IRC Symposium 2010
Pumps, Pipes, and Promises

Assessing sanitation costs and services in Andhra Pradesh, India

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Abstract

The Total Sanitation Campaign (TSC) is the flagship sanitation programme of efforts by the Government of India to reach the Millennium Development Goals, but it has not yet met its expectations. This paper described the methodologies and analysis of data from 20 villages across two agro-climatic zones in Andhra Pradesh on the costs of sanitation. It concludes that capital costs takes a lion share of the funding, followed by operation and maintenance costs while planning and budgeting for indirect and direct support costs and capital maintenance costs are negligible or missing. The sanitation service ladder parameters reveal that open defecation is rampant and access to sanitation facilities is far from within reach for many households. Use of toilets is much higher in NGP[1] (award winning villages) than in non-NGP villages but even in NGP villages is almost always below 100%. In non-NGP villages open defecation is rampant. An intensive approach is needed to prevent villages that achieve open defection free status from slipping back and to address sanitation crisis in many non-NGP villages. Field observations, focus-group discussions and personal interviews reveal that factors such as space to construct toilets, availability of water, lack of awareness, cultural factors and traditional practices are the major constraints to making the behavioural change away from open defecation. School sanitation remains a challenge as use and maintenance of school toilets is poor and keeping them clean can bring conflicts between parents and teachers. The solid and liquid disposal systems often receive a low priority and Panchayats (local government bodies) do not receive sufficient money to address these issues. The findings indicate the need for a life-cycle cost approach to planning and budgeting, additional funds for specific cost components, targeted efforts and continuous review to address sanitation progress with specific vision and targets rather than as add-on components to water supply programmes. This approach needs to be understood at all levels so that the focus can move from just providing toilets to maintenance and use of toilets and more comprehensive programmes of hygiene promotion. This paper has been produced by members of the WASHCost (India team) which is researching the unit costs of providing water and sanitation services in rural and peri-urban areas.

Keywords

Sanitation, Service delivery, service ladder, Total Sanitation Campaign, TSC, life-cycle costs, open defecation, rural, Andhra Pradesh, NGP, unit costs, methodology

[1]NGP = Nirrmal Gram Puraskar, a cash award, given to zero open defecation and litter free villages by the Government of India.

1 INTRODUCTION

Box 1

The Total Sanitation Campaign places a strong emphasis on Information, Education and Communication, Capacity Building and Hygiene Education for effective behaviour change with involvement of Panchayats, Community Based Organisations, and Non-Government Organisations, etc. The key intervention areas are individual household latrines (IHHL), School Sanitation and Hygiene Education, Community Sanitary Complexes (where there is no room for IHHLs), Anganwadi toilets (at child care centres), toilets at rural sanitary marts and production centres. Under the Nirmal Gram Puraskar Awards introduced in 2005, the central government gives cash awards of between US$ 1,000 and US$ 10,000 (depending on population) to the villages that have achieved open defecation free status and proper management of solid and liquid waste. Some State governments have also initiated their own incentive programmes. Andhra Pradesh makes Shubhram awards, although these are not given out regularly.

The severity of the sanitation challenge facing India can be judged from the fact that hardly one third of the overall population has easy access to sanitation facilities. In rural areas, sanitation coverage is only 22%, but reaches 59% in urban areas (WHO/UNICEF 2004). An estimated 55% of all Indians, close to 600 million people, do not have access to any kind of toilet and those living in urban slums and rural environments are affected the most. Three quarters (74%) of the rural population still defecates in the open. In these environments, cash income is very low and the idea of building a facility for defecation in or near the house is rarely given a high priority. Where facilities exist, they are often inadequate. India is losing billions of dollars each year because of poor sanitation. Illnesses are costly to families, and to the economy as a whole in terms of productivity losses and expenditure on medicines, health care, and funerals. (UN-Water and sanitation doc, 2008).The annual public budget allocations for the WASH sector have increased from US$ 2,025 million during 2002-03 to US$ 3,393 million during 2008-09 in real terms (adjusting for inflation), these budget allocations do not seem to be sufficient (in terms of amount and value for money) given the lack of coverage. Though this is almost an increase of 67% over a seven year period in absolute terms, in relative terms the share of WASH sector in the national budget was more than halved during the same period (Reddy & Batchelor, 2009).

In India, the Total Sanitation Campaign (TSC) was initiated in 1999 to ensure sanitation facilities in rural areas with the goal of eradicating open defecation. This programme is designed with cash incentives to generate competition between villages to be ODF (Open Defecation Free). Box 1 gives the details on the TSC.

Against this background and in the light of sanitation service ladder parameters[2]and indicators developed by WASHCost (Potter et al., 2010), this paper attempts to focus on the following objectives:

[2]WASHCost Sanitation Service ladder parameters include accessibility, use, reliability and environmental protection. The summary composite indicators devised by WASHCost are shown in Figure 4 on Page 10.

- To describe the methodology used by WASHCost to access sanitation costs and services delivered
- To assess the level of sanitation service delivery and the costs of sanitation service delivery
- To compare the costs and service levels between the *Nirmal Gram Puraskar Award (*NGP) *"open defecation free status"* villages and non-NGP villages.

Sanitation does not only refer to toilets but to all conditions that contribute to or harm public health. While this paper mainly considers access to and use of toilets and their costs, it also looks at community perceptions of solid and liquid waste management. The paper does not deeply explore data that has been collected on hygiene practices, but it does look at the cost of materials which are essential to good hygiene.

This paper comprises four sections. The first covers the introduction and aims of the paper, the second describes the methods and tools adopted by WASHCost to collect and analyse costs and services, section three reveals the findings categorised into service delivery and costs of sanitation in NGP and non-NGP villages. Section four describes the conclusions. The paper includes a list of references.

2 METHDOLOGY

WASHCost India has adopted a phased learning approach for collecting data on water and sanitation. As a first step, a number of tools were developed and tested in test bed villages and peri-urban locations on a pilot basis. Based on lessons learnt during the piloting stage, these tools were modified for adoption in the large-scale sample locations.

Sampling

A number of criteria were identified and discussed at learning alliance[3] (advisory and working groups) meetings and it was decided to select study areas on the basis of agro-climatic zones, as, to a large extent, these zones reflect natural criteria like rainfall, water quality, water source and scarcity. The same criteria have been followed for sanitation as for water. Further, some award winning NGP villages were selected to focus on the sanitation component. A stratified sampling design was followed to select 20 villages for collecting the cost data and 10 villages for assessing the service levels from each zone. Data collected from 20 villages spread over two agro-climatic zones was analysed and presented as a basis for this paper.

[3]A learning alliance is a group of individuals or organisations with a shared interest in innovation and the scaling-up of innovation, in a topic of mutual interest.

Methods and tools adopted

Both qualitative and quantitative research tools were used to elicit information at different institutional and stakeholder levels.

Tools and Methods	Measurements	Data use and interpretation
Village base maps *(using GIS and total station data):*	To show the road network, dwellings (houses), community places, institutions, places of worship, etc., overlayed with water supply and sanitation infrastructure assets, e.g. sources of water supply, pumps, pumping mains, storage facilities, distribution lines, water delivery points; drainages, individual toilets, community toilets, places of solid and liquid waste disposal, etc., and elevation contours with 1m interval using remote sensing satellite data and total station electronic surveying equipment.	The micro-level spatial maps helped to depict the spatial distribution of water and sanitation assets along with the associated spatial information on normative demand and actual WASH service levels. These would be of great significance in planning, implementation, effective monitoring and critical for informed decision making for the Rural Water Supply and Sanitation Department.
Secondary data collection	Focusing on collecting information from the department and the village Panchayat (government). Information regarding investments or costs associated with sanitation infrastructure was captured following the timelines of when investments were made. Direct and indirect support costs (ExpDS and ExpIDS) were also gathered from the data available in the records. Operation and maintenance costs incurred by the department as well as the Panchayat were gathered from the records at the district and sub district level. At the Panchayat level focus group discussions (FGDs) were used to track information on WASH services specifically focusing on:(1) details of household sanitary toilet subsidies; (2) Institutional toilets (schools, child care centres, etc.)(3) Investments in drainage and solid disposal etc.	To arrive at the life cycle costs of providing the sanitation services
Listing of households *(Rapid household survey using personal interviews):*	Household surveys assessed the socioeconomic status of families in study areas in terms of caste, religion, population, educational status, availability of WASH facilities (including infrastructure, status, use, etc.). While collecting information from each household the base maps were also validated with the information on the ground. Missing houses and functional / dysfunctional wells, toilets, drainage, solid and liquid waste systems, handpumps, public taps, etc. were identified.	To know the socio economic profile and the access to and use of WASH assets (allowing for poverty analysis). Also to link the Excel based attribute data to the GIS maps(as shown in the findings)
Quantified Participatory Assessments (QPA) *using focus group*	QPA options pre-tested and finalised to assess WASH services status and delivery at water point level and at village level discussing with the women's self-help groups (SHGs) and other community groups such as SC/ST and	To assess information related to the functioning of WASH systems, solid and waste water management

discussions with Panchayat[4] members, women's self-help groups and other community groups (youth and SC/ST[5])	youth groups. Community perceptions are quantified using score ranges between 0 and 100 categorising the worst situations as 0 and ideal situations as 100, in line with the sanitation service ladder (Potter, et al., 2010)	systems at the village level , participation in planning and implementation of WASH schemes, willingness to pay for better services, Panchayat response to the problems, community initiation on WASH related services, etc.
Sample household survey*(using personal interviews and personal observation)*	50 households were selected randomly for detailed data collection. The sample was based on income, caste, religion, land holdings and the location of the house in relation to the overhead service reservoir (OHSR) or water distribution system (problem and non-problematic)	Analysis of information to assess trends and patterns in WASH service delivery, the relationship between income and WASH facilities or service delivery, the extent of household expenditure on WASH, hygiene behaviour, and the status and use of sanitation facilities, etc.

Table 1 Methods and tools adopted for assessing sanitation service delivery and costs

3 FINDINGS AND ANALYSIS

3.1 Sanitation service delivery

The Government of India and of Andhra Pradesh are focusing their efforts to improve the sanitation situation by providing subsidies for infrastructure. However, our findings reveal that household toilets are still out of reach for many in the poorer villages, and that even many households that built toilets with government subsidy are not using the toilets but converting them for other purposes. This section analyses the four sanitation service ladder parameters:

- Access to sanitation facilities(both at household and community level)
- Use of sanitation facilities
- Reliability (operational and maintenance at community and household)
- Environmental sanitation (in terms of solid and liquid waste disposal at village level)

[4]Panchayat: Village level administrative unit represented by elected representatives and is responsible for maintenance of WASH assets and service delivery

[5] Social composition mainly consists of SC; BC and OC communities. SC (scheduled caste) communities are at the lowest rung of the social ladder and have constitutional provision of reservations in educational institutions and public sector jobs. BC (backward castes) communities are at the middle of the social ladder and have some reservations in educational institutions and public sector jobs. The extent of reservation varies from State to State. OC (Other Castes) are at the highest rung of the social ladder. ST stands for Scheduled Tribes, the category used for tribal populations.

Open defecation

In the sample villages, open defecation is rampant, up to 90% in some villages indicating that the majority of the population either do not have access to toilets or are not using them.

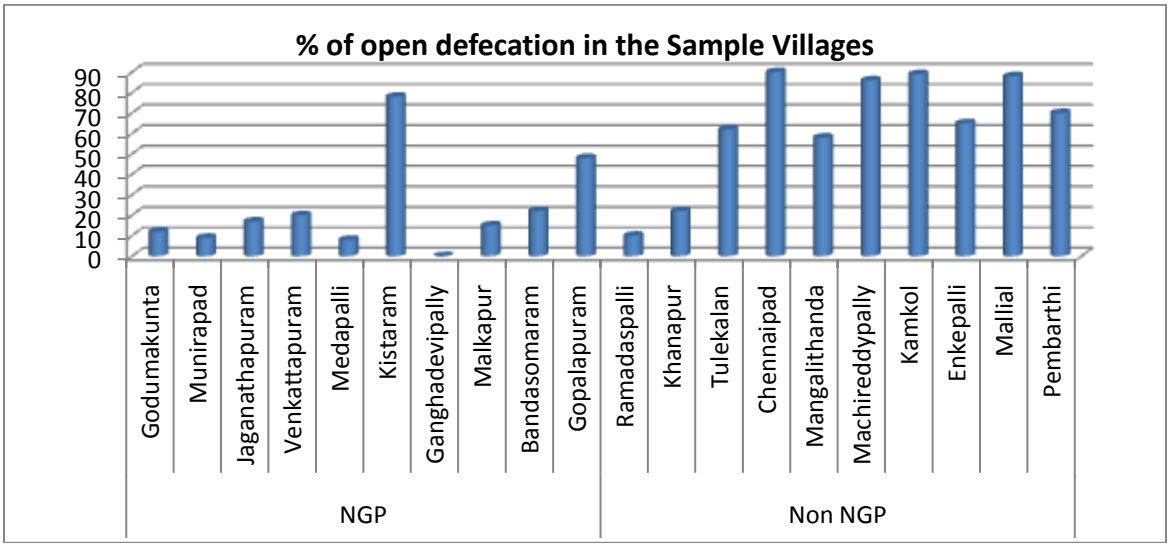


Figure 1 **Graph showing open defecation status in NGP and non-NGP villages**

Source: Data collected by WASHCost team from the Households in sample villages 2009/2010.

The difference between NGP and non-NGP Villages is substantial. NGP Villages have low open defecation percentages except in two villages (Kistaram and Gopalapuram) which should not have qualified for NGP status. In theory, the NGP villages should have no open defecation, since this is why they won the award, but only one village actually demonstrated this. In the NGP villages surveyed by WASHCost open defecation ranged from 8% to 15% showing that there has been a slippage in sanitation levels, and indicating the need for Government to design a follow up strategy to sustain NGP status. The situation in non-NGP villages calls for immediate attention to community level IEC activities. In many of these villages most households have access to toilets but are not using them.

Access to[6] and usage[7] of Individual Sanitary Latrines (ISLs)

Surveys in sample villages at household level reveal that around 76% of the households in NGP Villages and 32% of households in non-NGP villages have access to household toilet facilities. The higher access in NGP villages may be due to long-term efforts on sanitation promotion which is probably absent from non-NGP villages. Access levels vary across villages depending on household income, water availability, awareness, support from government schemes, etc. Despite the subsidy provided through the government programmes, sanitation is poor and

[6] An individual sanitary toilet (ISL) is designed to provide safety, privacy and dignity and is usually located within the house premises

[7] Usage means use of the toilet by all the family members at all times. This paper does not discuss in detail WASHCost data on hygiene behaviour in families

requires intensive efforts from both Government and communities. Factors such as low awareness levels, lack of space to construct toilets, resistance to changing a traditional practice of open defecation, and unaffordability act as major constraints to gaining access to toilets.

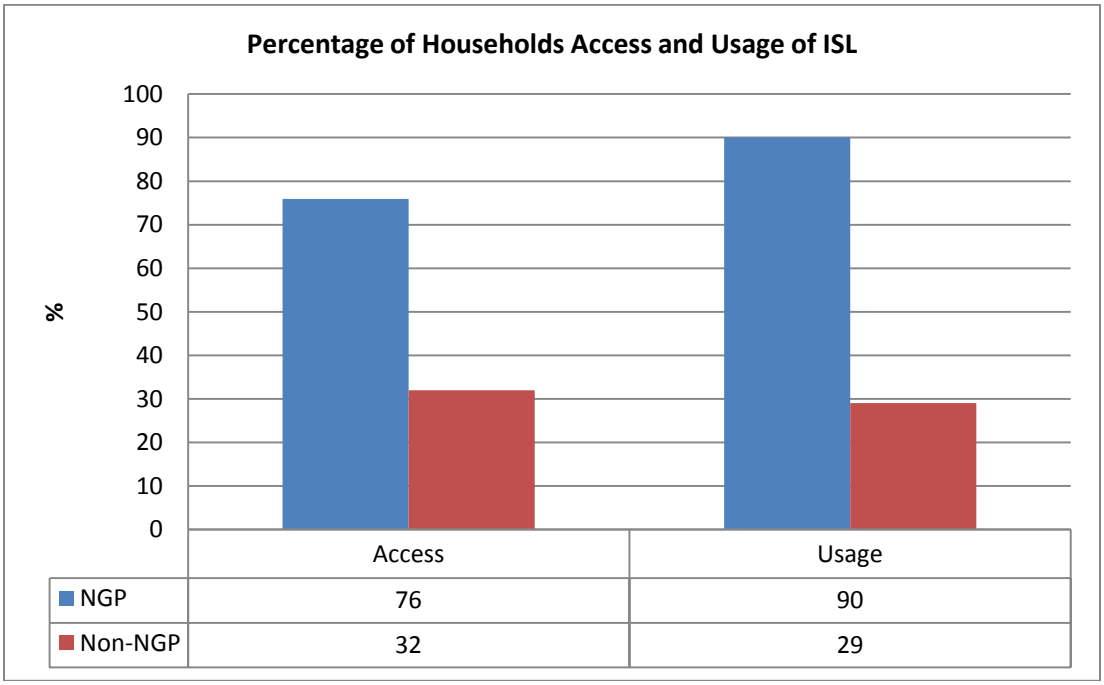


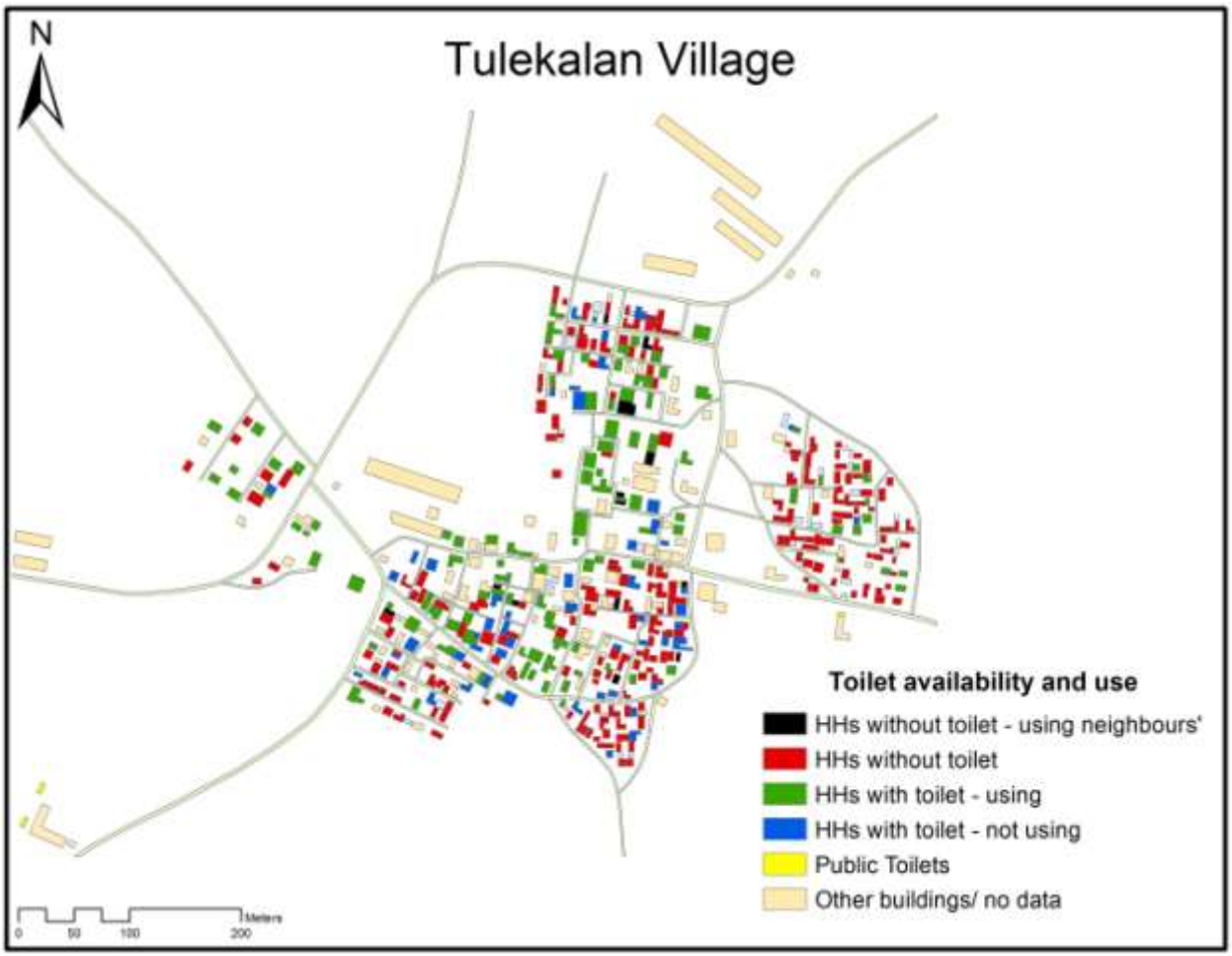
Figure 2 **Access and Usage of toilets in NGP and non-NGP villages**

Source: Data collected by WASHCost team from the households in sample villages, 2009.

Service levels in terms of use of individual sanitary latrines vary substantially between NGP and non-NGP villages. Usage levels are 14 percentile points higher in NGP villages even than theoretical access to such toilets, indicating that users must share toilets (they don't have a toilet, but they use one). Access to an ISL means having one at your own household – using your neighbour's toilet does not formally count as access. In non-NGP villages, usage is as low as 29% indicating that subsidy programmes for helping families to obtain toilets are not effective, and that even some households who own toilets are not using them. The difference between usage (29%) and access (32%) does not at first sight seem large. However, from Figure 1, we can see that two 'non-NGP' villages (Ramadaspalli and Khanapur) have low levels of open defecation, more in line with the NGP village figures – indeed, Ramadaspalli has been nominated for an NGP award. If these villages were taken out of the figures, the gap between having a toilet and using a toilet would be much more pronounced in the remaining non-NGP award villages. Interviews with households reveal that fear of the pit getting filled up, bad smells, a preference for open defecation, lack of awareness about the ill-effects of poor sanitation and poor hygiene practices, and cultural and traditional taboos about men and women using the same toilet are all factors that influence use. This indicates that investments made in installing ISLs can be wasted as there is no subsequent support (IEC/training) to raise

awareness, despite in theory 10% of the budget being set aside for this. The non-use of toilets may be connected to infrastructure construction being driven by subsidy rather than a demand driven approach to toilet use. This situation is alarming and should persuade the Government to rethink their efforts on comprehensive sanitation campaigns, which rely on using the media and triggering exercises as in CLTS (community-led total sanitation).

To illustrate the magnitude of the problem the following GIS map (Figure 3) indicates the toilet ownership and usage patterns in one non-NGP village.



Map 1 **Access to and usage of toilets in Tulekalan Village**
Source: Data collected by WASHCost team from the Households in sample villages 2009.

Map 1 shows toilet usage in Tulekalan where the predominant colour (red) shows that many households do not have toilets, while the blue boxes show households with toilets that they do not use, citing the reasons above. Many households cite as reasons for not constructing toilets, the fact that the subsidy does not cover the real costs, poor economic conditions, caste status,

lack of space, etc., reasons which are very well correlated in regression analysis with the markers for poverty, such as lack of literacy, caste, and lack of land.

Access to and usage of Institutional toilets

In all, 32 institutional toilets were surveyed in the ten selected villages. Of these 32, three were at Anganwadi day centres and the other 29 were in schools. The majority of schools did not have toilets, but of those that did have them, the majority had separate toilet arrangements for boys and girls. However, only three of the 29 school toilet blocks were being properly used. The main reasons for school toilets not being used are insufficient number of seats &toilets for boys and girls, improper maintenance, bad smell, lack of cleanliness etc.

Interviews with some of the school teachers revealed how dysfunction can lead to conflict and to giving up. One said, "Since there are no funds to appoint Ayahs (attendants) to maintain them, we gave the responsibility to the children, but the parents objected and started fighting with us, hence locking the toilet was the best option as we are busy with our academic studies." Another teacher revealed that "we do not have any funds for repairs". This underlines that the lack of funds for operation and maintenance and how this leads to an asset like a school toilet being unused.

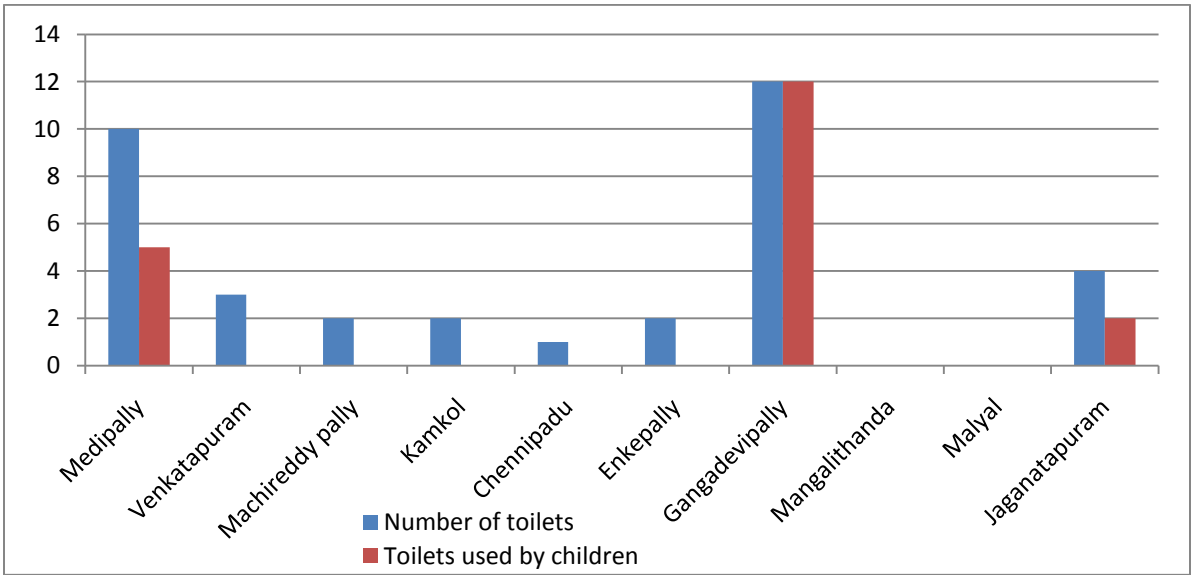


Figure 3 Access to and usage of school toilets in the selected sample villages

Reliability

The WASHCost sanitation service ladder lists ease of operation and maintenance and robustness of the structure as the indicators for assessing reliability. In the sample villages, the facilities are relatively new and there is not much data available. But one major finding is that when the household latrine pits filled up, some households stop using the toilets and revert to open defecation.

Main conclusions on sanitation services (toilets)

The overall sanitation services for faeces and urine received by the households can be compared with the WASHCost service level ladder published in 2010 (Potter, A. et al., 2010) from which the composite indicators are reproduced here as Figure 4. This reveals that in both NGP and non-NGP villages, services are basic to below service level indicating the large gap that needs to be addressed. The comparison of service levels in Andhra Pradesh with the WASHCost service ladder is made below in Table 2. No service, limited service and basic service are the three levels of service that occur most frequently.

<table>
<tr><th></th><th>Accessibility</th><th>Use</th><th>Reliability (O&M)</th><th>Environmental protection</th></tr>
<tr><td>Highly improved service</td><td>Each family dwelling has sufficient toilets for all members</td><td rowspan="2">Used by women, men and children, and infant faeces are disposed in toilet.</td><td>Routine O&M service requiring little user effort</td><td>Positive environmental impact, e.g. productive reuse of safe byproducts</td></tr>
<tr><td>Improved service</td><td>Each family dwelling has a toilet in the compound</td><td>Regular O&M service requiring minimal user effort</td><td rowspan="2">Non problematic environmental impact/ Safe disposal</td></tr>
<tr><td>Basic service</td><td>Cement slab (hh or shared) at national norm distance from hh</td><td>All family members use toilets</td><td>Weak O&M requiring high user effort</td></tr>
<tr><td>Limited ‘service’</td><td>Platform separates faeces from user</td><td>Used by some family members</td><td>O&M difficult to access/ doesn’t happen</td><td rowspan="2">Significant environmental pollution, increasing with increased population density</td></tr>
<tr><td>No ‘service’</td><td>No separation between user and faeces, e.g. open defecation</td><td>No use</td><td>Not applicable</td></tr>
</table>

Figure 4 **Summarised composite indicators for deciding overall sanitation service levels**
Source: Potter, et al. (2010).

	Overall status	Access	Use	Reliability	Environmental Sanitation
NGP	Limited and basic	Basic to improved	Basic	Not enough information	Limited service
Non-NGP	No service and limited	No service or limited	Limited	Not enough information	No service to limited

Table 3 Comparison of service levels received in Andhra Pradesh against the WASHCost service ladder

Status of environmental sanitation (solid and liquid waste disposal systems)

As stated above, sanitation is not only about toilets. Community perceptions of solid and liquid waste disposal have also been quantified using QPA methodology, as described above in Table 1. As with toilets, a range of possible situations were matched to a range of scores between 0 (no service and very poor conditions) and 100 (an ideal service and situation). Five levels of service have been identified from the worst case, where rubbish is thrown everywhere to the ideal where rubbish is either composted or recycled and sold. A 'benchmark' basic acceptable service was set as the midpoint, where all households take their rubbish to the village dump or there is a system of solid waste collection. These options were pretested and revised to make sure that all possible situations are captured from worst to ideal. Community members can give scores and cite the reasons for giving that particular score. The field investigators are intensively trained in this methodology and the options are carefully documented.

Figure 5 shows how in many of the villages there are no well-organised systems of solid waste management. The scoring patterns reveal that majority of the non-NGP villages did not reach even the basic service benchmark, being limited to the worst and poor conditions. While the NGP villages as a whole are just above the bench mark, only one has reached the ideal. NGP villages had a system of collecting the garbage from the houses but the waste was dumped on the outskirts of the village, causing environmental pollution. This requires special attention from the Village Water and Sanitation Committees and Panchayats to plan solid disposal systems which do not adversely affect the environment and from government to help them design such strategies.

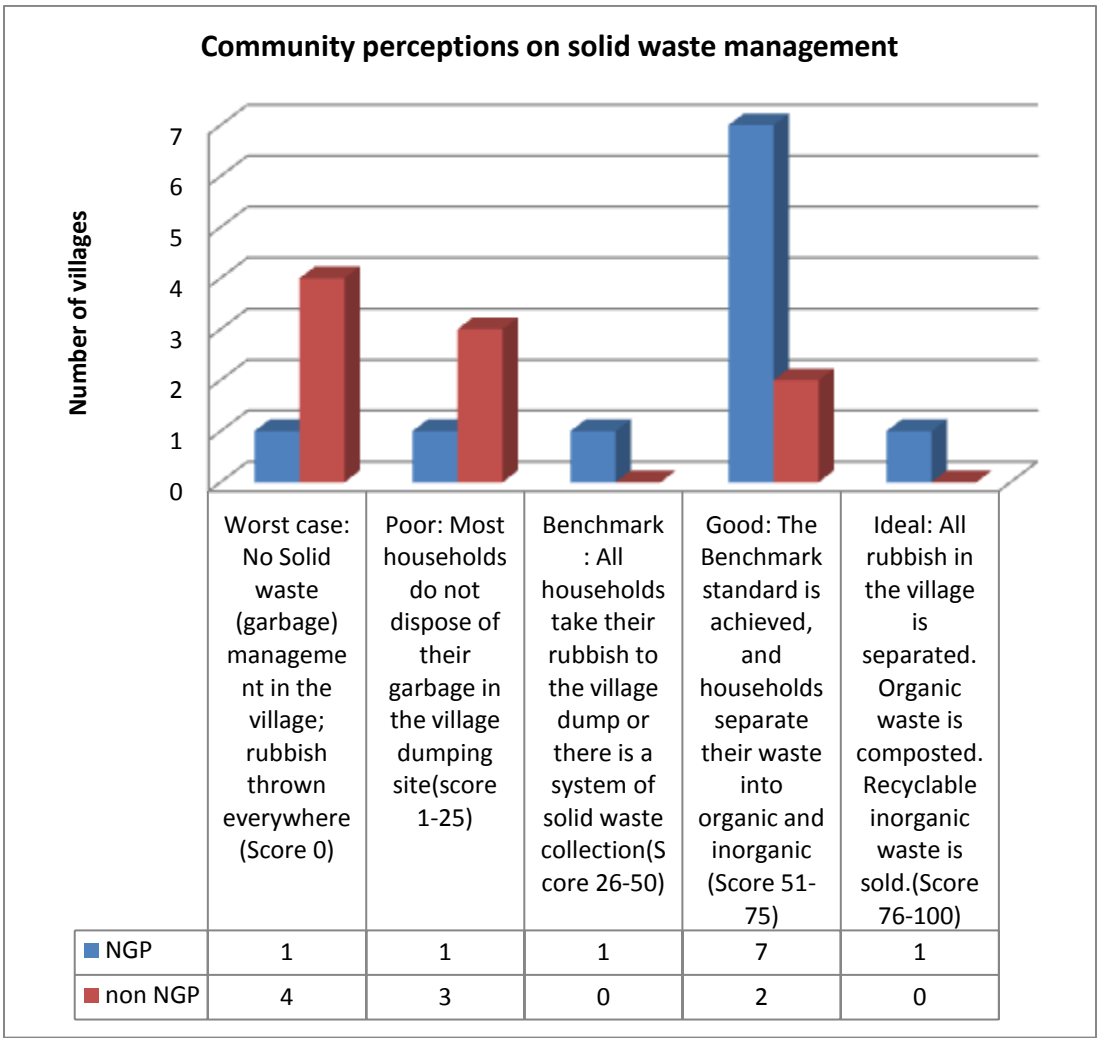


Figure 5 **Community perceptions in NGP and non-NGP villages on solid waste management**
Source: Data collected by WASHCost team from community groups in sample villages, 2009.

Community perceptions of wastewater /liquid waste management

In a similar way to assessing solid waste management, scoring options were worked out for the liquid water/waste management systems. Standards range from the worst case (no drains and stagnant pools of liquid around the village – score 0), to the ideal where wastewater is discharged into leach pits or into vegetation (score 76-100). The benchmark ('acceptable') standard is that well designed drains are regularly cleaned and work properly (score 26-50). Figure 6 shows that communities are unhappy with their drainage systems. In almost all villages perception scores of the community on the liquid waste disposal systems were below or at the benchmark. This includes NGP villages, indicating the overall bad situation. Reasons cited for this include lack of awareness, lack of funds, lack of technical knowledge and lack of ownership of existing assets.

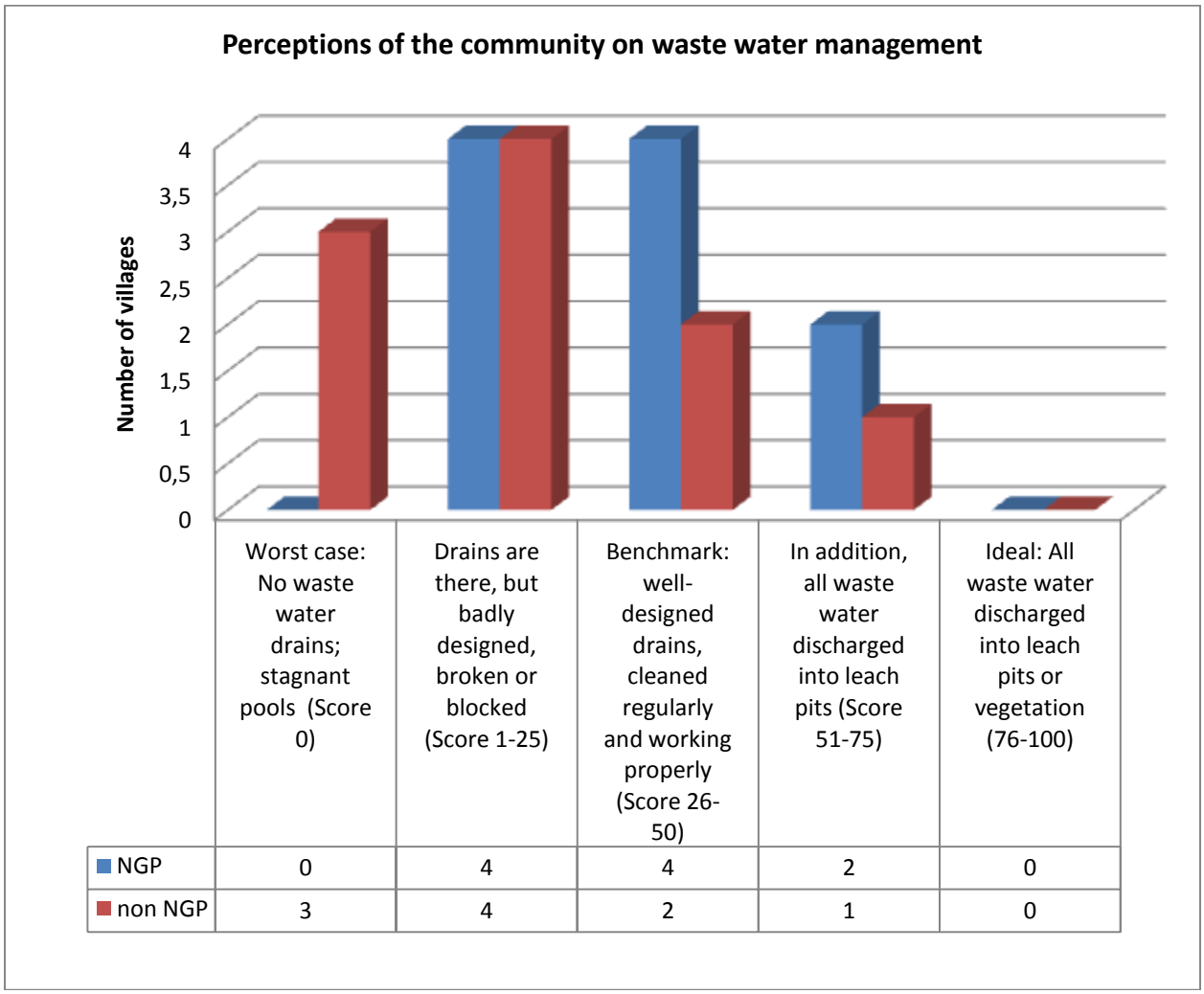
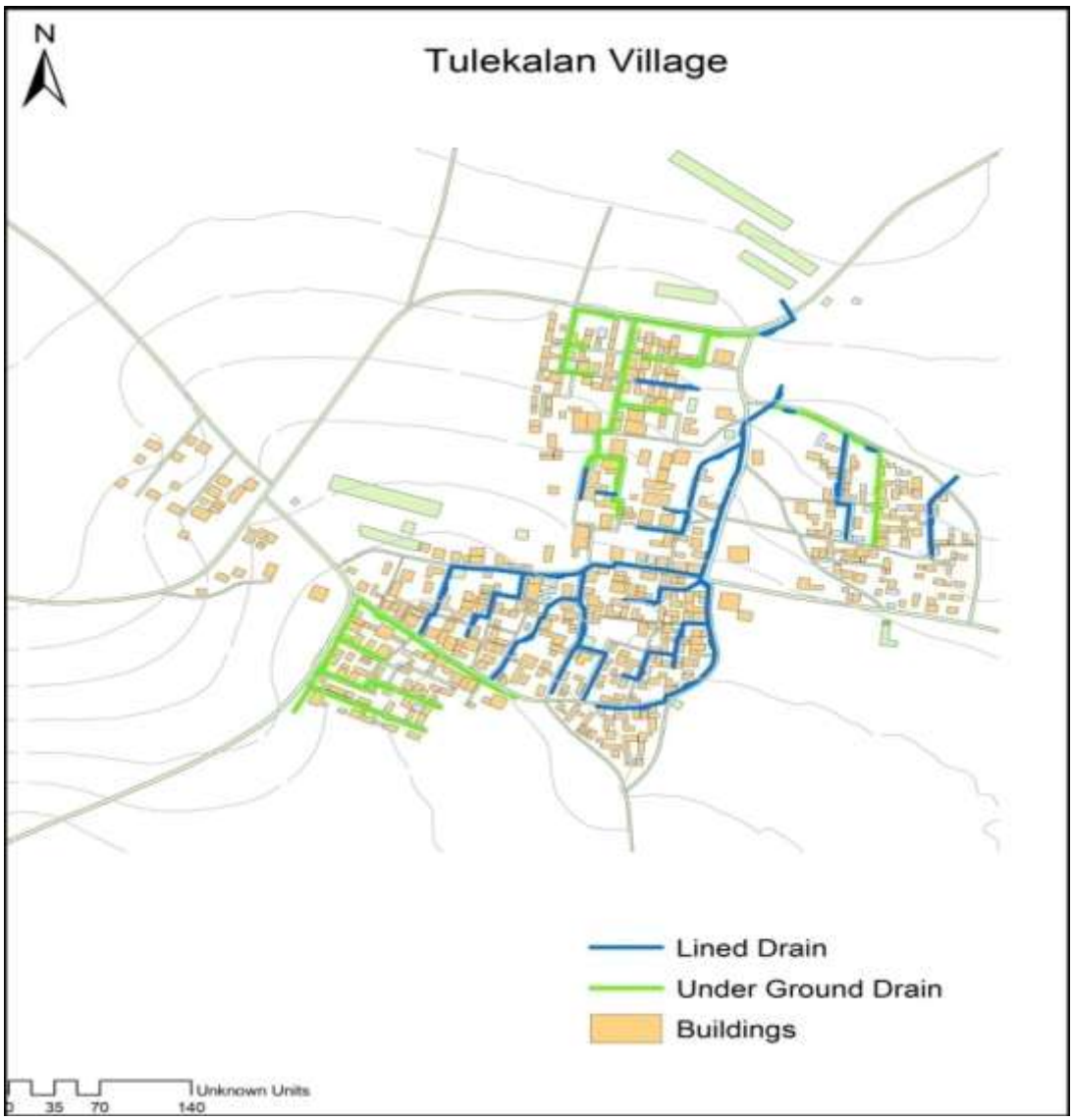


Figure 6 Comparison of community perceptions in NGP and non-NGP villages on wastewater disposal

GIS mapping in all the sample villages indicates that drainage is very badly planned, laid down without following the contours and not connected to a common drainage point. This results in pools of stagnant water in many villages contributing to the spread of disease. Even NGP villages are not exempt from such problems. The high quantity levels of water available in these villages leads to wastage and adds to drainage problems, especially since only one or two villages have any way to control the taps. In addition, whatever drainage is planned does not meet the correct technical specifications. Map 2 from Tulekalan village shows how surface and underground drains fail to remove liquid from the village. Drainage lines do not follow the contour lines and so do not correspond to natural slopes in the village. Ad hoc household drainage systems do not lead anywhere, often stopping in the middle of rows of houses. Stagnant wastewater in drains spreads disease and is more even dangerous than leaving water

on open ground, where at least it dries up. Comprehensive village sanitation plans needs to be prepared and implemented with improved technological design and a proper flow of funds.



Map 2 **GIS map showing ad hoc and unplanned drainage systems in Tulekalan**
Source: Data collected by WASHCost team from the Households in sample villages 2009.

Main conclusions on overall services received

The overall sanitation services received by the households are in line with the limited and basic services for toilets. Taken together services for dealing with faeces and urine and for other solid and liquid waste are only acceptable in the best run villages, and are subject to slippage even in villages that have made an improvement.

3.2 The costs of sanitation and hygiene

The main cost components of rural sanitation occur at household level and community level. At household level the main investment is in the form of individual sanitary latrines (ISLs). Households also spend on providing drainage systems for household waste water to the main drainage lines and on hygiene practices like water filtering, boiling, handwashing and cleaning materials and chemicals etc. In most cases the household investments are part of or due to the promotional activities of the department which include subsidies, incentives, etc. The Total Sanitation Campaign governmental guidelines give the (normative) unit cost of an individual latrine as US$ 63 towards which the households are expected to make a 10% (i.e. US$ 6) contribution. The remaining US$ 57 is provided by the department as a subsidy. Of these costs, about 20 per cent goes towards labour costs (pits + mason), 70-75 per cent towards materials (cement + sand + metal + rings + pipes + bends + steel + slab, etc.) and the remaining (5 to 7 per cent) towards the pan. There are cost variations across the villages, which could be due to variations in transport and labour costs. In reality the costs are much higher than the normative unit cost – as much as US$ 160 - US$ 227 per household. This explains why, despite the '90 per cent' subsidy, household toilets remain out of reach for many.

At the community level, the major investment includes public or common toilets (at schools[8], public places, and centres such as the child care Anganwadis), drainage systems, solid and liquid waste disposal systems, training and awareness programs, etc. The usual infrastructure is single pit toilets, but double pit toilets and septic tanks are also in limited use. No differentiation between the toilet technologies has been made for purposes of analysis. When assessing the cost of village level sanitation facilities all investments made at household level and community level are combined.

The cost components of sanitation (Fonseca et al., 2010) include capital expenditure (CapEx) both hardware and software, capital maintenance expenditure (CapManEx), operational and minor maintenance expenditure (OpEx),direct support costs (ExpDS) and indirect support costs(ExpIDS). Data analysis reveals that costs are available mainly for CapEx followed by OpEx and indirect support costs, while CapManEx and direct support costs are almost negligible.

Capital expenditure (CapEx) for sanitation facilities

For a basic level of service, the average capital expenditure costs of sanitation per capita per year are US$44.08in NGP villages and US$ 26.36 in non-NGP villages, which are not far short of the per capita costs of about US$ 55 a year for water supply (Reddy et al., 2010). These figures cover expenditure on toilets, solid and liquid waste and household expenditure related to hygiene (buying soap for example).

[8] School toilets are constructed by the education department.

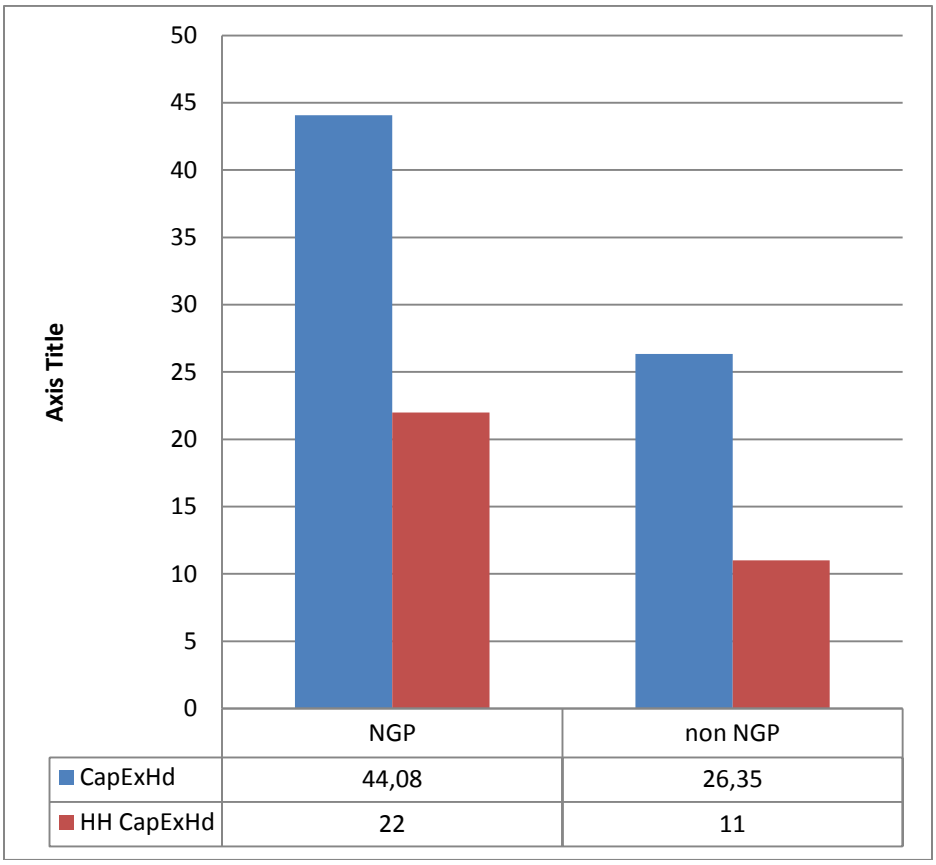


Figure 7 Capital expenditure costs on sanitation by department and households

For a higher level of service, with drainage systems, in one NGP village, Muneerabad, the capital expenditure costs of sanitation per household are approximately US$ 200. This village is a special case because it is located on the outskirts of Hyderabad and generates revenue from land transactions. However, similar observations were made in Ankushapur during the WASHCost test bed phase (Reddy et al., 2009).

Figure 7 shows clearly that the costs of sanitation provision is very high in NGP villages which is what would be expected as these villages have high access to ISLs and open /underground drainage systems. Some NGP villages, such as Gangadevipally, have constructed soak pits instead of drainage systems. This strategy improves water recharge within the village but it can also increase the risk of groundwater pollution. In the non-NGP villages the costs of sanitation is as low as US$ 0.3 per capita indicating the neglect of the sanitation sub-sector within the Department of Rural Water Supply and Sanitation (RWSS).

Household sanitation expenditure ranges between US$ 15 and US$ 133 with households investing more in NGP villages than in non-NGP villages, indicating that higher service delivery incurs higher costs. Households contribute to capital expenditure to complete toilet construction either in cash or kind, since the unit cost which determines the subsidy level is much lower than the real cost of toilets. Although there are different low cost technologies

available, households are often not aware of them, and in some cases they opt for higher quality toilets as they are regarded them to be permanent assets to their houses. Although the subsidy is a financial incentive to motivate and promote the toilet construction, the amount allocated is still too low to attract all the income and caste categories. For many of those on very low incomes, the costs involved in securing even a basic service are still out of reach.

Operational and minor expenditure (OpEx) on sanitation facilities

The operational and maintenance costs invested by the Panchayats and department to provide the sanitation services at village level include the materials and chemicals used for sanitation, salaries of the employees who clean the drains and collect the solid waste from houses etc. At the household level operation and maintenance costs include emptying of pits, small repairs and replacements and costs of hygiene material such as soaps and cleaning materials such as brushes, liquid detergents etc. The data presented here on sanitation OpEx needs to be viewed with caution because most records do not contain all the information and some data is not available.

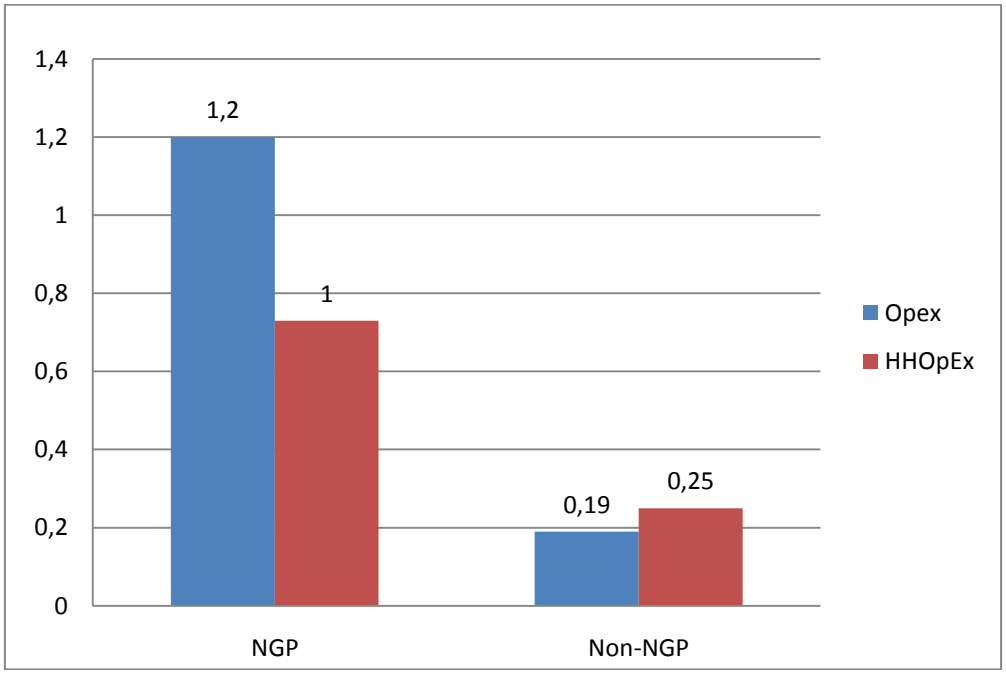


Figure 8 **Operational and minor expenditure on sanitation service provision by RWSS and households, per capita, per annum (US$ 2010)**

Source: Data collected by WASHCost from the Dept of RWSS and households 2009.

OpEx costs varies from USD$ 0 to USD$ 1.2 per capita at village level indicating the low priority given to operation and maintenance (O&M). Household expenditure on O&M is also relatively low given the basic service level. Figure 8 shows that in non-NGP villages the O&M costs are as low as USD $0.2 and the household level costs are relatively high in non-NGP villages indicating the negligence on sustaining even the basic service being provided. Indeed, in non-NGP villages

households are spending more per capita than the RWSS on sanitation OpEx. This indicates that the amounts allocated and spent on OpEx are not adequate to meet the desired service levels. Focus group discussions reveal that the Panchayats and Village Water and Sanitation committees do not receive any capacity building or funds for this purpose.

OpEx costs are difficult to capture as each component of the sanitation chain is dealt by different departments with different funding streams. School toilets are funded by the Education Department, Anganwadis by the Women and Child Welfare Department, and solid and liquid management by the Panchayat Raj Department. The overall coordination and responsibility lies is with the RWSS, , but coordinating these activities is generally not given a high priority and the department lacks the staff to undertakes these activities. Poor coordination is also due to non-functional district, mandal and village level water and sanitation committees.

Indirect support costs (ExpIDS)

ExpIDS: Only in one NGP Village the indirect support costs are available costing about USD $0.7 per capita while in non-NGP villages the costs are either not available or not incurred.

Relative composition of sanitation costs

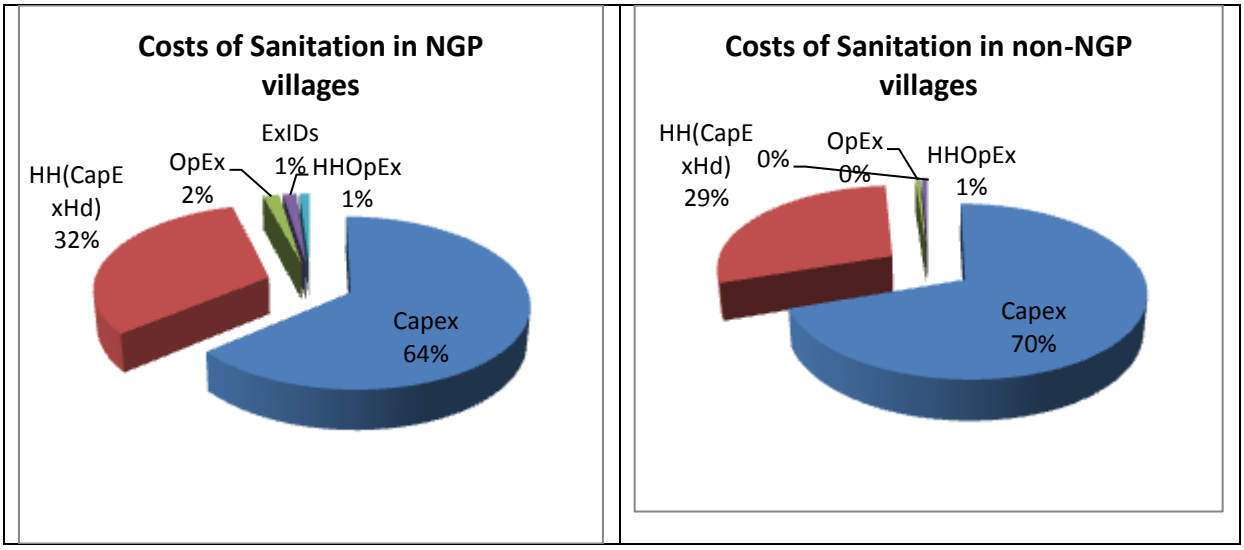


Figure 9 Breakdown of sanitation costs in NGP and non-NGP villages

It can be seen from the Figure 9 that the capital costs (State and household) amount to 96% of total costs in NGP villages and as much as 99% in non-NGP villages, showing the emphasis on infrastructure provision. Of this, households contribute about 30%, even in non-NGP villages where services are poor. Households do indeed spend far more than the 10% that is their share of the basic toilet costs under the subsidy scheme. These charts show that the operation and maintenance costs and indirect support costs which are crucial for sustaining sanitation services are negligible

4 KEY FINDINGS AND CONCLUSIONS

Overall the analysis reveals that a supply-side philosophy is evident in the case of the sanitation sub-sector. Almost the entire public spending was on capital expenditure hardware .Other cost components are either absent (capital expenditure software and capital maintenance expenditure) or received negligible allocations. Support costs that are especially important in sanitation are totally absent despite policy pronouncements after the Total Sanitation Campaign. The influence of sector reforms, which suggest that at least 10% of allocations should be directed towards support costs, appears to be limited in the sample villages. The substantial amounts spent by households on sanitation expenditure indicate that the infrastructure allocations set in government guidelines are not enough.

It may be noted that sanitation costs that are presented here are not the full coverage costs, as they reflect only the actual cost at the existing level of service coverage. Assuming that each household will have its own individual latrine, the real life-cycle costs will be twice that of present estimates. The cost of toilet ranges from US$$150 to US$ 227 depending on the location and technology. The underground drainage system costs about US$ 88 per capita and an open drainage US$ 26 per capita for the existing level of service. These estimates indicate that the cost of providing sanitation could be as high as, if not more than, the costs of drinking water provision if comprehensive sanitation were to be provided beyond existing levels to ensure environmental protection. More funds need to be allocated for improved sanitation service levels. These costs would be less for alternative options like soakpits, open drainage, recharge pits etc.

Although the Total Sanitation Campaign was designed to address access and use of sanitary facilities, efforts seem to be limited compared to what is needed to achieve the desired impact. A lot needs to be done to ensure that the facilities are used by households, especially Individual toilets. IEC activities need to focus in such a way that the demand is generated for toilets and their use. Solid and liquid waste management systems have not been established at village level, and this also requires attention. The department of Rural Water Supply and Sanitation should give special focus to a sanitation mission with proper allocations to cover the solid and liquid management systems. Government should encourage Panchayats to design comprehensive village water and sanitation plans. These need to be implemented with proper follow up and with regular IEC activities. Planning and budgeting should be based on a life-cycle approach with timely release of funds to sustain services and to avoid the ad hoc funding approaches currently practised.

ACKNOWLEDGEMENTS

Authors would like to acknowledge all the households and community members for providing their valuable time in providing responses. The encouragement received from Charles Batchelor, Catarina Fonseca, Suresh Reddy, and V.Anitha needs special appreciation. Thanks are due to all the investigators and team members of WASHCost (India) project. Special thanks to James Batchelor for providing the GIS maps.

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