Capturing Spatial Analysis of Slums in Global Monitoring

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Why focus on 'slums' in post 2015 monitoring of water and sanitation?

Over half of the world's population now resides in urban areas. Over the next two decades, the bulk of urban growth will occur in developing countries. This paper argues that in the context of urban areas, we need to focus specifically on slums as this group is discriminated against in provision of water and sanitation.

As per United Nations Human Settlements Programme (UN-HABITAT) estimates, nearly one billion persons, or every third urban resident in developing countries is a slum dweller.[2] 'Slums' have generally been recognized as areas in cities with relatively lower quality of housing and services and possibly, a lack of security of tenure. They are also sometimes referred as 'informal settlements' (because they do not conform to local building rules) or 'squatter settlements' (due to lack of clarity about status of land ownership of these settlements).

In the context of water and sanitation, analysis of slums is important from a number of different perspectives. From a human rights perspective "human rights law protects the rights of those living in informal settlements through the right to adequate housing (which includes the right to security of tenure), the right to water, and the right to sanitation".[3] The UN Committee on Economic, Social and Cultural Rights has emphasized that slum dwellers should not be denied equal rights in the context of the right to water: "Deprived urban areas, including informal human settlements, and homeless persons, should have access to properly maintained water facilities. No household should be denied the right to water on the grounds of their housing or land status".[4]

"On a more practical level, the human rights approach challenges us to focus efforts on people lacking access, especially in slums, people who pay excessive water charges to uncontrolled informal vendors, people who have to go long distances to fetch water, and people who live in an environment contaminated by their own and their neighbours' human waste".[5] "The urban poor suffer from a stigma unknown to the rural poor, the stigma associated with living in a slum, often lacking the most basic attribute of citizenship, a street address".[6]

This is also highlighted from an environmental benefit perspective as "appropriate isolation and/or treatment of human excreta provide environmental benefits such as averted

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[2] UN-HABITAT (2008b), Table 1.1.1, Page 32. Even with a stricter definition of two 'shelter deprivations', Sub-Saharan Africa and South Asia have over 30% of urban population residing in slums. (UN-HABITAT, 2005, Urban Indicators Programme, Phase III, as quoted in UN-HABITAT, n.d.).

[3] International Covenant on Economic, Social, and Cultural Rights (ICESCR), art 12, as quoted in Satterthwaite (2012a) footnote 179, p. 35.

[4] Satterthwaite (2012a) footnote 180, p. 35.

[5] JMP (2011) p. 12, Berlin Consultation Report.

[6] UN Millennium Project (2005) as quoted in UN-HABITAT (2006).

pollution of water resources and improved aesthetics, especially in towns, cities and slums".[7] A recent research report of the Sanitation and Hygiene Applied Research for Equity (SHARE) Consortium also highlights this: "While rural populations generally have lower levels of access, the sanitation associated risk may be greater for the urban poor due to the increased likelihood of these households being in areas with a high density of people without sanitation." The report advocates for "additional information on relative risk of shared facilities and density of population without sanitation would allow for better identification of priority areas and targeting of interventions".[8]

Thus, goals and analysis of access to water and sanitation in urban areas in developing countries need to consider situation in slum areas from equity and non-discrimination perspective. A discrimination perspective is relevant because often local policies inhibit access to water and sanitation for households residing in slum areas as maybe reflected in lower access to water and sanitation for households in slums. The fact that one of the targets for Millennium Development Goals (MDGs) was *to improve the lives of 100 million slum dwellers* suggests recognition of slums as an important determinant of differential living conditions in cities in developing countries.

Need to focus on spatial aspects of slums

Over the past decade, UN-HABITAT has provided estimates of slum population at country level. They have relied on a household level definition which is also used as the main indicator to measure progress on the MDG target on slums. The UN-HABITAT definition of slums has five characteristics[9]: "a slum household is defined as a group of individuals living under the same roof lacking one or more of the following conditions: access to improved water, access to improved sanitation facilities, sufficient living area (not more than three people sharing the same room), structural quality and durability of dwellings, and security of tenure". As security of tenure is not included in most household surveys, this has been omitted in the country level estimates. A household with any one of the other four characteristics is defined as a slum household. This definition of slums is not conducive to measuring differential access to water and sanitation in slums – as these parameters are included in the definition itself.[10]

A main characteristic of slums is their unique spatially identifiable existence. This is generally evident in most national definitions of slums based on settlement level parameters. The size of slum settlements varies significantly across cities and across countries. Large slum settlements such as Dharavi in Mumbai, India, Kibera in Kenya and Rocinha in Brazil have estimated population ranging from 1.0 million in Dharavi, anywhere from 170,000 to 1 million in Kibera and 70,000 in Rocinha. On the other hand, there are many slum settlements of much smaller size. The official definition of slums in India states that a slum is "a compact area of at least 300 persons or about 60-70 households of poorly built congested tenements,

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[7] Guy Hutton as quoted in JMP (2011), p. 50.
[8] Rheingans (2011), p.4.
[9] UN-HABITAT (2008), p.1 and UN-HABITAT (n.d.), p.1.
[10] One way to overcome this would be to use two housing related parameters (house type and size) as proxies to define slum like characteristics. In those surveys where data on security of tenure is available this may also be used. Differential access to services in slums can then be assessed for households with all three (or two) 'slum-like' characteristics.

in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities".[11]

Use of such cluster level definition of a slum, rather than the household level definition (households with slum characteristics) is important for several reasons. First, it allows monitoring to match with local definitions. While this would mean that there is no global definition, it allows the possibility of monitoring improvements in specific countries, cities and even some large slum areas.[12] Second, such monitoring can be better and more directly linked to actions. From the perspective of country and city level monitoring systems, use of such 'actionable targets' would have more relevance. Third, a slum-wide attention is relevant to maximize impact of sanitation improvements due to public health externalities. This means that monitoring overall improvement in access to water and sanitation in slum areas is important and relevant from a public health perspective.

Possible approaches to measure access to water and sanitation in slums

Global monitoring that captures spatial dimensions of slum settlements is currently not practiced. However, based on a review of various efforts, two approaches can be explored.

1. *Special slum samples in country (/state) household surveys*: Most developing countries recognize slums as spatial entities.[13] Such spatial demarcation is often linked to local planning and development policies. A number of examples are available where special efforts have been made in household surveys to capture 'slum settlements'. (See Table 1). In most of these studies, the sample design ensures that separate estimates for slums are possible. The examples in Table 1 have enabled an assessment of health conditions, access to services and living conditions among households in slum areas as compared to those in 'non-slum' areas. [14]

   Annex 1 provides results for eight Indian cities using the National Family Health Survey III (NFHS III) data that enables slum to non-slum comparisons. One key conclusion from these results is that slum location adversely affects access to sanitation. This may reflect the prevailing legal position that discourages public funding for households staying in non recognized slums.[15] In some cities (such as

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[11] Census of India (2001).

[12] As observed earlier, global comparisons of level of urbanization are also based on nationally definitions of urban areas. Thus, it would be quite justifiable to use country /city definitions for slum settlements.

[13] See for UN-HABITAT (2003) where Annex 2 on slum descriptions provides descriptions and definitions for 30 cities around the world. While the definition of slums varies across countries, this is somewhat akin to defining urban areas, as each country also uses a different definition of 'urban'. This has been accepted by the Population Division of the Department of Economic and Social Affairs of the United Nations in estimating urban population of the world.

[14] Some researchers also argue that "Current monitoring indicators at the national and global levels fail to incentivise targeting the areas of greatest need and potential greatest impact. Existing limitations in monitoring efforts … in some settings, (result in the under counting of the most vulnerable urban populations. (Rheingans, 2011, p.5).

[15] State Government of Maharashtra does not recognize households that have moved into a slum after 1995. Those with proof of residence before this cut-off date are entitled to alternative accommodation if they are evicted. (*Government Resolution No. Jho-pu-yo- 1096/Project No. 68/Slum Rehabilitation -2/ Gru-ni-sel, dated 16.5.1996, the Government of Maharashtra*). Subsequently, the 'cut-off date' is now 2001.

Mumbai), this has been addressed through provision of shared toilet facilities. For water supply, while basic levels are attained for all in most cities, households in slums are significantly less likely to have taps on premises.

Table 1: Special slum samples in household surveys

Country / city	Source of data	Approach
Bolivia – four largest cities of La Paz, El Alto, Cochamba	2003: Demographic and Health Survey (DHS)	Clusters in peripheral areas are identified four large urban centres, and level of poverty assessed across five categories.
Egypt – Cairo	2003: DHS	Oversample of Cairo to capture 'slum' areas. DHS clusters identified as slums using maps – with characteristics such as: unplanned, lacking services, constructed without permits, unstructured streets etc.
Mumbai	1998-99: National Family Health Survey (NFHS-2, DHS)	Slums as notified by the local government, and also identified by supervisor using the official definition. Special sample of slums in all 8 cities to provide city level estimates for households in slums areas. Analysis of results
Mumbai, and 7 other cities, India	2005-06: NFHS-3 (DHS)	for slum versus non-slum areas across 8 cities is available in Gupta et.al (2009) and Agarwal (2011).
Nairobi, Kenya	1999: Special surveys	The survey was done with 5% sample drawn across 110 census sub-locations (about 20,000 population) with a total sample of over 100,000. Census enumeration areas were classified as slum/non-slum using the UN-HABITAT definition for classifying households.
	2003: DHS	"Areas of Nairobi classified into five socio-economic classes, the lowest of which are denominated as slum areas".
Lima Peru	1996: DHS	"Officially designated 'pueblos jovenes': shantytowns on outskirts of city" are considered as slums.
Greater Manila, Philippines	2003: DHS	Slums are identified based on "geographical heterogeneity based on distance and wealth level in clusters".
Addis Ababa, Ethiopia, 2003	Special survey with support from UN-HABITAT	Survey (of 1500 households) information has been used to assess situation at a smaller spatial unit using mapping techniques, though not necessarily classified as slums/non-slums.
Cape Town, South Africa	Census data	Information for census enumeration blocks is used along with GIS mapping to identify areas with poor sanitation and poor housing conditions.
States of Gujarat and Maharashtra, India	2009: Special urban water supply and sanitation (UWSS) surveys under the PAS Project, CEPT University	Special household surveys (with a total sample size of nearly 15,000 households) with samples drawn to derive state estimates for situation across four city size and in slums/non-slum categories. Detailed analysis with comparison of slums/non-slums has been made.

Sources: a) Turkstra and Raithelhuber (n.d.) for Nairobi 1999 and Addis Ababa 2003: b) Rutstein et. al. (2005) for: Bolivia, Egypt, Mumbai 1998-99, Lima, Greater Manila; c) Gupta et. al. (2009) for Mumbai and 8 cities, India for 2005-05; d) Nielsen (2011a and 2011b) for Gujarat and Maharashtra, India, e) UN-HABITAT 2003a for Cape Town, South Africa.

More detailed analysis can help provide a better understanding of determinants of access to water and sanitation services and importance of slum location versus other household characteristics such as income, occupation, education, wealth ranking, etc. This would also help assess whether and to what extent the slum location forms a constraint to improving access to water and sanitation. Such analysis can supplement the Joint Monitoring Program (JMP) approach of assessing differential access to services across wealth quintiles.[16]

Over time, it is possible to monitor an affirmative target to improve situation for households in slum areas. In this context, the identification of slums census enumeration blocks in the recently concluded 2011 Census in India can provide a sound basis for monitoring.[17]

2. *Special slum surveys and monitoring systems*: A few countries, provinces and cities have attempted to assess housing conditions and access to basic services in slum areas. Some of these have been through special slum settlement level or household surveys. In many cases, this has been done through participation of slum communities either in doing the surveys or in post verification. Over the past decade, there is also a growing emphasis on the use of technology for mapping at both slum settlement level and at city level. For example, in Kenya, the recently set up 'MajiData', a pro-poor data base covering all the low income urban areas.[18] It is envisaged to be updated regularly and used in planning and decision-making at both local and country levels. Similarly, Government of India has placed emphasis on development of city level slum information system to support planning and monitoring of its ambitious new program to make cities slum free.[19]

The review of approaches listed in Table 2 suggests a few directions for post 2015 monitoring. First is the possibility of creating a large-scale country wide information system as illustrated by the example from Kenya 'MajiData' and several state and city examples from India and Brazil. Such large scale efforts, if carried out systematically, can provide information to monitor access to water and sanitation for the relatively poor in urban slums and low income areas. An advantage of such a system would be that this information will also be useful for planning purposes. Also, such systems will be aligned with national, country and city level priorities.

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[16] Recent JMP reports use analysis across wealth quintiles to illustrate disparities in access to services. It is often argued that all poor do not live in slums and that all households in slums are not poor. While this is likely to be correct, the relevant issue is whether being located in a slum settlement adversely affects the chances of having access to water and sanitation services.

[17] All enumeration blocks in 2011 Census of India were classified as: notified slum, recognized slum, identified slum and non-slum (Census of India, 2010).

[18] This data base was prepared in 2009 by the Ministry of Water and Irrigation and the Water Service Trust Fund in cooperation with UN-HABITAT, KfW and GIZ.

[19] Such city level slum MIS is a requirement under the newly launched countrywide program called Rajiv Awas Yojana (RAY). RAY envisages a slum-free India with inclusive and equitable cities where all citizens have access to basic civic and social services and decent shelter. It aims to cover all about 250+ class I cities with more than 100,000 population. (MHUPA, 2011).

Table 2: Special slum surveys and mapping

	Scale of effort	Approach
India		
Census of India, National Sample Survey Organization (NSSO)	Census 2001: slum enumeration and statistics for 1743 cities with >20,000 population. Census 2011: slum enumeration for all statutory towns. Statistics will be available by 2013.	Census of India does full slum enumeration for basic slum statistics including housing and access to basic services. In 2001, this was done for selected cities. For 2011, it will cover all identified slum enumeration blocks. NSSO has done two rounds of surveys in slums in randomly selected sample urban blocks across the country. Four rounds of surveys have been done, the latest in 2002 and 2008-09.
State of Karnataka	All 214 urban local governments covering 3500+ slum settlements and 0.7 million households.	To support the state level department in the context of programme for urban poverty, slums and housing. Household surveys have been done with the help of self help groups (SHGs) and non-governmental organizations (NGOs). All slums are mapped as point locations. Based on this a state level management information system (MIS) has been developed.
State of Andhra Pradesh	All 131 urban local governments covering 7522 slum settlements, nearly 2 million households and 9 million population.	The state government has established a special Mission for formulating strategies for urban poverty reduction programmes. State level MIS has been set up to assist with planning and monitoring. Household surveys have been done with the help of SHGs.
States of Gujarat and Maharashtra (PAS Project), CEPT University	Ongoing across all 400+ urban local governments (ULGs) – 4 years data.	Service provider performance benchmarking includes information on access to water and sanitation services in slum areas within their jurisdiction.
	Gujarat, across 159 ULGs covering 1800+ slum settlements with 0.3 million households.	The data collected with research tools like focus group discussion (FGD), digital documentation, consultation with stakeholders such as urban local body (ULB) staff, slum community, community based organizations (CBOs) etc.
Cities across India [Society for the Promotion of Area Resource Centres (SPARC)/ National Slum Dwellers Federation (NSDF)]	Covers 3700+ slum settlements in 41 cities and six states (Maharashtra, Tamil Nadu, Andhra Pradesh, Pondicherry, Orissa, and Gujarat).	Data gathered with local communities, SHGs and volunteers. In some cities, it is being developed with local governments and will assist them in evolving a strategic plan. For communities, it will assist them in evolving local level plans.
Ahmedabad Municipal Corporation (AMC) and CEPT University	773 slum settlements with 0.2 million households and 0.9 million population.	Detailed surveys to support planning for the Rajiv Awas Yojna (RAY) project as per the Government of India (GOI) formats. Household surveys and total station surveys for all slums with professional agencies. Validation in each settlement is being done with a NGO (Mahila Housing Trust). Support by CEPT University in managing and setting up a city level slum MIS.
City of Pune [Maharashtra Social Housing and Action League (MASHAL), Community Housing Federation	477 slum settlements with 0.2 slum households and 1.1 million slum population.	Detailed mapping and socio-economic surveys for all settlements to assist in developing schemes for housing and basic services. These are done with involvement of people, local authorities and other social organizations. Support provided by CHF International.

	Scale of effort	Approach
(CHF) International] with Pune Municipal Corporation		
Brazil Municipal Housing Secretariat Cities Alliance	About 4500 settlements housing low income population, including favelas, irregular settlements, tenements and upgraded settlements.	HABISP, an information system focusing on residential areas that house low income population in the city of Sao Paulo. It has been used to improvement and prioritization plans as well as for monitoring changes. The system is now being expanded in several other cities in Brazil.
Kenya Ministry of water And Irrigation	MajiData – an online database covering all 212 cities with 1882 low income areas with a population of 7.8 million.	Prepared by the Ministry of Water and Irrigation and the Water Services Trust Fund with UN-HABITAT, Kreditanstalt für Wiederaufbau (Reconstruction Credit Institute) or KfW, Google org. and Deutsche Gesellschaft für Internationale Zusammenarbeit (German Agency for International Cooperation) or GIZ. It contains information on housing and services to assist with planning for slums and low income areas.
Syrian Arab Republic Central Bureau of Statistics	A sample of 3000 households in slum areas in 13 directorates. Survey done in 2008 and repeated in 2010.	Central Bureau of Statistics did a survey of slums in governorates of districts where the scale of slums was likely to be high. Survey included data to generate indicators for housing, population characteristics and access to water and sanitation.

Sources: Refer Annex 1 for details.

This approach need not cover all countries for a full global monitoring, but can instead focus on those countries that have larger slum populations. This approach suggests the use of 'provider data' as against use of household based data in the first option above. The performance benchmarking being done with 400+ ULGs under the PAS Project incorporates monitoring of water and sanitation services in slum settlements. This allows the service providers and state governments to track equity in service provision and evolve appropriate policies and local level plans to improve access for the unserved and under-served areas.

Further, besides the government and service providers, it is possible to incorporate participation of consumers, local communities and civil society organizations in this approach. This requires appropriate designs where the service providers, CBOs and NGOs work together to set up and maintain these information systems. Use of new technologies linked to mobile telephones, and with crowd sourcing can help rapid growth of such systems in a participatory and transparent manner. While preliminary reviews suggest that these approaches are still at a very embryonic stage, with careful designs, they can grow rapidly and even go 'viral' in settings, where access to mobile telephones have picked up significantly.

Way forward

In moving forward, there is a clear need to focus on spatial definition of slums that allows identification and monitoring of access and use of water and sanitation services in slum areas. This will help monitor progress in reduction of disparities in achievement of water and sanitation goals as slum areas generally lag behind in terms of access to these services. This can be more directly linked to actionable policies to provide services in these areas as is

being done in many countries. It would also be useful to do further analysis of the extent to which location in slums affects level and use of water and sanitation services in urban areas using the data already available from various surveys as reviewed above in Table 1.

It would be important to build on the emerging experience as reviewed in Table 2 to set up slum monitoring systems as a part of the provider surveys. This will help to gradually help build country systems as a base for improved global monitoring. Use of emerging information technology can also play an important role in this. In global monitoring, it is possible to add slums as a stratum in regular household surveys [such as DHS, Multiple Indicator Cluster Survey (MICS) etc.]. The available experience suggests that the additional benefits far outweigh costs of including additional slum samples in urban areas. Selection of countries and cities for such additional samples can be done in relation to the share and growth of slum population in a given country. A slightly different approach would be to use 'population density without sanitation' and environmental vulnerability scores' as used by Rheingans et. al. (2011). This may allow the analysis to capture 'slum-like' situations without specific additional slum samples.[20]

A bigger challenge in global monitoring would be to build country (and city) level systems that include slums and other forms of "discriminatory" variables in their own monitoring systems.[21] This would include both: a) household surveys (such as the census or special surveys), and b) service provider surveys that are done in many countries as a part of performance benchmarking exercises or for reporting to regulators. The service provider surveys are currently at a global level only through voluntary disclosures in the World Bank managed International Benchmarking Network for Water and Sanitation Utilities (IBNet). This can be included in the emerging global analysis through Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS).

It may also be useful to add specific dimensions of equity and access to services by slum dwellers in benchmarking exercises, as is being done in India, Brazil, and Kenya. International Benchmarking efforts through the World Bank (IBNet), or the International Water Association (IWA) need to include the equity dimensions in their benchmarking manuals.

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[20] Rheingans et. al. (2011) have used the GPS coordinates that are now available in new DHS surveys in many countries to assess population density of sampling clusters. In addition, the environmental vulnerability score is derived by available information if most DHS type surveys regarding housing and water sources. This approach can be adapted for use in urban clusters. However, this may not be able to address issues related to possible under sampling of 'slum type settlements in urban areas.

[21] This was also emphasized at the Berlin meeting: "Future monitoring should be aligned with national monitoring, such that global targets and indicators would be relevant for countries and greater focus would be placed on national capacity-building" as quoted in Satterthwaite (2012b).

References

Agarwal, S (2011), "The state of urban health in India: comparing the poorest quartile to the rest of the urban population in selected states and cities", in Environment and Urbanization, 23(1), pp 13-28.

Aliancade Cidades and Prefeitura Da Cidaded de Sao Paulo (n.d.), "Planning instruments: Information and prioritizing interventions systems", Mimeo.

Arimah, Ben (n.d.), "Slums as an expression of social exclusion: Explaining the prevalence of slums in African countries", UN-HABITAT, Mimeo.

Census of India (2001), "Metadata and Brief Highlights on Slum Population", downloaded from: http://censusindia.gov.in/Data_Products/Data_Highlights/Data_Highlights_link/metadata_highlights.pdf

_____ (2010), "Census of India circular no. 8: Formation and identification of slum enumeration blocks for slum demography", No. 9/93/2009-CD (CEN), January 20, 2010.

Cities Alliance (2009), "Social Housing in Sao Paulo: Challenges and new management tools", with Prefeitura Da Cidaded de Sao Paulo and World Bank.

DMA (Directorate of Municipal Administration) (2010), "Asha Kiran Mahiti: Karnataka slum mapping and socio economic survey", Presentation at a workshop on "Slum Free Cities", New Delhi. Government of Karnataka, Mimeo.

Dzikus, Andre (2011), "Mapping poverty for determining urban equities" presentation at the Workshop on 'Urban Inequities: Service Delivery and Social Development' at World Water Week in Stockholm, August 2011, Mimeo.

FIRE Project. 2002. "Innovative Programs to Improve Access of the Poor to Urban Environmental Services in Andhra Pradesh", Project Note No. 30. Indo-USAID FIRE Project. New Delhi.

Gupta Kamala, Fred Arnold and H. Lhungdim (2009), "Health and living conditions in eight Indian cities", International Institute for Population Sciences, Mumbai.

Joint Monitoring Program (2011), "Report of the First Consultation on Post-2015 Monitoring of Drinking-Water and Sanitation held in Berlin, 3-5 May 2011", WHO and UNICEF.

Mashal (2011), "Pune slum atlas", prepared in association with Slum Redevelopment Authority, Urban Community Development, Pune Municipal Corporation and Community Housing Federation (CHF) International.

Mathur, Om Prakash (2009), "Slum Free Cities: A new deal for the urban poor", National Institute of Public Finance and Policy (NIPFP), Mimeo.

Mehta, Meera, K Mukundan, R Kesavan and S Mukerjee (2003), "Sustainable Private Financing of Community Infrastructure in India: An approach paper", World Bank. Report No. 26235-IN.

MHUPA (Ministry of Housing and Urban Poverty Alleviation) (2011), "Guidelines for Rajiv Awas Yojana: Towards a slum-free India", Government of India.

National Buildings Organisation, (2010), "Report of the Committee on Slum Statistics/ Census", Ministry of Housing and Urban Poverty Alleviation, Government of India. Web-link at: *http://mhupa.gov.in/W_new/Slum_Report_NBO.pdf*

National Sample Survey Office (NSSO) (2010), "Some characteristics of urban slums, 2008-09: NSS 65th round", Ministry of Statistics and Programme Implementation, Government of India.

Nielsen (2011a), "Equity in service delivery of urban water and sanitation in Gujarat, results from household survey", submitted to PAS Project, CEPT University, Prepared by ORG Centre for Social Research, AC Nielsen ORG MARG.

_____ (2011b), "Equity in service delivery of urban water and sanitation in Maharashtra, results from household survey", submitted to PAS Project, CEPT University, Prepared by ORG Centre for Social Research, AC Nielsen ORG MARG.

Rheingans Richard, Oliver Cumming, John Anderson and Julia Showalter (2011), "Estimating inequities in sanitation-related disease burden and estimating the potential impacts of pro-poor targeting", Research report for the SHARE Consortium.

Satterthwaite Margaret (2012a), "Background Note on MDGs, Non-Discrimination and Indicators in water and sanitation", background paper for post215 group on Equity and Non-discrimination.

_____ (2012b), "Draft report of meeting at Lisbon 27 and 28 February, 2012", JMP Working Group on Equity and Non-Discrimination. Mimeo.

SPARC and NSDF (2010), *"Enumerations & Mapping: Scaling Up For Citywide Slum Upgrading In India".* Presentation at a workshop on "Criticality of Participatory Slum Mapping-with Communities as Partners in Development", May, Pune. Mimeo.

Turkstra Jan and Martin Raithelhuber (n.d.), "Urban slum monitoring", paper prepared for the UN-HABITAT, Mimeo.

UN-HABITAT (2003a), "Slums of the World: The Face of Urban Poverty in the New Millennium? Monitoring the Millennium Development Goal, Target 11-World-wide Slum Dweller Estimation" Working Paper.

_____ (2003b), "Guide to Monitoring Target 11: Improving the lives of 100 million slum dwellers - Progress towards the Millennium Development Goals, Nairobi", May, UN-HABITAT.

_____ (2006), "State of the world cities: 2006/07", UN-HABITAT.

_____ (2008a), "State of the world cities: 2008/09: Harmonious cities", UN-HABITAT, Earthscan.

_____ (2008b), "State of the world cities 2010/11: Bridging the urban divide", Earthscan.

_____ (2009), "Global urban indicators – selected statistics", Mimeo. Downloaded from http://www.unhabitat.org/downloads/docs/global_urban_indicators.pdf, March 30, 2012.

_____ (2012), "Slum estimates data: Table 4" downloaded from http://ww2.unhabitat.org/programmes/guo/statistics.asp, on March 30, 2012.

_____ (2010), "The urban inequity survey methodology (UISM): Fact Sheet, Mimeo.

_____ (n.d.), "Slums: Some definitions", UN-HABITAT.

UN-HABITAT Global urban observatory (2008), "Case Study: Slum households and shelter deprivations: degrees and characteristics", used for UN-HABITAT (2010).

UN Millennium Project (2005), "Task Force on Improving the Lives of Slum Dwellers".

Annex 1: References for Table 2.

For a) India:

i) NSSO: NSSO (2010); also see the web-link at http://mospi.nic.in

ii) Census of India: http://censusindia.gov.in/; and NBO (2010).

iii) State of Karnataka: DMA (2010); also see the web-link at: http://www.mrc.gov.in/akm; http://municipaladmn.gov.in/

iv) State of Andhra Pradesh: http://apmaud.gov.in/SlumProfile/secI4_rep_dist.php

v) States of Gujarat and Maharashtra (PAS Project): a) data from 400+ cities under the PAS Project at pas.org.in; and b) Survey of slum settlements in 159 cities of Gujarat, under the PAS Project, by Urban Management Centre, and CEPT University.

vi) SPRAC /NSDF: SPARC and NSDSF (2010).

vi) Ahmedabad: Based on analysis of socio-economic surveys in slum settlements in Ahmedabad during 2010-11, carried out under the PAS Project, CEPT University for Slum Networking Cell at Ahmedabad Municipal Corporation.

viii) Pune (Mashal): Mashal (2012); also see the web-link at: http://mashalindia.org/2011/06/the-slum-atlas

For b) Other Countries:

i) Brazil: Aliancade Cidades and Prefeitura Da Cidaded de Sao Paulo (n.d.); Cities Alliance (2009); also see the web-links at: http://www.urbaninform.net/home/minidoc/351/uss-upgrading-slums-system.html, and http://www.habisp.inf.br/

ii) Kenya: Peters (2011), and also see the web-link at http://www.majidata.go.ke

iii) Syria: http://www.cbssyr.org/different-EN.htm

Annex 2: Water and sanitation in slums and non-slums: Results for India

National Family Health Survey III – special slum samples for eight cities: The National Family Health Survey III (NFHS III) in India, done in 2005-06, included a special slum sample for eight cities. The share of population staying in slums across these eight cities ranged from 17 percent in Hyderabad to over 54 percent in Mumbai (Fig A2-1). The special sample in these eight cities permits a comparative analysis of water and sanitation situation for households staying in slums versus those outside slums as illustrated in Figures A2-2 and A2-3.

Figure A2-1: Slum population as a proportion of urban population (%)
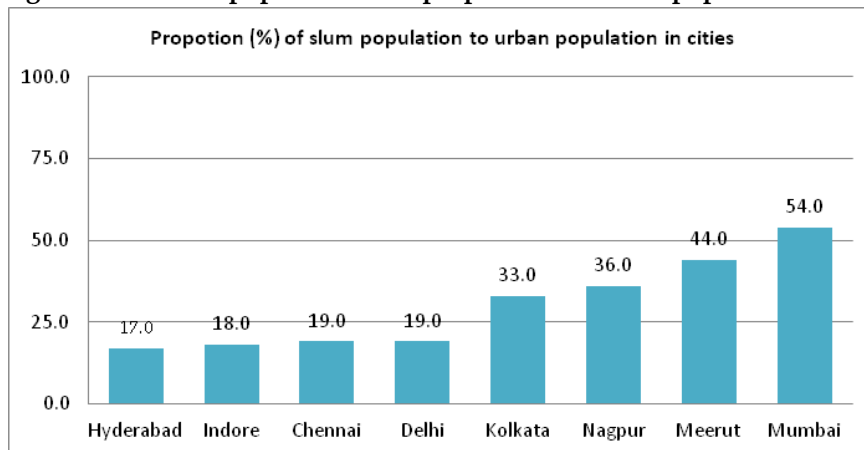
Source: Based on Census of India, 2001 as reported in Gupta et. al. (2009), p. 13

Only three cities have problems with access to basic water supply: In Chennai and Delhi, use of tanker supply is high due to general water shortages, whereas in Nagpur households continue to use open dug well. Other cities have there is good coverage for basic water and there is not much

Figure A2-2: Source of drinking water for slums versus non-slum households
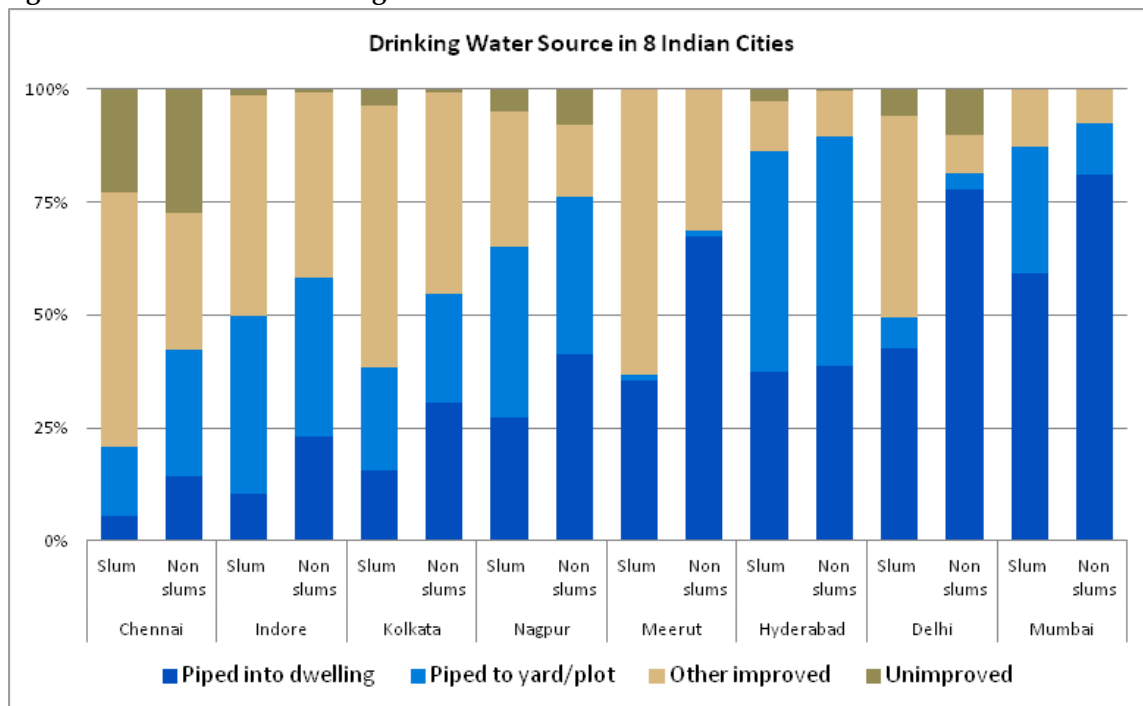
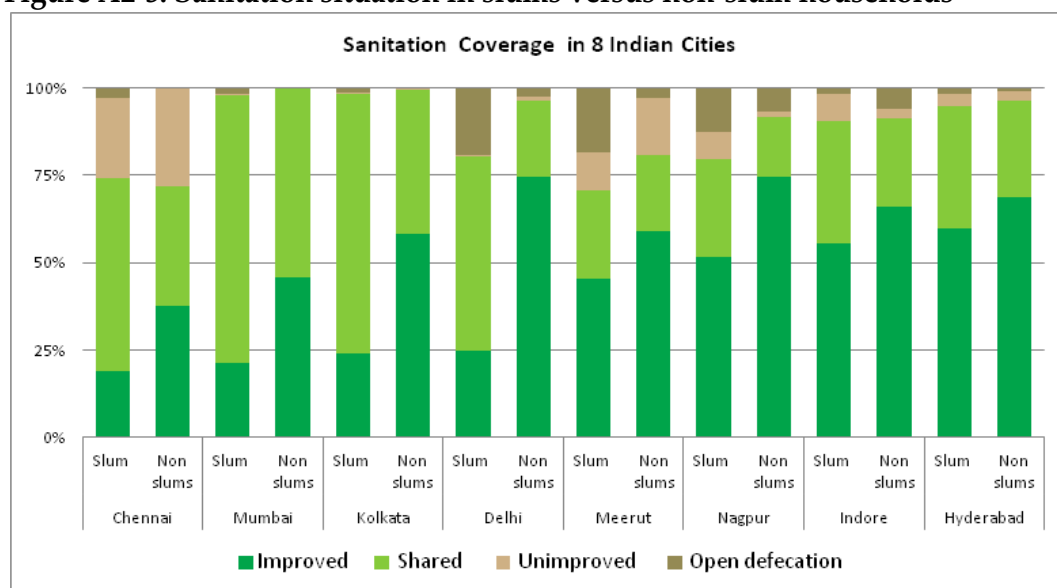

Source: Analysis by author based on NFHS III data.

difference between slums and non-slums. However, households in slums are far less likely to have access to water supply through on-premise piped water. This is evident from the fact that for six out of eight cities the difference in values of "piped into dwelling" between slums and non-slums is statistically significant at 1 percent. Only in Hyderabad, the difference is not statistically significant. In Hyderabad, the local water utility (Hyderabad Metro) has used available grants and subsidies to expand access to on-premise water connections in slum settlements.[22]

Thus, inclusive policies in India for basic services have led to almost universal access to basic water supply. These policies were initiated from early seventies when Government of India provided funding to ensure access to shared services in slum settlements under its program of Environmental Improvement of Urban slums (EIUS). Later state governments have also provided such funding from their own funds. In addition, during eighties and nineties, the Government of India continued to provide funding for basic services for the poor in slum areas through a number of programs such as Urban Basic Services for the Poor (UBSP) and the National Slum Development Program.

The analysis of NFHS-III suggests that further policies are needed to increase access to on-premise piped water in slum settlements. This is important as service quality increases significantly with a house tap. It also allows the poor (and particularly women) to save time from collecting water at shared taps. There may also be greater health and hygiene benefits from such on-premise water connections. There are a few good practice examples of improved access where local city level policies have helped to improve access to on-premise water connection for households in slum areas.

Compared to water supply, access and use of 'safe sanitation' facilities varies across slum and non-slum households. All eight cities show statistically significant differences between households in slums versus those in non-slum areas in terms of use of "improved toilet facility". In almost all cities, slum households also use shared toilet facilities, which are not recognized as improved under the JMP. However, these reduce the need to resort to open defecation. In cities such as Delhi, Meerut and Nagpur 12 to 18 percent of slum households resort to open defecation, though this is statistically significant at 1 percent only in the case of Delhi.

Figure A2-3: Sanitation situation in slums versus non-slum households

Source: Analysis by author based on NFHS III data.

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[22] FIRE Project (2002) and Mehta et.al. (2003).

On the other hand, some of the larger cities such as Mumbai and Kolkata have a high share of shared facilities that has helped control open defecation. The community managed shared toilets probably provide a good sanitation solution in light of space constraints in high density Mumbai slums. Only three cities have high level of unimproved toilets amongst both slum and non-slum households in Chennai and Meerut probably suggest the need for some toilet upgradation. Interestingly, except for Delhi, differences in open defecation levels between slums and non-slums are not statistically significant.

Household Surveys under the PAS Project, India: Under the PAS Project at CEPT University, special household surveys were done in 2009 with a focus on urban water and sanitation in two states in Western India, namely Gujarat and Maharashtra, with a total estimated urban population of about 70 million. The sampling design allows for state level estimates of water and sanitation, for households in slum and non-slum settlements, and by size class of urban areas (refers Figures A2.4 to A2.6).

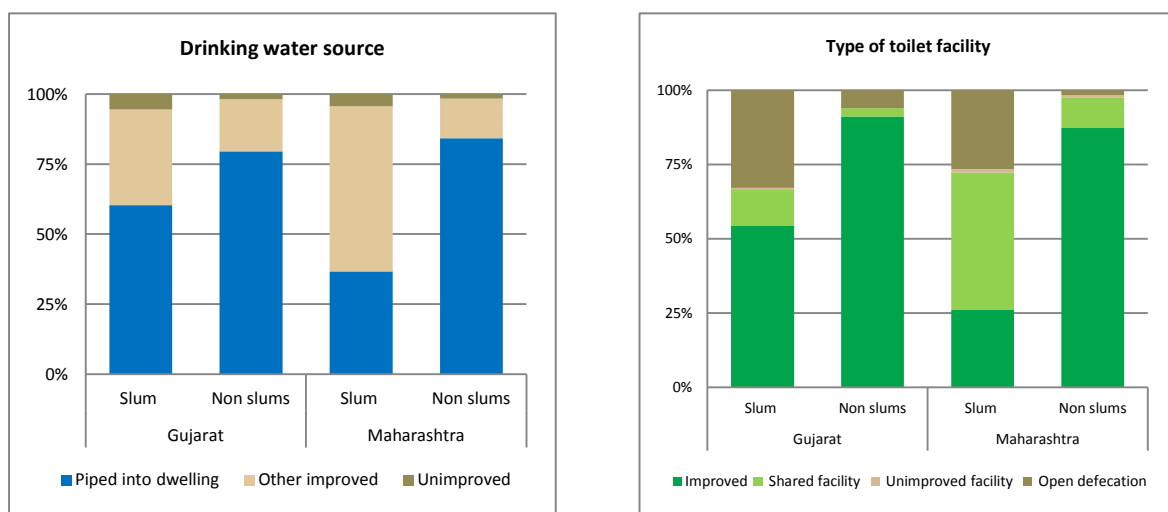**Figure A2.4: Urban water supply and sanitation for households in slums/non-slums (%)**

Figure A2.5a: Urban water supply for households by size class of cities and slums/non-slums (%)
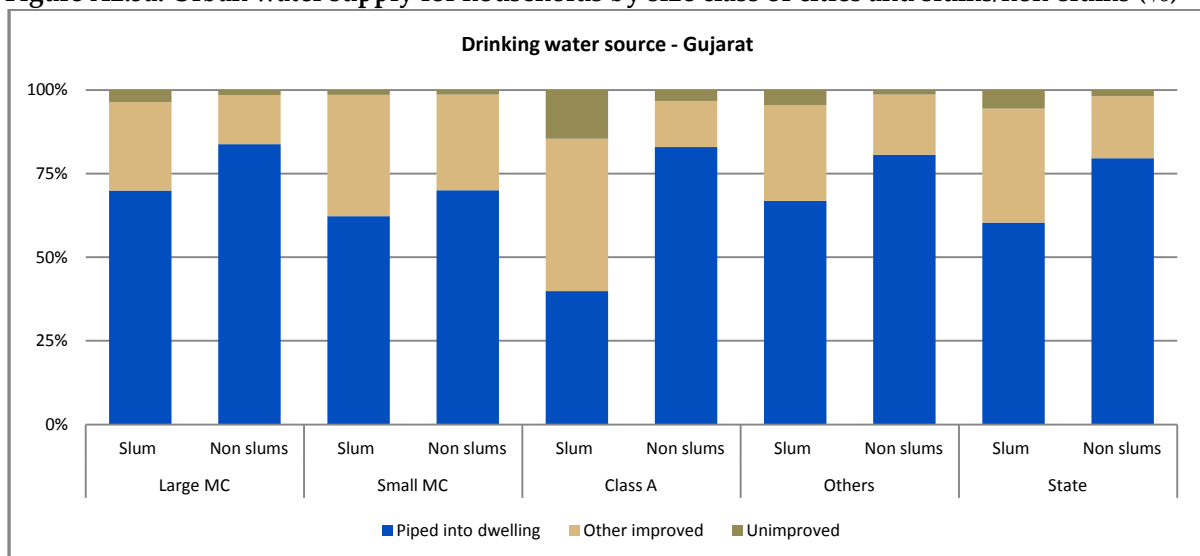

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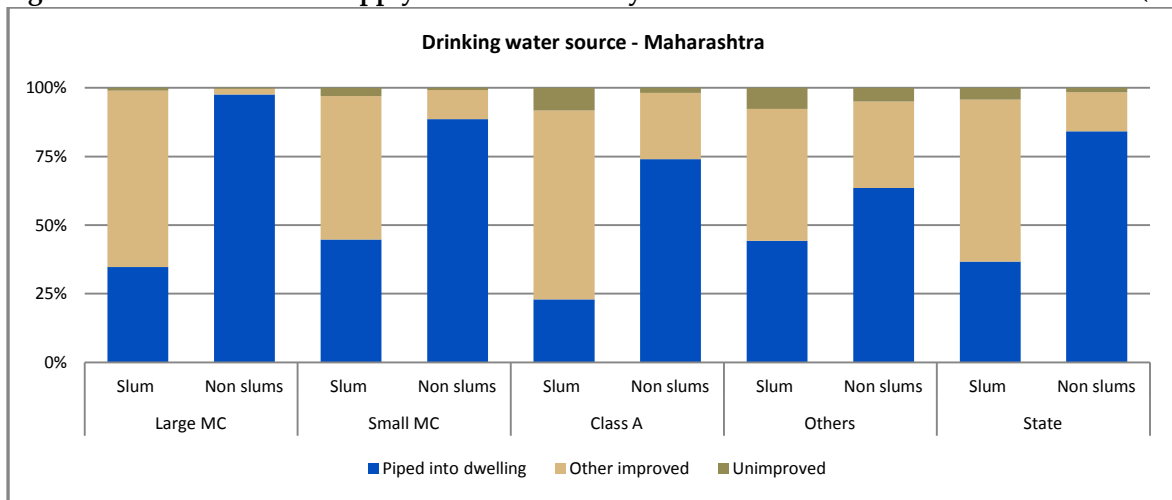**Figure A2.5b: Urban water supply for households by size class of cities and slums/non-slums (%)**
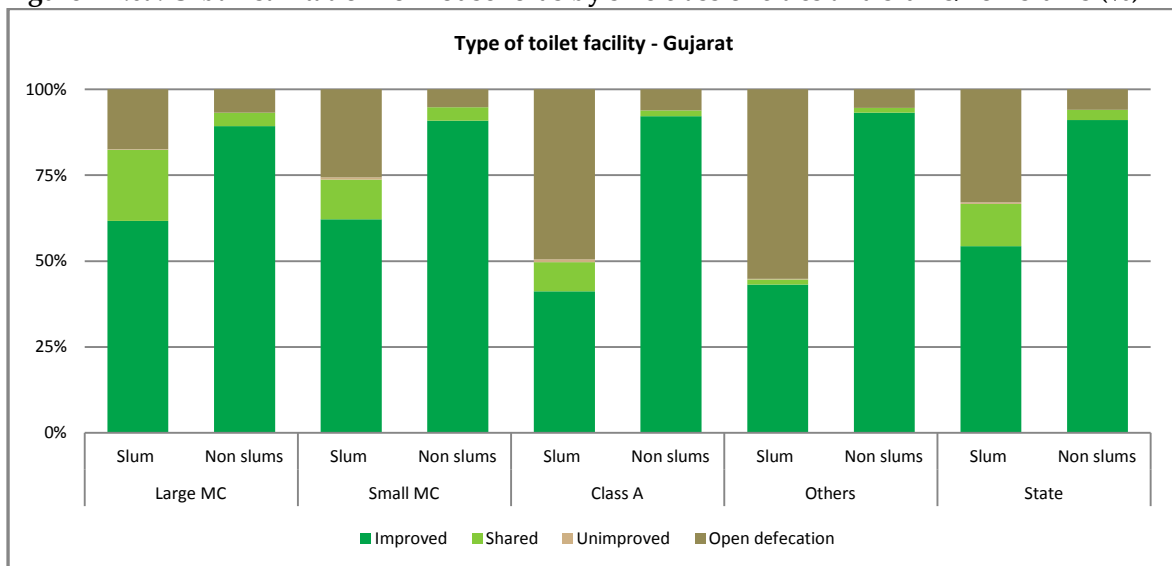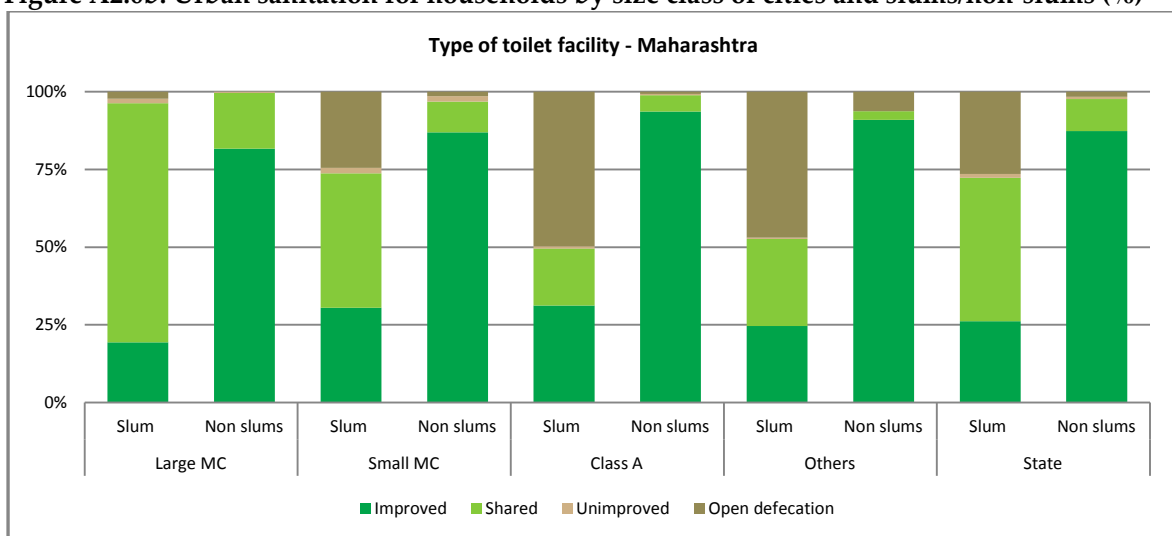

Drinking water source - Maharashtra

Legend: Piped into dwelling, Other improved, Unimproved

Figure A2.6a: Urban sanitation for households by size class of cities and slums/non-slums (%)

Type of toilet facility - Gujarat

Legend: Improved, Shared, Unimproved, Open defecation

Figure A2.6b: Urban sanitation for households by size class of cities and slums/non-slums (%)

Type of toilet facility - Maharashtra

Legend: Improved, Shared, Unimproved, Open defecation

The Performance Assessment System (PAS) Project

The Performance Assessment System (PAS) Project aims to develop appropriate methods and tools to measure, monitor and improve delivery of water and sanitation in cities and towns in India. The PAS Project includes three major components of performance measurement, performance monitoring and performance improvement. It covers all the 400+ urban local governments in Gujarat and Maharashtra.

CEPT University has received a grant from the Bill and Melinda Gates Foundation for the PAS Project. It is being implemented by CEPT University with support of Urban Management Centre (UMC) in Gujarat and All India Institute of Local Self-Government (AIILSG) in Maharashtra.

PAS Project

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