure in slum communities prevent and discourage households from investing in sanitary facilities (Nivedita, 2010). Also, most common type of sanitary facilities in rural areas are pit latrines, whereas in urban areas, toilets are connected to sewer networks. Not all households will have connection to sewage networks which obstructs households from using the infrastructure besides inadequate operation and maintenance leading to depreciation of infrastructure over time (Nivedita, 2010). There are further many such complexities that constrain toilets to function effectively, resulting in open defecation.

Given this backdrop, the current paper is organised as follows – situation analysis of Bengaluru's slums in accessing toilets in Section I and in Section II of the paper we look at the intervention made by Infosys Foundation for improving access to toilets in Northern districts of Karnataka. Our paper will bring to the fore some key concerns highlighting constraints in the technology adopted, problems encountered and its acceptance. We will also discuss some of the interesting initiatives that have aided in technology redesign and improved governance. After reviewing these two cases and based on review of best practices in other parts of the country, we arrive at some solutions that call for improved nuances in governance to meet the key aspiration of eradicating open defecation. Our study findings in Bangalore city (representing slums) and North Karnataka (representing rural areas) reiterates the fact that we will not be able to adopt a one-size-fits-all approach, rather, a context based approach considering social, economic, cultural, geographical and technical aspects, in attaining the SDG in the context of water and sanitation. Water and sanitation are linked; however, we will be discussing sanitation explicitly and toilet concerns in specific. The case studies discussed will throw light on generalising issues that may be applicable to other contexts as well. There are several common issues but some are specific to rural and urban areas. Hence, we will discuss them separately.

We attempt to answer three questions (i) What are the key factors that act as constraints in eradicating open defecation? (ii) What approaches may help in improving governance mechanisms to eradicate open defecation? (iii) What are the constraints in implementing existing technologies in the context of usage and design?

Accessing Toilets – Challenge in Slums of Bengaluru city

Bengaluru is one of the fastest growing cities and fifth largest city in India. Bengaluru's population has grown immensely (84,49,944 as per 2011 census). Similar to any other metropolitan cities, rapid urbanisation has posed serious challenges to urban planning and management in providing infrastructure and other civic amenities like housing,

electricity, water and sanitation in the urban areas (Ahluwalia, 2011; Bhagat, 2011; Kundu, 2011, Kulkarni and Ramachandra, 2006).

In the context of providing sanitation to the urban poor, there are several issues that needs to be addressed. To begin with, data from Karnataka Slum Development Board (KSDB) indicates 597 slums in Bengaluru city of which 388 slums are notified and 209 are non-notified[2]. However, the number of slums have remained same over the period of time, which may not be true, for certain. More number of slums may be getting added in the cities, which are not accounted for. Surveys about the number of slums was conducted more than four decades ago. So, while we discuss, problems of the poor, we are not accounting for the new entrants into the slum category. We are also not discussing slums that may have been rehabilitated, hence, are no more slums. These are also not listed in the Annual Reports of the Karnataka Slum Development Board. We strongly feel that all this will have an influence on interventions to be made, fund allocations and policy implications.

Few independent studies have highlighted sanitation concerns faced by the urban poor in Bengaluru city. Benjamin (2000) observes that women are forced to use open fields for defecation and face harassment from drunken men making it unsafe. Kala Sridhar and Venu Reddy (2011) see the need for a policy to incentivise and influence the entry of private service providers into slums. Study by Mythri Sarva Seva Samithi (2012), highlights 40% slum population did not have access to toilets. There are instances of sharing one toilet by 100 people and sharing nine toilets by 200 people (in Tasker Town, Shivajinagar). Besides, these-toilets tend to become unusable due to lack of maintenance, a matter of serious concern. Public health experts and other studies have pointed out that large sections of the urban poor are denied access to toilets. Extent of night soil disposed into rain water drains is of serious concern that could cause implications on health. An official report, in 1994, (Ravindra, 1997) says around 1,13,000 houses were without toilets, while 17,500 had dry toilets. Sanbergen and Loes-Schenk (1996), highlight that of 22 slums, nine (with a total population of 35,400) had no toilet facilities, while in the remaining ten slums; there were 19 public toilets for 16,850 households or 102,000 inhabitants. However, as per Census data, Bengaluru city has shown a substantial progress in improving access to toilets from 90.78% to 96.76% from 2001 and 2011 respectively. In this backdrop, our study in slums is an attempt to understand the current problems in the context of toilet constructed and usage leading to open defecation in spite of the increase in toilet construction.

Methodology and Data Sources

We collected both qualitative and quantitative data, reviewed studies on sanitation, secondary data was collected from concerned departments Bruhat Bengaluru Mahanagara Palike, (BBMP), Bengaluru Water Supply and Sewerage Board (BWSSB), Karnataka Slum Development Board (KSDB), Corporate initiated schemes, and NGO initiated Sulabh Shauchalaya Schemes and other case studies. Interviews and discussions were held with government officials and other personnel of the corporates and NGOs. Both structured and semi-structured survey instruments (questionnaires/ checklists) were designed for stakeholders, group level meetings and individual interactions. 10 declared and 10 undeclared slums were identified across all zones of the city representing ownership of land (government land and private land), slums with migrant population only, location (slums located beside railway lines, alongside of sewage drain), slums without access to toilets, having access to public toilets, pay and use toilets and slums that are benefited with housing schemes. Twenty

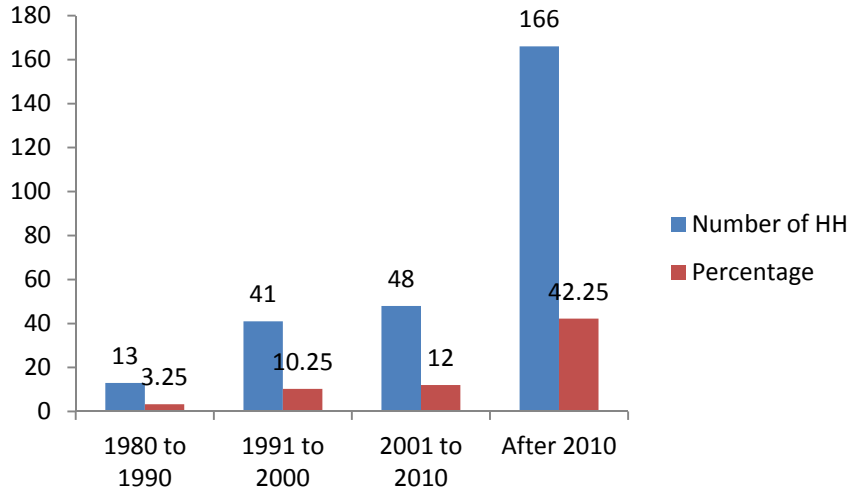
[2] Annual Report 2014-15, KSDB

respondents covering a total sample of 400 respondents across 400 households were surveyed (20 HHs each from 20 slums), representative of age groups, women, and elderly population. Focused group discussions also formed part of the survey for a comprehensive analysis.

Augmenting Toilet Structures

We observed that various schemes have been implemented by the State and Central governments to provide toilet access by providing financial assistance for constructing houses with toilet facilities besides individual toilets. It can be seen that the total number of individual toilets constructed in the study area has increased after 2010 (Figure 1). The data collected during the household survey indicates that 42% of individual toilets were constructed after 2010 which may be attributed to the implementation of various government schemes viz, Basic Services for the Urban Poor (BSUP) and Integrated Housing and Slum Development Scheme (IHSD) under Jawaharlal Nehru Urban Renewal Mission (JnNURM). In addition, recently under the World Bank sponsored project Karnataka Municipal Reforms Project (KMRP) implemented by BWSSB, toilets have been constructed in several slums. Innovative initiative like e-toilets installation in public spaces and vicinity of slums have aided to a certain extent in providing access pay and use option, besides making it convenient as it has several automated features. Besides the schemes, various government initiatives and NGOs have promoted awareness on hygiene via Nirmal Bharat Abhiyan, Swachh Bharat Mission etc., thus motivating people to construct toilets. Another reason for increase in private toilets built by residents own costs in slums may be attributed to the non-availability of space for open defecation making it an everyday challenge, resultant effect of enormous growth of built up area in Bengaluru. Also, when people can afford, they do not want to suffer inconveniences caused due to lack of access to toilets. This fact is also reiterated by Dasra 2012 where he makes a comparison to rural areas and urban areas. Households in urban areas have a demand of and value for toilets, with increasing population growth and scarcity of land, not only land is mostly unavailable for open defecation, the act of open defecation and the embarrassment of security issues of such an act are more easily observed.

Figure 1: Toilet Construction over Time



Source: Primary Survey, 2015

In 45.5% of the households with individual toilets, toilets were constructed on their own and 21.5% have received financial support either from the State or Central government

under various schemes (only in notified slums). In non-notified slums, majority of the toilets are self-constructed, excepting a few which have been constructed with the help of World Bank scheme KMRP implemented by BWSSB. Under KMRP project, the beneficiaries are to contribute for construction. However, under JNNURM, VAMBAY, people have contributed 10% of the total cost of house construction which varied between Rs.28,000 and Rs.36,000 across slums.

We observed that a majority of the surveyed households have access to individual toilets[3]. Having individual toilets is constructive as households with individual toilets feel less beleaguered as compared to those that use public or shared toilets. Besides, it also motivates all the members within households to use toilets. Individual toilets are largely used by households owning them. In few cases, we observed that though households have toilets at home, some members of the family, particularly men, do not make use of them and are comfortable with open spaces to relieve themselves.

Increased Number of Toilets but problems in accessing toilets remains

Type of toilets and their infrastructure is an important indicator for understanding the quality of toilets which, in turn, affects usage. Toilet infrastructure across the slums highlights an important aspect indicating the prevalence of open defecation in spite of the availability of toilet facility (out of 20 slums, 10 slums practice open defecation). So, mere provision of the physical infrastructure does not necessarily ensure accessibility to toilets. There are several issues concerning access, for instance, water scarcity, and technical aspects etc. which force people in to defecating in the open.

While the latest Census 2011 data indicate that 5.2% of households lack toilet facility and 94.8% have access to toilet facility in Bengaluru, the absolute numbers of households that lack toilets are still high, majority of which comprise the large segment of the population living in poorer pockets of the city. This also has been evidenced by our study wherein 67% (i.e. 268 households) have access to individual toilets (in-house toilets), while a significant percentage of the households (19.5% , 78 households) are dependent on shared/ pay-and-use public toilets. Another 13.5% of the households (54 households) are denied of toilet facility of any form forcing them to use open spaces/area for defecation (Table 2). Households with no access to individual toilets depend on community toilets/public toilets, shared toilets or neighbour's toilets. Around 7% of the households use public toilets.

Table 1: Type of Toilets Used and Practice of Open Defecation

Type of toilets	**Percent**	**Notified**	**Non-notified**
Individual/own Toilet	67.0	75	59
Public toilet	7.2	10	4.5
Shared toilet	12.3	2.5	22
Open space	13.5	12.5	14.5
Total	100.0	100	100

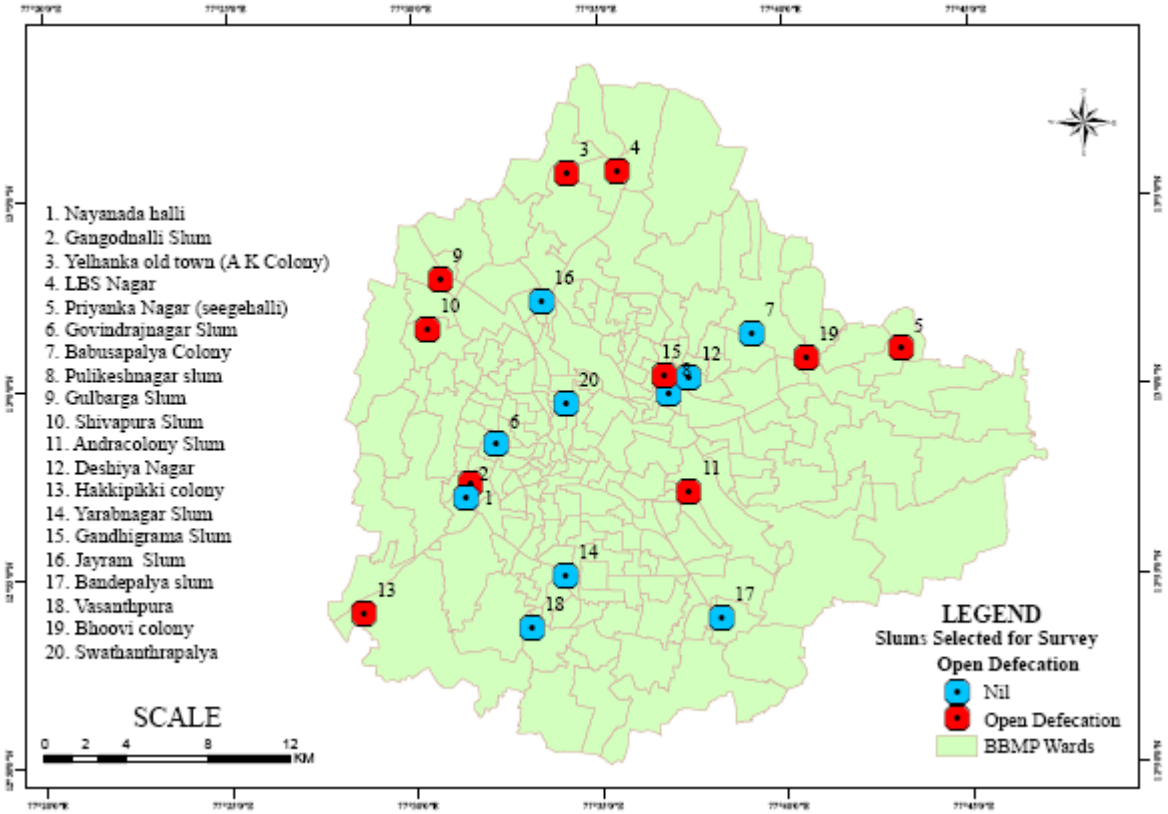
Source: Primary Survey, 2015

[3] Most of them in Gangodana halli slum, Govindaraja nagar slum, Yarab nagar slum, Nayandahalli slum

Constraints in eradicating Open Defecation

Open defecation prevailed for varied reasons in the study area. For instance, in Hakki pikki colony with a population of around 2000, all 208 households (except 3 or 4 households) defecate in the open areas as they do not have access to any type of toilet. Similarly, in Shivapura slum, LBS nagar slum, Yelahanka A K colony slum, around 50% of the households do not have access to any kind of toilets facility and hence practice open defecation (see Map 1). This stands supported by a survey conducted in 2013 by Bengaluru Urban zilla panchayat (ZP) which highlights that 34,656 households in Bengaluru Urban district do not have access to toilets and hence, resort to open defecation. Some of the reasons are lack of space to construct toilets, inadequate number of public toilets, unused toilets due to poor maintenance etc. People largely complained about inconvenience caused as they have to travel long distances in search of open spaces which adds to stress, safety concerns for women, inconvenience to children and the aged, particularly in the late evenings.

Map 1: Slums practicing open defecation



Source: Primary Survey, 2015

Toilet Usage

Complete access and effective usage of toilets is the key factor in making Bengaluru an open defection free city. We observed that just providing toilet infrastructure for the slum households does not merely ensures its usage. Instead, there are other several constraints that make toilet usage difficult as discussed in detail in the following section.

Type and Quality of Toilets determine Usage

Toilet usage in slum households is determined by several socio-cultural, technical factors. Unless these aspects are covered, access to and usage of toilets gets affected.

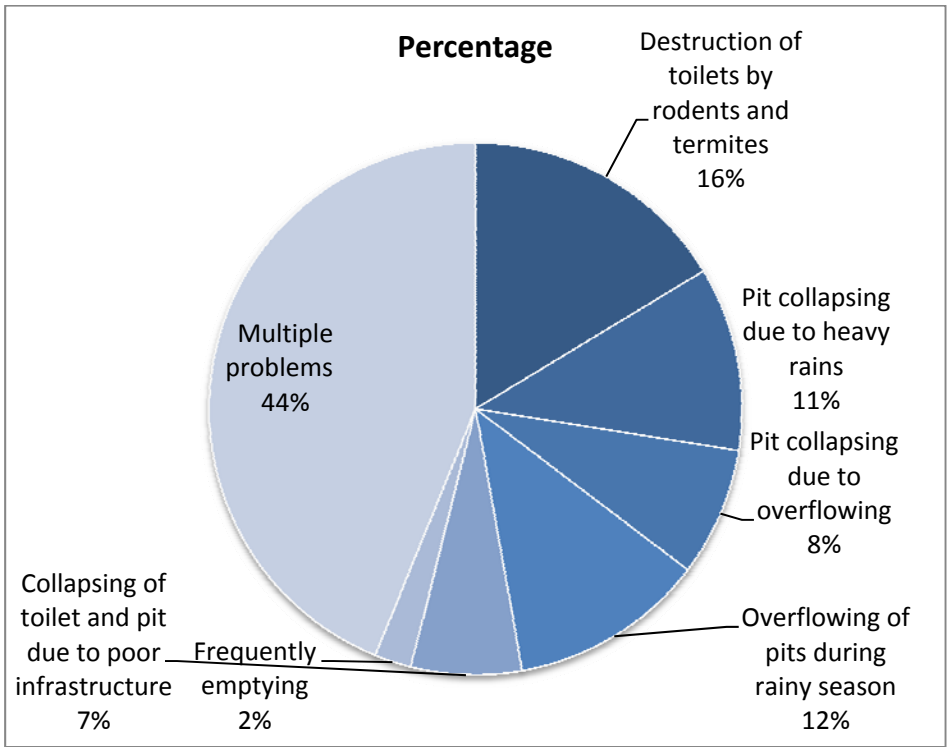
Inadequate number of toilets

Inadequate number of toilets is another issue because of which slum dwellers depend on open spaces. 9 slums have partial access to toilets i.e., few households have access to individual toilets or shared toilets and not to public toilets. They are forced to opt for open defecation in view of water shortage and drainage problems. For instance, Gulbarga slum is a non-notified slum where 50 HHs out of a total of 325 HHs, have constructed own individual toilets[4]. The rest of the slum dwellers defecate in nearby open spaces.

Technical problems

In our observations, there are toilets constructed across slums that have the physical structures but does not ensure usage. Among the surveyed slums, 12 slums had access to individual/shared/public toilets. However, problems faced force household members to defecate in the open. In several instances, blockage of underground drainage is a prominent problem encountered across slums. Some of the technical problems that restrict the usage of toilets are - damaging of toilets by rodents and termites, collapsing of pits due to heavy rains, overflowing, poor infrastructure and irregular emptying of soak pits. A majority of the respondents (44%) have reported a combination of above mentioned problems followed by damaging of toilets by rodents and termites (16%), over flowing of pits during rainy season (12%) and pit collapsing due to heavy rains (Fig 2).

Fig 2: Technical Problems *Source: Primary Survey, 2015*



[4] 24 are ring-pit type of toilets and the remaining 25 are connected to the drainage system.

Lack of Space - a major hurdle in toilet construction

The landscape of a given slum is an important factor that determines the construction of toilets. Slums have evolved in unplanned manner, hence, are mostly congested with very small lanes. Another reason for the absence of toilets in the dwelling units is the lack of sufficient space for constructing individual toilets, so the construction of community toilets being the only option. Absence of individual/community toilets has led to open defection, as observed in LBS nagar, Priyanka nagar AK Colony and Shivapura slums. Most of the houses are too small with variations, the area of buildings are about 12*15 feet, 12*18 feet and 12*20 feet. 18.2% of the respondents live in households that cover an area of 10*15 feet, while 29.8% of the respondents live in HHs that occupy an area of 10*10 and even less and hence, the construction of toilets is an issue. Besides, the houses are located too close to each other with no space available either to construct toilets within or outside of the households. Besides, the sub-standard quality of semi-pucca households adds further to the problem.

Plate 1: Narrow Lanes and Space constraints for toilet construction, Swatantrapalya Slum

It is observed that in Shivapura slum, most of the households do not have access to toilets, excepting 50 households which have constructed toilets using their own funds on the storm water drainage. The remaining households resort to open defecation. Men generally use open lands located nearby, while women use the adjacent lake beds for defecation. People consider the daily drudgery of open defecation as a challenge, causing inconvenience with regard to timings since they have to plan their timings each day i.e., early mornings or late evenings as privacy is an issue besides self-dignity.

Water scarcity affects Toilet Usage

Inadequate water availability affected toilet usage as water access and availability is a matter of concern across most of the slums. Although the slum dwellers have access to water, it is not sufficient to meet their requirements completely; 32.75% of the respondents have reported water insufficiency. Another reason for not being able to access water is the motor related problems faced by households (vertical structures). Households living on the second and third floors have to depend on motors for lifting water to overhead tanks. Motors get frequently damaged and require frequent repairs, additional costs that are a burden.

Plate 2: Water Storage, Purchasing water from Tanker, Water Scarcity, Nayandahalli Slum

Purchasing of water is a common feature across slums. This explains the reasons that affect sanitation drastically. People face problems in balancing expenditure, as purchasing water is a major component, where they have to purchase water for drinking and also for toilet usage.

Behavioural Problems

It is observed that, there are a small percentage of men who prefer to defecate in the open as they do not feel comfortable to use toilets. This is a cultural factor as migrants from rural areas who have settled in Bengaluru still continue with the habit of using open spaces for defecation. 15% of women respondents have expressed inconvenience with regard to the use of toilets, particularly when men are around the public toilets. The behavioural aspects of toilet usage are influenced by educational levels as well. The educational levels of the respondents are low, however, the educated, particularly the youth, prefer and insist on individual construction.

Poor maintenance of Public toilets leads to open defecation

Public toilets serve as an alternative for toilet access among the densely populated low income communities in urban and semi-urban areas. Among the surveyed slums, public toilets are present in seven slums and around 7% of the total surveyed households (29 households) are dependent on public toilets (Map 1). The public toilets constructed in the study slums are operated on pay-and-use basis, excepting one in Swathantrapalya slum.

People are not satisfied with public toilets due to poor maintenance (76%) and water scarcity (24%) and hence, resort to open defecation (Table 2). Besides, respondents especially find it inconvenient to use public toilets because their usage is subject to restricted timings (closed by 9 pm), leaving people with no choice other than defecating in the open. Other inconveniences include poor lighting facilities and lack of sufficient water/no water (Gandhi grama slum). Another major reason of inconvenience caused to the users was standing in long queues during the rush hours.

The condition of public toilets in some of the slums is extremely poor. However, in some of the slums, they are maintained well - LBS nagar, for example.

Table 2: Reasons for Not Satisfied with Public Toilets

Reasons	**Number of HH**	**Percent**
Poor maintenance and hygiene	22	76
Water scarcity	7	24
Total	29	100

Source: Primary Survey, 2015

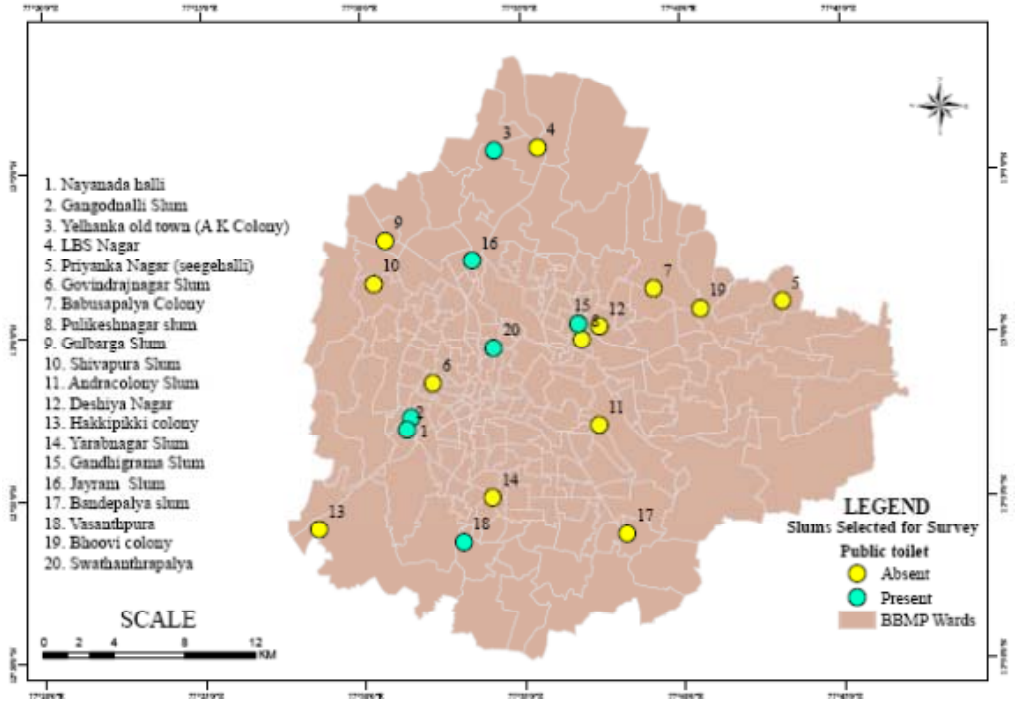
Overall, a few people were comfortable paying user charges, while some of them complain that user fees is high for them to afford. Public toilets are used by slums but varied in the usage pattern across families/slums. Some of the families completely depended on public toilets as they did not have an individual toilet in their houses. However, there were families, although had individual toilets, used public toilets during situations where their toilets were blocked, drain leakage etc. Respondents complained about lack of hygiene and maintenance in public toilets leaving them with no choice than use them.

In Gangodanahalli slum, few households are dependent on a community toilet located nearby. In Nayandahalli, Swatantrapalya and Gandhinagar slums, though the residents own houses with individual toilets, due to frequent blockage of sanitary pipes, dependency on community toilets is relatively high. Public toilets are an alternative option, not a preferable choice. Major reasons for dependency on public toilets -

(a) Lack of space for construct own toilets in (LBS Nagar, Swatantrapalya, Jayaram slum (3.2%) as they are located in highly congested, densely populated areas with small houses.
(b) Individual toilets are too small to use
(c) Financial constraints to have their own toilet (2.2%)
(d) Water scarcity

Plate 3: Public Toilets

Map 2: Access to Public Toilets



Source: Primary Survey 2015

Shared Toilets and Open defecation – Sharing of one toilet by two households was more common across slums. For instance, in Vasanthapura slum, shared toilets were more in number due to space constraints and three - four households share one toilet. At times, some extreme cases, one toilet was shared by 15 households (LBS nagar slum). Shared toilets caused a lot of inconvenience as people had to wait for their turn before using toilets, many a times, forcing them to opt for open defecation. Since shared toilets generally lack maintenance and accessibility on time, men opt for open defecation. Among the 400 households, 49 households (12.2%) were using shared toilets, across 10 slums. The dependency on shared toilets was more in non-notified slums compared to notified slums. Observations indicate, in 2% of the HHs, two families share a single toilet and in around 6% of the HHs, three families share a single toilet and 3% of the HHs, 4 families share single toilet (Plate 4).

Plate 4: Shared Toilets, Jayaram Slum

Individual Toilets in all houses aids Open Defecation Free Slums - There are some slums (Gangondanahalli, Govindarajnagar, Swanthatrapalya, Yarabnagar, Sarvagnanagar, Deshiyanagar slums) which are completely free from open defecation besides maintaining toilets well. This was observed in slums where individual toilets are present in all the houses (Plate 5). The households were built under JnNURM scheme along with toilets prior to which open defecation was prevalent along the sides of the railway lines located close by. People now feel relieved that houses have been constructed with access to toilets. Toilets are used by every member of the family with no open defecation practiced.

Plate 5: Individual Toilets located beside Houses

Toilet Maintenance

38% of the respondents with individual toilets clean the toilets once in a week, while 17.75% clean daily and 16.5% cleaned twice in a week. In all households, cleaning is carried out by women except in around 8% of the households, paid labour were hired to clean toilets. Individual toilets were maintained well by a majority of the households. In the case of shared toilets, households took turns to wash toilets on a weekly basis.

Poor Hygiene

Hygienic conditions varied across and within slums as also across households. The cultures of keeping the immediate surroundings clean vary extensively. Newly constructed vertical structures looked like ‘concrete slums’. Tendency to misuse common areas to dump belongings, store firewood, heat water etc. makes the place untidy. Few households had kept their houses and surroundings clean and tidy. Instances of renovating the houses to suit their tastes by redoing flooring, painting walls etc. at their own cost were also observed. Given the overall conditions of the slums, there is a large scope for intervention in creating awareness to maintain a minimum level of hygiene.

40% of the respondents took a bath every day as access to water is good in their slums. While 42% take a bath on alternate days as the water is supplied on alternate days. In these households, there was no adequate space to store water. Few slums face acute water scarcity problems and the residents have bath once in three days (17%) or once in a week

(1.2%). It is well known that hand washing practices plays an important role in preventing the transmission of several diseases. 98.2% of the respondents washed their hands prior to cooking, while 97.2% of the respondents washed their hands prior to eating. 68% of respondents used soap to wash their hands, which depended on the type of occupation they are involved in. People engaged in construction and sanitation activities tend to use soap whereas those engaged in sorting out metals, paper waste, etc. washed hands with plain water.

To sum up, numbers of toilets have increased but usage is affected due to several factors. It is important that all aspects of functionality of toilets are ensured for effective usage. There is need for improved governance in providing more options to construct toilets that suit local contexts. People are receptive and involving them to consider innovative options would make way for open defecation free city.

Toilets in Rural Areas – The North Karnataka Experience

Infosys Foundation as part of its corporate social responsibility (CSR) has provided sanitation facilities in North Karnataka as open defecation is a major problem in these districts. The program 'Parishudh Initiative', began in October 2011 with the motto of educating the people regarding the importance of hygiene and improving sanitation facilities through toilet construction. The aim was to create model villages, popularise the approach and upscale it. Besides, the team also wanted to demonstrate that right approaches and initiatives would aid in attaining sanitation goals. Parishudh team worked with the local people in innovative ways, encouraged entrepreneurs and adopted toilet models to suit local contexts. Specific objective was to achieve the target of constructing 10,000 toilets covering 50 villages and a population of 50,000 in one year. With this backdrop, an attempt was made to study sanitation initiatives in the rural areas of North Karnataka where an NGO, Parishudh has taken up several initiatives to address the problem of sanitation. In spite of the various initiatives under taken by the Government, NGOs and other institutions, Parishudh Initiative's (PI) approach/model of achieving 100% sanitation within a short time frame while simultaneously promoting awareness among people as part of bringing about a behavioural change is relevant from a larger spread effect point of view in the state. Against this background, the study focused on documenting the processes and situational analysis for understanding institutional dynamics, performance and benefits of the initiative.

Methodology

The study was carried out using comprehensive data sets from secondary sources, the existing data base with Parishudh, as well as primary fieldwork based data. To understand key issues in sanitation sector, an extensive review of studies and data from secondary sources were referred. A comprehensive field survey was carried out, covering various aspects of sanitation. Field survey was conducted using structured and semi-structured survey instruments designed for group level meetings and individual interactions. Primary data was collected from households using a structured questionnaire. The questionnaire were designed covering socio-economic, physical, financial, user satisfaction and environmental aspects to receive a systematic public feedback to assess the performance and perceptions. Based on pilot visits to some districts, the study team revised the questionnaire.

An appropriate sampling design was followed at different levels for selecting respondents. Case studies and focused group discussions across types of beneficiaries -

individual households, institutions, and community toilet were included. Stratified Random Sampling was adopted for covering geographical area representing villages, technology, land holding size, institutions. Villages thus selected were representative of toilets constructed in terms of highest, medium and lowest numbers. The districts covered were Gulbarga, Yadgir, Bidar, Raichur, Bijapur and Koppal. Responses were collected from 500 households (5% of the sample) representative of cross-sections of the society- caste wise, income-wise, with and without water connection. The representation was also extended to various types of beneficiaries - households, institutions and biogas connected users. Besides, discussions were held with initiators and Nirmal Grama Samithis, Panchayat representatives and Contractors.

Open Defecation in rural areas – Causes and Concerns

The traditional practice of open defecation is common in rural areas and may be attributed to the cultural practice of open defecation that was followed since generations. With large open areas available, people never felt the need for toilets. Besides, the usage of toilets was not a practice acceptable to them as toilet usage is generally viewed as a practice followed in the urban areas, and was, therefore, one of the reasons for sanitation programmes being partially successful. Besides, they felt that, having toilets within the house was against the cultural practice and many believed it would bring bad luck. Further, there were designated places to defecate, hence, did not see the need for toilet construction. For instance, from the households interviewed, 33.20 % of the respondents were not keen on constructing toilets as they were used to open defecation. People expressed discomfort with respect to defecating in closed set-up, while defecating in open fields was considered more comfortable. Similarly, 31.63% of the respondents opined that the need to construct toilets did not occur to them, indicating that open defecation was very much a part of their lives.

Over time, situations have changed. Survey findings indicated problems encountered. With the population expansion and associated activities, the availability of space has become a constraint and more visible in the peri-urban areas. This has resulted in people travelling far distances to find open spaces. Besides, adding to the problem, designated areas that were meant for open defecation have been converted into either cultivatable land or roads, and commercial layouts. In fact, 54.22 % of the respondents expressed that there were no designated areas for defecation. In addition, farmers were reluctant to allow people to defecate nearby their cultivable lands for defecation; around 4% of the respondents reported that land owners opposed defecation in their farm lands, with many of them fencing their lands. This led to a situation wherein there was reduction in space for open defecation and caused stress to the people every day.

Lack of access to toilets forced women to travel long distances for finding spaces that had privacy, safe and free from people and vehicular movement (14%). Traveling long distances was another difficulty with 7% of the respondents spends more than an hour. This caused mental stress to women as they were to return home to attend to their routine work of cooking and serving other working family members. With limited time available for her to meet the demands of family routine and family members, conflicts were quite common, affecting personal and professional work of family members. Travelling far distances was cumbersome and tedious for expectant mothers (7.8%) besides worrying about the risks of accidental fall that could put their life at risk. Hence, women would delay their defecation, causing associated physical ailments besides mental discomfort. The elderly population suffered the most with no toilet access. It was difficult for the elderly as they had to walk long distances in search of open spaces, risking injury and the resultant medical expenses for the family, as reported by 6.5% of the elderly respondents. It was pathetic that the elders would have minimum food or would sleep hungry to avoid going out to use toilets during

night fall. Instances were reported of young members of the family insisting that elders have little or no dinner as they taking them out to relieve during night fall was cumbersome.

Difficulty during Night fall was a common problem for both men and women with 23.2 % of the respondents reporting that defecating at night time being challenging due to lack of lighting in the streets and surroundings. During night times, searching for an open space was a herculean task. Insects and snake bites and mosquitoes were the added problems. This forced people resorting to defecating on road sides especially during night times.

An attack by pigs was another menace faced by the people whenever they ventured out for defecation in fields, as reported by 5.3% of the respondents. Many a times, the attack would be violent, fractures to the elderly. Children were traumatised and would always want company to go to the fields.

Rainy season would create further additional trouble with water stagnating on roads, thus making defecation in fields/places extremely murky and unhygienic. Rainy season was a crisis period in terms of the spread of diseases and infections. Stagnant water would facilitate the spread of infections and diseases in view of increase in mosquitoes and flies and the resultant conditions unhygienic situation with foul smell and the loss of aesthetics. Water bodies like lakes, rivers, tanks and ponds got contaminated with the practice of open defecation. 10.41% of the water bodies observed were contaminated, making it unfit for consumption.

Constraints Involved in Construction of Toilets

Financial Restriction and Reluctance to Invest in Toilet Construction

The finance problem was reported as the major constraint encountered to construct toilets, since most of the people in rural areas live on daily wages which makes it difficult for them to afford toilet construction. Access to financial assistance was reported as the best motivator for taking up toilets construction. Thus, Parishudh Initiative helped many households with direct cash and in some cases, in the form of construction materials. However, there were examples, wherein people could afford but were not willing to invest in toilet construction and reported financial constraints as the reason. People were willing to invest in gadgets like LED TV sets, mobile phones by every member of the family, but not in toilets indicating the mindset and preferences of people.

Insufficient space

Insufficient space was a major constraint for households in rural areas, as reflected by 27.70 % of respondents having limited space for construction of private toilets. Besides, in many of the villages, the village layout was not well planned and haphazard. Hence, community toilets and group toilets were preferred. Cultural factors/belief systems and preferences determined the location and usage of toilets which had to be accommodated within the limited space. For instance, several households i.e. 85 % had preferred to have toilets built outside their houses as compared to 14% of households wanting to have toilets constructed inside their houses.

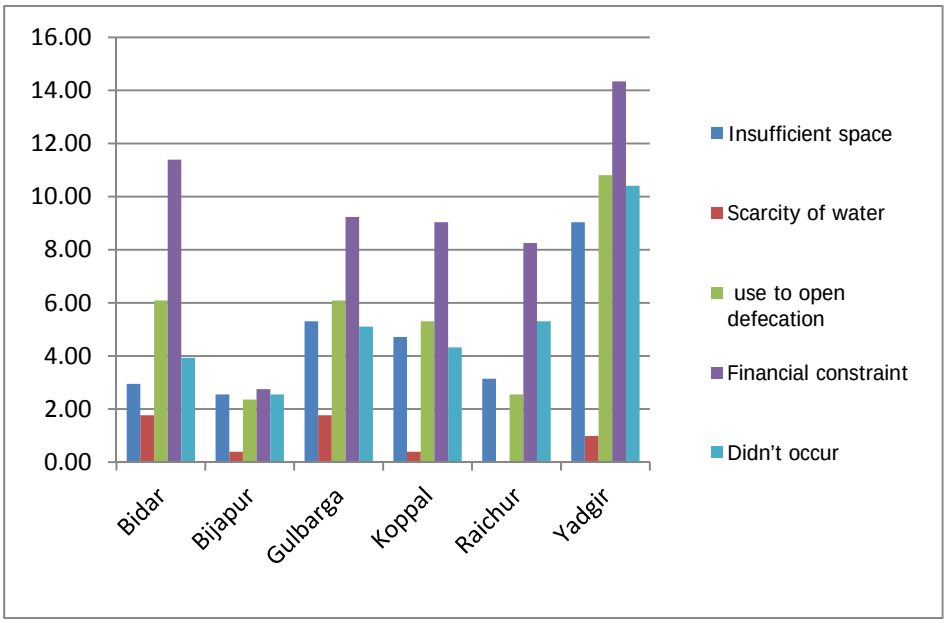
Scarcity of water

Water scarcity was another major demotivating factor as far as the construction of private toilets. Gulbarga and Bidar respondents reported water scarcity as a major concern as compared to other districts.

Being used to Open defecation

Several of the respondents practiced open defecation and were used to it and were not keen on changing their habits. Besides, open defecation being such a natural part of their lives, it was mentioned that it did not occur to them that they need to have/use toilets.

Figure 3: Causal Factors for Not Opting for Toilet Construction



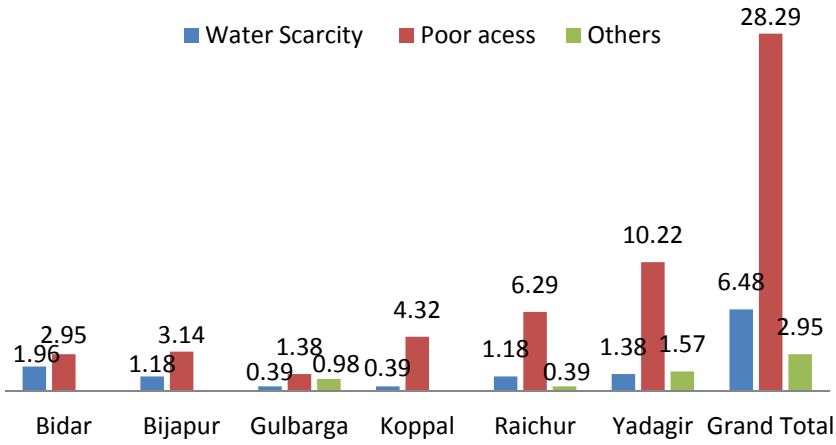
Source: Primary survey
Note: Percentage figures do not add up to hundred due to Multiple Responses

Post Toilet Construction – Challenges for Usage

Lack of Water Availability Affects Toilet Usage

Toilet usage and water availability were directly related. During six months of adequate water supply, people would use toilets and for the rest of the year; they were forced to defecate in the open due to water scarcity. 28.29 % expressed poor access to water due to failed bore wells and lack of other alternative sources. In few other places, there was adequate water available, but inadequate power supply and frequent power cuts were a major problem for water accessibility (Figure 4). For instance, people in Suntanur Village of Gulbarga Taluk, Gulbarga District would experience a severe scarcity especially during summer. On an average family would devote nearly 12 hours a day to fetch water.

Figure 4: Poor Accessibility to Water



Source: Primary survey

Misconceptions

People felt that the soak pits would get filled up soon if used every day. Another reason was their speculation regarding water leakage caused while flushing toilets might flow out of the toilet. These misconceptions mainly hamper the usage rate of toilets in many villages. In certain cases, this belief increased the construction cost of toilets as people constructed pits thrice in size to the prescribed one. To address these issues, explaining to the beneficiaries more about the technical aspects of the structure became important.

Neighbours' Objections

The households having toilets faced neighbours' objections as the neighbours believed that odour from the toilet would make their living difficult. Some of them who constructed toilets had specifications about the location of toilet in that the living rooms and toilets should not be constructed in the same premises. The preference to construct the toilets outside the house, though within their own premises, was objected to by 4.71 % of the neighbours.

Adapting to new habits was a challenge

We also observed that it was difficult for people to change their set habits. Several reasons that people expressed were (i) felt restricted in a closed environment (ii) felt self-conscious to enter a toilet (iii) Felt scared (iv) men felt open defecation was more comfortable; (v) Younger women preferred to defecate openly as that is the only time freedom they have available for them for interactions with peers and sharing (vi) children were not used to using toilets (vii) used to open defecation and so difficult to break the practice; (viii) the concept of using a small room for defecation causes discomfort; (ix) restricted ventilation and no fresh air in closed rooms

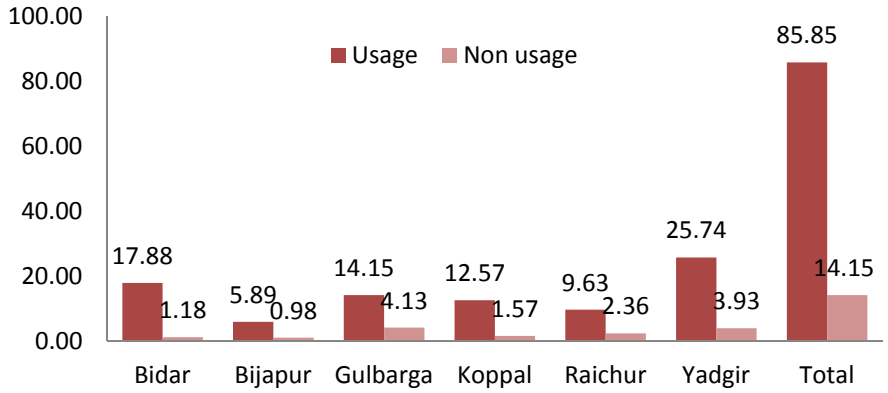
Constructed toilets for other reasons

There were several reasons expressed that people constructed toilets but not used them. (i) not used to toilets but wanted to have private toilets since neighbours had constructed toilets (ii) may be useful during emergencies (nightfall, sickness) and make use of funds provided (iii) better to construct toilets as funds are provided and may be used for storage purposes

Gradual increase in Usage Levels

There was gradual change observed in the usage of toilets among all sections of the society with an increase in the percentage of people using toilets i.e. 85.8% of households. Among the family members' women and elderly were using toilets regularly as compared, 6.48 % of men using toilets rarely (during rainy season/ill health) and 3.54 % during night time. 14.15 % of households not using toilets are a matter of concern.

Figure 5: Status of Toilet Usage across the Districts (%)

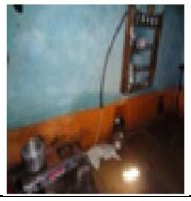


Source: Primary survey

Toilet Models and Preferences

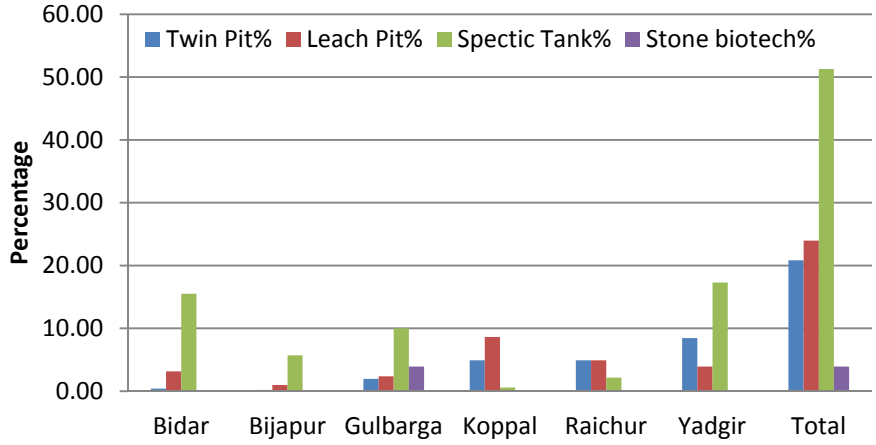
Technology is an important aspect which needs to suit the various aspects like locality, climatic and socio-economic conditions besides being user-friendly. Total Sanitation Program in India, with the limited technological options it offers, is not suitable to cater to the diverse socio-economic (poor/tribal areas), geographical (hills, deserts etc.), geo-hydrological conditions (low/high water areas). In India, providing environmentally safe sanitation facilities is challenging for; the introduction of new technologies can challenge people's tradition and beliefs (*Asian Development Bank Report, 2009*). Parishudh Initiative, founded by the Infosys Foundation identified certain technologies that could be suitable to the Northern Karnataka regions keeping in view the soil conditions and water availability. The models installed and peoples responses are discussed in the table were

Models	Features		Implementation and Experiences

Single pit model	- Septic tanks were more in demand - User-friendly and durable - A simple structure with single pit septic tank - Relatively quick to construct. - Brick/cement blocks used for walls		- Gulbarga has a hard rocky bed under the soil which prevents wastewater getting absorbed. Hence, wastewater flow from toilets is channelled through underground drains or is let out into pits of short depths to be soaked up beside the toilets - 51% respondents adopted septic tank model, - 24% adopted leach pit and 21% twin pit models
Septic Tank Traditional Model	- Brick and mortar used for toilet building. - The model has two pit plastered septic tank. - Material and manual labour intensive/highly durable - Sludge can be poured out - Costs - 80 % more than low cost models		- Popular in Koppal and Raichur districts, people have adopted leach pit and twin pit models due to presence of rocky beds Common model used in places where UDG is absent
Stone Biotech Model	- Special cleaning material like natural detergents - Salt, Coal and Antawala/Rita used to ensure that microbes are not destroyed.		-Acceptable but not popular as people were not following guidelines
Prefabricated Toilet	- Easy to install as prefabricated elsewhere - People were convinced with its utility and found it user-friendly		- Popularly adopted in Yeragunta, Raichur
Septic Tank connected to Biogas	- Cost effective and subsidised by Government - Slurry is an added value and has high demand, residue sold at Rs 3000 per ton	 	-Socially acceptable without any cultural restraint and was successful. Around 272 biogas based toilets across Gulbarga and Davanagere.
Twin Pit Model	- Consists two alternating pits connected to a pour flush toilet. Solids are sufficiently dewatered, removed and reused as manure. - Low operating costs but relatively high investment costs - Twin pits were constructed so that when one is filled, the other one is used until the filled one is emptied and relocated.		- Not applicable in hard rock soil, high ground water levels or areas prone to flooding
Ecological Sanitation (Eco-san Model)	- Based on 'closing the loop approach (Nutrient Cycling)', where urine and faeces are regarded as resources rather than waste		- Although ecosan toilets are more environment friendly and requires minimum use of water, it was not acceptable due to its high costs and design

Group Toilets	- Minimises construction costs - Constructed in common location - used and maintained by individual families		- Community toilets and group toilets were preferred due to lack of space. (Belegere village, Yadgir district), .

Figure 6: Technology Adopted



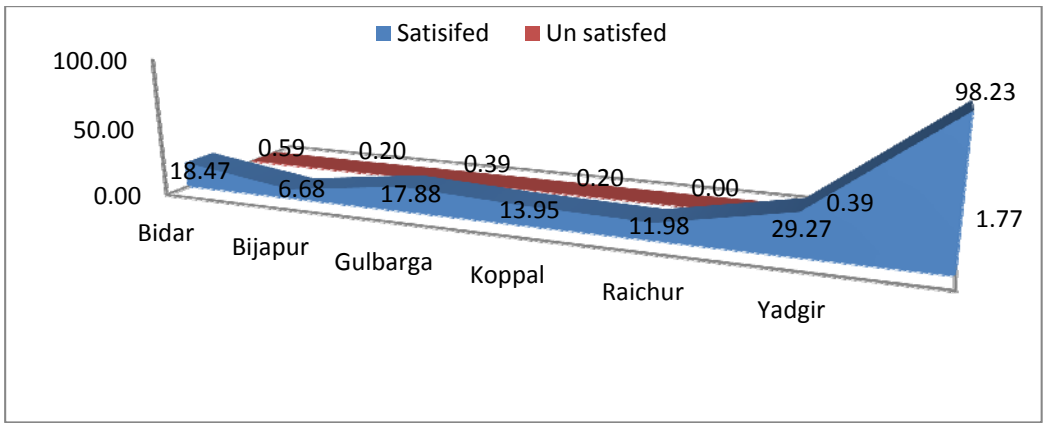
Source: Primary Survey, 2013

The most commonly used technology was the conventional design i.e., Septic tanks – brick wall – RCC roof were used for toilet construction and were selected based on the soil structure.

Satisfaction Levels on Models Adopted

Parishudh worked towards making the technology user-friendly after analysing technical factors like soil texture, durability, cost, style and pattern etc. 98.23 % were satisfied with the models adopted.

Figure 7: Beneficiaries Satisfaction on Toilet Models



Source: Primary survey

It is important that models that are discussed prior implementation with household members by involving them at all stages as it influences usage patterns. However, there were some households in villages of Raichur who complained of mosquitoes and foul smell in the vicinity of the toilets. Such aspects have to be considered and taken care of while adopting technologies in the future. Similarly, although ecosan toilets are more environmentally friendly and require minimum usage of water, it was not acceptable to the people due to its high costs and design. However, interestingly biogas model proved to be socially acceptable and successful in some villages. People did not have any cultural restraint using biogas for cooking and may be attributed to the role of strong and influential self-help women groups in promoting biogas based toilets.

Parishudh Approach

Involving and participation of all stakeholders from the initiation of the project has led to good governance of the PI. The process of implementation includes components of replicability, awareness and design. The processes were planned in collaboration with a local NGO via, identification of villages, feasible design options, finances, coalition, time frames, bank procedures, and coverage and so on. Progress tracking and monitoring strategies were planned for ensuring transparency and accountability. An Advisory Committee supervised the work progress and provided suggestions. Anticipating risks in view of failure, strategies to overcome them were planned. As for Legal and Contract Management, all the legal MOUs had been signed for ensuring conflict-free management and quality work assurance. Schedules and Formats had been so designed as to ensure clarity and progress in respect of all aspects of work-construction, finance and quality. Awareness creation and management of specific goals and approaches were the other important components that worked towards ensuring sustainability of the project.

Orientation to the Parishudh Staff on a regular basis helped them introspect, communicate, understand about resolving issues at the field level. For instance, during weekly, they would decide on good/medium/no response villages. Besides, they would also make a list of the technologies identified for a given village and a structured checklist about the time lines which would help them follow up on tasks. Targets were set supported with motivation through recognition helped retain enthusiasm among the staff members. Besides, daily meetings lasting about 15 min with the team members helped them keep track of status and progress of toilet construction.

The Parishudh team consisted of 20 members apart from the Information Education and Communication (IEC) team. Members were grouped into different sub teams - (1) Inspection team (construction) (2) Global Positioning System Team (3) Incentive team (4) Co-coordinators team. The process began with a team of 5 Parishudh staff consulting the GP members/other influential persons (at least 4 pro-active members) and sensitise them about PI. Education and awareness creation programmes were held to promote good sanitation practices by distributing pamphlets, brochures and film screening. Date and time for conducting the IEC programs were planned in consultation with the people to ensure maximum participation.

Awareness Creation Sessions

IEC team carried out door –to-door visits covering more than 5000 houses to spread the concept of safe and improved sanitation. Between October 2011 and February 2012, 75

sessions were conducted across 60 plus villages with more than 25,000 families attending the sessions, followed further by smaller follow up and awareness sessions. House listing was done and for the persons who showed interest in constructing toilets was provided with applications. A tentative plan was drawn up for the identification of space for toilets to be built and specific aspects like technology and type of toilets etc. A time limit was also set for the construction of toilets, which helped assess their enthusiasm. Incentives were given on the completion of toilet construction. The PI team would also request these enrolled persons to encourage at least 5 other persons to construct toilets, which worked out effectively. Finally, Nirmal Gram Samithis were formed with volunteers to work and motivate others to construct toilets.

Innovativeness in Convincing the Beneficiaries - The team used various innovative ways to motivate the beneficiaries. For instance, team members reached out to people of lower caste groups and convinced them to construct toilets. Once the lower caste households constructed toilets, they would use this as a means to convince the upper caste families informing them about the completed toilets among the lower caste households. Thus, the team indirectly, used the construction of toilets as a status symbol. Similarly, they would speak to the newly wedded grooms to ensure safety and privacy for their young wives. This appealed to majority of the young men and they constructed toilets immediately.

The team involved at all stages till the construction of toilets was complete including the delivery of incentives. Issues arising during the construction phase would be rectified and proper guidance provided throughout. The team would visit the households 5 times at various stages from initiation to completion. This ensured confidence among the beneficiaries, leading to increased enrolments for toilet construction. Exposure Visits to Model Villages of village leaders to villages that had achieved 100% sanitation motivated them to initiate the program in their respective villages.

Special Awareness Drives – People living in villages have great respect to religious Gurus. PI involved local Gurujis and their associates to deliver speeches on sanitation. Five such exclusive sessions were held. Besides, even in all public meetings, the significance of sanitation was stressed, not missing any opportunity to promote sanitation.

Involving Volunteers - Volunteers from Infosys Foundation, Bangalore visited households in villages during weekends promoting importance of sanitation. Children were also involved as agents of change. A competition on rural hygiene and sanitation was conducted in January 2012 in 1200 schools across five districts of North Karnataka. Over 10,000 students from 500+ schools participated in the essay, speech and drawing competitions.

Plate 6: IEC Program

Toilet Summits – Three toilet summits, representing more than 55 villages, each with more than 300 participants were held. The summit included motivational speeches, brain storming sessions, showcasing of best practices and sharing of experiences popularising the importance of sanitation. Prototypes and display of artefacts were constructed for visual display and understanding about sanitation. (Plate 7).

Plate 7: Toilet Summit

Mass media **-** Participation in government programs, updates to the press regarding the initiative etc. were used for creating awareness among the public. Press updates were popular with more than 50% of the Gram Panchayats in these districts.

Plate 8: Newspaper Clippings on PI

Volunteer's network- Volunteers belonging to varied backgrounds played a major role in promoting the construction of toilets. About 1000 volunteers worked with the Parishudh team roped in from the existing institutions - village leaders, religious heads, young men and women, self-help group members, former Panchayat members and so on. The role of volunteers was intense and involvement at every stage was ensured. Volunteers had to make 10 visits before the toilet construction was complete. Several volunteers had spent money initially to ensure the construction of toilets which was later paid back by the users in instalments indicating motivation of leaders and goodwill and trust amongst the people.

Models to suit local situations

***Loan Repayment Approach* –** PI was initiated in collaboration with NGO called SPREAD, Raichur. Agencies used the funds provided by Parishudh and worked out a sustainable model. The NGO primarily identified Self-help groups (SHGs) across different villages, while at the same time; awareness about the PI scheme was popularised. The NGO's approach was to create a repayment model, not a one-time incentive, to aid SHGs have rotating funds to increase the number of toilet construction. SHG members had to sign an agreement after which construction material for toilet construction worth Rs 8000 was provided to each individual household. On completion of toilet construction, households repaid monthly instalments.

***Cost Effective Model* -** Parishudh Team collaborated with Indus Foundation, an NGO operating in Koppal for promoting the construction of toilets. Indus Foundation manufactured fabricated toilet models and the cost was met by Parishudh Initiative and NBA scheme of the government. The beneficiaries did not have to contribute towards owning toilet and this joint initiative turned out to be successful.

Maintaining a Data Base and Ensuring Accountability

Parishudh adopted GIS technology for maintenance of accurate data. "Salesforce.com", cloud computing software was used to cover details of each beneficiary, village, GP, phone number, status of his toilet construction etc. Besides these, the details of payment, incentive provided etc. was also covered. Thus, this software has enabled accuracy, accountability status and effective reporting. The other software used is the "Poimapper", wherein photograph of all individual toilets built with its longitude and latitude position is mapped. To check and avoid misappropriation of toilet construction, 600 GPS were installed.

To sum up, the initiative taken up by the Infosys Foundation has been laudable. Since Northern districts of Karnataka state indicates the need for improved sanitation compared to other districts, the initiative was implemented in selected districts. Overall the program is successful and was able to meet more than the planned target of 10,000 (11,000 constructed) toilets within the stipulated one year.

Policy Options for improving Governance

Enhanced Governance Initiatives

Need for a plan document with respect to achieving an open defecation free city/village through improving toilet access is important. There is a need for a systematic understanding of the ground realities and formulate the plan by involving stakeholders. This should cut across departments and agencies, institutions, experts, community to gather views and options to make it a complete document. Another pressing need is for improving data and information systems. For instance, with respect to Bengaluru, currently, the data on slums is being documented by the Directorate of Municipal Administration, using the GIS software which is a welcome initiative. However, it is also important to work towards upgrading the available data by capturing the field situations. For instance this was adopted in the Parishudh Case discussed above. Effectual data base using GIS and GPS technology for the maintenance of accurate data has been effective way to use technology integration to sanitation aspects. The software enabled in accuracy and accountability status and effective reporting of the information.

Another important component required is maintaining transparency and accountability by streamlining processes with checks and balances at all levels. In the PI case discussed, progress tracking and monitoring strategies had been strategically planned for ensuring transparency and accountability. Achieving the goal and meeting specific targets were the other important components that worked towards ensuring sustainability of the project by promoting healthy competition among the employees. A vision to attain total sanitation had been put in place phase-wise with a specific time frame. Schedules and Formats had been designed as to ensure clarity and progress of all aspects - work-construction, finance and quality. An Advisory Committee supervised the work progress besides providing suggestions.

It is noteworthy to understand that the programme implementation of PI was based on effective planning and dynamic process as it helped evolve during the process and rectify problems they encountered. Apart from this, the processes of implementation had been worked out in detail including the components of replicability, awareness and design which was prepared in consultation with all the grass root employees, hence ground realities were intertwined within the design. The execution processes had also been intricately planned in collaboration with a local NGO with respect to location identification, feasible design

options, finances, coalition, time frames, bank procedures and coverage and so on. This further aided in understanding the local contexts, demand and preferences of the local people. Rewards and recognition approach at various levels can also go a long way in motivating all the stakeholders concerned.

As for Legal and Contract Management, all the legal MOUs were signed for ensuring conflict-free management and quality work assurance. Risk Management had been well planned. Issues of conflicts, finance mismanagement, withdrawal after acceptance were issues encountered and were handled in consultation with the team members.

Stakeholder Participation

Stakeholders have to be part of the programme from the inception of the project. This was an important learning from all the successful cases reviewed[5]. Involvement of stakeholders at all the stages of planning and implementation with roles and responsibilities made clear would provide a platform for negotiation, expression of views and sorting problems. Community involvement, involving women is important as they play an important role in promoting and maintaining hygienic practices in a sustainable manner which have been reiterated in several studies. Case studies from other cities have indicated that NGOs play an important role in awareness creation and community motivation. Political will at the ward level have improved sanitation services. Also, there are several volunteer groups and institutions working on improving sanitary conditions in slums. To ensure that their efforts last after intervention, education is the key to make the urban poor responsible. PI case has proven to be a success with involvement of stakeholders, Personal visits and continuous follow ups at all stages of toilet construction. Besides, monitoring at all stages aided in rectifying problems, if any.

Education and Awareness

Promoting awareness in a way that is effective is important for sustainability of any programme. This was observed across all the success stories we reviewed during the study[6]. One emotional health benefit observed across several studies was related to prestige. Several individuals, toilet construction and usage were seen as an entry for achieving a good life (Jenkins and Curtis, 2005). Effective dissemination of knowledge and information has to be innovative. Interesting approaches suggested by Jack Sim, a leading social entrepreneur and Founder of the World Toilet Organisation (WTO) can be tried in some slums. Jack Sim believes that toilets have to be made fashionable, desirable as a matter of status, pride, and convenience. Also, toilets have to be made desirable in design, colour and aesthetics, to provide choice. Addressing the psyche of people effectively to get positive results as people by nature are insecure and look for ways to show supremacy, pride etc. Hence, in the context of social pressures would want to own a toilet if their neighbours have them. Promoting through ads with celebrities featuring is seen as a certain way to promote a sustainable usage of toilets. Travel to urban areas and exposure to urban life style, through government jobs, education and marketing of commercial produce transforms perceptions about open defecation. Awareness of other lifestyles where open defecation is not practiced makes people to question their current practices and feel open defecation as a sense of embarrassment, a barrier towards a superior lifestyle and status. In other words, usage of toilets will be seen as a modern or luxurious activity. This was supported by a study

[5] 17 case studies representing states and cities were reviewed and lessons drawn.

conducted by O'Reilly and Louis (2014) in India and found similar results regarding the influences of urban lifestyles.

As seen in Parishudh Initiative, special awareness drives included involving religious heads, political leaders etc. to influence toilet construction. During weekends, employees of Inforsys Foundation volunteered to sensitise people on sanitation. Programmes to include children by having painting competitions about sanitation also helped considerably. Organising toilets summits, toilet exhibitions were advantageous as it was visual and gave scope for more awareness and understanding. All these events had broad coverage at media level making it a point of attraction and pride to the villagers who achieved 100% toilet construction. This motivated the neighbouring villages to opt for the programme and visits were organised for neighbouring villages to visit the village with toilets constructed, thus, turning it into a movement towards improving sanitation.

Design is Vital

Design is another important aspect as it impacts access as well as usage to a large extent. There is need for improved toilet designs – low cost lighting, ventilation, and user friendly options. Toilets must be designed in ways as to shape positive user behaviour. Understanding the dynamics, ergonomics and all the behavioural issues is important prior to designing. Topography and soil conditions are to be considered prior to construction. Designs should be context-specific as the slums are severely congested and unplanned. There is scope for innovation in equipment to improve cleaning efficiency to avoid people from cleaning toilets with flimsy equipment/bare hands. Alternate options/preferences like e-toilets, bamboo toilets, eco-toilets are desirable so that installing newer designs/options toilet types where people are more pro-active to see its applicability. Delhi Urban Arts Commission organised a competition with respect to public toilets where designs and prototypes of ergonomically designed on-site assembled high tech toilets were shortlisted for installation in slums. These toilets are pre-fabricated, easily installable and can be maintained easily, besides being economical. Bamboo toilet is another innovative design, cost effective, eco-friendly and easy to build.

PI highlighted the ways in which technological issues were addressed. Technological options in toilet designs like -Stone-biotech model, septic tank model, ring pit model have helped in overcoming some of the geological limitations in the region and also managing with limited water in water scarce regions. Biogas model was a success in few villages. Besides, preferences of the users were taken into consideration which is most important aspect of improving sanitation. It provided an option for them to choose the model, cost to suit their conditions.

Community Empowerment

It is crucial to develop leadership qualities across gender and age to promote various activities, of which sanitation can be one among them. However, understanding the community's psyche before undertaking the leadership programme and designing it accordingly is important, while keeping the larger approaches of leadership same. Using existing networks for upgrading water and sanitation systems would be effective with several networks in place via, religious organisations, women help groups, youth organisations. Training people to operate systems and handling simple technical problem would be useful. This will empower them to resolve issues without depending on external help or delay in handling problems that do not need specialised intervention.

In the PI, an interesting component of the program that can aid in implementing large scale implementation and may be cost effective is tapping of the social capital. It was interesting to watch the volunteers narrate stories of their zeal to spread sanitation awareness and increase the numbers of toilets constructed. In total, more than 1000 volunteers contributed to the success of the program.

People's Preferences matter

It is of utmost importance to involve the community during the construction of toilets besides ensuring that they are comfortable with the design and the technology type of toilets. People have strong views which have to be taken into account while implementing programmes, else, toilets do not get used, defeating the very purpose. For instance, in some slums people felt that the size of the toilets were small, similarly, in another slum, people were not comfortable with toilet cum bathing facility in one unit, thus, affecting usage. Identification of the location of individual/public toilets should be undertaken by involving the community. For instance, culturally, majority of the people living in slums have been used to open defecation for a long time, more so because, they happen to be migrants, hence prefer public toilets compared to individual toilets. In other cases, people from different communities are reluctant to using common toilets. Within a house, men and women using toilets located in same complex is not acceptable, hence practice open defecation.

In the PI case, there were innovative ways used to manage this wherein monitoring and evaluating the construction of the toilets and its quality. Depending on the context, the toilet models, design, costs were tailor made to suit the requirements of the beneficiaries. This is also an important lesson to learn as it included the preference of the beneficiaries.

Improving Financial Management

It would be useful to think of innovative ways to improve finances to improve toilet usage and also use toilet complexes and drawn from review of best practices that are applicable to Bengaluru. Financial assistance may be provided for the construction of individual toilets by agencies, Banks or any other financial institutions with proper tie-ups. The success stories have depicted that this has been a positive initiative, particularly with women. Defining contributions wherein households can be given the option of contributions either in cash or kind. Besides, people can be employed for monitoring the maintenance of toilets. This model has been successful in Tamil Nadu. The usual practice in respect of operations and maintenance is to levy user charges wherein evasion of payment is an issue. There is scope for collecting funds well in advance and the use of token system has worked well mostly. Another interesting approach is to tap Corporate Social Responsibility[7] Funds for improving Toilet Access. There are various initiatives in water and sanitation sector in the country, for instance- Housing and Urban Development Corporation Limited (HUDCO) is also undertaking several CSR activities. Specific to toilet infrastructure, HUDCO has extended support for construction of Community/Pay and Use Toilets in Kotputli, Kota, Rajasthan, Seemapuri, Delhi, Bangalore Rural Dist, Karnataka etc. Similarly, as a part of the "Swachh Bharat Mission", the Public Sector Undertakings under the Ministries of Power, Coal and New & Renewable Energy plan to construct 50,000 toilets in schools across the

[7] Recently, The Ministry of Corporate Affairs, Government of India has notified the section 135 of the Companies Act, 2013 along with Companies (Corporate Social Responsibility Policy) Rules, 2014 to make it mandatory (effective from April 2014), to comply with the provision relevant to Corporate Social Responsibility. Under CSR guidelines, all Central Public Sector Enterprises (CPSE) are supposed to spend a certain earmarked fund each year in creating and sustaining socially beneficial projects.

country. Several other corporates like TCS, Toyota Kirloskar, Bharti Foundation and Ambuja Cements are constructing toilets. Specific to Bengaluru, Wipro Limited has constructed toilet blocks in the government school of Vivekanagar. In the case of PI, financing for toilet construction and building trust with people was a challenging responsibility. It was important for the Parishudh coordinators to enable that the promised subsidy reached them on time to ensure trust and confidence among the people. The focus was to motivate people to construct toilets; hence, all ways were explored to complete the task.

Novel Ideas for Value Added Benefits

There is good scope for innovative value added services that benefit the slum residents as is evident from reviewed case studies. Wealth from waste - Biogas for common cooking, can become a win – win situation for both the slum dwellers and the implementing agencies in achieving open defecation free slums. Slum residents are provided with community toilets fuelled by methane gas generated from human waste. While designing public toilets, installing innovative structures of conserving natural resources can be attempted. This is adopted by Triratna Prerana Mandal where solar panels have been installed in managed toilet blocks of Mumbai. The solar panels generate electricity to meet the lighting demand of the toilet complex, office and computer institute cutting power costs by 40% . Implementation of rain water harvesting initiative aids water conservation as well.

Similarly, the *Rewards Approach or Social Capital Credits Approach* can be promoted. This approach has interesting components like - partnering with municipal agencies and leveraging public infrastructure for creating community, tapping hub of commerce with scope for creating job opportunities, habit formation through focusing on the key rational and emotional behaviour, promoting workable reward initiatives, maintenance through human-centred bottom-up design, deconstruction of decision making process. Similarly, another interesting approach has been the '*Social Capital Credits'* (SoCCs), constitutes a new medium of exchange to reward socially relevant tasks undertaken by individuals and the community, which will be redeemed for critical products and services. Communities or individuals can earn SoCCs for various tasks like managing waste, planting trees etc., where SoCCs earned can be redeemed for products and services like water filters, health check-ups, loans etc. The above approaches have not been tried in slums of Bengaluru and would be an interesting way to involve community. SOCCs approach has been used successfully in some cities in India, Costa Rica, Ghana, Kenya.

Several institutions and interventions are involved in providing improved sanitation facilities; however, complete sanitation access is yet to be achieved in Bengaluru city. The findings of the study highlight the complexities involved in providing toilet access, reasons for the persistence of open defecation across the study slums and the major problems encountered with no access to toilets. It is possible to improve toilet access and usage in slums if the interventions if appropriate interventions are made. In totality, sanitation challenge is complex and has to be addressed holistically to attain the goal.

With reference to PI, there was ample scope given to the employees to implement innovatively. For instance, the partnership taken with a local NGO in Raichur to implement the programme has been innovative and within the broader framework of implementable guidelines. The NGO evolved an approach where the beneficiaries would deposit the fund in instalments into the SHG so that it served as a revolving fund for others to construct toilets. Similarly, the staff's working in the grassroots were given freedom to influence the people. This motivated them to think creatively to influence people to construct toilets. The staff

explored local strengths - using local resources, tapping the success of SHGs, influence of the religious leaders/political leader, motivating the youth etc. by understanding the local dynamics.

Conclusion

Providing access to toilets is one of the sanitation aspects that need to be addressed urgently to improve health and wellbeing of urban and rural poor. Several issues discussed have highlighted the concerns related to toilet access among the poor. Based on our study, we have highlighted several policy options suitable to both urban and rural contexts. To sum up, we see there is large scope for improvement in governance and it needs to be holistic inclusive of socio-economic and cultural dimensions keeping in view local contexts and their connectedness with the respective institutions providing sanitation facilities. Focus should be more on the demand, requirement, convenience rather than quantification. Innovation in awareness and communication plays a significant role while stakeholder participation is crucial as preferences matter. There is large scope for innovative options like newly initiated e-toilets role in Bengaluru, drawn from Kerala's experience. Using technology to improve database besides transparency and accountability is an interesting option. Similarly, the biogas option that was successful in few villages can be popularised, it has worked successfully in urban slum of Chennai as well. Intervention in rural contexts proved to have positive implications on health and wellbeing of people, particularly women.

References

Ahluwalia, Montek (2011) "Prospects and Policy Challenges in the Twelfth Plan", Economic & Political Weekly, 46(21): 88-105.

Ana Hardoy et al (2005). Governance for water and sanitation services in low income settlements: experiences with partnership based management in Moreno, Buenos Aires, Environment and Urbanization, Vol 17 No 1 April 2005

Annual Report 2013-14, Karnataka Slum Development Board

Asian Development Bank. 2009. India's Sanitation for All: How to Make it Happen. © Asian Development Bank.

Benjamin, S. (2000). Governance, economic settings and poverty in Bangalore. Environment and Urbanization , 12 (35), 1 - 23.

Berna I.V. (2006). India: From Alienation to an Empowered Community - Applying a Gender Mainstreaming Approach to a Sanitation Project. In: Office of the Special Adviser on Gender Issues and Advancement of Women, Gender, water and sanitation case studies on best practices. New York, United Nations.

Bert van Woersem, Mark Keen, Edwin van Someren, (2011), Water Supply and Sanitation Collaborative Council (WSSCC) External Review 2005 - 2010 Final Report, April 2011, IOD PARC, UK

Bhagat (2011), Emerging Pattern of Urbanisation in India, Economic and Political Weekly, August 20, 2011 vol XLVI no 34

Census of India, 201, Government of India.

Reed A Craig, (1961), The impact of mass society on rural communities, M.S. Thesis, Columbus, Ohio State University.

Diligent Media Corporation India, (2014) Cabinet nod to 5 year long Swachh Bharat Mission' September.

Krishna Prasad Sigdel, (2014), Sanitation, Hygiene and Nepal's Scenario.

Karina Derksen - Schrock, Kate Schneider, Mary Kay Gugerty and Claus Pörtner, (2010), Sustainable Agricultural Productivity Recommended Readings EPAR Brief No. 103, Prepared for the Agricultural Development Goals Deliberation Group Of the Bill & Melinda Gates Foundation, November 8.

Datta Pranati, (2006); 'Urbanisation in India', paper presented at European Population Conference, 21-24 June, 2006.

Dasra (2012), Squatting rights: access to toilets in urban India, Report, Mumbai.
Harpham and Kwasi Boateng, (1997).Urban Governance in Relation to the Operation of Urban Services in Developing Countries, Elsevier Science Ltd, Pergamon, HABITATINTL. Vol. 21, No. 1, pp. 65-77, 1991

Jenkins MW, Curtis V. (2005). Achieving the 'good life': why some people want latrines in rural Benin, Soc Sci Med. 2005 Dec; 61(11): 2446-59. Epub Jun 9, 2005

Kulkarni, V. and Ramachandra T.V. (2006). Environmental Management, Commonwealth Of Learning, Canada and Indian Institute of Science, Bengaluru.

Kundu (2011): "Politics and Economics of Urban Growth", Economic & Political Weekly, 46(20): 10-12.

Kathleen O'Reilly and Elizabeth Louis (2014), The toilet tripod: Understanding successful sanitation in rural India, Health and Place, Volume 29, September 2014, Pages 43–51

Manasi S, Latha N, (2016), 'Pathways to Sanitation: Growing Challenges and Access to Urban Poor - A Study of Bangalore City'CRUA Report 2, Institute for Social and Economic Change, Bangalore.

Manasi S, Sunil Nautiyal, B.R. Hemalatha, S. Poornima, M.S. Shruthi (2013) Towards Improving Rural Sanitation in Karnataka -Understanding the Institutional Dynamics, Performance and Benefits of Constructing Private Toilets under Infosys Foundation Assisted Project – Parishudh Initiative, CEENR Report, 2013, Institute for Social and Economic Change, Bangalore.

Nelson Ekane, Bjorn Nykvist, Marianne Kjellén, Stacey Noel and Nina Weitz, (2015) Multi-level sanitation governance: understanding and overcoming challenges in the sanitation sector in sub-Saharan Africa, Published Online: January 30, 2015

Rajaraman, D, Travasso S, Heymann J. (2013). A qualitative study of access to sanitation amongst low--income working women in Bangalore, India. Journal of Water, Sanitation and Hygiene for Development, 3(3):432-440

Rogers M Everett, (1965). Diffision of Innovations, The Free Press, New Yotk. Habitat Intl. Vol. 21, No. 1, pp. 65-77

Ramani V Shyama, Shuan SadreGhazi, Suraksha Gupta, (2016), Catalysing innovation for social impact: the role of social enterprises in the Indian Sanitation Sector, Technological Forecasting and Social Change, Elsevier, (in press).

Sanbergen, Loes-Schenk (1996), "Women, water and sanitation in the slums of Bangalore: a case study of action research" in Schenk, H (editor), Living in lndia's Slums: A Case Study of Bangalore', New Delhi: IDPAD: Manohar

Sridhar, Kala Seetharam and A.Venugopala Reddy (2011). Investment and economic opportunities: Urbanization, infrastructure and governance in the north and south of India, Asia Pacific Development Journal (UNESCAP), 18 (1) June 2011: 1-46.

Tanu Kulkarni, 'More than a lakh households in Bangalore don't have toilets' The Hindu date 07 August, 2012

Trudy Harpham and Kwasi A. Boateng, Couvrieht Q (1997), Urban Governance in Relation to the Operation of Urban Services in Developing Countries, Elsevier Science Ltd South Bank University, London, UK

The World Bank, Brief on Sanitation: Facts, Figures, Resources, September 23, (2014) available at http://www.worldbank.org/en/topic/sanitation/brief/sanitation-facts-figures-resources

Water Supply and Sanitation Collaborate Council, (2010)

Websites referred

http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.936.5197&rep=rep1&type=pdf

http://www.who.int/choice/demography/seasian_region/en/

http://www.who.int/topics/sanitation/en/

https://sustainabledevelopment.un.org/content/documents/8680WTD_Concept.pdf

https://sustainabledevelopment.un.org/index.php?page=view&type=13&nr=1785&menu=1634

https://www.ncbi.nlm.nih.gov/pubmed/15949883
athttp://www.developmentbookshelf.com/doi/abs/10.3362/1756-3488.2014.024

http://www.dasra.org/pdf/SquattingRights_Report.pdf

http://trn.gorkhapatraonline.com/index.php/op-ed/4997-sanitation,-hygiene-and-nepal%3Fs-scenario-krishna-prasad-sigdel.html

http://www.dnaindia.com/india/report cabinet – nod – to – 5 - year-Long - Swachh - Bharat - Mission – 2021333.

http://hdl.handle.net/11540/2535.

https://www.dasra.org/cause/improving-urban-sanitation

The UNU-MERIT WORKING Paper Series

2017-01 *The economic impact of East-West migration on the European Union* by Martin Kahanec and Mariola Pytliková
2017-02 *Fostering social mobility: The case of the 'Bono de Desarrollo Humano' in Ecuador* by Andrés Mideros and Franziska Gassmann
2017-03 *Impact of the Great Recession on industry unemployment: a 1976-2011 comparison* by Yelena Takhtamanova and Eva Sierminska
2017-04 *Labour mobility through business visits as a way to foster productivity* by Mariacristina Piva, Massimiliano Tani and Marco Vivarelli
2017-05 *Country risk, FDI flows and convergence trends in the context of the Investment Development Path* by Jonas Hub Frenken and Dorcas Mbuvi
2017-06 *How development aid explains (or not) the rise and fall of insurgent attacks in Iraq* by Pui-Hang Wong
2017-07 *Productivity and household welfare impact of technology adoption: Micro-level evidence from rural Ethiopia* by Tigist Mekonnen
2017-08 *Impact of agricultural technology adoption on market participation in the rural social network system* by Tigist Mekonnen
2017-09 *Financing rural households and its impact: Evidence from randomized field experiment data* by Tigist Mekonnen
2017-10 *U.S. and Soviet foreign aid during the Cold War: A case study of Ethiopia* by Tobias Broich
2017-11 *Do authoritarian regimes receive more Chinese development finance than democratic ones? Empirical evidence for Africa* by Tobias Broich
2017-12 *Pathways for capacity building in heterogeneous value chains: Evidence from the case of IT-enabled services in South Africa* by Charlotte Keijser and Michiko Iizuka
2017-13 *Is innovation destroying jobs? Firm-level evidence from the EU* by Mariacristina Piva and Marco Vivarelli
2017-14 *Transition from civil war to peace: The role of the United Nations and international community in Mozambique* by Ayokunu Adedokun
2017-15 *Emerging challenges to long-term peace and security in Mozambique* by Ayokunu Adedokun
2017-16 *Post-conflict peacebuilding: A critical survey of the literature and avenues for future research* by Ayokunu Adedokun
2017-17 *Effects of health insurance on labour supply: A systematic review* by Nga Le, Wim Groot, Sonila M. Tomini and Florian Tomini\
2017-18 *Challenged by migration: Europe's options* by Amelie F. Constant and Klaus F. Zimmermann
2017-19 *Innovation policy & labour productivity growth: Education, research & development, government effectiveness and business policy* by Mueid Al Raee, Jo Ritzen and Denis de Crombrugghe
2017-20 *Role of WASH and Agency in Health: A study of isolated rural communities in Nilgiris and Jalpaiguri* by Shyama V. Ramani
2017-21 *The productivity effect of public R&D in the Netherlands* by Luc Soete, Bart Verspagen and Thomas Ziesemer
2017-22 *The role of migration-specific and migration-relevant policies in migrant decision-making in transit* by Katie Kuschminder and Khalid Koser

2017-23 *Regional analysis of sanitation performance in India* by Debasree Bose and Arijita Dutta

2017-24 *Estimating the impact of sericulture adoption on farmer income in Rwanda: an application of propensity score matching* by Alexis Habiyaremye

2017-25 *Indigenous knowledge for sustainable livelihoods: Lessons from ecological pest control and post-harvest techniques of Baduy (West Java) and Nguni (Southern Africa)* by Leeja C Korina and Alexis Habiyaremye

2017-26 *Sanitation challenges of the poor in urban and rural settings: Case studies of Bengaluru City and rural North Karnataka* by Manasi Seshaiah, Latha Nagesh and Hemalatha Ramesh