


Innovations for Scaling up to Citywide Sanitation

Workshop Report

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pas performance assessment system

CEPT UNIVERSITY

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The Performance Assessment System (PAS) Project **(www.pas.org.in)** is about developing appropriate methods and tools to measure, monitor and improve delivery of water and sanitation in cities and towns in India. The overarching aim of the research project is to develop an assessment system at local and state level, and link the planning and fund allocation process to performance.

CONTENTS

Workshop Background

The National Urban Sanitation Policy (NUSP) has set up an ambitious goal of providing safe sanitation to all in urban India. Despite improved sanitation coverage, open defecation persists in Indian cities. Most cities in India do not have a sewerage system, and those that have a sewerage system do not have full coverage or adequate waste treatment facilities. In a majority of cities, on-site sanitation technology is used. In these cities, there is poor regulation and monitoring of the on-site systems, wastewater is discharged in open drains, and there is improper discharge of sludge.

There have been a few attempts to explore new technologies to address this situation, particularly focused on decentralised treatments as an option to conventional underground sewerage. However, these have been for small quantities of waste and cover only a part of the city. Further, little attention is paid to their finance and governance aspects. The challenge is to develop a set of options for appropriate technology and business models that can be scaled up at city level and operated and managed well in small towns in India. Given the current financial situation of urban local bodies, it is also important to plan and design citywide sanitation solutions that are affordable for both users and municipal governments.

The workshop reviewed experiences from India and other countries that have implemented alternatives to conventional sewerage systems and developed solutions for effective sanitation management. The workshop also discussed replication and adaptation of these experiences for small and medium towns in India. The discussions bridged the gap between science and practical application and generated useful insights for approaches to achieve universal sanitation and making cities open defecation free. There was also discussion on technology, finance and governance related questions that affect scaling up of innovative solutions to citywide scale.

Key Messages from the Workshop

The participants over the two days deliberated and debated on a number of aspects for sustainable sanitation solutions. It was agreed by all that providing access to sanitation is a critical issue, and impacts number of other issues, including health, poverty, education, governance and the environment. It was also recognised that while building new infrastructure can help address the immediate need for access, it may not necessarily improve quality of existing services. Poor management practices cannot be substituted with new investments. It requires a long-term vision, collaborative planning and institutional capacity building to deliver safe sanitation for all in cities.

Sustainable and citywide sanitation planning needs to be undertaken in a comprehensive manner that considers an integrated approach. It also needs to be in the context of existing ground realities related to excreta management, water availability, density and topography, grey water and solid waste management practices. Equity in service delivery and existing financial capacity of institutions are often overlooked while suggesting technology options for sanitation. Some of the key messages emerging from the workshop are stated below:

- **Citywide sanitation assessment and planning require integrated approaches that address the full sanitation value chain**: Conventional approaches to sanitation assessment and planning focus on toilets and sewerage system. However, this often does not address issues of treatment and reuse. More importantly, when on-site systems are being used, other components of the value chain, i.e. collection, transport and treatment are not given enough attention. Ground realities in Indian cities also suggest critical links between different sanitation sub-sectors. These deliberations suggest that an integrated approach to urban sanitation that focuses on different sanitation sub-sectors (black water, grey water, storm water and solid waste management) across all components of value chain should be adopted for sanitation assessment and planning.

- **Robust information systems and detailed analysis of options are critical for citywide sanitation plans and stakeholder consultation:** The workshop discussions emphasised the need for robust information for decision-making. It was concluded that there is a need for more informed stakeholder consultation. This would require briefing all stakeholders adequately about the sanitation assessment and identification of priorities and hotspots. There is a need for more evidence based decision-making and all stakeholders need to be provided proper information on various sanitation options and their technical and financial implications. Various speakers, while talking about the City Sanitation Plan (CSP) processes, emphasised that mere planning may not be sufficient and one needs to establish proper monitoring systems.

- **Appropriate assessment of technology options with stakeholders is needed to ensure cost effectiveness and sustainability**: The presentations in the sessions stressed the need to review operation and maintenance (O&M) requirements of conventional underground sewerage solutions. It was concluded that sanitation solutions should be driven by outcomes and not just technology. Such an approach helps achieve larger goals of sustainable solutions. While choice of technology has to be made at some point, it was felt that there is need to consider a basket of alternative technologies related to low-cost networks as well as an array of on-site sanitation options. While reviewing technology options, one needs to assess both capital costs and running costs of O&M. Comparative assessments should be made using life-cycle analysis of costs and revenues.

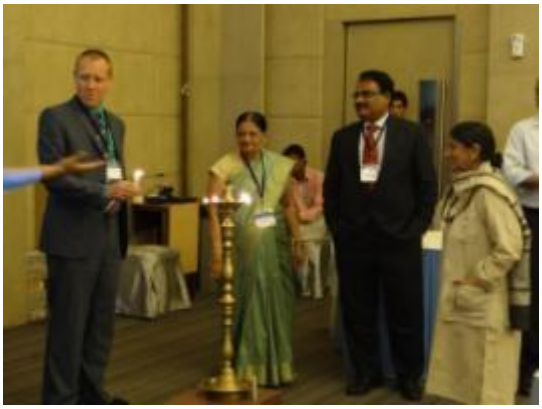
- **Institutional and governance systems have key influence on successful citywide sanitation solutions**: There was an overwhelming consensus that sanitation is not about creating infrastructure, it is about ensuring safe sanitation services. This requires identification of institutional responsibilities and clarity on mandates for service provision by various stakeholders. Appropriate contracting and procurement methods and implementation of laws and rules related to safe sanitation are also essential. The workshop participants also elaborated on various governance challenges. Participants from urban local bodies (ULBs) stated that while their responsibilities for sanitation have increased, the staff has not increased proportionately due to various state government directives. There is an urgent need

for designing proper frameworks (contracting, costing, monitoring) for ULBs to obtain services of non-governmental organisations (NGOs), community and private enterprises. In India, an absence of regulation and monitoring of septic tank construction and operation of septic tank emptiers has often led to serious environmental consequences in cities.

- **Evolution of good sanitation systems require long-term policies and plans and sustained commitment:** The Malaysia presentation at the workshop emphasised the need for a long-term comprehensive approach for safe sanitation. It demonstrated how appropriate policy, regulation and involvement of public and private sector helped the country to move from an unregulated waste disposal system to an efficient septage management over almost four decades. Over the years, faecal sludge handling and management in Malaysia has progressively improved to include sludge management strategies, acquiring dedicated and controlled sludge disposal sites and continuous research and development programme for sludge reuse. From Malaysia's experience, it was clear that good sanitation systems and policies evolve over time and involve incorporating lessons to bring in appropriate changes in policies, partnerships and choice of technologies.

- **City Sanitation Plans should be internalised in ULBs:** It was emphasised that sanitation planning needs to be internalised by cities as an ongoing activity and not as a onetime effort. The current approach in India is donor and consultant driven. It would meet a similar fate as the City Development Plans prepared under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), unless steps are taken to let cities take ownership of the CSPs. Regular annual updating of Service Level Benchmarks (SLBs) will help ULBs to assess and amend priorities. Focus should also be on several process improvements that may not require significant investments. This, coupled with appropriate partnerships, investments and spending on sanitation services will help achieve larger sanitation goals.

Inaugural Session: Introduction and Key Note Address



The inaugural session of the workshop got underway with the main guests being invited to light the lamp. **Ms. Manvita Baradi,** while welcoming the audience underscored the relevance of sanitation and also elaborated about the Performance Assessment System (PAS) Project of CEPT University, Urban Management Center (UMC) and All India Institute of Local Self-Government (AIILSG). **Dr. Sneha Palnitkar** underlined the significance of urban sanitation and elaborated on the work done by AIILSG. **Mr. R.K. Mopalwar,** IAS, Member Secretary, Maharashtra Jeevan Pradhikaran (MJP) highlighted the efforts by Government of Maharashtra on capacity building related to sanitation. In Maharashtra, 18 percent of urban population has no access to toilets. The challenges in Maharashtra include looking for options to sewerage, which is capital intensive, has low

operational efficiency, low-cost recovery, and low connectivity. He highlighted other issues including low connectivity to safe disposal system, poor maintenance and inadequate number of public toilets, and resulting environment and health issues. He also stressed the need for a basket of site and culture specific technologies for onsite sanitation.

Mr. Jonathan Parkinson from the International Water Association (IWA) spoke about need for integrated solutions to tackle sanitation problems at household, community and city level. He described IWA's work on Urban Sanitation Initiative. In reviewing global experiences that are relevant to India, he cited examples of Indonesia Sanitation Sector Development Programme (2006 – 2010), which has successfully brought urban sanitation as an important part of the national agenda and now has been extended to all urban areas. Similaly, the National Sewerage and Septage Management Programme (NSSMP) in Philippines provides lessons on how water utilities, local government and private sector can work together in designing and operationalising a citywide septage management programme. He also narrated experiences of Brazilian cities that have made efficient use of appropriate technologies like simplified sewer systems.

Prof. Dinesh Mehta made a presentation about the PAS Project and emphasised the need to undertake proper assessment of sanitation services. He described the PAS Project's efforts in developing indicators on capturing non-networked scenario and equity aspects. He provided a live demonstration of the PAS portal (pas.org.in) and the web based monitoring system that will soon be used by ULBs in Gujarat and Maharashtra for monitoring sanitation service levels. Prof. Mehta also spoke about the support provided by the PAS Project for improvement planning and the various tools developed to help ULBs undertake this task. He underlined the need for robust information for decision-making.

<u>Key points from the discussion:</u>

- **Appropriate assessment of technology options is important:** The discussion stressed the need for looking at various sanitation options as conventional sewerage options are very expensive and have a number of issues related to capacity of ULBs for O&M.

- **State and city led improvement initiatives are important in mobilising all stakeholders:** Examples of sanitation planning in other countries suggest that national governments and local governments can be the drivers of change for sanitation. Various public programmes have helped scaling up of sanitation reach and help generate local ownership.

- **Robust information systems are critical for effective decision-making and informed consultation:** City level information base (like PAS Project) can be used for

citywide sanitation planning. Information provides opportunities for evidence based decision-making and identifying right priorities.

- **Social engagement and informed consultation with stakeholders help create a better buy-in for city sanitation plans:** If we accept access to safe sanitation as a basic human right, then engaging with all stakeholders, particulars with those who do not have access, is very important. Quoting Philippines examples, it was highlighted that there has been a process of evolution of responsibilities for municipal authorities. The key was to define responsibilities at various levels and for various stakeholders and identify accountability measures.

Session I: Urban Sanitation in Indian Context: Issues and Challenges

This session discussed the current state of urban sanitation in India. It covered sanitation assessment frameworks and discussed the policy frameworks at national and state level in India. Experience of CSPs was also discussed.

Presentation by **Prof. Meera Mehta** on "A Framework for Citywide Sanitation" discussed the shortcomings of commonly used measurement of sanitation performance. These approaches do not capture the full value chain of sanitation related to collection, conveyance, treatment and disposal. Sanitation assessment needs to focus not only on households but should be citywide and integrated across different sub-sectors. The presentation also highlighted the need to link planning to wider outcomes and not be technology driven. It was stressed that all the sub-sectors (including black water, grey water, storm water and solid waste) are intricately linked and need to be analysed in an integrated manner. The presentation also included lessons from a review of various CSPs. It suggested the need for city sanitation planning to not only include capital intensive infrastructure planning, but focus more on service delivery. Similarly, emphasis was placed on moving away from sole dependence on capital grants from state and national governments to examine innovative financing by leveraging non-public sources through micro-finance, private-community partnerships etc.

Ms. Alix Zwane from the Bill and Melinda Gates Foundation (BMGF) talked about the Foundation's support to innovations in sanitation. She highlighted that BMGF's Water, Sanitation and Hygiene (WASH) programme promotes development of safe, effective, and affordable sanitation services. She mentioned that piped sewage systems and wastewater treatment plants serve only a small fraction of those in developing countries, leaving the poor with on-site systems, such as pit latrines. Replacing or emptying of full pits requires a continuous and at times difficult and expensive process which if not done regularly can lead to adverse environmental hazards. She mentioned that BMGF is now supporting technology innovations through the "Reinventing Toilet" challenge and is focused on

supporting work on non-networked sanitation solutions. She also highlighted the Foundation's focus on appropriate business models for sanitation.

Mr. Dirk Walther from Deutsche Gesellschaft für Internationale Zusammenarbeit (German Agency for International Cooperation) or GIZ made a presentation about GIZ's support to urban sanitation and CSPs in India. He mentioned that under NUSP, support has been provided at various levels, but in future, there is a need to focus more on state level sanitation policies. He highlighted stepwise process followed for CSP analysis and emphasised the need for cross dimensional approach considering governance, finance, institution and capacity building, inclusiveness and technology. He also stressed the need to translate CSPs into action at city level. At present, very few of the CSPs are being taken up for implementation. The need for capacity building at local level was also highlighted. Implementing sanitation plans requires commitments from all stakeholders, as was mobilised for the National School Sanitation Initiative. Under this programme supported by the GIZ, school sanitation standards have been adopted by Central Board of Secondary Education (CBSE) for more than 10,000 schools throughout India.

Key points from the discussion:

- **Citywide sanitation assessment across the value chain is essential:** The framework for citywide sanitation assessment should address the full sanitation systems (or value chains) from user interface to treatment/disposal and reuse. It should be citywide and 'integrated' across sanitation sub-sectors – not only excreta management – but also grey water, storm water and solid waste – as all are intricately interlinked. It is also necessary that CSPs are outcome driven rather than technology driven.

- **Sharing CSP information and analysis with stakeholders to make informed choices and set the right priorities:** The participants also discussed the problems that teams had to face while preparation of CSPs. It was mentioned that while a large amount of information was generated in the CSP process and it was not always used for informed debate with stakeholders. The GIZ's brochures for each CSP explaining the key points, analysis, priorities and proposals of CSP in a succinct manner were appreciated.

Session II: Experiences in Citywide Sanitation Planning

This session discussed the experiences of citywide sanitation assessment and planning. Examples of CSP preparation were shared and discussed by various agencies for several cities across India. This helped to set the context of issues in citywide scaling up and helped orient the discussions on technology, governance and finance.

Prof. Saswat Bandopadhyay from the CEPT University presented the experiences from preparing CSPs in Puri-Konark and Varanasi. Both cities are tourist/pilgrimage towns and see a large influx of visitors. The sanitation challenges in such places are very different than other cities. In addition to adopting the NUSP framework for CSP, the CSP was also aligned with existing Ghat Heritage Walk. This 1.8 km route covers temples of different types, places of heritage value, several Ghats (series of steps leading to a holy river) and food bazaars. The approach included identifying 'sanitation hotspots'. These included areas that had a high need of toilets, visible open defecation and urination, and poor O&M of existing sanitation infrastructure. He cautioned against overambitious targets and drew attention on the need to develop urban planning and management capacity in cities**.**

Mr. Abhay Kantak from CRISIL Infrastructure Advisory shared findings from CSP for Mumbai. He mentioned that Mumbai had lowest Sanitation rank amongst the metro cities of India, despite having the resources. With 57 percent of Mumbai population living in slums, city sanitation planning that would include them in the process was a big challenge. The state government policies of provision of services only in notified slums has led to widespread dependence on shared facilities and many of them are inadequate and ill-maintained. In terms of institutional responsibilities, he emphasised the need to set up a mechanism/ system at ward and a city level agency to monitor sanitation services.

Ms. Jaylaxmi Chekkala from AIILSG elaborated on approach and methodology for city sanitation planning used for 19 municipal corporations in Maharashtra. She listed the three principles used in preparing these CSPs – a grass root focus, participatory planning and an integrated approach. In each city, a City Sanitation Taskforce was formed to lead the CSP process. Data was collected at ward and zone levels. The social mapping process was carried out with community based workers and group discussions were held with communities in various parts of the city. Funds were provided to all the corporations for information, education and communication (IEC) activity under CSP. Under the IEC activities, municipal corporations were advised to organise competitions, and prepare poster presentation, street plays, and conduct group discussions.

Ms. Megha Phansalar, Consultant, CEPT University, focused on the process of CSP for Wai city. Her team at Micro Cloud Computing (MCC) is working with CEPT University to develop few CSPs using city wide assessment framework developed by CEPT. The CSPs are being prepared for small towns of Wai, Sinnar, Ambajogai and Hingoli. Extensive use of geographic information system (GIS) for analysis, in-depth study of entire value chain, identification of pilots while developing the CSP with the ULBs, promoting innovative information and communication technology (ICT)/GIS applications and phase-wise planning were highlighted as the key aspects of CSPs. She emphasised that governance and accountability needs take a front seat in CSP. **Mr. Saurabh Agashe** from MCC elaborated the phase-wise (short, mid-term and long-term) strategies for wastewater management and discussed potential pilot projects of Wai city.

Key points from the discussion:

- **Focus of many CSPs is on creating new infrastructure:** CSP experience showed that overt emphasis on creating new infrastructure has made CSPs a "paper-exercise" as there are no funds forthcoming from central or state governments. The clear message is that sanitation is not only about creating infrastructure, it is about safe sanitation services. CSPs need to review existing systems and provisions to deliver the services, identifying institutional responsibilities, and bringing in greater clarity on mandate for service provision. A CSP should also clarify operational issues, suggest on setting right monitoring mechanisms, and advise on better O&M of existing infrastructure including for adequate local technical capacities.

- **Sustainability of solutions needs to consider existing physical, social and economic context:** As there is high uncertainty in availability of water in many cities, approach to sanitation planning should also consider water conserving methods and technologies. Mandating rain water harvesting is one such option that can help secure water availability at household level. The participants noted that there is a need to make citizens aware of the present scenario with respect to sanitation. This can help get valuable feedback and their involvement in decision-making.

- **Sanitation targets need to phased and planned over the improvement period:** The discussion recognised that CSP is not a "one-off" exercise. There was caution against overambitious targets. It was suggested that cities need to adopt phase-wise intervention strategies and take up activities from their own funds in the initial stages. This requires a focus on strengthening municipal finance so that the local government is able to itself mobilise some funds for sanitation activities.

Session III: Open Defecation Free Cities, On-site Sanitation and Faecal Sludge Management

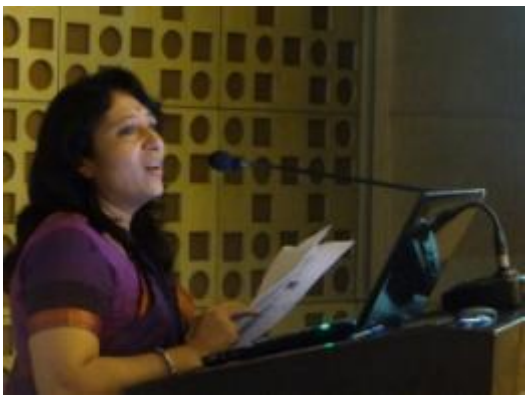
Ms. Manvita Baradi initiated the session by briefly narrating the initiatives on sanitation undertaken by three cities in Gujarat. The officers of these three cities were invited to speak about these initiatives**.**

Chief Officer, Kadi Municipality, Mr. Nareshbhai informed that Kadi has constructed many toilets under Nirmal Gujarat Sanitation Programme (NGSP) of Government of Gujarat. Half of the city has sewerage system. The sewerage network is being extended to the new areas of the city. The city has 100 percent door to door collection of solid wastes. Currently, compost is made from solid waste. Their problem is absence of a market for this compost. Hence, only 15 percent of solid waste generated is turned into compost.

Chief Officer, Morbi Municipality, Girishbhai informed that there are 3000 ceramic and other small industries around Morbi and hence, there is a potential market for treated

wastewater supply to these units. To capitalise on this, the city has plans to supply treated wastewater to industries from its new treatment plant that uses Sequential Batch Reactor (SBR) technology. Since the year 2007, 45,000 individual toilets have been constructed under NGSP. The municipality offers septic tank cleaning service at a reasonable fee. Approximately, 40 tonnes of solid waste is collected every day and there is 90 percent door to door collection. 30 sakhi mandals (women's groups) are involved in solid waste collection. The incidence of open defecation is very less. The city now wants to prepare and implement a CSP.

Chief Engineer, Patan Municipality, Kiritbhai Patel described the situation in Patan. Patan is a city with rich heritage. In 1979, a sewerage system was constructed in a part of city. The city has an oxidation pond for sewage treatment. Treated wastewater is sold to farmers. The city has now expanded and the sewage system is inadequate. There is a plan to extend the sewerage system to the entire city and have a new treatment plant.



Ms. Bijal Bhatt from Mahila Housing SEWA Trust (MHT) presented their work in the field of sanitation. MHT works with poor women in urban areas and it has ongoing activities in 5 states and 13 cities. The key focus of their work is building capacity of community based organisations, and getting them involved in planning, design and construction of infrastructure. For the toilet programme, Indian Rupee (INR) 30 million has been the raised through community contribution and INR 50 million through government funding. A total of 200,000 people have benefitted from their work. She also described the Slum Networking Programme (SNP) undertaken in Ahmedabad, which covered 10,000 urban poor households. The SNP provided water, toilet, sewage connection, storm drainage and roads in slum settlements. The work under NGSP of Government of Gujarat was also highlighted. MHT also works on micro-finance for water and sanitation. The loan size ranges from INR 12,000 to 15,000. She highlighted that the MHT works with the government to reach larger numbers. It also assists the urban poor in moving towards formalisation and mainstreaming.

Mr. K.V. Dinesh made a presentation on faecal sludge management in India. He mentioned that currently, there is limited legal framework and guidance for septage management. Manual scavenging is banned, yet it is sometimes practiced in smaller cities. The municipal septage services are cheaper but not always readily available, whereas the private septic tank emptying service is readily available but more expensive. Often septage is disposed without treatment into drains, garbage dumps and agriculture fields. There is currently an absence of monitoring of faecal sludge management (FSM).

Ms. Ali Hartini Binti from Indah Water Konsortium (IWK), Malaysia presented an 'Overview of Faecal Sludge Management in Malaysia'. Ms. Binti highlighted the history of sanitation improvement in Malaysia. She stated that sewerage service in Malaysia was corporatised in 1994. The concession was given to IWK for a period of 28 years. Prior to this, sewerage services were the responsibilities of local and city councils. IWK now operates and maintains all public sewage treatment plants (STPs) and sewer networks within the service area covering the whole country. Today, IWK operates and maintains 9,446 STPs and 16,000 km of sewers. The Water and Sewerage Industry Act (WSIA) came into force in 2008 to regulate water and sewerage services sector. In non-sewered area, IWK provides desludging services. Approximately, 1.22 million septic tanks within IWK's operational areas are being served.

Prof. Barbara Evans gave a presentation on 'Costing of Sanitation Options'**.** She highlighted the need for detailed cost analysis and the importance life cycle costs. According to her, the decision-makers often tend to underestimate the long-term costs to demonstrate the viability of the project. Her analysis showed that life-cycle costing depends on several factors, such as energy cost and the rate of interest, both of which in turn depend on several global forces. Local factors are also important such as labour costs, distance to disposal sites etc. She presented the analysis of three cities – Johannesburg (South Africa), Gondia (India) and Nile Delta (Egypt).

<u>Key points from the discussions:</u>

- **Evolution of good sanitation systems require long-term policies and plans and sustained commitment:** The Malaysia case demonstrated how a vision of safe sanitation was transformed into policy and action through a series of actions. From Malaysia's experience, it was clear that it is necessary for the national and state governments to translate their commitments for safe sanitation to effective policies and programmes. It is also necessary to have appropriate institutional mechanism for service delivery that responds to local conditions.

- **Legal and regulatory framework have a key influence on sanitary environment:** The legal and regulatory framework for septage management in India is weak. There is very little supervision and regulation of on-site infrastructure by local authority. Of particular concern is management of grey water and septic tank effluent, which are often disposed in open drains or on roads. Participants at the workshop also urged for regulation and monitoring of septic tank emptying activity. They also

urged for looking at faecal sludge removal, wastewater treatment and solid waste in an integrated manner.

- **Appropriate assessment of financially sustainable technology options is essential:** It was also observed that the common tendency to plan for a conventional sewerage system, which is often financially unsustainable. It was suggested that life-cycle costing of all technical options needs to be done and properly assessed before choosing a technical option. Participants from municipalities pointed out that it is expensive for smaller towns to maintain sanitation systems for black, grey and storm water and asked for assistance in choosing technologically appropriate and financially sustainable options. The discussion concluded by stressing that all the options should be presented to the decision-makers and stakeholders with adequate analysis, including life cycle costs, for an informed debate.

Session IV: Alternatives to Conventional Sewerage

This session discussed alternatives to conventional sewerage for conveyance and treatment technologies that have been implemented in Indian cities. It covered the experience of small bore (solid free) sewers and decentralised wastewater treatment systems. The first presentation in this session was by **Mr. Shyamal Sarkar** on experience of small bore sewer (SBS) technology under the Punjab Rural Water Supply and Sanitation Project (PRWSSP). The presentation discussed the advantages of SBS as compared to conventional sewerage systems. It highlighted that SBS requires less water, less excavation cost, reduced materials cost and reduced treatment requirements. However, it requires proper maintenance, effective control over connections, and prevention of illegal connections without interceptor tanks. The presentation discussed the recent experiences of upgrading existing on-site sanitation in the Indian state of Punjab. Initially, a few pilot schemes were implemented to draw lessons and scale up to over 100 villages by December 2013. In the next phase, 800 villages are being considered.

While the Punjab experience was for large villages, the participants discussed its applicability in small towns. It was concluded that SBS is an appropriate option in small towns, expanded areas, and fringe areas of larger towns. Also both SBS and conventional systems could be used in appropriate combination, with SBS discharging into the conventional system. Solids removed from the interceptor could be treated at septage treatment facility, disposed off at the solid wastes treatment/ disposal site of the municipality or could be used to produce compost.

The participants also discussed the willingness of community to pay for SBS. In the Punjab case, it was mentioned that strong political will and intensive communication was required. In Punjab, the emptying of septic tank was included in O&M contracts of contractor. Initially, three years of O&M contact was entrusted to contractors. As many of households did not need to clean their septic tanks in three years, in later cases, O&M contract was done

for seven years. Lively discussions on citywide systems of SBS, Decentralised Wastewater Treatment System (DEWATS) and conventional sewer system stressed that evaluation of options will need to be done in the context of the city: i.e. the density, topography, existing infrastructure, capacity of local authority etc.

Mr. Pedro Kraemer from Bremen Overseas Research and Development Association (BORDA) and Consortium for DEWATS Dissemination, South Asia (CDD-SA) presented "Experiences and lessons from DEWATS in Asia". BORDA-Basic Needs Services (BNS) have partner network with 25 organisations from three continents. He talked about the story of Rome, where clean water was supplied through a network of aqueducts and wastewater was discharged into rivers. On the other hand, he narrated the story of Edo, where there was a circular flow concept for nutrients and water. This emphasised the need to look at the water cycle and nutrient cycle in an integrated manner. He also narrated the mission of BORDA to facilitate sustainable delivery of basic services of water, sanitation and energy in poor urban and peri-urban areas.

The presentation highlighted DEWATS as a solution for deteriorated urban environment and non-functioning conventional treatment plants. DEWATS provide sanitation from the toilet to the river. BORDA believes in "What will not be maintained does not need to be built". He also highlighted the possibility of using DEWATS in situations that require phase-wise planning.

Dr. Rajesh Biniwale from National Environmental Engineering Research Institute (NEERI) shared experiences of decentralised system using PHYTORID technology. Phytorid is essentially a wetland system comprising primary settling unit, secondary advanced filter unit and tertiary biological wetland unit. This removes 80 – 95 percent of biochemical oxygen demand (BOD). The advantages are that sludge generation is minimal, flow is gravity based, it can be operated by an unskilled person, and plant species are commonly available. The operation is odourless and tolerates fluctuations in operating conditions such as flow, temperature and pH. It is useful for treatment of wastewater in domestic wastewater, agriculture wastewater, dairy waste and in municipal landfill leachates. Treated wastewater can be reused for gardening, agriculture and other land-based applications.

Key points from the discussion

- **Applicability of SBS in smaller towns:** From the Punjab experience, it was concluded that SBS is an appropriate option for off-site sanitation in small towns. However, it requires a level of monitoring of septic tanks, connection to SBS and sludge disposal that is often beyond the technical and managerial capacity of a small municipality. It can work well when there is a contractor/operator, who has a medium term (7-10 years) contract. The participants discussed willingness of community to pay for SBS as they would have to maintain a septic tank as well as

connect to the SBS network. It was suggested that a strong campaign is required to demonstrate that in the long-run, the SBS system is sustainable.

- **Choosing appropriate solutions for wastewater systems and treatment:** The participants discussed appropriateness of SBS, DEWATS and conventional sewer system. It was recognised that three-fourths of STPs in India are dysfunctional. So one needs to decide on a technology option that is not only financially sustainable in the long-run, but is also suitable based on the technical and managerial capacity of the operator. It was concluded that solutions should not be driven by technology but be based on outcomes.

Session V: Finance and Governance

The focus of the session was on the alternative business models for provision of services in the sanitation sector along with the policies and institutional and regulatory framework.

Mr. S. Vishwanath, Director of Biome Environmental Solutions Ltd., presented the role of informal septic tank emptying entrepreneurs (honey suckers) in wastewater disposal and their business model in Bangalore. The informal sector plays an important role in managing waste from pit latrines and septic tanks, right from their construction to disposal of waste. The precast concrete rings used to line pit latrines are made on the road sides by informal workers in Bangalore. There are around 300 honey suckers that operate informally in the city. They use the mobile phones and respond to peoples' calls and therefore, need no office. They can suck waste from as far as 100 m distance and thus have, been instrumental in reducing manual scavenging as required by the *employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act of 1993*. Assembly of trucks for emptying the pit latrine has also emerged as a big business. Some honey suckers have realised the nutrient value of the waste and have started making compost from the waste. This compost is largely used for areca nut, coconut and banana plantations and tests so far prove it to be a good alternative to chemical fertilisers. He stressed on the need to consider farming and agriculture as a solution to sanitation problems.

Prof. Barbara Evans from the Leeds University made a presentation on innovative financing. A lot of public money is wasted when infrastructure system do not work. It is primarily for this reason that the donor agencies are increasingly moving towards Output Based Aid (OBA). She presented four case studies of Gharbeya (Egypt), Prodes (Brazil), Colombo (Sri Lanka) and Ho Chi Minh city (Vietnam) where OBA and performance based contracts were used to improve service delivery in sanitation.

- In **Gharbeya**, the objective was to increase connectivity to Waste Water Treatment Plant (WWTP) and the payments were based on the volume of faecal matter entering the plant. The contractors had to run the WWTP and were free to convey wastewater either through network or non-network means. Even though the city administration was skeptical, the contractors were very optimistic for such contracts.

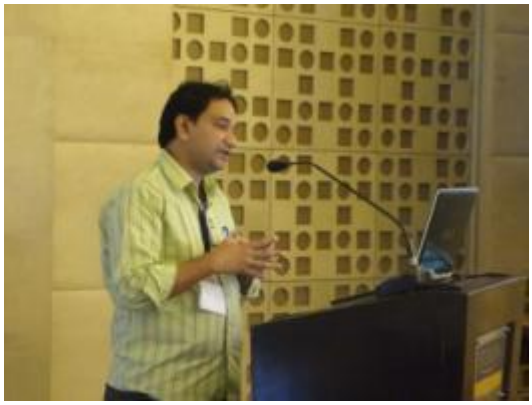
- **PRODES** was a programme initiated by the *Agencia Nacional De Aguas* (ANA), the national water agency of Brazil to create incentives to invest in wastewater treatment. The subsidies were delivered on reaching performance standards. The contractors received incentives for use of low-cost alternatives and maintain a good operational performance.

- In **Colombo** as in many cities, there were i) areas with network, ii) areas where network could be extended and iii) areas where network could not be extended. This created an inequitable situation. Performance based contracts have increased the connections to existing networks, extended networks and have subsidised on-site systems. The key challenge was to change the mindset that on-site services can be valued equally with the networked services.

- In **Ho Chi Minh City** (HCMC), performance related contract was used to reduce unaccounted water. The OBA payments were released when the saved water was served to the poor. The availability of good maps and a reliable customer database along with universal metering in the city were highlighted.

The discussions also revolved around advantages of OBA to reduce costs and prevention of leakage of public funds. At the same time, one needs to be cautious in use of OBA as pre-financing is often required and a good monitoring system needs to be put in place.

Mr. J. Murty presented the institutional framework and regulations for on-site sanitation systems in Maharashtra, based on an ongoing study under the PAS Project. He pointed at the absence of policy for wastewater management at the state level. He also said that though the city bye-laws talk about the size, material and other details for construction of septic tanks, there is lack of effective mechanisms to verify the same in actual construction. More importantly, there are no regulations regarding emptying and disposal of waste from the septic tanks.



He also highlighted that various institutions are involved in policy-making, service provision and regulation in the state. Under the municipal law, construction and maintenance of toilets and urinals, drainage and sewerage networks is an obligatory function of the ULB. However, establishing and maintaining sewage disposal site is a discretionary function. He cited the need to have policies and regulations that address the entire value chain of sanitation.

Ms. Utkarsha Kawadi presented the case of Mahad, a small city in Maharashtra that has attained a status of an Open Defecation Free (ODF) city. It was achieved through concerted efforts of the former president of the municipal council. He initiated a campaign of publishing pictures of people defecating in the open in the local newspapers. Out of humiliation, people stopped the practice and it has continued till date. The local government has used its own funds, continuously monitors open defecation and use of community

toilets, and has got the private landowners to willingly contribute their lands for constructing community toilets. Most importantly, Mahad Municipality has continuously followed up on monitoring and follow-up actions. The Mahad story of making and sustaining as an ODF city is inspirational and can provide guidance to other small cities to take up such a challenge.

Key points from the discussion:

- **Use of performance contracting and conditional grants to achieve sanitation goals:** Innovative financing through OBA has helped to reduce costs and led to appropriate monitoring of sanitation outcomes. It was argued that OBA increases the risk and hence, the value of the contract is often higher. On monitoring contracts, it was discussed that the contract has to explicitly state the expected outcomes and penalties for non-performance. A verification protocol has to be in place for monitoring. While such contracts place importance on monitoring, it was pointed out that such monitoring is needed in the sector.

- **Institutional and governance systems have key influence on successful citywide sanitation solutions**: Discussions revealed that sanitation is not about creating infrastructure, it will need to review existing systems and provisions to deliver the services. It was evident that it may be imperative to clarify institutional responsibilities, extending experiences from successful past examples and bringing in more clarity on mandate for service provision before engaging in any kind of long-term sanitation planning exercise. At times, the CSP team may also need to clarify operational issues, suggest monitoring mechanisms, and advise on better O&M of existing infrastructure.

- **The need for legal framework for septage management was highlighted.** The discussion suggested that while it is important to recognise the contribution of informal service providers including the private septic tank emptiers, it is also essential to develop an appropriate legal framework. This should be such as to support their work, rather than hinder or stifle their activities.

Session VI: Roundtable on City Level Solutions

For the last session, the workshop participants were divided into three groups. The groups discussed the following:

I. **Choosing sanitation solutions: CSPs are strong in identifying problems but have not necessarily started implementation.**

The Group 1 discussed the following two questions:

- Is there additional information and analysis that cities need to reach for more detailed stage of planning?
- How could this additional information and analysis be provided?

The Group emphasised the role of a City Sanitation Taskforce as per the NUSP guidelines. The Group also discussed that the information needs to be disseminated to the people in order to understand the importance of these plans. Adequate stakeholder consultation is required before approval of the Plan for implementation.

Data collection and analysis needs to be streamlined and shared through appropriate forums with citizens. This would save time and there would be a better form of data collection. For any CSP preparation, financial sustainability needs to be given importance. Mobilisation of funds for implementation of the full CSP is often a constraint. Thus, implementation can be done in stages with some immediate actions that require less funding resources to be taken up in the early stages. These could be activities to make the city ODF as well as improvement of existing contracts for sanitation services.

II. **Ensuring sustainability of sanitation plans: What are the key factors affecting sustainability?**

The Group 2 discussed the following two questions:

- What should be done at city level to ensure sustainability of sanitation infrastructure?
- If sanitation is about service and not infrastructure, how does one monitor the outcome of sanitation investment?

The group discussed that one of the key aspects of sustainability is proper maintenance of infrastructure. At the planning stage, only high end technical solutions are discussed without considering their O&M implications. In financial calculations, it is important to use life cycle cost analysis. Sustainability of infrastructure requires proper tariff to recover partial costs of O&M. There is also a need for strategic asset management plan at local level. The Group also stressed that for CSPs to be sustainable and the ownership of CSP has to be broad-based. For this, different stakeholders should be involved in planning and decision-making from the beginning and at appropriate stages.

Monitoring of CSPs can be done by the ULBs themselves using the SLB/PAS framework of indicators. Consolidation of data available with ULBs in form that is useful for monitoring has been demonstrated by PAS Project. This framework needs to be adopted by all cities for monitoring outcomes. As of now, the SLBs/PAS indicators are updated annually. As ULBs gain experience in on-line data entry, this can be updated on quarterly basis.

III. **Extending the CSP experience to more cities and towns: The cities which have been supported by the external partners (such as PAS, GIZ etc) have been able to develop more robust plans.**

The Group 3 discussed the following two questions:

- What could be done to ensure that this knowledge and experience spreads to other cities?
- What is the role for PAS team and other actors?

Group members discussed that with over 100 CSPs in the country, there is plenty of knowledge and experience. The first step would be to document this experience, identify what worked and what did not. The NUSP requires the state government to prepare state sanitation policy. The CSPs are required to be formulated within the context of the state policies. It is therefore important to support state governments to develop and finalise their sanitation policies.

The PAS team and other partners need to guide cities in formulating CSPs. They can do this by preparing guidelines for CSPs. Partner agencies should also work toward building capacities of ULBs to prepare CSPs.

Concluding Session

Participants reflected on the deliberations in the workshop and remarked that this workshop provided a way forward for looking at city level sanitation in an integrated way – across the value chain and across all sub-sectors (black water, grey water, and solid waste). Partner organisations mentioned that the national and international experiences presented at the workshop provided many lessons for their own work. The representatives from ULBs mentioned that it was good to hear from a diverse group of experts in the sanitation sector and urged that such workshops should also be organised for political leaders from ULBs.

Prof. Meera Mehta thanked the participants and stated that from PAS Project's point of view, the workshop had provided an opportunity to forge new partnerships with GIZ, BORDA, IWA, and Leeds University. These will be valuable in taking forward the agenda of developing and implementing CSPs in future.

Workshop Agenda

Tuesday, October 16, 2012		
9:00 – 10.00	**Registration**	
Inaugural Session		
10.00 – 11.15	Introduction and key note addresses	
	Urban sanitation… Help it make sense!!!	R K Mopalwar (MS, MJP)
	Achieving improvements in urban sanitation at scale, International experiences in citywide sanitation, IWA's role in incentivising change through demonstration and dissemination	J Parkinson (IWA)
	Sanitation situation in India: Need for innovative solution	D Mehta (CEPT)
11.15 – 11.30	**Tea**	
Session I: Urban Sanitation in Indian context: Issues and Challenges		
Session objectives: This session intends to provide a context to the discussion on citywide sanitation planning. It will discuss the current state of urban sanitation in India. It will cover efforts to develop a framework for sanitation performance assessment at local level. It will also discuss the support being provided to recent policies at national and state level and the emerging experience in developing city wide sanitation strategies.		
11.30 -13.00	A framework for assessing citywide sanitation	M Mehta (CEPT)
	BMGF support to innovations in sanitation	A Zwane (BMGF)
	National urban sanitation policy, Experiences in preparation and implementation	D Walther (GIZ)
	Discussions	
13.00 – 14.00	**Lunch**	
Session II: Experiences in Citywide Sanitation Planning		
Session objectives: The session will share experiences for citywide sanitation planning. This will include the various experiences in India as well as the ongoing work under the PAS Project for small cities in Maharashtra. This will help to set the context for discussing issues in citywide scaling up.		
14.00 -15.30	Presentation CSP case studies	
	Structuring city sanitation plans - Experiences from Puri-Konark and Varanasi	S Bandopadhyay (CEPT)
	City sanitation plan for Mumbai	A Kantak (Crisil)
	City sanitation plans for 19 municipal corporations in Maharashtra, Approach and Methodology	J Chekkala (AIILSG)
	City sanitation plan, The process: Wai, Sinnar, Ambajogai and Hingoli	M Phansalkar, MCC
15.30 – 15.45	**Tea**	
Session III Open Defecation Free Cities, On-site Sanitation and Faecal Sludge Management		
Session objectives: This session intends to provide an overview of septage management practices in India and other countries. The session also intends to discuss appropriate costing of various sanitation options.		
15.45 -16.30	Presentations by ULB officials from Kadi, Patan and Morbi municipalities in Gujarat	ULB officials from Kadi, Patan and Morbi municipalities
	Mahila Housing SEWA Trust (MHT): Experiences in water and sanitation	B Bhatt (MHT)
16.30 – 18.00	Faecal sludge management in India – Issues and emerging practices	K V Dinesh, Consultant

	Overview of faecal sludge management in Malaysia	A Hartini Binti (Indah Water Consortium, Malaysia)
	Costing urban sanitation options	B Evans (Leeds University)
	Discussions	
20.00 onwards	**Dinner**	
Wednesday, October 17, 2012		
Session IV: Alternatives to Conventional Sewerage		
Session objectives: Is the conventional water borne sewerage appropriate for Indian cities? What are the more appropriate options? Though alternative technologies are largely known and available, why have these not been implemented in Indian cities at scale? The session would explore experiences of alternative technologies such as settled sewerage system and simplified sewers for conveyance and decentralised treatment systems. The session will also discuss the conditions necessary for these alternative technologies to be effective and sustainable in the long run.		
9.30 – 11.00	Settled systems: Small bore sewerage	S Sarkar (World Bank)
	Decentralised wastewater management - Experience sharing	P Kraemer/ Susmita Sinha (BORDA/CDD-SA)
	PHYTORID, Other sewage technology for treatment	R Biniwale (NEERI)
	Discussion	
11.00 – 11.15	**Tea**	
Session V: Finance and Governance		
Session objectives: The session will review existing and innovative financing mechanisms for sanitation from different countries. Similarly, different business models ranging from private informal sector to an active local government will be discussed. Emerging findings from ongoing studies for the institutional and regulatory framework for liquid waste and faecal sludge management will be presented.		
11.15 – 12.45	Honey-suckers, Partially based on a research sludge reuse from mega-cities – A Southern India case	S Vishwanath (Arghyam)
	Sanitation financing and new business models	B Evans (Leeds University)
	Beyond putting people in latrines, Review of institutional framework and regulations	J Murty (Consultant, ex WSP)
	MAHAD… An open defecation free city in Maharashtra	U Kawadi (AIILSG)
	Discussions	
12.45 – 14.00	**Lunch**	
Session VI: Roundtable on City Level Solutions		
Session objectives: Moderators: Barbara Evans (Leeds University) and Jonathan Parkinson (IWA) The session will be organised as round table discussions in groups around these topics. 1. Choosing appropriate sanitation options: How do we identify a range of options and how do we decide on the best option? 2. Ensuring sustainability of sanitation plans: What are the key factors affecting sustainability? 3. Extending the CSP experience to more cities and towns: what needs to be done?		
14.00 – 16.00	Three groups for discussions on cases	All participants in groups
	Presentation and discussion in Plenary	
Concluding Session		
16.00 – 16:30	Wrap up and Close To identify key actions and follow up activities that can be taken up participating institutions and can be supported under the CEPT University's PAS Project	CEPT and partners

List of Participants

Sr. No.	List of Participants	Designation/Organisation
1	Agashe Saurabh	Urban Planner - Micro Cloud Computing
2	Ali Hartini Binti	Northern Region Planning Manager - Indah Water Konsortium, Malaysia
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6	Bhatt Shivangi	Documentation Officer - Urban Management Centre
7	Bhavsar Dhruv	CEPT University
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9	Biniwale Rajesh	Principal Scientist - National Environmental Engineering Research Institute , Nagpur
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76	Walther Dirk	Sustainable Urban Habitat - Senior Advisor – Gesellschaft für Internationale Zusammenarbeit (German Agency for International Cooperation)

Abbreviations and Acronyms:

AIILSG	All India Institute of Local Self-Government
ANA	Agencia Nacional De Aguas
BMGF	Bill and Melinda Gates Foundation
BNS	BASIC NEEDS SERVICES
BOD	Biological Oxygen Demand
BORDA	Bremen Overseas Research and Development Association
BWSSB	Bangalore Water Supply and Sewerage Board
CBS	Community Based System
CBSE	Central Board 0f Secondary Education
CDD	Consortium for DEWATS Dissemination
CEPT	Centre for Environment Planning and Technology
CPHEEO	Central Public Health and Environmental Engineering Organisation
CSP	City Sanitation Plan
FSM	Faecal Sludge Management
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HCMC	Ho Chi Minh City
HH	Household
ICT	Information and Communication Technology
INR	Indian Rupee
ISTS	Individual Sewage Treatment Systems
IWA	International Water Association
IWK	Indah Water Konsortium
JMP	Joint Monitoring Programme
KM	Kilometres
MCC	Micro Cloud Computing
MCGM	Municipal Corporation of Greater Mumbai
MDG	Millennium Development Goal
MHT	Mahila Housing SEWA Trust
MJP	Maharashtra Jeevan Pradhikaran
MLD	Million Litres Per Day
NEERI	National Environmental Engineering Research Institute
NGSP	Nirmal Gujarat Sanitation Programme
NSSMP	National Sewerage and Septage Management Programme
NUSP	National Urban Sanitation Policy
O&M	Operation and Maintenance
OBA	Output Based Aid
ODF	Open Defecation Free
PAS	Performance Assessment System
PIP	Performance Improvement Planning
PRWSSP	Punjab Rural Water Supply and Sanitation Project
SBR	Sequencing Batch Reactor
SBS	Small Bore Sewer
SNP	Slum Networking Programme

STP	Sewage Treatment Plant
ULB	Urban Local Body
UMC	Urban Management Centre
WASMO	Water and Sanitation Management Organisation
WSIA	Water and Sewerage Industry Act
WSP	Water and Sanitation Programme
WWTP	Waste Water Treatment Plant

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The Performance Assessment System (PAS) Project

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

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

p a s performance assessment system

CEPT UNIVERSITY