

Suggested Citation

Kumar, A. (2014). Sanitation in Rural India: An Analysis of Households' Latrine Facility. *Journal of Studies in Dynamics and Change (JSDC)*, 1(6), Pages 231-246.

## Sanitation in Rural India An Analysis of Households' Latrine Facility

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### ABSTRACT

This paper examines Households' Latrine Facility in rural India using recent datasets from Census of India, National Sample Survey Housing Condition Rounds and other official estimates namely Physical Achievements of IHHL under NBA and Baseline Survey-2012 by Ministry of Drinking Water and Sanitation, and Evaluation Study on TSC by the Programme Evaluation Organization, Planning Commission, on the basis of which, it analyses and discusses the discrepancies found among various statistics. Although there has been an improvement over time, there has been a rise in the absolute number of deprived households, with notable variations in access among states, and rising disparities among economic and social groups, highlighting exclusion of backward-areas, Poor, Wage Labourers, STs and SCs. The results highlight the need to inclusively accelerate the pace of sanitation coverage in rural areas so as to comprehensively cover the rural community on target basis, with special attention to backward regions and weaker sections (socio-economic), through renewed strategies for enhancement of the quality of life of the people and to attain the vision of Nirmal Bharat by 2022.

**Keywords;** *Rural Sanitation, Individual Household Latrine Facility (IHHL), Total Sanitation Campaign, Nirmal Bharat Abhiyan, Socio-Economic Groups, Sopher's Disparity index, Probit analysis*

**JEL Classification:** J15, O18, P25, R53

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### **1. Introduction and Review of Policy and Programmes**

Health and hygiene of an individual is fundamentally dependent upon adequate availability of drinking water and proper sanitation. Consumption of unsafe drinking water, improper disposal of human excreta, improper environmental sanitation and lack of personal and food hygiene have been major causes of many diseases in developing countries. Astonishingly, around 2.5 billion people in the world still do not have access to proper sanitation, including toilets or latrines, which have dramatic consequences on human health, dignity and security, the environment, and social and economic development. The estimates of the United Nations reveal that over one billion people worldwide practise open defecation and thus constitutes the clearest

manifestation of extreme poverty. It directly impacts the vulnerable population, especially persons with disabilities and women, exposing them to sexual violence. Lack of private toilets in schools has long been a major reason for girls discontinuing their education once they enter puberty. Poor sanitation and water supply also result in economic losses estimated at \$260 billion annually in developing countries.

There is therefore, a direct relationship between water, sanitation and health, the importance of which was recognised by the UN Millennium Development Goals (MDGs). The 'Target 7c' of the MDGs exhorted the nation states to commit to 'Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation'. Recognizing that greater progress on



sanitation is essential for fighting poverty, ensuring proper health to all and for achieving all the MDGs, UN has renewed its commitment and determination on 'Target 7c' to make a headway towards progress on the sanitation and water goals and end the practice of open defecation by 2025.

The concern for access to sanitation in rural areas, especially latrine facilities was acknowledged by the Government of India in 1986, when the *Central Rural Sanitation Programme (CRSP)* was launched. The major objective of this program was to improve the quality of life of the rural population and provide privacy and dignity to women. Subsequently, the ambit of this program was amplified with the launch of a demand-driven and people-centred approach called the *Total Sanitation Campaign (TSC)* in 1999. It broadened the concept of sanitation to cover "personal hygiene, home sanitation, safe water, garbage disposal, excreta disposal and waste water disposal" and emphasized on Information, Education and Communication (IEC), human resource development, capacity development activities to increase awareness among the people in rural areas (MoDW&S: 2012a).

To give a fillip to the TSC, Government of India launched the *Nirmal Gram Puraskar (NGP)* in 2003. It sought to reward the achievements and efforts made in ensuring full sanitation coverage and give incentives for fully sanitized and open defecation free Gram Panchayats (GPs), Blocks, Districts and States. The award gained immense popularity and contributed effectively in bringing about a trend in the community to attain the 'Nirmal' status. This significantly added to the achievements made for increasing the sanitation coverage in the rural areas of the country.

Another landmark initiative of the Union Government was the launch of *Provision of Urban Amenities in Rural Areas (PURA)* in the year 2004. Targeted towards development of rural India, the primary objectives of PURA included provision of livelihood opportunities and urban amenities in rural areas in order to bridge the rural-urban divide. As a Public Private Partnership (PPP) between local executive bodies like the GPs and private sector partners, the technical assistance for this scheme was to be provided by the Ministry of Rural Development (MoRD), Department of Economic Affairs and the Asian Development Bank. This initiative was seen to be the first comprehensive attempt by the government that would lead to rural infrastructure development

combined with economic re-generation activities for people in remote rural areas (MoRD: 2011a).

With the determination to ensure rural development, *Bharat Nirman* was launched in the year 2005. The TSC has been included in this program along with other schemes that aim to improve the access to basic amenities in rural areas with special provisions for the poor, excluded and marginalised groups.

Encouraged by the success of NGP, the TSC was renamed as "*Nirmal Bharat Abhiyan*" (NBA) in 2012. The overall objective was to improve the quality of life in the rural areas and accelerate the pace of sanitation coverage in rural areas so as to comprehensively cover the rural community through renewed strategies and saturation approach and attain the vision of *Nirmal Bharat* by 2022.

The strategies and approaches to achieve the above objectives include: a) motivating communities and Panchayati Raj Institutions to promote sustainable sanitation facilities through awareness and health education; b) ensuring proper sanitation facilities and proactive promotion of hygiene education and sanitary habits among students in schools not covered under *Sarva Shiksha Abhiyan (SSA)* and *Anganwadi Centres*; c) encouraging cost effective and appropriate technologies for ecologically safe and sustainable sanitation; d) developing community managed environmental sanitation systems (like the *Community Sanitary Complexes* supported by *Rural Sanitary Marts and Production Centres*) focusing on solid and liquid waste management for overall cleanliness; and e) provision of *Individual Household Latrine (IHHL)*<sup>1</sup> that comprises of a cash incentive to households which itself constructs a Toilet unit<sup>2</sup>.

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<sup>1</sup> A duly completed household sanitary latrine, i.e. IHHL, shall comprise of a Toilet unit including a super structure. The construction of household toilets should be undertaken by the household itself and on completion and use of the toilet; the cash incentive can be given to the household in recognition of its achievement.

<sup>2</sup> The incentive amount to BPL households/identified APL households for construction of one unit of IHHL shall be Rs.4600.00 (Rs.5100.00 for difficult and hilly areas). The central share out of this shall be Rs.3200.00 (Rs.3700.00 in case of hilly and difficult areas) and State Government share shall be Rs.1400.00. Minimum beneficiary share shall be Rs.900.00 in cash or labour. State Governments are allowed the flexibility to provide higher incentive for a household toilet, of the same or higher unit costs from their own funds. All houses constructed with the central or/and state assistance should invariably have suitable sanitation facility as an integral part. Also all houses constructed by

While this program covers all rural families, the provision of incentives is extended to all Below Poverty Line (BPL) Households and Above Poverty Line Households (APL) restricted to scheduled castes/scheduled tribes (SCs/STs), small and marginal farmers, landless labourers with homestead, physically handicapped and women headed households. MoRD initiated the convergence of TSC and Mahatma Gandhi National Rural Employment Guarantee Scheme, with employment generated in the process of construction of IHHL as unskilled labour (up to 6 person days) and skilled labour (up to 2 person days under material component) (MoRD, 2011b).

This paper assesses the sanitation facility (household's latrine facilities) in rural areas using data from Census and National Sample Survey (NSS) followed by the analysis of the same using other official estimates namely Physical Achievements of IHHL under TSC/NBA and Baseline Survey 2012 by Ministry of Drinking Water and Sanitation (MoDW&S), and Evaluation Study on TSC by the Programme Evaluation Organization (PEO), Planning Commission. It also includes a discussion on the recent estimates of households' latrine facilities and the observed discrepancies. The patterns of households' Latrine Facilities across states along with the gaps among economic and social groups are analysed. It concludes with a discussion on determinants of households having Latrine Facility by using the household unit record data of the NSS Housing Conditions round (2008/9) that would help to identify the factors that affect the likelihood of households having Latrine Facility in the house.

## **2. Trends in Households' Latrine Facility**

### **2.1 Census of India, 2001 and 2011**

Census of India is conducted in two phases: the "Houselisting and Housing Census" phase and the "Population Enumeration" phase. The objective of first phase is to identify each building/census house and ascertain the quality of the census house, amenities accessible to it and assets available to the households living in those census houses.

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the beneficiaries under the Indira Awas Yojana (IAY) or any other state rural housing scheme which did not have toilets are also be eligible for the incentive as above for creation of sanitation facilities for the targeted groups under NBA.

The indicator which is selected from Census for assessing the deprivation in access to sanitation is ***Households not having latrine facility within the premise***. It refers to households having *public and open latrine use*, meaning no latrine facility within the premise. It excludes all the households having Latrine Facility, including water closet, pit and other latrine, within the premise. (This indicator was also used for fixing the target of 108 million under TSC in the year 2001).

Table 1 illustrates that access to latrine facility within the premise in rural areas has seen an improvement from year 2001 to 2011, with the percentage of households not having Latrine facility within the premise falling from 78.1% to 69.3% (improvement of 9 percentage points). It reveals that of the 30.7% of the households having latrine facility within the premise in 2011, 19.4% have water closet and 11.3% have pit and other latrine facility. Of the 69.3% of the households not having Latrine facility within the premise, 1.9% use Public Latrine and 67.3% practice Open Defecation.

The absolute number of households having Latrine facility within the premise has risen by 21.2 million from 30.3 million in 2001, to 51.6 million in 2011 (decadal growth of 70.1%). However, the absolute number of households not having Latrine facility within the premise has risen by 8.3 million from 108 million in 2001, to 116.3 million in 2011 (decadal growth of 7.7%). It indicates that the rate of decline of households not having Latrine facility within the premise has clearly fallen short of the desired rate to contain the rise in number of households not having Latrine facility within the premise.

### **2.2 National Sample Survey, Housing Condition Rounds, 1993, 2002, 2008/9 and 2012**

The National Sample Survey (NSS) Housing Condition Rounds is designed to collect information on housing condition (known as Schedule 1.2) with wider coverage on the aspects of housing, drinking water, sanitation, hygiene, and so on. The indicator which is selected for assessing the deprivation in access to sanitation is ***No Latrine Facility in the house*** (It refers to Public/community use and no facility in the house. Exclusive use and shared with other households both are excluded here).

There has been an improvement in the access to latrine facility in the house by the households during 1993 and 2008/9 with acceleration during 2002 and

2008/9 (Kumar: 2014). The proportions of households having No Latrine Facility in the house were 87.3%, 78.3%, 66.4% and 59.4% during 1993, 2002, 2008/9 and 2012 respectively (Table 7, Kumar: 2014; MoSPI: 2013). The compounded annual rate of decline of the proportions of households having No Latrine Facility in the house were found to be 1.1%, 2.6% and 3.0% between 1993-2002, 2002-2008/9 and 2008/9-2012 respectively<sup>3</sup>. This suggests that there has been significant acceleration in the rate of decline for households having No Latrine Facility in the house over time.

Thus it is observed from the above two data source-Census and NSS data that there are discrepancies and variations in the recent estimates of sanitation. While the 2001 Census reported 78.1% of the households deprived in latrine facilities in the house and the estimate for the same from NSS was 78.3% in 2002. However, the 2011 Census reported 69.3% of the households deprived in latrine facilities in the house, whereas the NSS estimates vary and reports the same as 66.4% and 59.4% during 2008/9 and 2012 respectively.

### **3. Other Official Estimates of Households Latrine Facility**

#### ***3.1 Progress and Performance of Physical Achievements of Individual Households Latrine (IHHL), Nirmal Bharat Abhiyan, Ministry of Drinking Water and Sanitation<sup>4</sup>***

<sup>3</sup> It should be noted here that the reference time is considered to be the mid-point of the NSS Housing Conditions surveys for arriving at the year differences between two surveys. 49<sup>th</sup> Round (January to June, 1993), 58<sup>th</sup> Round (July to December, 2002) and 69<sup>th</sup> Round (July to December, 2012) were completed in six months duration each whereas the 65<sup>th</sup> Round (July, 2008 to June, 2009) was completed in a year.

<sup>4</sup> The website of the MoDW&S ([www.ddws.nic.in](http://www.ddws.nic.in) , <http://tsc.gov.in/> ) hosts comprehensive information and data in connection with the formulation implementation and outcome of the programme. This data together with any other relevant data on social indicators can be utilized for social audit (MoDW&S: 2012). The website uploads and reports the real time data periodically for the physical achievements of the IHHL and can be accessed at <http://tsc.gov.in/TSC/NBA/NBAHome.aspx> .

The Ministry has also launched 'Swachhata Prerak' website, which is a one stop resource hub for all Swachhata Preraks, state/ district administration and field level implementers. The website will be an effective tool for monitoring the programme at district, state and national levels (access at

An illustration of the all-India figures for physical achievements of IHHL from Financial Year 2001-2002 to 2013-2014 (accessed from the website of the MoDW&S) is provided in Table 2. This data is available by beneficiaries for BPL households (disaggregated into SC and ST households) and APL households (disaggregated into SC, ST, Small & Marginal Farmers, Landless Labourers with homestead, Physically Handicapped and Women Headed Households).

It shows that there has been rapid increase in the physical achievement of IHHL (for aggregate and also BPL and APL) during 2001-2002 to 2010-2011 followed by declining trend thereafter during 2011-2012 to 2013-2014.

The total progress of physical achievement of IHHL between 2001-2002 and 2010-2011 was 78.27 million (achievement of 72.5% of the total target of 108 million households not having Latrine facility within the premise based on 2001 Census as fixed by TSC) and between 2001-2002 and 2013-2014 was 96.61 million. It should be noted here that 30.3 million households (of total 138.3 households) had latrine facility within the premise based on 2001 Census. On the basis of Census 2001 figures (total households 138.3 million), it also claims that 80.91% and 93.85% of the total households have achieved latrine facility within the premise by 2010-2011 and 2013-2014 respectively (Format A6, Table on Percentage-wise achievement against census 2001 total household, NBA). Based on the new targets fixed under NBA (125.7 million households including increase in the households based on projections for 2011), it claims that 76.7% of the targets has been achieved till 2013-2014 ([FormatA3] state-wise percentage achievements (only NBA), NBA).

These figures reveal marked inconsistencies and contradictions in the attainment levels of households not having Latrine Facility, as per the data furnished by the Census and the NSS. The physical achievement of IHHL between 2001-2002 and 2010-2011 reported an addition of 78.27 million households having Latrine facility within the premise. However, the 2001 Census reported 30.3 million households (21.9% of the total 138.3 million households) having latrine facility within the premise

<http://tsc.gov.in/SwachhtaPrerak/SwachhataPrerak/website/index.aspx> ).

which rose to 51.6 million households (30.3% of the total 167.8 million households) in 2011, leading to an addition of only 21.2 million households having Latrine facility within the premise during 2001 and 2011. NSS figures also support similar addition of households having latrine facility within the premise and marginally more than that of Census as discussed before.

The gap of 57 million households in the addition of households having Latrine facility within the premise during 2001 and 2011, between physical performance of IHHL, MoDW&S (78.27 million) and Census (21.2 million), is highly unlikely and also contrary. Other statistics from Base Line Survey 2012, MoDW&S and Evaluation Study on TSC, PEO, Planning Commission (discussed below) also suggest their divergence and dissimilarity with the figures provided from the physical performance of IHHL, MoDW&S. Therefore, this raises serious question on the credibility of the rural sanitation statistics from physical performance of IHHL, MoDW&S.

### **3.2 Base Line Survey - 2012, Ministry of Drinking Water and Sanitation**

There was a Base Line Survey conducted by MoDW&S in 2012 based on entries done by Gram Panchayats (GPs) (as reported by 240516 out of 249907 GPs (96.24 %) from 29 States). The survey reported that 59.6% of the households (total households - 171.22 million and total households without toilet - 102.12 million) are without toilets in their house (Table 3). It also reported that 59.0% and 60.1% of the BPL and APL households are without toilets respectively (BPL and APL households comprised 42.7% and 57.3% of the total households respectively).

### **3.3 Evaluation Study on TSC, Programme Evaluation Organization, Planning Commission**

The Programme Evaluation Organization (PEO) of Planning Commission was entrusted to conduct an independent evaluation of the TSC programme in order to assess the socio-economic impact of the programme, especially on individual health and environment with regard to the improvement of the sanitary services on different user groups, particularly the rural poor. The study covered 122 Districts, 206 Blocks, 1207 Gram Panchayats, 127 Rural Sanitary Marts (RSM) / Production Centres, 11,519 beneficiary households spread over 27 sample states of the country. One of the significant estimates of the study is that 72.63% households in rural India in the

sample state practice Open Defecation (OD) irrespective of having or not having toilet facilities (Planning Commission: 2013).

### **4. Comparison of Various Recent Estimates of Households' Latrine Facility**

The TSC had earlier fixed a target of 108 million households (not having Latrine facility) based on the Census 2001 figures, has now been replaced with new a target fixed under NBA of 125.7 million households incorporating the increase in the households, (during 2001 and 2011) based on the projections for 2011.

The proportion of households not having Latrine facility within the premise (includes public latrine and open defecation) were 69.3% (116.3 million households not having Latrine facility within the premise out of a total 167.8 million households) in 2011, as per the Census data.

The Evaluation Study on TSC estimated that 72.63% households in rural India (in their sample state) practiced open defecation irrespective of having or not having toilet facilities (Planning Commission: 2013). According to NSS housing condition rounds data, the proportions of households having No Latrine Facility in the house were 59.4% during 2012.

The Base Line Survey conducted by MoDW&S reported that 59.6% of the households (102.12 million households) were without toilets in their house in 2012.

The differences between the estimates of households not having latrine facility by Census (69.3%) for 2011 and NSS (59.4%) for 2012 and Base Line Survey, MoDW&S (59.6%) for 2012 raises serious questions and scepticism on the improvement occurred within one single year (2011–2012). Census reports that there has been improvement of 9 percentage points (over 10 years) in the proportion of households not having Latrine facility within the premise, which fell from 78.1% to 69.3% from year 2001 to 2011. However, data from NSS and Base Line Survey, MoDW&S for 2012 suggest improvement of 10 percentage points (over one year) in the proportion of households not having Latrine facility within the premise as compared to Census 2011 data.

For this to happen over one year (between 2011 and 2012), the compounded annual rate of decline of the

proportions of households having No Latrine Facility in the house has to be approximately 14% and the number of households getting Latrine Facility in the house has to be approximately 15 million<sup>5</sup>. The NSS data does suggest acceleration in the rate of decline of the proportions of households having No Latrine Facility in the house over time and the compounded annual rate of decline was 3% during 2008/9 and 2012. The data for progress on physical achievement of IHHL under NBA (Table 2) reports addition of only 8.8 million households during 2011-2012. Thereby suggesting that the improvement over one single year (2011-2012) as reported from various data sources may be spurious, and requires urgent attention for future planning and policy making.

## **5. Pattern of Households' Latrine Facility across States and Disparities among various Economic and Social Groups**

### ***5.1 Deprivation in Households' Latrine Facility across States***

As per the Census 2011, households in the states of Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Jammu & Kashmir, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal were found to have high levels of deprivation of Latrine Facility within the premises (Table 4). Spatial variations found can be also attributed to geographical, natural, social, cultural and local factors.

The 7.7% rise in the number of rural households not having availability of latrine facility within the premises from 2001 to 2011 was due to the rise in the number of deprived households in the states of Assam, Bihar, Chhattisgarh, Jammu & Kashmir, Jharkhand, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh and North-Eastern states like Arunachal Pradesh and Mizoram.

### ***5.2 Deprivation in Latrine Facility by the Households across Economic and Social Groups***

According to NSS data during 2008/9, among the economic groups - household type categories,

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<sup>5</sup> Number of Households in 2012 (based on exponential forecasting using Census data, 2001 and 2011) = 171 million, and 59.4% (households having No Latrine Facility in the house in 2012 by NSS) of 171 million households = 101.6 million households. Difference between figures for 2012 (101.6 million) and 2011 (116.3 million by Census) comes out to be approximately 15 million households.

Agricultural Labourers (83.1%) were found to be highly deprived in access to Latrine facilities in the house followed by Other Labourers (68.1%), Self Employed in Agriculture (65.1%), Self Employed in Non-Agriculture (53.0%) and lowest for Others (41.28%) (Kumar: 2014b).

Poor households were found to have very low annual rate of decline in case of deprivation in access to Latrine facilities in the house as compared to non-poor households, from 1993 to 2008/9, resulting in high levels of deprivation in 2008/9 (Table 5). Disparities in the deprivation among poor – non – poor households (as measured by Modified Sopher's Disparity Index, where the ideal value for the Index for having no disparity is 0), were observed to be substantially increasing as suggested from the increasing values of the index from 1993 to 2008/9.

According to the NSS, during 2008/9, 66.41% of rural households did not have latrine facility in the house. Across Socio-Religious groups, the levels for no latrine facility in the house was found very high for SCs (77.4%) followed by STs (76.5%), OBCs (70.4%) and lowest for Others household (44.5%) among social groups, and Hindus (69.9%) witnessed highest levels of deprivation among religious groups followed by Muslims (50.6%) and Other Religious Minorities (38.2%) (Kumar: 2014b).

The ST and SC households experienced higher levels of deprivation in access to Latrine facilities in the house and also lower annual rate of decline for the deprivation in access to Latrine facilities in the house as compared to 'Others' households in every MPCE quintile class categories during 1993 and 2008/9 from NSS data (Table 7). The rate of decline per annum improves for all the categories of social groups as we move from bottom to top MPCE quintile classes but the pattern across social groups remains the same. Disparities across various social groups in every MPCE quintile classes were also observed to be increasing as suggested from the increase in values of the Modified Sopher's Disparity index.

## **6. Determinants of Households having Latrine Facility in the House**

In order to identify the factors that affect the likelihood of the households having Latrine Facility in the house, the Household unit record data of 2008/9 NSS Housing Conditions Round has been used (using the Probit Model). The dependent variable in the model is households having latrine facility in the house and the explanatory variable are

household's affiliation to Monthly Per Capita Expenditure (MPCE) quintiles (consumption expenditure class categories), Household types, Social groups, Religious groups and States & UTs (with the category that was omitted for a variable referred as the 'reference category' for that variable). The results (estimated marginal effects) of the econometric exercise that was carried out to examine the contribution of different factors to households having latrine facility in the house are reported in Table 8.

Across MPCE quintiles, the results illustrate that as we move towards bottom quintiles, the probability for households having latrine facility in the house declines vis-à-vis the top quintile (reference category) households, controlling for other factors. The pattern across household types shows that AL and OL households were found worse with lesser probabilities as compared to 'Other' household types. The pattern across social groups suggests that ST and SC households were found to be worse with lesser probability followed by OBCs relative to 'Others' households. Across religious group, Hindu households followed by Muslim households were found to have lesser probabilities compared to Other Religious Minorities. Across states and UTs, households in backward states such as Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh were mostly found to have lesser probabilities than other states as compared to the reference category state i.e. Kerala.

The result of determinants of households having latrine facility in the house further supports the findings discussed in the earlier sections.

## **7. Conclusions and Policy Implications**

Though there has been an improvement in the proportion of rural households having latrine facility within the premise of the house over time as suggested by the Census and NSS data, the existing level of deprivation of the households having latrine facility (116.3 million households i.e. 69.3% of total households in 2011) is very high, alarming and calls for immediate attention towards sanitation in rural India. This becomes all the more important for enhancing the quality of life of people and ensuring sustainable development and environment as well.

The other cause of concern is the increase in the absolute number of such deprived households (8.3 million during 2001 and 2011) as suggested by the Census data. It clearly indicates that the rate of

decline of such deprived households has fallen short of the desired rate to contain the rise in number of such deprived households (also pointed out by the evaluation study on TSC by PEO, Planning Commission, 2013). Thus, despite having several programs like the TSC, PURA, NBA and others, a reinvigorated approach to achieve 'total sanitation for all' effectively is urgently needed, with special focus to end manual scavenging and open defecation. This would further consolidate India's determination to achieve the Millennium Development Goals of the UN in a time-bound manner.

Several discrepancies in the statistics of rural sanitation were found and highlighted while analysing additional information from other official estimates namely physical achievements of IHHL under TSC/NBA, MoDW&S and Baseline Survey 2012 by MoDW&S, and Evaluation Study on TSC by PEO, Planning Commission.

The physical achievement of IHHL, MoDW&S between 2001-2002 and 2010-2011 reports addition of 78.27 million households having Latrine facility within the premise. However, Census reported addition of only 21.2 million households having Latrine facility within the premise during 2001 and 2011. The gap of 57 million households in the addition of households having Latrine facility within the premise during 2001 and 2011, between physical performance of IHHL, MoDW&S (78.27 million) and Census (21.2 million), is unlikely and also contrary. Other statistics from NSS, Base Line Survey, MoDW&S 2012 and Evaluation Study on TSC by PEO, Planning Commission also suggest their divergence and dissimilarities in the figure provided by the physical performance of IHHL, MoDW&S.

The differences between the estimates of the proportion of households not having latrine facility by Census (69.3%) for 2011 and NSS (59.4%) for 2012 and Base Line Survey (59.6%) for 2012 raise doubts on the improvement occurred within one single year (2011 - 2012). According to the Census, there has been improvement of nine percentage points (over 10 years) in the proportion of households not having Latrine facility within the premise (falling from 78.1% to 69.3%) from year 2001 to 2011, whereas, data from the NSS and Base Line Survey for 2012 suggest improvement of 10 percentage points from 2011 to 2012 (over one year) in the proportion of households not having Latrine facility within the premise. This contradiction suggests (along with other empirical evidences as discussed

before) that these estimates may be spurious and requires serious care for future planning and efficient research.

Households in backward states like Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh were found lagging behind other states in the rate of decline for deprivation of Latrine facility within the premises, and were also found to have high levels of deprivation in the present situation.

Poor households as compared to non-poor households and Scheduled Tribe and Scheduled Caste households as compared to Others households were found to have slower annual rate of decline in the deprivation in access to Latrine facilities in the house, resulting in their high levels of deprivation in terms of the existing levels and in their persistence in the access gap. The rate of decline per annum improves for all the categories of social groups as we move from bottom to top MPCE quintile classes, but the pattern across social groups remains the same.

Disparities in the deprivation among poor - non-poor households, between Scheduled Tribe and Scheduled Caste households, between Scheduled Caste and Other households, and between Scheduled Tribe and Other households were observed to be increasing as suggested from the increasing values of the Modified Sopher's Disparity index.

Households in backward states and those belonging to poor, Wage labourers (Agricultural and Other Labourers), Scheduled Tribe and Scheduled Caste were found to be most deprived in latrine facilities in rural areas. The result of determinants of households having latrine facility in the house further vindicates these findings.

Hence, sanitation in rural India requires an immediate and urgent attention along with appropriate policy measures, with an emphasis upon backward states and targeted social and economic groups. This would go a long way in achieving the goal of Inclusive Growth, besides ensuring safeguards towards equitable access to services.

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## Tables Used

**Table 1: Levels and Changes in Latrine Facilities of the Households during 2001 and 2011 in Rural India.**

	2011		2001		2001 - 2011 (Changes)			
	Number (in million)	as proportion of total HHs (in %)	Number (in million)	as proportion of total HHs (in %)	Number (in million)	decadal growth in %	annual exponenti al in %	compound ed annual in %
Total Households	167.8		138.3		29.6	21.4	1.9	
Households Not having Latrine Facility within the premise	116.3	69.3	108.0	78.1	8.3	7.7	0.7	-1.2
Households having Latrine facilities within the premise	51.6	30.7	30.3	21.9	21.2	70.1	5.3	3.4

Note: Annual compounded growth rate is calculated based upon proportion of HHs in 2011 over proportion of HHs in 2001 of levels of deprivation/attainment.

Source: Author's Calculation using Tables on Houses, Household Amenities and Assets, Houselisting and Housing Data, Census of India, 2001 and 2011.

**Table 2: All India figures of Physical Achievement of Individual Household Latrines (in millions), Nirmal Bharat Abhiyan (NBA), Ministry of Drinking Water and Sanitation**

SL.No	Finance Year	IHHL BPL			IHHL APL						Total IHHL (APL+ BPL)	
		Total	SC	ST	Total	SC	ST	Small & Marginal Farmers	Landless Labourers with homestead	PH		Women Headed House holds
1	2001-2002	0.64	0.08	0.02								0.64
2	2002-2003	0.60	0.07	0.03								0.60
3	2003-2004	5.50	1.55	0.48	0.63							6.14
4	2004-2005	2.89	0.87	0.23	1.70							4.58
5	2005-2006	4.08	0.90	0.37	5.09							9.17
6	2006-2007	4.77	1.06	0.59	4.93							9.70
7	2007-2008	5.76	1.28	0.84	5.76							11.53
8	2008-2009	5.57	1.27	0.79	5.69							11.27
9	2009-2010	5.87	1.22	0.91	6.54							12.41
10	2010-2011	6.16	1.39	0.91	6.09	0.46	0.15					12.24
<b>Total</b>	<b>2001-2011</b>	<b>41.84</b>	<b>9.68</b>	<b>5.16</b>	<b>36.44</b>	<b>0.46</b>	<b>0.15</b>					<b>78.27</b>
11	2011-2012	4.73	1.13	0.75	4.06	0.49	0.21					8.80
12	2012-2013	2.92	0.70	0.34	1.64	0.18	0.11	0.21	0.08	0.01	0.02	4.56
13	2013-2014	2.55	0.53	0.39	2.42	0.37	0.24	0.91	0.31	0.03	0.11	4.98
<b>Total</b>	<b>2001 - 2014</b>	<b>52.04</b>	<b>12.05</b>	<b>6.63</b>	<b>44.56</b>	<b>1.51</b>	<b>0.71</b>	<b>1.12</b>	<b>0.39</b>	<b>0.03</b>	<b>0.13</b>	<b>96.61</b>

Note: IHHL- Individual Household Latrine, BPL- Below Poverty Line, APL- Above Poverty Line, ST- Scheduled Tribe, SC- Scheduled Caste, PH- Physically Handicapped.

Source: Ministry of Drinking Water and Sanitation, Accessed online from <http://tsc.gov.in/tsc/NBA/NBAHome.aspx>

**Table 3: Statewise Base Line Survey - 2012, Ministry of Drinking Water and Sanitation (Abstract) for IHHL (in millions)**

SL. No.	State Name	Total HH (APL+BPL)	Total HH without Toilets (APL+BPL)	BPL Households			APL Households			Identified
				Total	With Toilet	Without Toilet	Total	With Toilet	Without Toilet	
1	2	3=[5+8]	4=[7+10]	5	6	7	8	9	10	11
1	A&N Isl.	0.05	0.02	0.01	0.00	0.00	0.04	0.02	0.02	0.01
2	AP	12.03	8.32	11.39	3.41	7.99	0.64	0.30	0.33	0.16
3	Aruna. Pr.	0.18	0.10	0.12	0.05	0.07	0.05	0.02	0.03	0.03
4	Assam	4.89	2.82	1.55	1.17	0.38	3.34	0.90	2.44	2.19
5	Bihar	21.40	16.81	11.61	2.64	8.97	9.79	1.94	7.84	6.66
6	Chhattisg.	4.43	2.68	1.87	1.05	0.82	2.56	0.70	1.86	1.68
7	Goa	0.19	0.07	0.03	0.01	0.03	0.15	0.11	0.04	0.01
8	Gujarat	7.03	3.32	1.74	0.86	0.88	5.28	2.84	2.44	1.92
9	Haryana	3.07	0.76	0.78	0.56	0.22	2.29	1.75	0.54	0.49
10	H. P	1.48	0.21	0.28	0.25	0.04	1.20	1.03	0.17	0.15
11	J & K	1.04	0.78	0.45	0.08	0.37	0.59	0.18	0.41	0.29
12	Jharkhand	5.16	3.71	2.50	1.26	1.25	2.66	0.19	2.47	2.37
13	Karnataka	8.51	5.50	5.38	1.78	3.59	3.14	1.23	1.91	1.48
14	Kerala	5.20	0.28	1.92	1.67	0.25	3.28	3.26	0.02	0.02
15	M. P.	12.23	9.03	5.35	1.73	3.62	6.88	1.47	5.41	4.33
16	Maharashtra	12.52	6.51	3.93	1.83	2.10	8.59	4.18	4.41	3.31
17	Manipur	0.43	0.21	0.20	0.13	0.07	0.23	0.09	0.14	0.14
18	Meghalaya	0.41	0.20	0.26	0.14	0.12	0.15	0.08	0.07	0.07
19	Mizoram	0.17	0.04	0.06	0.04	0.02	0.11	0.09	0.02	0.02
20	Nagaland	0.26	0.13	0.21	0.09	0.12	0.05	0.04	0.01	0.01
21	Odisha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Punjab	3.19	0.79	0.57	0.36	0.20	2.62	2.04	0.59	0.37
23	Rajasthan	11.51	8.37	2.16	0.61	1.56	9.35	2.53	6.81	5.42
24	Sikkim	0.06	0.01	0.02	0.01	0.01	0.04	0.04	0.00	0.00
25	Tamil Nadu	9.54	5.27	3.44	1.41	2.03	6.10	2.86	3.24	3.05
26	Tripura	0.82	0.31	0.33	0.20	0.13	0.48	0.31	0.18	0.14
27	U. P	28.69	18.58	9.99	5.12	4.87	18.71	4.99	13.71	12.29
28	Uttarakhand	1.55	0.51	0.60	0.40	0.20	0.95	0.64	0.31	0.30
29	West Bengal	15.17	6.78	6.34	3.14	3.21	8.83	5.25	3.57	2.82
<b>Total :-</b>		171.22	102.12	73.12	30.00	43.12	98.1	39.10	59.00	49.71

Note: 1) Report is based on entries done by 240516 out of 249907 (96.24 %) GPs as reported by 29 States.

2) Report may get changed because of continuous data entries is being done.

Source: Ministry of Drinking Water and Sanitation, Accessed online from <http://tsc.gov.in/tsc/NBA/NBAHome.aspx>

**Table 4: Households deprived of Latrine Facility within the premise across States & UTs between 2001 and 2011 in Rural India**

Rural	2011		2001		2001 - 2011 (Changes)			
	No. (million)	<i>as proportion of total HHs (in %)</i>	No. (million)	<i>as proportion of total HHs (in %)</i>	No. (million)	<i>decadal growth in %</i>	<i>annual exponential in %</i>	<i>compounded annual in %</i>
Jammu & Kashmir	0.92	61.4	0.68	58.2	0.24	36.0	3.1	0.5
Himachal Pradesh	0.44	33.4	0.79	72.3	-0.36	-44.8	-5.9	-7.4
Punjab	0.98	29.6	1.64	59.1	-0.66	-40.1	-5.1	-6.7
Chandigarh #	0.00	12.0	0.01	31.5	-0.01	-87.8	-21.1	-9.2
Uttarakhand	0.65	45.9	0.82	68.4	-0.17	-21.1	-2.4	-3.9
Haryana	1.30	43.9	1.75	71.3	-0.45	-25.6	-3.0	-4.7
Delhi	0.02	23.7	0.06	37.1	-0.04	-70.2	-12.1	-4.4
Rajasthan	7.63	80.4	6.11	85.4	1.51	24.8	2.2	-0.6
Uttar Pradesh	19.93	78.2	16.63	80.8	3.30	19.8	1.8	-0.3
Bihar	13.95	82.4	10.90	86.1	3.05	28.0	2.5	-0.4
Sikkim	0.01	15.9	0.04	40.6	-0.02	-60.6	-9.3	-9.0
Arunachal Pradesh	0.09	47.3	0.09	52.7	0.01	6.9	0.7	-1.1
Nagaland	0.09	30.8	0.09	35.4	-0.01	-6.5	-0.7	-1.4
Manipur	0.05	14.0	0.07	22.5	-0.02	-29.5	-3.5	-4.6
Mizoram	0.02	15.4	0.02	20.3	0.00	0.6	0.1	-2.7
Tripura	0.11	18.5	0.12	22.1	-0.01	-5.3	-0.5	-1.7
Meghalaya	0.19	46.1	0.20	59.9	0.00	-1.4	-0.1	-2.6
Assam	2.17	40.4	1.71	40.4	0.47	27.3	2.4	0.0
West Bengal	7.31	53.3	8.16	73.1	-0.85	-10.4	-1.1	-3.1
Jharkhand	4.33	92.4	3.55	93.4	0.78	21.8	2.0	-0.1
Odisha	7.00	85.9	6.26	92.3	0.74	11.8	1.1	-0.7
Chhattisgarh	3.75	85.5	3.19	94.8	0.56	17.6	1.6	-1.0
Madhya Pradesh	9.66	86.9	7.40	91.1	2.26	30.6	2.7	-0.5
Gujarat	4.53	67.0	4.61	78.3	-0.08	-1.8	-0.2	-1.6
Daman & diu #	0.01	48.6	0.02	68.0	-0.01	-58.7	-8.8	-3.3
D. & N. Haveli #	0.03	73.5	0.03	82.7	0.00	-4.0	-0.4	-1.2
Maharashtra	8.07	62.0	8.99	81.8	-0.92	-10.3	-1.1	-2.7
Andhra Pradesh	9.66	67.8	10.38	81.9	-0.71	-6.9	-0.7	-1.9
Karnataka	5.63	71.6	5.51	82.6	0.12	2.1	0.2	-1.4
Goa	0.04	29.1	0.07	51.8	-0.04	-50.3	-7.0	-5.6
Lakshadweep #	0.00	1.9	0.00	6.9	0.00	-86.6	-20.1	-11.9
Kerala	0.28	6.8	0.92	18.7	-0.65	-69.9	-12.0	-9.6
Tamil Nadu	7.34	76.8	7.09	85.6	0.26	3.6	0.4	-1.1
Puducherry #	0.06	61.0	0.06	78.6	0.00	2.2	0.2	-2.5
A & N Islands#	0.02	39.8	0.03	57.7	-0.01	-18.0	-2.0	-3.6
India	116.25	69.3	107.97	78.1	8.28	7.7	0.7	-1.2

Note: # denotes Union Territories.

Source: Author's Calculation using Tables on Houses, Household Amenities and Assets, Houselisting and Housing Data, Census of India, 2001 and 2011.

**Table 5: Changes in Levels of Deprivation of Latrine Facility in the House in Rural Areas by Poor - Non-Poor, 1993 and 2008-09 (in percentage points and Annual Compound Growth Rate)**

	Non-Poor	Poor	Total		Modified Sopher's Disparity Index  (Poor, Non-Poor)
<b>No Latrine Facility in the House</b>					
<b>Levels in 1993</b>	84.01	91.65	87.83		-0.07
<b>Levels in 2008-09</b>	59.83	83.8	66.46		-0.23
<b>Changes during 1993- 2008-09 (annual compounded)</b>	-2.13	-0.57	-1.75	Changes in Index Value	-0.16

Note: Poverty line has been calculated based on old official poverty line method used by Planning commission. Poverty line has been updated using Consumer Price Index for Agricultural Labourers (Base year 1986-7 = 100).  
 $Modified\ Sopher's\ Disparity\ Index = \log(X2/X1) + \log[(200-X1)/(200-X2)]$   
 Annual compounded growth rate is calculated based upon proportion of HHs in 2008/9 over proportion of HHs in 1993 of levels of deprivation.  
 Source: Author's Calculation using National Sample Survey, Housing Conditions Round unit record data for the respective years.

**Table 6: Deprivation in Access to Latrine Facility within the Premise by the Households across Social Groups between 2001 and 2011 in Rural India**

Rural	ST	SC	Other	Total		Modified Sopher's Disparity Index (SC, ST) (SC, Other) (ST, Other)		
<i>2011</i>								
<b>Number (in million)</b>	16.96	25.4	73.89	116.25				
<b>as proportion of total HHs (in %)</b>	84.2	77.2	64.4	69.3		0.06	-0.12	-0.19
<i>2001</i>								
<b>Number (in million)</b>	14.13	23.72	70.12	107.97				
<b>as proportion of total HHs (in %)</b>	88.9	84.9	74.2	78.1		0.04	-0.10	-0.13
<i>2001 - 2011 (Changes)</i>								
<b>Number (in million)</b>	2.84	1.67	3.77	8.28	Changes in Index Value	0.03	-0.02	-0.05
<b>decadal growth in %</b>	20.1	7.1	5.4	7.7				
<b>annual exponential in %</b>	1.8	0.7	0.5	0.7				
<b>compounded annual in %</b>	-0.5	-1.0	-1.4	-1.2				

Note: ST- Scheduled Tribe, SC- Scheduled Caste, Other- Other than ST and SC.  
 Source: Author's Calculation using Tables on Houses, Household Amenities and Assets, Houselisting and Housing Data, Census of India, 2001 and 2011.

**Table 7: Changes in Levels of No Latrine Facility in the House by Social Groups and MPCE Quintile Categories in Rural India, 1993 and 2008-09 (in percentage points and Annual Compound Growth Rate)**

CEC	ST	SC	Others	All	Modified Sopher's Disparity Index	
					(SC, ST)	(SC, Others)
	<b>Levels in 1993</b>				<b>1993</b>	
<b>0-20</b>	94.65	93.63	90.99	92.26	0.01	-0.02
<b>20-40</b>	91.73	92.03	88.68	89.82	0.00	-0.03
<b>40-60</b>	88.32	90.13	86.93	87.73	-0.02	-0.03
<b>60-80</b>	87.31	88.92	83.18	84.62	-0.01	-0.05
<b>80-100</b>	80.79	82.47	73.57	75.2	-0.02	-0.08
<b>Total</b>	90.83	91.09	85.37	87.24	0.00	-0.05
	<b>Levels in 2008-09</b>				<b>2008-09</b>	
<b>0-20</b>	91.07	89.12	80.09	84.63	0.02	-0.08
<b>20-40</b>	79.14	82.79	73.93	76.85	-0.03	-0.08
<b>40-60</b>	71.36	76.62	65.78	68.86	-0.05	-0.10
<b>60-80</b>	66.07	70.97	56.4	60.19	-0.05	-0.15
<b>80-100</b>	47.82	52.17	35.05	38.38	-0.05	-0.22
<b>Total</b>	76.52	77.43	60.92	66.41	-0.01	-0.16
	<b>Changes in Levels during 1993 to 2008-09, Annual Compounded</b>				<b>Changes in Index Value</b>	
<b>0-20</b>	-0.24	-0.31	-0.81	-0.55	0.01	-0.06
<b>20-40</b>	-0.93	-0.67	-1.15	-0.99	-0.03	-0.05
<b>40-60</b>	-1.34	-1.03	-1.75	-1.53	-0.03	-0.07
<b>60-80</b>	-1.75	-1.42	-2.44	-2.14	-0.03	-0.10
<b>80-100</b>	-3.27	-2.87	-4.6	-4.18	-0.04	-0.14
<b>Total</b>	-1.08	-1.03	-2.12	-1.72	-0.01	-0.11

Note: ST- Scheduled Tribe, SC- Scheduled Caste, Others- Forward Castes and also Other Backward Castes.

MPCE: Monthly Per Capita Expenditure. Consumption Expenditure Classes (CEC) MPCE Quintile classes are in percentages.

Source: Author's Calculation using National Sample Survey, Housing Conditions Round unit record data for the respective years.

**Table 8: Results of Maximum Likelihood Probit Model for Latrine Facility in Rural India during 2008/9**  
**Dependent Variable: Households having Latrine Facility in the House**

	dF/dx	Robust Z	P> z
<i>CEC MPCE Quintile Categories</i>			
<b>Quintile 1 (0-20)*</b>	<b>-0.263</b>	-44.03	0.00
<b>Quintile 2 (20-40)*</b>	<b>-0.217</b>	-37.61	0.00
<b>Quintile 3 (40-60)*</b>	<b>-0.177</b>	-30.95	0.00
<b>Quintile 4 (60-80)*</b>	<b>-0.125</b>	-21.98	0.00
<i>Household Types</i>			
<b>Self Employed in Non-Agriculture*</b>	<b>-0.041</b>	-5.55	0.00
<b>Agricultural labourers*</b>	<b>-0.282</b>	-43.14	0.00
<b>Other Labourers*</b>	<b>-0.193</b>	-26.41	0.00
<b>Self Employed in Agriculture*</b>	<b>-0.094</b>	-14.74	0.00
<i>Social Groups</i>			
<b>ST*</b>	<b>-0.193</b>	-27.17	0.00
<b>SC*</b>	<b>-0.160</b>	-27.43	0.00
<b>OBC*</b>	<b>-0.094</b>	-17.96	0.00
<i>Religious Groups</i>			
<b>Hindus*</b>	<b>-0.136</b>	-12.83	0.00
<b>Muslims*</b>	<b>-0.077</b>	-6.52	0.00
<i>States &amp; UT's</i>			
<b>Andhra Pradesh*</b>	<b>-0.393</b>	-49.26	0.00
<b>Arunachal Pradesh*</b>	<b>-0.133</b>	-6.54	0.00
<b>Assam*</b>	0.024	1.66	0.10
<b>Bihar*</b>	<b>-0.408</b>	-53.04	0.00
<b>Jharkhand*</b>	<b>-0.388</b>	-44.04	0.00
<b>Delhi*</b>	<b>-0.138</b>	-3.20	0.00
<b>Goa*</b>	<b>-0.323</b>	-11.47	0.00
<b>Gujarat*</b>	<b>-0.381</b>	-44.87	0.00
<b>Haryana*</b>	<b>-0.334</b>	-29.28	0.00
<b>Himachal Pradesh*</b>	<b>-0.342</b>	-32.07	0.00
<b>J and K*</b>	<b>-0.306</b>	-23.65	0.00
<b>Karnataka*</b>	<b>-0.385</b>	-45.44	0.00
<b>Madhya Pradesh*</b>	<b>-0.412</b>	-53.17	0.00
<b>Chhattisgarh*</b>	<b>-0.363</b>	-34.10	0.00
<b>Maharashtra*</b>	<b>-0.385</b>	-46.57	0.00
<b>Manipur*</b>	<b>0.366</b>	13.27	0.00
<b>Meghalaya*</b>	0.006	0.28	0.78
<b>Mizoram*</b>	<b>0.375</b>	6.92	0.00
<b>Nagaland*</b>	<b>0.150</b>	4.43	0.00
<b>Orissa*</b>	<b>-0.414</b>	-54.57	0.00
<b>Punjab*</b>	<b>-0.320</b>	-25.17	0.00
<b>Rajasthan*</b>	<b>-0.420</b>	-59.21	0.00
<b>Sikkim*</b>	<b>0.294</b>	9.35	0.00
<b>Tamil Nadu*</b>	<b>-0.399</b>	-51.08	0.00
<b>Tripura*</b>	<b>0.370</b>	15.93	0.00
<b>Uttar Pradesh*</b>	<b>-0.466</b>	-61.41	0.00
<b>Uttaranchal*</b>	<b>-0.359</b>	-28.81	0.00
<b>West Bengal*</b>	<b>-0.267</b>	-25.53	0.00
<b>Andaman and Nicobar Islands*</b>	<b>-0.351</b>	-17.03	0.00
<b>Chandigarh*</b>	<b>-0.173</b>	-3.16	0.00

<b>D and N Haveli*</b>	<b>-0.276</b>	-9.82	0.00
<b>Daman and Diu*</b>	<b>-0.275</b>	-9.58	0.00
<b>Pondicherry*</b>	<b>-0.358</b>	-16.19	0.00

<b>Number of observations</b>	97098
<b>Pseudo R2</b>	0.3576

Notes: Reference Categories – MPCE: quintile 5 (80-100); Household Types: Others; Social groups: Others; Religious Groups: Other Religious Minorities; States & UT's: Kerala. (Lakshadweep dropped from the estimation as it predicts success perfectly)

Df/dx are marginal effects, i.e., the change in probability of having Latrine facility in the house with a one unit change in the right side variable (discrete change of dummy variable from 0 to 1)

A “\*\*” implies the variable is dichotomous.

Z and  $P > |z|$  correspond to the test of the underlying coefficient being 0.

dprobit option from STATA have been used for estimation using vce(robust) command.

Source: Estimated using unit record data from the National Sample Survey on Housing Conditions during 65th round (2008/9).