

Looking Beyond Capital Costs - Life Cycle Costing for Sustainable Service Delivery - A Study from Andhra Pradesh, India

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ABSTRACT

In India, though considerable investments are made through the Total Sanitation Campaign (flagship program of Govt of India) the ground realities of sanitation facilities are very poor and alarmingly dangerous for human health. The capital investments made on sanitation are often going to waste, as the toilets constructed are not being used. The innovation of Nirmal Gram Puraskar (NGP) award increases the use of toilets but the indications are that it does not guarantee sustained open-defecation free status. The study conducted by WASHCost Project in Andhra Pradesh reveals that, in many NGP villages more than half of the families defecate outside. The intra village variation between the sanitation practices of the poor and rich are significant and the subsidies provided by the Government do not even meet 30% of the total investment required to construct the toilet.

Based on analysis of household and village-level data from over a hundred villages and more than five thousand households, this paper i) analyses public and private expenditure using the life cycle costing approach and ii) gives particular attention to identifying factors and drivers that lead to differential access to and use of sanitation services by the poor and non-poor.

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The main conclusions from this study are that the Total Sanitation Campaign and Nirmal Gram Puraskar award system need improvement in the following aspects: i) increasing the scale and duration of expenditure on IEC to carry out more activities over a longer period with the aim of achieving sustained behaviour change; ii) implementing a stepped award system that rewards sustained achievement of sanitation services; iii) putting in place safeguards for poor people with regard to taking loans for constructing latrines; iv) developing a payment transfer system that treats villages as a unit for fund transfers rather than targeting individual households for subsidies, and v) Increased emphasis on achievement of behavioural change by dovetailing social responsibility for construction and monitoring of toilets, solid and liquid waste disposal at village level.

Introduction

Sanitation is vital for the well being of families and the worst effects of sanitation are well known and well documented. Despite this fact sanitation and hygiene are not given enough priority in developing countries though the economic losses of ill health are high. Inadequate sanitation causes considerable economic losses, equivalent to 6.4 per cent of India's GDP in 2006 at US\$53.8 billion (Rs.2.4 trillion), according to The Economic Impacts of Inadequate Sanitation in India, a report from the Water and Sanitation Program (WSP, 2010). Govt of India and Andhra Pradesh have been focussing their efforts on the Total Sanitation Campaign (TSC) but the desired results have not yet been achieved. Reaching of Millennium Development Goals (MDGs) and open defecation free status by all the people by 2012 (TSC goal) seems to be a distant dream even though, between 1990 and 2008, the proportion of the population using improved sanitation facilities increased from 18% to 31% (JMP, 2010).

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 expenditures on medicines and health care (United Nations, 2008). Since independence in India, many sanitation programs have been designed but the actual reform program started only with designing of Total Sanitation Campaign (TSC). TSC was launched in 1999 shifting the national sanitation program from high subsidy to a low subsidy approach with greater household involvement, demand responsiveness. It emphasizes Information, Education and Communication and social marketing to generate demand for sanitation facilities, and is carried out in a campaign mode so that 100 percent of households, pre-schools and schools have toilets which are used by all. To add vigour to the TSC program, the Government of India started an incentive scheme (Nirmal Gram Puraskar-NGP) in 2003 in which awards are provided to fully sanitized and open defecation free Panchayats, Blocks, and Districts. The level of awards range from about rupees 50,000 (US\$ 923) to 50 lakh rupees (US\$92,300) and are provided to local government, depending on the population size of the area which has achieved total sanitation.

Ten years of effort on TSC has seen significant increase in the number of people with toilets. The proportion of the rural population with access to a toilet doubled from 14% in 1990 to 28% in 2006. Access to sanitation across India reached 67% by September 2010, according to official statistics (CMS, 2011). Though the coverage has increased fourfold since the launch of the TSC program, still there are many unanswered questions. Are the allocations sufficient for sanitation? Are the investments made on the right components? Are the benefits reaching the poor and disadvantaged? what motivates the households to access and use a toilet etc. Keeping this background in

view, this paper analyses public and private expenditure using the life cycle costing approach and gives particular attention to identifying factors and drivers that lead to differential access to and use of sanitation services by the poor and non poor.

Methodology:

This paper has been prepared using data from the WASHCost Study. The sample covered more than 5000 households randomly selected from 107 villages across the nine agro-climatic zones of Andhra Pradesh, India. Methods of data collection included Qualitative Participatory Assessments (QPA) and household interviews.

Information about the investments/costs made by the Government on sanitation were collected from the department of Rural Water Supply and Sanitation at various levels, specifically, Panchayath (Village level Governance body), sub district, district and state levels. The costs associated with operation and maintenance were collected from the Panchayats and also from state department. The quality of the services received was measured at household and community levels on pre-identified parameters. The investments made on sanitation were analysed using the Life Cycle Costing Approach (LCCA) and a service ladders framework developed by the WASHCost Project.

Defining Life Cycle Cost Approach:

WASHCost project promotes LCCA, a way of analysing the costs of WASH services that takes into account past, present and future needs. Disaggregating the costs means that every aspect of providing a service is included. The rationale behind this is, the WASH services become more resilient and sustainable when a life-cycle cost approach is taken into planning and budgeting service delivery.

Table 1: Life cycle cost components

| Cost Component | Definition |
|--|---|
| Capital costs of sanitation (CapEx) It is both on Hardware (CapEx Hrd) and software (CapExSft) | Capital investment in fixed assets that include Individual Sanitary Latrines, (activities include excavation of pit, lining, slabs, superstructures and drainage pipes etc.) Community toilets at schools, Anganwadis (pre-school centres) or in public places, drainage systems and solid and liquid waste disposal systems. |
| Operation and Maintenance Costs (OpEx) | Day-to-day maintenance, chemicals, cleaning materials, soap for hand washing, minor repairs and replacement costs |
| Capital Maintenance Expenditure (CapManEx) | Occasional and lumpy costs that seek to restore the functionality of a system such as replacing a slab or emptying a septic tank or superstructure etc. |
| Expenditure on direct support (ExpDS) | The costs of promoting toilets and good hygiene in communities and providing support to Village Water and Sanitation Committees (VWSCs). Cost of conducting Information Education Campaigns (IEC) and awareness camps and training programs and so on. |
| Expenditure on indirect support (ExpIDS) | Expenditure on macro-level support, including planning and policy making, support to decentralized service authorities or local government |
| Cost of Capital (CoC) | Interest on the loans that Government borrows from other funding agencies. Also interest that the households pay on the loans they take to construct a toilet |

Source: Life Cycle Cost components adopted from Fonseca et.al (2010)

These six cost components are collectively known as the life-cycle costs. The LCCA includes a method of annualising costs so that explicit attention is taken of the life spans of system component. Through this, comparisons can be made between one-off or irregular expenditure (e.g. CapEx and CapManEx) and regular and more routine expenditure (e.g. OpEx and ExDS). Further this helps in appropriate allocation of funds for cost components necessary for sustainable service delivery.

Defining Service Delivery Ladders:

WASHCost Project developed a service delivery approach which focuses on

- whether people actually access and use toilets
- the reliability of the service provided and
- kind of environmental protection followed with solid and liquid waste disposal.

All types of service levels are shown below from "no service" to "improved", and are defined in keeping with country Government norms. The service ladder (Table 2) was adapted to Indian context keeping the ladder developed by potter et al (2010).

Table 2: Household Sanitation Service Ladder adapted to India

| Service level | ISL1 Access | ISL use | Reliability | Environmental protection |
|----------------------|----------------------|---|--------------------------------------|---|
| Improved | More than one toilet | All the family members use toilet& infant faeces disposed in toilet | Rs1000(\$20)+ spent on O&M per year | Drains and dumps are well maintained, In addition, solid and liquid re use and recycle is practiced |
| Basic | One ISL | All the members of family using | Rs 500(\$10)+ spent on O&M per year | Drains are well maintained. Dumps used for solid disposal |
| Limited/Sub Standard | Shared | Some family members using the toilet | less than Rs 500 (\$10)spent on O&M | Drains are there but poorly designed and maintained. Dumping area for solid waste exists but not used |
| No service | No ISL | All Open Defecation | Households did not spend any amount | No Solid or liquid waste management |

1 ISL= individual sanitary latrine

Source: Revised based on WASHCost service ladder on sanitation (Potter et.al 2010)

Results and Discussion

The results of the study are discussed in three sections: the life cycle cost analysis using the cost data; secondly, the service delivery received by the different social and economic categories of families; and finally the drivers/ factors that influence sanitation at household level.

Life Cycle Cost Analysis (India or Andhra Pradesh, 2009-2011)

Fig 1: Expenditure on Life Cycle Cost Components

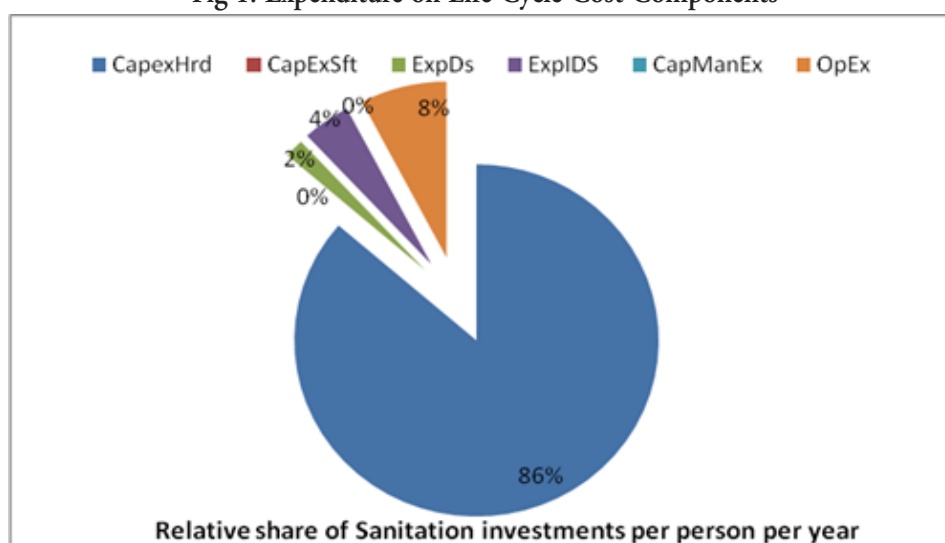


Figure 1 indicates that 86% of the Government investments for sanitation were spent on capital costs, that is, largely on household and institutional toilets. A very small proportion i.e only 2% of the government investment was used for direct support costs such as sanitation promotion through Information Communication and Education (IEC) or training programs. Investment in these software components-promotion and training are usually considered to be essential to ensure consistent use and maintenance of facilities and, in the long run, the sustainability of sanitation.

Operation and maintenance costs are only 8% of the total, implying low priority given to regular maintenance and management. Capital maintenance including pit emptying and replacement costs fall completely to the consumer and do not figure in the Government expenditures. During the interviews some households reported that after toilet pits filled up, they had reverted back to open defecation. On the other hand, some families reported that not all family members use the toilet for fear that the pit may get filled¹.

¹ In the entire sample there were 10 households who had incurred these costs and the study could not capture the entire expenditure on pit emptying and will be taken up as a separate case study.

The investments (4%) on the indirect support costs (ExpIDS) are arrived based on the assumption that they have been spent for revising the policies from time to time. These are investments made to design policies; however, translating the policies into practice appears to have been given little importance as evidenced by the very low investments (2%) on software and direct support costs (ExpDS). The investments in IEC are better in NGP villages but are non significant to the TSC program allocations and to the expenditure on hardware costs.

The TSC guidelines recognise the importance of software costs and the 10 % of allocations are made accordingly, but in reality these amounts are not being spent on the ground. Only about one-fourth of the nationally approved amount for sanitation was, in fact, utilized and priority is given to toilet/ drainage construction rather than demand generation, sanitation and hygiene education and training (Snehalatha & Anitha 2011).

WASHCost study findings reveal that in seven out of the 21 NGP villages declared open defecation free, more than half the population practiced open defecation indicating the slippage. In theory, the NGP villages should have no open defecation, since this is why they won the NGP award. The research, however, indicated that only 1 of the 21 villages had 100% open defecation free status. Similar findings were reported in a study conducted by Taru where about half of the Panchayats /villages awarded the NGP (open defecation free villages) continue to have open defecation to some degree. In 14% of the Panchayats, open defecation was fairly high; and more than 60 percent population resorted to open defecation (Taru2008). Slippage in sanitation behaviour change requires continuous follow up and monitoring and this can only be possible, when sufficient allocations are reserved for direct support costs at various functional levels, similarly for the capital maintenance. Long term programs need to be designed to promote sanitation and hygiene in a sustained manner. The WASHCost argues that the allocations need to be made using the LCC framework, which will help in planning and allocating the resources in an effective manner and provides the vision beyond the capital costs. Further if the resources are allocated on all the cost components in a sequential and coordinated manner then there will be greater scope for sustainable service delivery and improved value for money.

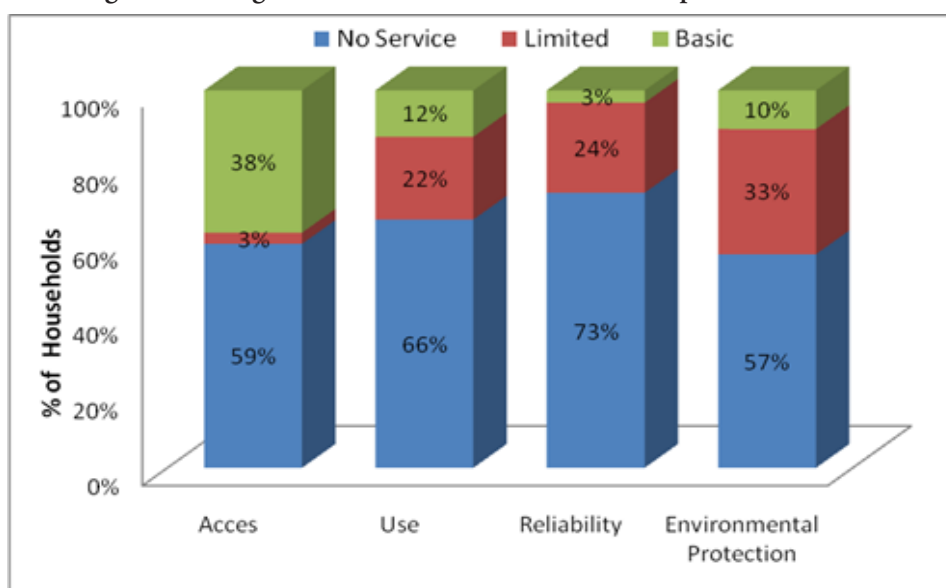
Sanitation Service Delivery Status:

In Andhra Pradesh majority of the families surveyed had poor sanitation service delivery status. This is true even in some villages that have received the NGP award - although services are comparatively better in these villages. The service delivery levels are measured and consolidated against the service level framework mentioned in the methodology.

The responses reveal that only 38% of families had access to a toilet (basic service), while 59% had no service (meaning they had no toilet within the house or in the compound). A further 3% had limited access meaning that they shared a toilet with their relatives and neighbours.

Data about use of toilets are still worse. Use of toilets was measured through observation of the toilets, self reporting and cross validation of responses etc. Only in 12% of households did all family members use the toilet (basic service). In 22% households only some family members used the toilet (limited service). Two out of three (66%) had "no service" - which means that the whole family practises open defecation. In most villages there is no service provided by the Government for pit emptying of latrines or no sewer lines constructed by Government in rural areas. When the pit fills up, the households revert to open defecation. Other households are put off from getting their own toilet, because they fear they will become a source of smells, flies and pollution.

Fig: 2 Percentage of households in each service level parameter Source:



Source: WASHCost (India) study, 2010

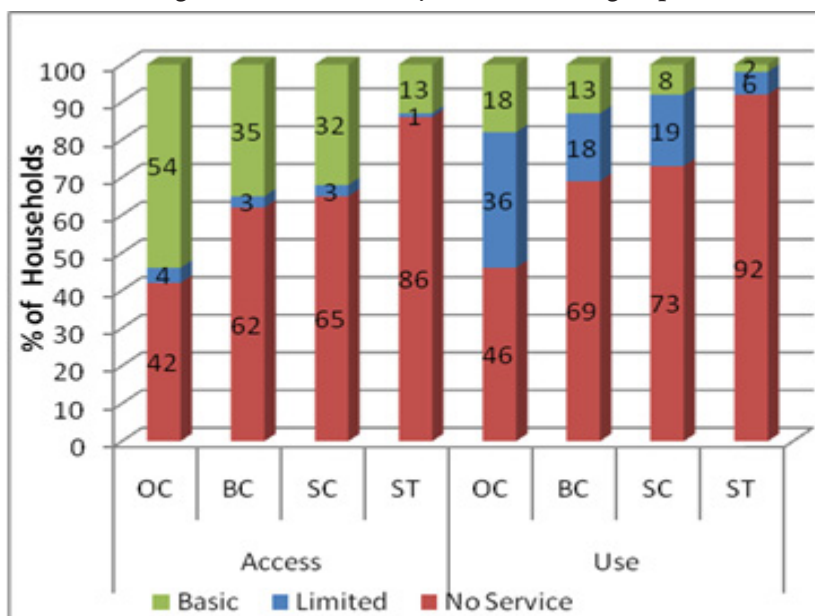
For assessing reliability of latrines, a proxy indicator of money spent for maintaining toilets on a day to day basis is considered. The idea behind this is that latrines which are maintained tend to be more reliable. However, majority of the households spent nothing on maintenance and cleaning indicating low use of toilets. The study showed that in most villages the households have no service or limited service for environmental protection indicating the lack of proper systems for solid and liquid waste. Only 10

percent of the households were able to dispose of solid and liquid waste without causing much pollution to the environment achieving a basic service level

Differential Access and Use of Sanitation Services

In India there is an association between caste and position in the social structure. Castes can be broadly divided into three categories, 'scheduled', 'backward' and 'other'. Scheduled Castes (SC) and Scheduled Tribes (ST) are at the lowest social rung and have constitutional provision enabling access to educational institutions and public sector jobs. Backward Castes (BC), who are somewhat higher than the SC and ST groups in the caste system, also have some provision for access in educational institutions and public sector jobs which vary from state to state. Other Castes (OC) are considered to be the highest rung of the social ladder and not in need of special positive action.

Fig 3: Access and Use by different caste groups



Source: WASHCost (India) study, 2010

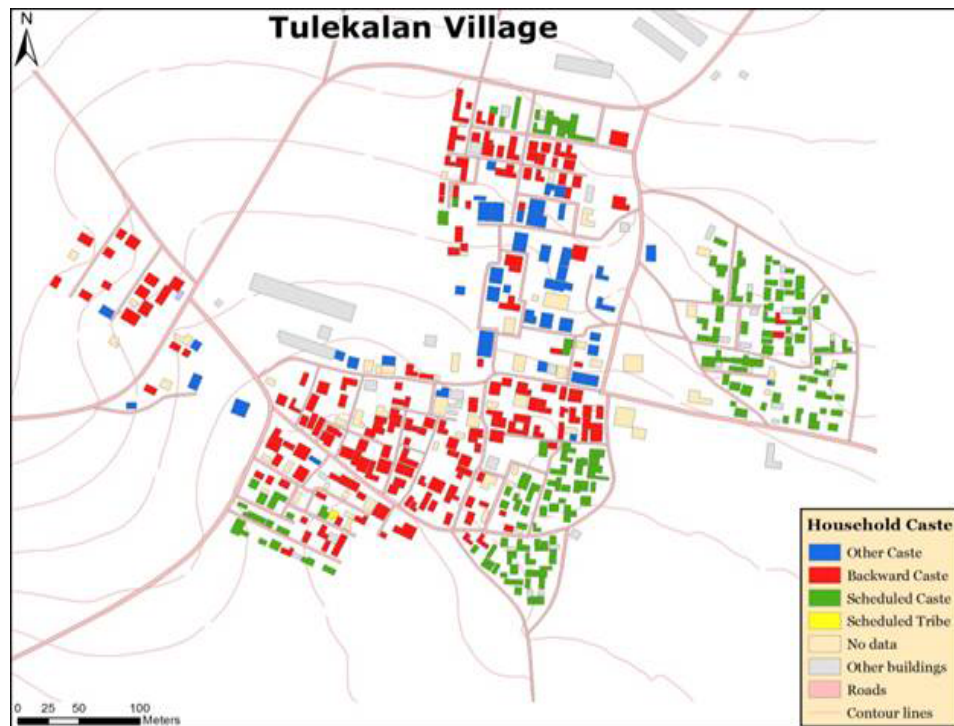
From the WASHCost study it was found, as expected, that the OC households have higher access to toilet facilities compared to the lower caste groups (BC, SC and ST) given their social and economic dominance compared to the other groups. The STs being the tribal communities are in a much more disadvantaged state. More than half the people have latrines in the OC groups perhaps due to their having greater disposable income and perhaps also to their influence in capturing the benefits of the Government subsidies.

Further fig 3 indicates that OC and BC households use the toilets more consistently compared to the SC and ST households. Further it could also be seen across all the caste groups a very low percentage of families have basic service i.e. all the family members of the household are using the toilet. While 36% of the OC households show limited usage (i.e only some family members use the toilet) and among SCs and BCs it is as low as 18 % and 19% respectively.

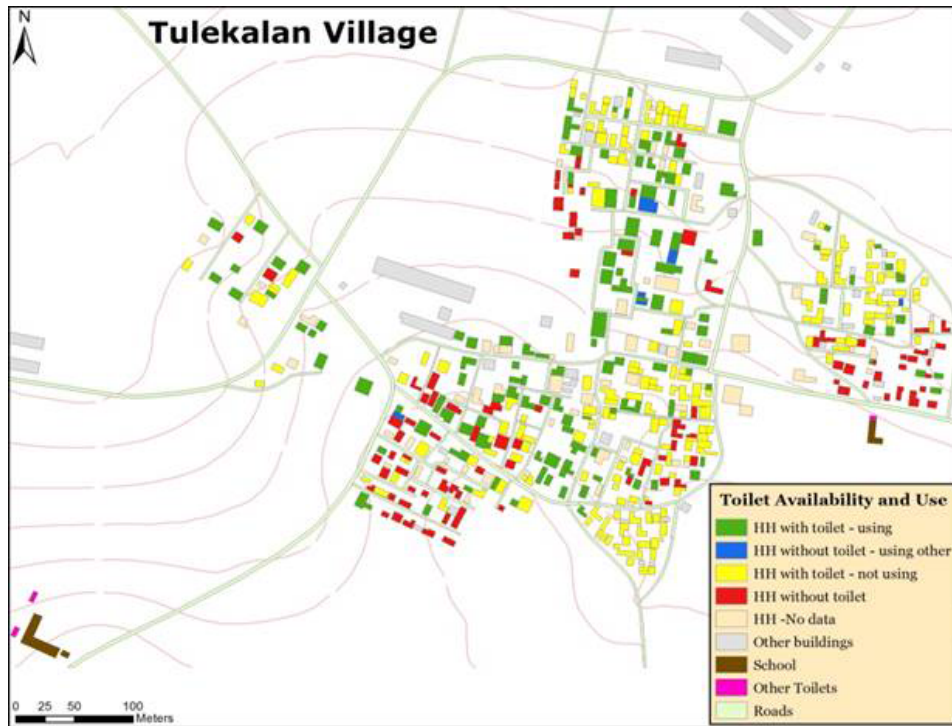
Specific case example

To illustrate these findings, data is provided about access and use patterns from a particular village, showing the GIS maps that were used in data collection. The village, called Tulekalan, is similar to other villages in the study, Map 1a shows that the caste groups have their distinct delineated locations in Tulekalan village with the OCs and BCs occupying more central areas while the scheduled caste groups live on the periphery.

Map 1a; Location of the Households



Map 1b: ISL Access and usage across the households



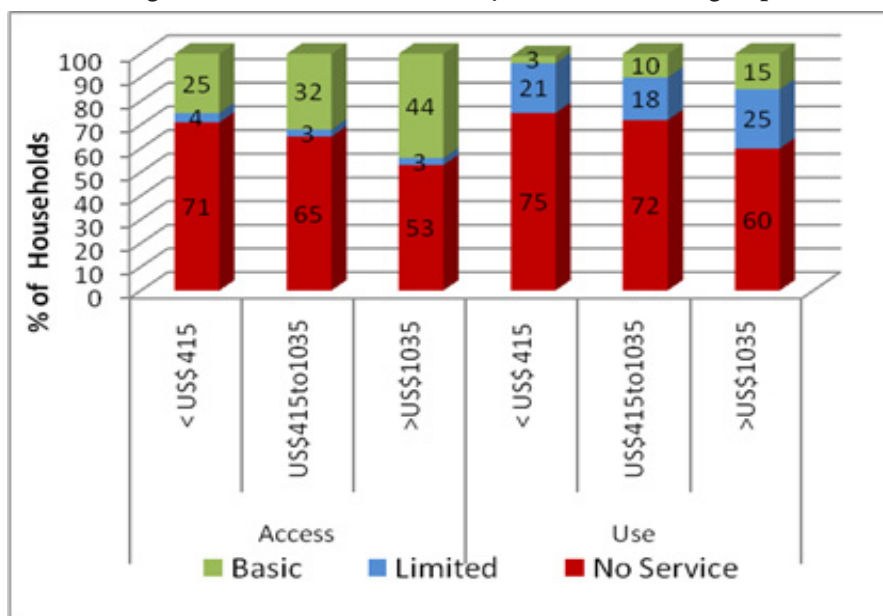
Map 1 b shows that many SC households do not have the toilets, while many of the BC and some SC households do have a toilet but they are not using it indicating the lack of IEC activities for behaviour change while the OC households have the toilets and they are using it. Further this also brings out that the SCs have less/ no awareness and economic power to afford the better services. This clearly brings out continuous special provisions did not make much impact. This makes it very clear that translation of policies and guidelines requires much more intensive efforts to make the benefits reach the actual beneficiaries.

Access and Use across the Different Income Groups

The Annual income of the families is considered to categorise the income categories. The families with less than Rs 20,000 (US\$ 415) are classified as low income group families and the families between Rs 20,000-50,000 (US\$ 415 to 1035) as middle income and families above Rs 50,000 (US \$ 1035) as high income households. The access and use of toilets across the different income groups show that the high income groups have higher access (44%) and the low income groups have lower access (25%). A very limited number of households share the toilets across all income groups. The reasons for less access to toilet by poor are lack of space in their small dwellings, money

and information. The poor households often deprived to even receive the subsidy, as their voice is never heard in the development planning not only in WASH but in almost all the other welfare/development programs. Further the usage figures show that not all the families who have access to toilets are being used by all the family members. The field teams observed that majority of women and adolescent girls and old age members of the family use the toilets while men and children in the family defecate openly which can be attributed to traditions, norms and culture etc. This brings back to the point of having the effective IEC programs and awareness campaigns involving professional support organisations on safe sanitation and hygiene to protect the environment and safe guard against the diseases.

Fig 4: Access and use of toilets by different income groups

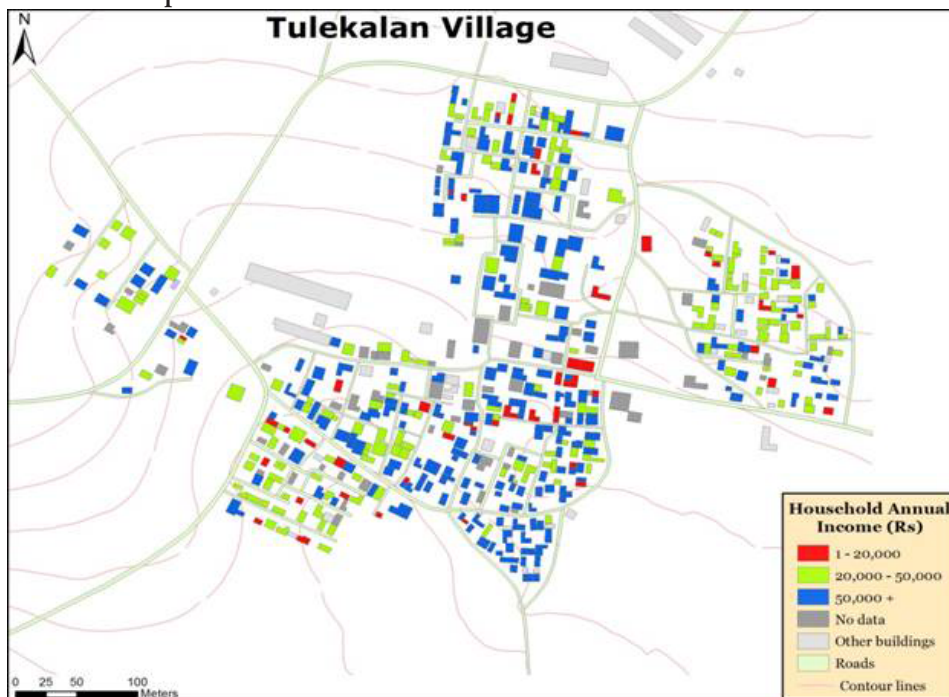


Source: WASHCost (India) study, 2010

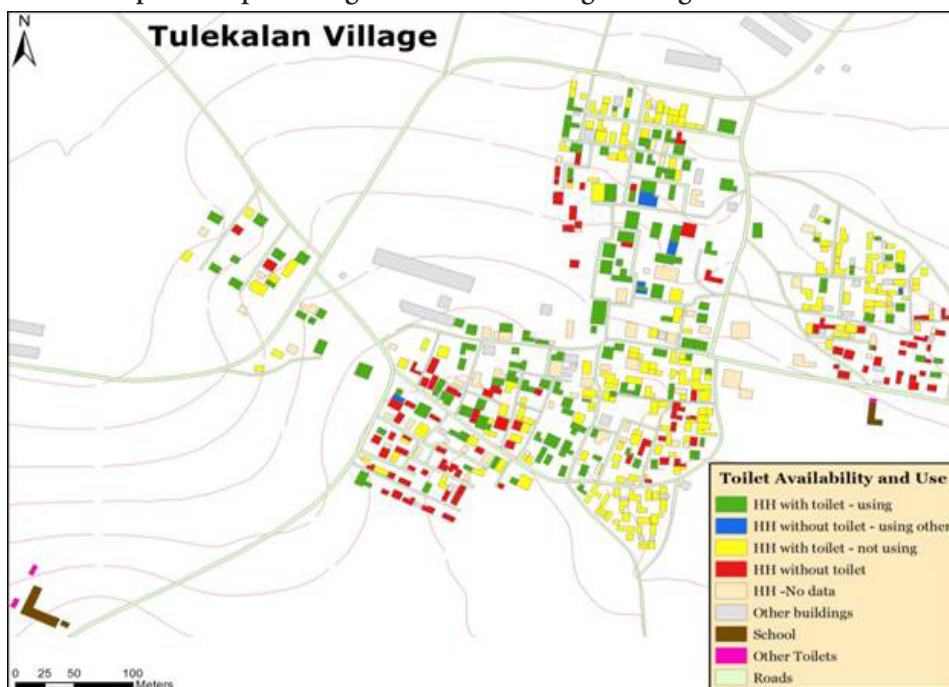
Map 2a and 2b of Tulekalan village specifically indicate that low income groups across the village are the ones who do not have the toilets. But income is not always a good indicator as it is difficult to assess the exact income of the family as the households do not reveal it due to the fear of losing other Government benefits.

Keeping this data limitation the land holding of the families is considered to differentiate the rich and poor. Government holds the official records of extent of land possessed by the households hence the error is minimal.

Map 2 a: Distribution of Households based on Annual income



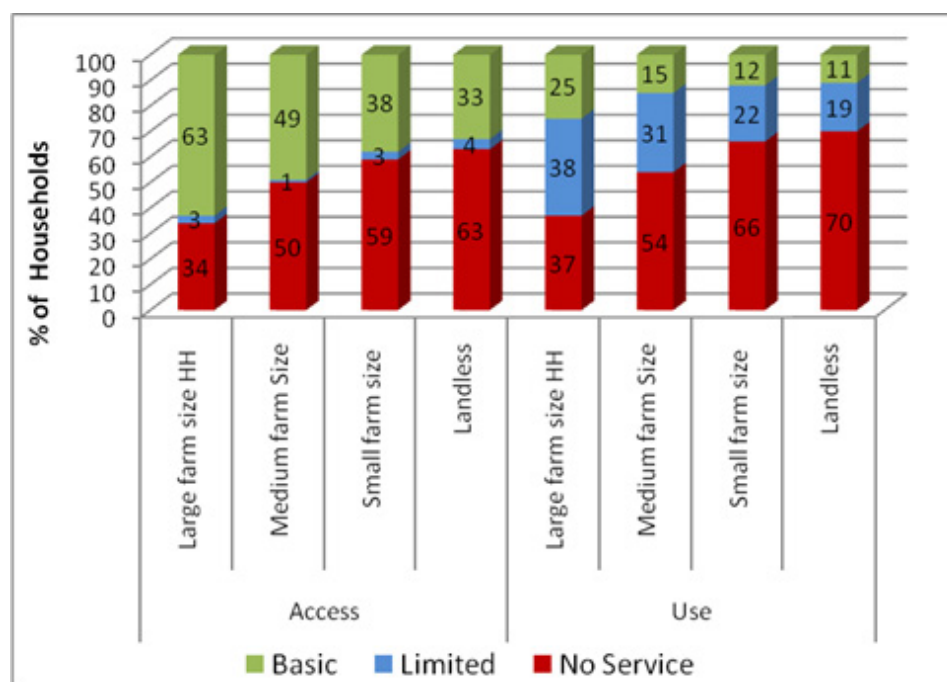
Map 2b: Map showing ISL access and Usage among the households



Access and Use across the Different land holding groups:

The access and use across the different land holding groups reveal that the large farm holding households have high access while small and landless families have low access. Even this small percentage of access by landless and small families can be attributed to the Government housing scheme (which makes the toilets compulsory) and subsidies but not with the realisation of health benefits.

Fig 5 : Access and Use by differentL and category

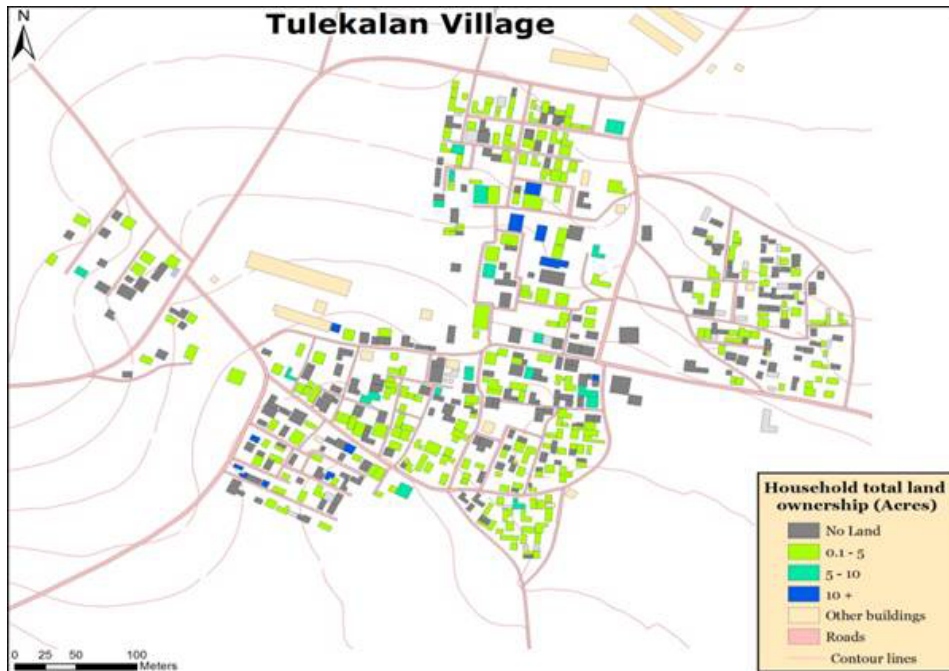


Source: WASHCost (India) study, 2010

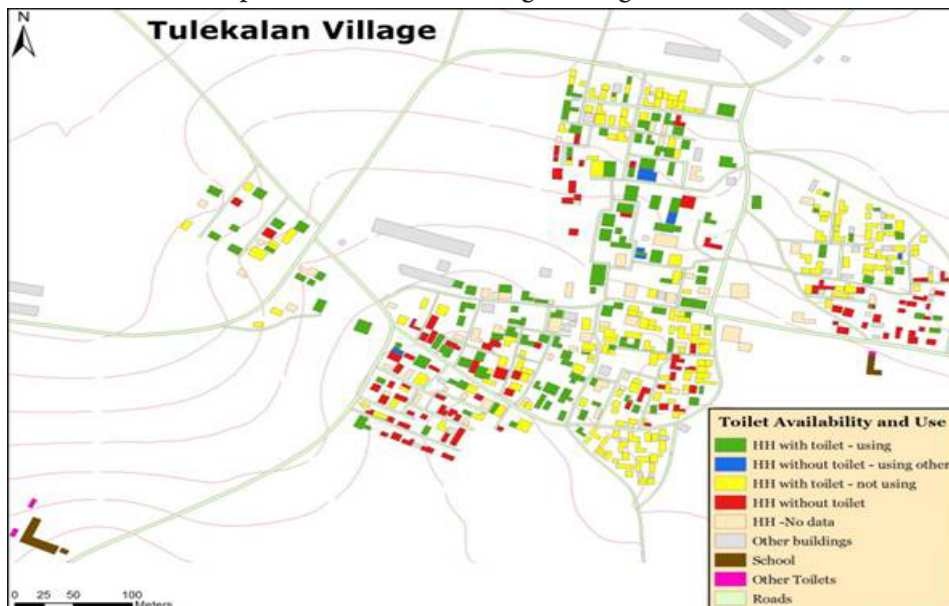
The usage figures reveal that the large farm holding households do use the toilets but not all the family members use the toilets indicating that habits (open defecation) die hard. The higher access and usage among the large family holdings is due to their education, awareness and exposure to better standard of living. The usage levels among the medium, small and landless families indicate very low levels of basic service (i.e. all family members use the toilet). Often to promote the toilet construction the govt is supplying the material at the door steps of the households and in some places the contractors take over. These factors are resulting in low quality assets which the households are not using or using for other purposes such as storage for fuel or agriculture equipment or to house the livestock etc. The value of safe sanitation is not realised by the households and Governments are not able to reach effectively on the behaviour change.

The detailed analysis at the household level within the village indicate and confirm the findings as shown in maps 3a and 3b.

Map 3a: Houesholds based on their farm size holding



Map3b : ISL Access and usage among households



The map clearly indicates that the access and use are high among the large farm size households having toilets in their house and are using it, while the landless families do not have the toilets and those who have toilets are not being used, which is similar across the small and medium farm size households. The non use of toilets that are constructed shows the wasted and dead investment for the hardware. Government and NGOs need to look at motivating the people to adopt better sanitation practices and to influence the behaviour change process shifting the business as usual to a more practical ways of addressing the root causes of poverty and bring awareness on better standard of living.

What drives people to have a toilet?

While conducting the household interviews it was also enquired from households what made them to construct the toilet and what factors really contribute to adopt better sanitation and hygiene. Some of the responses include "*Dignity for women and children*", "*comfort for elderly*", "*safety at night*", "*and protection from rain and sun*", etc. Based on the responses received from the field that the factors influenced the households to construct a toilet can be categorised into three types as shown in the table 3. These important factors need to be highlighted while designing the IEC for sanitation programs as success of some of the NGP villages can be attributed to these factors.

Table 3: Factors/Drivers perceived to motivate the households to access and use a toilet

| Personal factors | Socio and Economic Factors | Seasonal/environmental and Other factors |
|---|---|--|
| Privacy | Subsidy from Govt | Convenience during rainy seasons & night times |
| Security for women and Adolescent Girls | Improved social status in the society | Awareness on health benefits |
| Needs of elderly | Education levels of the family members | Non availability of open fields/ difficulty in accessing the agricultural fields |
| Self respect and shame to defecate openly | RWSS /Contractor constructed or Pressure from Panchayats to win the NGP Award | |

Source: WASHCost (India) study 2010

Conclusions:

The findings reveal that though the TSC and NGP award systems accelerating the coverage status but the actual usage of these toilets are very nominal and the open defecation is rampant among the rural households. Sanitation services received by the rural households are poor and the poor and disadvantaged families are the worst affected. If India has to achieve the open defecation free for all then the program requires a complete revamp of looking beyond the capital costs. The main recommendations from this study are that the TSC and NGP award system needs improvement in the following aspects:

- i) Increasing the scale and duration of expenditure on IEC that involves more activities over a longer period for achieving sustained behaviour change needs to be institutionalised, looking beyond the capital costs. Involving professional advertising agencies, media and Non Government Organisations is essential for effective results.
- ii) A step wise award system that rewards sustained achievement of sanitation services need to be designed. Third party monitoring for every six months should be in place before disbursing the total reward amount to the NGP villages;
- iii) Safeguards should be in place for the poorest of the poor, SC/ST and disadvantaged households to receive the Government subsidies on priority. Involving the SCs and STs and poorest of the poor households in decision making require the support of a professional agency / NGO's .
- iv) For effective implementation of TSC, there is an urgent need for convergence and sequencing the activities of TSC with proper allocations using LCCA. The activities need to be sequenced as "*demand generation*" followed by "*fund disbursal*" followed by "*regular monitoring*" to ensure sustained sanitation behaviour at household, school and community levels.
- v) Considering the village as a unit for fund transfer rather than targeting individual households for subsidies and behaviour change. Solid and liquid waste disposal should be coordinated well among the responsible departments.
- vi) Increased emphasis on achieving behavioural change keeping the motivational factors in view and building social responsibility for construction and monitoring of toilets, solid and liquid waste disposal at the village level.

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