

Commentary on India's Economy and Society Series

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Swachh Bharat - 2019: Will Rural India be ODF/Swachh?

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India's Economy and indeed its society has been undergoing a major change since the onset of economic reforms in 1991. Overall growth rate of the economy has increased, the economy is getting increasingly integrated with the rest of the world and public policies are now becoming very specific compared over arching framework policies of the pre-reform period. Over the past few years, a number of important policies have been enunciated, like for instance the policy on moving towards a cashless economy to evolving a common market in the country through the introduction of a Goods and Services Tax. Issues are becoming complex and the empirical basis difficult to decipher. For instance the use of payroll data to understand growth in employment, origin-destination passenger data from railways to understand internal migration, Goods and Services Tax Network data to understand interstate trade. Further, new technologies such as Artificial Intelligence, Robotics and Block Chain are likely to change how manufacturing and services are going to be organised. The series under the "Commentary on India's Economy and Society" is expected to demystify the debates that are currently taking place in the country so that it contributes to an informed conversation on these topics. The topics for discussion are chosen by individual members of the faculty, but they are all on issues that are current but continuing in nature. The pieces are well researched, engages itself sufficiently with the literature on the issue discussed and has been publicly presented in the form of a seminar at the Centre. In this way, the series complements our "Working Paper Series".

CDS welcomes comments on the papers in the series, and these may be directed to the individual authors.

**SWACHH BHARAT - 2019:
WILL RURAL INDIA BE ODF/SWACHH?**

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ABSTRACT

Launched on 2nd October 2014, the Swachh Bharat Mission (SBM) is the Government of India's (GoI) nation-wide flagship program ideated with an objective to advance the country's sanitation agenda. Although many are listed its main aim is to reduce and subsequently eliminate open defecation through the construction of individual, cluster and community toilets and establish reliable mechanisms to monitor the latrine usage. SBM aims to achieve an open defecation free India by 2nd October 2019. It also envisages appropriate Solid and Liquid Waste Management, Information, Education and Communication (IEC) activities, Capacity building of the stakeholders, and Micro-financing of construction of toilets. Several efforts are being made by many agencies as well as the government of India and state governments to attain the target of making entire India open defecation free by 2nd Oct. 2019. Although the programme has separate components for both rural and urban settings, in this we consider the achievements and draw backs of rural villages alone.

The capabilities approach of Amartya Sen, synthesised with the New Intuitional Economics is used as the theoretical basis. A district wise analysis of the situation making use of the NFHS 4 data has been carried out in order to explore to what extend the entire country will be able to achieve the targets. This is corroborated with the monitoring information available with the Ministry of Drinking Water and Sanitation for each district as on 30-6-2018 and the same is analysed to explore to what extent it will be possible to make India open defecation free. Studies and analysis carried out by others through secondary sources of information and researches have also been used to elaborate to what extend it will be possible to achieve the target. Achievements and pit faults are looked into and policy suggestions are made as to what corrective action can make rural India ODF at the earliest. Further implications of open defecation particularly among children are also explored making use of the NFHS 4 data, mainly to establish to what extend the nutrition among children are affected/influenced by sanitation, as a measure of the final outcome i.e. sanitation and capabilities. The results of many studies and our own analysis points to the fact that though there are substantial reductions in open defecation it is not possible to achieve fully by the targeted date. The policy conclusions are that there is a dare need to retune the IEC and its implementation in many states, plug the leakages in the system etc. Further many technologies both conventional and old and new exist, diffusion of it among the common man has not taken place or rather it is very weak; even after elapsing two decades of its introduction. Exploitation of such technologies to the fullest extend depending on the local circumstances could possibly ward off many of the fears and achieve full target with optimal sustainability of the programme.

Keywords: Swachh Bharat, ODF, Sanitation, IEC, Capabilities, Stunting

JEL Classification: I 38

Swachh Bharat - 2019:

Will Rural India be ODF/SWACHH?

INTRODUCTION

There are variations on the use of the term "sanitation" between countries. For example, hygiene promotion is seen by some as an integral part of sanitation. Field experience suggests that promotion of hygiene activities yield better result than the provision of hardware components alone. For this reason, the Water Supply and Sanitation Collaborative Council defines sanitation as "The collection, transport, treatment and disposal or reuse of human excreta, domestic wastewater and solid waste, and associated hygiene promotion." Poor sanitation is a primary cause for many deadly diseases, deaths among children under age five, contamination of groundwater sources, loss of family income on account of increased health costs, and compromised human dignity. In managing safe sanitation at each level - household, community, and governments, understanding the impacts of poor sanitation, contribution of all key stakeholders including communities, implementation of safe sanitation processes etc are considered crucial.

The World Health Organization defines the term "sanitation" as "..... generally refers to the provision of facilities and services for the safe disposal of human urine and feces. The word 'sanitation' also refers to the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal." However, experience shows that this provision itself is insufficient and whatever provided must be used too.

Sanitation includes all four of these engineering infrastructure items (even though often only the first one is strongly associated with the term "sanitation"): excreta management systems, wastewater management systems (including wastewater treatment plants), solid waste management systems, drainage systems for rainwater, also called storm water drainage.

Effective sanitation systems provide barriers between excreta and humans in such a way as to break the disease transmission cycle (for example in the case of fecal-borne diseases). This aspect is visualised with the F-diagram where all major routes of faecal-oral disease transmission begin with the letter F: feces, fingers, flies, fields, fluids, food.

The "F-diagram" (feces, fingers, flies, fields, fluids, food), showing pathways of fecal-oral disease transmission.

Further information: Child mortality and Infant mortality



Despite iterated efforts one of the main challenges is to provide sustainable sanitation, especially in developing countries. Maintaining and sustaining sanitation has aspects that are technological, institutional, behavioural and social in nature. Sanitation infrastructure has to be adapted to several specific contexts including consumers' expectations and local resources available, and the penetration and understanding among the common people about the choices, advantages and disadvantages of different technologies. All these requires appropriate tools and some mediation to disseminate the advantages from it.

Providing sanitation to people requires attention to the entire system, not just focusing on technical aspects alone; such as the toilet, fecal sludge management or the wastewater treatment plant. The "sanitation chain" involves the experience of the user, excreta and wastewater collection methods, transporting and treatment of waste, and reuse or disposal. All need to be thoroughly considered.

The Human Right to Water and Sanitation was recognized by the United Nations (UN) General Assembly in 2010. Sanitation is a global development priority and the subject of Sustainable Development Goal 6. The estimate in 2017 by the joint Monitoring Programme (JMP) (Unicef-WHO-2018) states that globally around 4.5 billion people currently do not have safely managed sanitation, and India do chip in a predominant share into it. Lack of access to sanitation has an impact not only on public health but also on human dignity and personal safety and long run intergenerational health issues. Table 1 below shows the scenario of open defecation as the JMP report 2017 reveals.

Table 1: Scenario of open defecation and HDI ranks across selected countries

Percentage of Open Defecation and Unimproved Latrines in countries

Country	%with UNIMPROVED Latrine	PERCENTAGE OPEN DEFECACTION			HDI Rank 2015
		NATIONAL	RURAL	URBAN	
India	4	40	56	7	0.62
Nepal	5	30	35	6	0.55
Ethiopia	59	27	32	7	0.44
Nigeria	20	26	35	14	0.52
Botswana	15	17	36	2	0.69
Afghanistan	38	14	18	0	0.47
Indonesia	5	12	21	5	0.68
Kenya	37	12	15	3	0.55
Pakistan	22	12	19	0	0.55
Mali	40	8	13	1	0.44
Uganda	60	6	7	2	0.49
Myanmar	20	5	7	0	0.55
Vietnam	14	4	5	2	0.68
Sri Lanka	0	3	3	2	–
Brazil	11	2	11	0	0.75
China	19	2	3	1	0.73
Mexico	2	2	6	1	0.76
South Africa	8	2	5	1	0.66
Bangladesh	31	0	0	0	0.57
Bhutan	29	0	0	0	0.6
Malaysia	0	0	0	0	0.79

Source : JMP Report 2017

Table 1 expressly brings in the need for a mass movement like Swachh Bharat in India. The JMP report (2017) gives evidence to the fact that India is one among the top open defecating countries in the world. Both among many of the South Asian and African countries India stands apart as the sub continent with maximum open defecation. Among the countries there are some with even lesser HDI ranking than India such as Nepal, Ethiopia, Nigeria, Afghanistan, Kenya, Pakistan, Uganda, Myanmar, Bangladesh, and Bhutan with lesser open defecation. Of these countries such as Bangladesh and Bhutan

could completely annihilate open defecation, though some make use of unimproved latrine. Countries such as Brazil, Mexico, China, South Africa, Sri Lanka, Indonesia, Vietnam, and Botswana are on higher scales of HDI and could also show better performance in doing away with open defecation. This shows not only the need for doing away with open defecation but also the importance that many countries attribute to it considering the prospective human development. One should remember that sanitation has far reaching effects and impact on development of human capital and hence the importance of 'Swachh Bharat'.

Tracing back to history, Sanitation has undergone changes across periods based on occupation, culture, religion, practices, knowledge of usage etc. Sanitation program in India was introduced way back in the Indus valley civilization itself (Alok, 2018) and later in Hampi, part of the Vijayanagaram empire. As farming and animal husbandry became the prime modes of occupation in the rural India and a major source of livelihood, rising in the dawn and tending to fields and animals became a necessity, thereby the habit of every day ablution began to be generally performed away from dwellings and the practice of open defecation became a way of life. Though efforts were made even in 1556 by emperor Jhahangir, as part of the communal culture and the protection extended to people particularly of women, to construct latrines to the rural people (100 families) at a distance of 12.5Kms in Delhi the sheer ignorance of the people on the benefits of sanitation and hygiene practices forced to have a natural death to the program. This indeed should be an eye opener to the policy makers even today at least in some states, specifically of Bihar, Jharkhand, and Uttar Pradesh etc that forced adoption of the programme by the community could possibly land up only in failures. Tracing back to occupation large areas under cultivation and low density of population in the early periods do not give much problems of open defecation. However it began to change as the density of population has changed over periods, availability of land became more and more scarce, and urbanisation became a way of life. Gradual impleading of sanitation to the way of life in urban and rural areas became a need and necessity for the community.

In the post independent India Rural Sanitation programme was introduced in the year 1954 as a part of the First Five Year Plan of the Government of India. The 1981 Census revealed rural sanitation coverage was only 1%. The International Decade for Drinking water and Sanitation during 1981-90, began giving emphasis on rural sanitation, but since the coverage of drinking water itself was considerably low; priority has gone for water than for sanitation. Government of India introduced the Central Rural Sanitation Programme (CRSP) in 1986 primarily with the objective of improving the quality of life of the rural people and also to provide privacy and dignity to women. From 1999, a "demand driven" approach under the "Total Sanitation Campaign" (TSC) was introduced by the Government of India (GOI).

TSC emphasized more on social engineering such as Information, Education and Communication (IEC), Human Resource Development (HRD), Capacity Development activities; to increase awareness

among the rural people and generation of demand for sanitary facilities. This was inculcated into the program with a view to enhanced people's capacity to choose appropriate options through alternate delivery mechanisms as per their economic condition. Financial incentives were provided to Below Poverty Line (BPL) households for construction and usage of individual household latrines (IHHL) in recognition of their achievements. However, the pace of progress was too low. To generate awareness on sanitation, and to accelerate the pace of progress in implementation the Nirmal Gram Puraskars (NGP) were awarded to recognise the achievements and efforts made at the Grama panchayat (GP) level in ensuring full sanitation coverage and achieving other indicators of open defecation free GPs. While the award gained popularity in bringing about a desire in the community for attaining Nirmal Status, there have been issues of sustainability in some awardee GPs. It has become more of a fashion to the leaders of the GP's than of a benefit realisation to the common man. Further though constructions have taken place in the rural the use was low at least in some districts as the people never like to change the age old practices. (spears, 2013, 2018, 2019)

The "Nirmal Bharat Abhiyan" (NBA) a modified successor programme of the TSC, was launched from 1.4.2012. The objective was to accelerate the sanitation coverage in the rural areas so as to comprehensively cover the rural community through renewed strategies and community/village based saturation approach. Nirmal Bharat Abhiyan (NBA) envisaged covering the entire community for saturated outcomes with a view to create Nirmal Gram Panchayats. Under NBA, the Incentives for Individual Household Latrines (IHHL) were enhanced and further focussed support was obtained from MNREGA. However there were many impediments in the actual implementation. Difficulties in convergence of NBA with MNREGA as funding from different ministry's and sources created delays, besides the issues of dovetailing the sources. Further it was left to the local body to decide on the priorities and in that process there was conflict of interests in many local bodies as the priority for sanitation was less compared to that of roads and many other developmental works.

The latest transformation of the sanitation programme in India was the Swachh Bharat Mission, launched on 2nd October 2014. The Swachh Bharat Mission (SBM) is Government of India's (GoI) nation-wide flagship program ideated with an objective to advance the country's sanitation agenda. Its main aim is to reduce and subsequently eliminate open defecation through the construction of individual, cluster and community toilets and establish reliable mechanisms to monitor the latrine usage. SBM aims to achieve an open defecation free India by 2nd October 2019. It also envisages appropriate Solid and Liquid Waste Management, Information, Education and Communication (IEC) activities, Capacity building of the stakeholders, and Micro-financing of construction of toilets. Several efforts are being made by many agencies as well as the government of India and state governments to attain the target of making entire India open defecation free by 2nd Oct. 2019. Having examined the historical perspective let us examine the theoretical underpinnings with which it is implemented.

II

Capabilities and Sanitation - A Theoretical Basis

One of the important attainments of Swachh Bharat is the 'functioning's' achievements as put forth by Sen (1985,1986). The following diagram forms the theoretical basis of this analysis. The theoretical proposition is based on the synthesised model of the Capabilities approach as put forth by Amartya Sen (1985, 1986) and the New Institutional economics of Douglass North (1990). These have been synthesised and presented in Murugan 2012 and the same is adopted for the analysis of this too. A summary of the operationalisation of the theoretical concepts applicable to Sanitation is laid down in Fig 1; each of the nodes are distinctly important in attaining the ultimate outcome. The plausible achievements for the individual /households through sanitation is listed in the box on capabilities, from which one can have varying combinations of achievements depending on the options he or she exercises.

One of the important capabilities listed among many and is being monitored across the globe and in India too is the problem of stunting particularly among children less than five years of age. Researches carried out both in the past and based on our own findings show that one of the crucial determinants of reduction in child stunting, 0 to 59 months age is Sanitation (see Spears 2017, 2018, 2019). Hence it is needless to highlight the importance of sanitation in human development and economic progress. Our own research shows that open defecation contributes to child stunting; almost 0.19 percentage points across districts in the country (Murugan, 2019). This highlights the importance of sanitation in the country across districts. We have considered only one of the 'functionings' achievements here. There can have several such functionings and/or combinations of that in the real world of sanitation. The processes in which sanitation functions to the ultimate aim of achieving functionings is described in short in the flow chart.

Having examined the theoretical basis of the analysis it is worthwhile to examine the objectives set forth in the Swachh Bharat mission (Gramin) by the GOI in the next section.

III

Swachh Bharat - Mission (Gramin)

Objectives - Rural

The SBM (Gramin) in its guidelines (2014,2017) envisages that, shall mean improving the levels of cleanliness in rural areas through Solid and Liquid Waste Management activities and making Gram Panchayats Open Defecation Free (ODF), clean and sanitised. ODF according to the guidelines would mean the termination of faecal-oral transmission, defined by,

- a) No visible faeces found in the environment/village and,
- b) Every household as well as public/community institution(s) using safe technology option for disposal of faeces, as defined by the Ministry.

The main components and activities for implementation of SBM-G are as follows:

- Construction of Individual Household Latrines (IHHL)
- Solid and Liquid Waste Management
- Information, Education and Communication (IEC) activities
- Capacity building of the stakeholders
- Micro-financing of construction of toilets
- Community Sanitary Complexes.

Accordingly, the objectives of the SBM(G) are as under:

- a) Bring about improvements in the general quality of life in the rural areas, by promoting cleanliness, hygiene and eliminating open defecation;
- b) Accelerate sanitation coverage in rural areas to achieve the vision of Swachh Bharat by 2nd October 2019 ;
- c) Motivate communities and Panchayati Raj Institutions to adopt sustainable sanitation practices and facilities through awareness creation and health education;
- d) Encourage cost-effective and appropriate technologies for ecologically safe and sustainable sanitation;
- e) Develop, wherever required, community managed sanitation systems focusing on scientific Solid & Liquid Waste Management systems for overall cleanliness in the rural areas;
- f) Create a significant positive impact on gender and promote social inclusion by improving sanitation especially in marginalized communities.

The Strategy adopted is to move towards 'Swachh Bharat' by making it a massive mass movement that seeks to engage everyone in the task of cleaning homes, workplaces, villages, cities and surroundings, in a collective quest.

Sanitation being a state subject the focus is to provide flexibility to State governments, to decide on their implementation policy, use of funds and mechanisms, taking into account State-specific requirements. This is to enable States to develop an implementation framework that can utilise the provisions under the Mission effectively and maximize the impact of the interventions. Government of India's role would be to complement the efforts of the State governments through the focused programme being given the status of a Mission. Perhaps one of the flaws on the part of the central government could be that states have been given too much autonomy, particularly in technology selection, even though the states in many cases do not have sufficient understanding of the differences in technologies, thereby some states at least haven't implemented the programme in order to reap the real benefits envisaged in the guidelines. Despite all the hectic efforts and popularisation many states have followed construction of the conventional single pit, which has given birth to a set of new generation problem of pit emptying and safe disposal of faecal matter. It has also resulted in a new generation of problems of faecal sludge removal; and its processing and safe disposal, effectively stabbing the achievements. The key elements of the Strategy include:

- Augmenting the institutional capacity of districts for undertaking intensive behaviour change activities at the grassroots level.
- Strengthening the capacities of implementing agencies to roll out the programme in a time-bound manner and to measure collective outcomes.
- Incentivizing the performance of State level institutions to implement behavioural change activities in communities, through appropriate strategies. It is suggested that implementation framework of each State be prepared with a road map of activities covering the three important phases necessary for the Programme:

(i) Planning Phase

(ii) Implementation Phase and

(iii) Sustainability Phase

Behaviour change is envisaged to be the key differentiator of Swachh Bharat Mission and therefore emphasis is placed on Behaviour Change Communication (BCC). Yet; BCC is not a 'stand-alone' separate activity to be done as a 'component' of SBM-G, but about mobilising and nudging communities into adopting safe and sustainable sanitation practices through effective BCC, ultimately aiming for a collective behaviour change of all the members.

Collective Behaviour Change: The suggested approach for this would be to adopt Community Approaches to Sanitation (CAS) through Behaviour Change Communication (BCC) focusing heavily on triggering entire communities and on achieving collective behavioural change. Emphasis is to be placed on awareness generation, triggering mindsets leading to community behaviour change and demand generation for sanitary facilities in houses, schools, Anganwadis, places of community congregation, and for Solid and Liquid Waste.

One of the best strategies for achieving the CAS is through Inter-Personal Communication (IPC). IPC has been made as the focus, especially for triggering of demand and use of toilets through social and behavioural change communication and house-to-house interventions. It was laid down that hygiene and sanitation intervention to include an essential element of social behaviour change, alongside infrastructure, without which the desired outcomes cannot be achieved.

Though all these were beautifully documented in the guidelines there are enormous problems of implementation in the states. Even among states that propagate sanitation and behaviour change do not have adequate knowledge of existing technologies and its attendant benefits. If at all some are aware dissemination of it has remained as a problem thereby deterring the real diffusion that is warranted. First of all targeting 2019 to be the date for achievement itself seems to be made without understanding the gravity of the situation in the grass roots and also before quantifying the amount of efforts and work involved. Although states were given a free hand on policy and implementation in the actual field they were beating around the bush out of sheer ignorance on what to do. Many backward states were not even aware of what to do or how to go about. Above all, there was serious shortage of manpower and that too with knowledge on sanitation and behaviour change. All these could not be solved for some time, particularly in the backward districts of the country. Even in the national level the bureaucracy was quite unwilling to heed to the words of experts in the domain. Another aspect that needs analysis is the financing of Swachh Bharat.

Financing Sanitation

According to the guidelines issued, Government of India stipulates, that financial assistance extended to BPL households and selected APL households shall be up to Rs.12,000 for construction of one unit of IHHL and to provide for water availability including storage for hand-washing and cleaning of the toilet. Although coverage of drinking water was very high on an average, in most of the districts in the country, many areas were defiant in water during the summer periods. Competing demands for irrigation also forced the depletion of ground water in many of the aquifers in the country and blocks were running to dark.

Of the above Central Share of this incentive for IHHLs from Swachh Bharat Mission (Gramin) shall be Rs.7,200 (60%) and the State share will be Rs.4,800 (40%). Funding pattern for 8 North-Eastern States and 3 Himalayan States - Jammu and Kashmir, Himachal Pradesh and Uttarakhand - will be 90:10 basis for all components of SBM(G). For UTs, the funding pattern will be 100% by the Central Government, except in CSCs where funding will be 90:10 (Centre: Community).

Total assistance under SBM(G) for Solid Liquid Waste Management (SLWM) projects shall be worked out on the basis of total number of households in each Grama Panchayat (GP), subject to a maximum of Rs.7 lakh for a GP having up to 150 households, Rs.12 lakh up to 300 households, Rs.15 lakh up to 500 households and Rs.20 lakh for GPs having more than 500 households. Funding for

SLWM project under SBM(G) is provided by the Central and State Government in the ratio of 60:40. Any additional cost requirement is to be met by funds from the State/GP and from other sources like Finance Commission, CSR, Swachh Bharat Kosh and Public Private Participatory Model.

Assistance from the World Bank has also been extended to some of the laggard states. For World Bank funded project states in addition to the above, the outputs and outcomes are also measured, and the achievements are measured through Disbursement Linked Indicators (DLI), with the following criteria.

- i. Reduction in the prevalence of Open Defecation amongst the rural households in the state compared to that of the previous year, measured based on a household level question on access, usage and safety of toilets.
- ii. Sustaining Open Defecation Free (ODF) status in villages is the second criteria, the funds shall be released on the basis of estimated population residing in ODF villages in a given year, including villages that attained ODF in previous years and sustained the status.
- iii. The third criteria are rural population served by Solid Liquid Waste Management, based on the population served with acceptable level of SLWM services.

The evaluation of the above criteria is to be carried out based on a National Annual Rural Sanitation Survey (NARSS) through an independent agency. Though it is envisaged to be so in practice it is as good as the Implementing Ministry itself carries out the Sanitation Survey, which is a major lacuna in the implementation of the programme, or quite often the agency undertakes the survey suitably manipulate situations so as to favour and show as achievements, though the actual field situation varies widely and far from truth. Some adopt physical measures, while some others adopted observational and psychological measures, ignoring the real truth or just to show that the target is achieved.

14th Finance Commission for improving water and sanitation in rural areas - As the Fourteenth Finance Commission has emphasized on the services relating to sanitation and water; it is imperative that the capacities of GPs are strengthened to help them in carrying out this mandate by sustained handholding. Advisories were issued to utilize a predominant part of the 14th Finance Commission grants on improving basic services like water supply and sanitation. The GPs could consider setting up and managing projects relating to SLWM, public toilets, providing household connections for water supply and O&M of village-level water supply schemes, utilizing the 14th Finance Commission grants (MDWS, MoPR Joint D.O.No.S- 18012/59/2015-SBM, dated 11.08.2015).

Financing of Information, Education, Communication (IEC)

As stated earlier Information Education and Communication is an important lifeline of the Swachh Bharat Mission. Substantial outlay of the programme has been set apart for this. Out of the central fund allocation under SBM(G), 8% is to be utilised on IEC activities. Out of this, 3% is to be utilized at the Central level (MDWS) on a pan India campaign. This shall highlight national priorities on sanitation, hygiene and cleanliness. The remaining 5% of central share allocation shall be used at

the States on IEC/BCC/IPC and all related communication activities, and on capacity building. The State must put in its share of funds for IEC keeping with the Centre-State sharing in the ratio of 60:40 between GoI and the State Governments. All together states have around 11% of their outlay for activities of IEC. There is a directive that States should spend at least 60% of the overall IEC allocation (Central and State share) on Inter-Personal Communication.

Despite all these only very few states have seriously implemented the IEC programme. The relative efforts for South Indian states were easier than that of the north. In the northern states mostly it remains only in papers, excepting in very few states like Chhattisgarh, partly Rajasthan and Gujarat. These in effectiveness of the IEC have culminated in wrongful and mythical procedures and quite often large scale of unused latrines and also non propagation of cheaper efficient and effective technologies that could have saved many problems from its recurrence.

Thus, though substantial funding was available to all the states, since the resource flow was launched all on a sudden, careful planning and resource utilisation have not taken place in many states. Further, leakages and mistargeting were also substantially large. Inadequate propagation and ignorance on the part of many of the implementers and the common villagers have retarded the progress in many ways.

Now let us examine the coverage status of the Rural areas in the country as on 30-6-2018.

IV Coverage

The problem with measurement of coverage status of rural India on sanitation is very subtle; lack of reliable and authentic data is the biggest challenge. One of the recent authentic sources of data on coverage status is the results of NFHS 4. Hence, we make use of that for evaluative purposes. We have analysed the coverage of 610 rural districts in the country as reported in NFHS-4¹. Table 2 shows the all India coverage of districts as reflected from NFHS 4 survey.

It may be noted that all together roughly 25% of the rural districts, 143 in number out of 610 in the country have coverage only of 20% or less of households at the end of 2016, leaving another 80% to be covered within three years. Among these the position of around 26 districts, 5% of total rural districts in the country is quite precarious that it will, in any case, be impossible to achieve the targets unless exceptional efforts are made to achieve the targets set forth for 2019. The coverage in these districts is less than 10% leaving 90% to cover within a span of three years. Performance in the past show that the maximum achievable is only around 15%, even if it is accelerated to say 20 it might be possible to cover only 60% households leaving a balance of 20% more by the end of the programme.

¹ The classification of districts is based on 2011 Census. Some more districts are added subsequent to the Census. For purposes of sampling the 2011 Census districts were used as frame.

Table 2: Coverage status of Improved Latrines across districts RURAL India

Coverage %	No of Districts	Percent of Districts	Cumulative Percent
0.1 to 10	26	4.3	4.3
10.01to15	65	10.7	14.9
15.01to20	52	8.5	23.4
20.01 to 30	109	17.9	41.3
30.01 to 40	81	13.3	54.6
40.01to50	70	11.5	66.1
50.01to60	63	10.3	76.4
60.01to75	77	12.6	89.0
75.01 to 90	44	7.2	96.2
All>90.01	23	3.8	100.0
Total	610	100.0	

Source: Author's computation from District reports; NFHS 4.

Experience also suggests that the last leg achievements of construction and coverage will be very slow and the laggards will be difficult to cover. However, through vigorous efforts, careful planning and commitment on the part of implementing agencies; it is possible to attain the achievements. Yet, problems of Solid Liquid Waste Management (SLWM) need to be solved in these villages. The same is the fate of another 65 districts where the coverage is less than 15%, leaving a balance of 85% to be covered. These two are the very critical districts. Another 52 districts with coverage between 15 to 20 percent is in the critical region. Further, it could be possible that these districts are faraway places and the comparative rates of literacy could also be less. Hence it will definitely be not possible to complete the achievements. In another 260 districts the coverage ranks from 20 to 50%, with vigorous efforts many of them though not all will be able to achieve the targets. The remaining 207 districts could attain the achievements in the normal course. Now we move on to the scenario of unhygienic latrines.

Table 3 shows the scenario of unhygienic latrines and open defecation practices. Only around 3.8% of the districts in the country are somewhat Open Defecation Free (ODF). Another 5% is also nearing ODF. In around 15% of the districts at least 70% households are following ODF leaving a large share. The presence of unimproved latrines in some districts shows the dire need for it or there exist a potential demand which can easily be canalised, it could be the lack of information or inaccessibility to the facilities or non-availability of land that drives these households out of the programme. Lack of diffusion of appropriate technology could be another. Some households in more than 80% of the districts do follow open defecation in varying proportions.

Table 3: Status of Open defecation and unimproved Latrines Rural All India districts

Districts with % Range OD&Unimp	Frequency	Percent	Cumulative Percent
1.to10	23	3.8	3.8
10.01 to 20	29	4.8	8.5
20.01 to 30	40	6.6	15.1
30.01 to 40	53	8.7	23.8
40.01 to 50	63	10.3	34.1
50.01 to 60	70	11.5	45.6
60.01 to 70	84	13.8	59.3
70.01 to 75	48	7.9	67.2
75.01 to 80	57	9.3	76.6
All > 80.01	143	23.4	100.0
Total	610	100.0	

Source: Author's computation from District reports; NFHS 4.

In 402 districts out of 610 rural districts, more than 50% of the households practice open defecation. Literature suggests that open defecation has a problem of negative common property. Just like your consumption will not affect mine in the case of common property resources here your open defecation affects not only you and your family but others in the surroundings as well, mostly children, which have serious health and impairment consequences. Open defecation with more than 75% of households accounts for in 200 districts, a little less than one-third of total districts in the country.

Having examined the scenario of toilets in the rural, Table 4 provides a view of the states and districts where the possibility of not achieving the targets i.e. those with less than ten percent coverage, 905 or more uncovered.

Table 4: Showing names of state and districts with <10% coverage (NFHS-2014)

State	Districts with <10% Household coverage
Madhya Pradesh	Singrali, Dindoli, Chatharpur, Anuppur, Mandla, Shahdol, Sidhi, Jhabus, Tikamgarh-9
Jharkhand	Simdega, Latehar, Dumka, Purbi Singhbhum, Saraikela Kharsawar, Deoghar, Garhwa-9
Uttar Pradesh	Gonda, Shrawasti, Sonbhadra, Sitapur, Balrampur -5
Chathisgarh	Narayanpur, -1
Bihar	Araria -1
West Bengal	Purulia -1
Jammu & Kashmir	Kargil -1
Karnataka	Yadgir -1

Source: Author's computation from NFHS 4.

Though UP, Bihar and West Bengal have less number of districts when compared to that of Madhya Pradesh, Jharkhand etc there exists only marginal differences in Bihar and U.P, probably those with coverage of a little more percentage is taken then these states will be like that of Madhya Pradesh and Jharkhand.

In order to verify how far the observation made above are correct we have made an attempt to compare the position of achievements of these districts with that of the Census 2011. This is summarised in Figure 1. Figure 1 shows that in almost all districts the achievements made during Census 2011 are less than that of the NFHS 4 figures. In the case of Purbi Singbhum in Jharkhand the Census figures are a bit higher than the NFHS 4 signifying that some of the toilets that might have been present earlier should have become defunct or extinct now for reasons of either pit filling or demolition. In Sonabhadra Sitapur, Balrampur, Gonda, Lathehar and Shrawasti districts not much change has occurred when compared to the Census, despite elapsing half a decade. The scenario is examined in detail by Coffey and Spears (2017) and in their writings earlier too, particularly of Sitapur and Balrampur. The distance between the red and blue diamonds in the diagram reveals how far they have improved from the achievements compared to that of the position during Census.

The distance between Census 2011 and NFHS 4 in Figure - 1, shows to what extent the district has improved in its performance since the Census up to 2016, though the coverage of the district as of NFHS field work is less than 10% in its performance. Higher the distance of NFHS 4 from the base of Census 2011, higher the performance of the district shows that the Swachh Bharat has made some initiatives. Distance is higher in respect of Yadgir, Thikkamghar, Araria, Garhwal, Garhwa, Deoghar, Sare-kale Kharswan, Jhabua, etc and is gradually declining, indicates that these districts have improved from that of Census 2011. Balrampur, Sitapur, Sonabhadra, Srawasti are districts with absolutely no improvement at all during the 6 year period. Similar is the situation in Latehar, Anuppur, Chatarpur, Dindori, Simdega, and Singrauli.

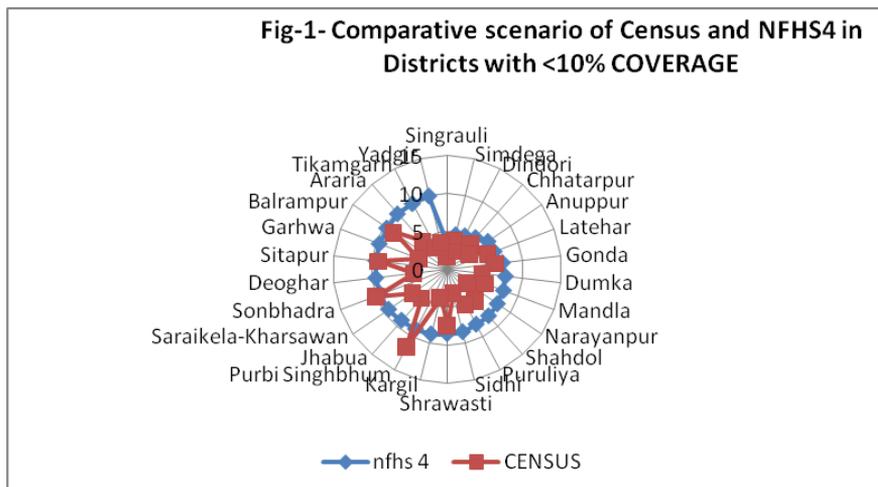
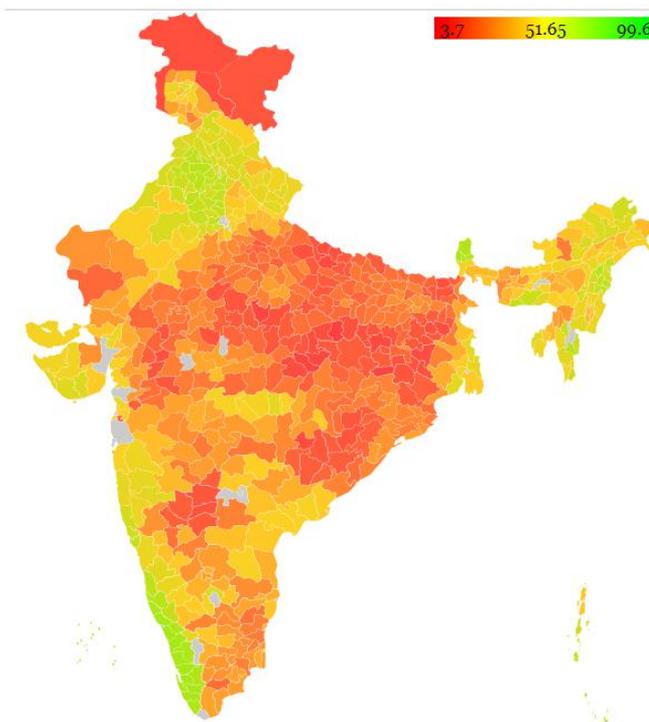


Fig 2: India Improved sanitation coverage - Rural NFHS -4



Moving on to Coverage status of the 610 rural districts in the country according to the figures available from the NFHS 4 - district reports are summarised in the Figure 2. The lowest covered regions are marked with dark black districts gradually achieving light black in the mid range of coverage and whiter while it crosses 90%. Lakshadweep, Kerala, Sikkim, Nagaland, Haryana, Mizoram, Some districts of Punjab, Meghalaya, Goa, southern districts in Karnataka, some districts in Himachal Pradesh have performed well and had achieved remarkable progress. On the contrary many districts of Madhya Pradesh, Jharkhand, Bihar, Odisha, Uttar Pradesh and West Bengal are abysmally poor in their performance and outcome as evident from the dark black districts area. Although some districts in Chhattisgarh too are very poor in their performance considering the implementation strategy set forth in the state it could be possible for them to realise the achievements well before the target date. Some districts in Maharashtra, Tamil Nadu, and Karnataka are also equally poor as of now but considering the implementation strategy put forth by these states it is possible to achieve the target.

This being the scenario as sourced from NFHS 4; Table 5 speaks for itself, computed from the data available with the Ministry of Drinking Water and Sanitation in their Monitoring web page as on 30-6-2018. The table gives an overall view of the scenario and measures support the findings in NFHS 4.

Table 5: Status of Villages and Rural districts to be Covered as on 30-6-2018

Coverage range of districts	Frequency	Percent	Cumulative Percent
Fully covered (0 to10) uncovered	415	59.4	59.4
10.01 to 40% remain uncovered	29	4.1	63.5
>40.01 to 60 uncovered	52	7.4	71.0
60.01 to 70 uncovered	36	5.2	76.1
All > 70.01 uncovered	167	23.9	100.0
Total ²	699	100.0	

Source: computed by the author from MDWS Monitoring report downloaded as on 30-6-2018.

Table 5 shows that almost 60% of the districts are covered fully or only very few numbers of villages remain, which shall easily be covered by the target date. There are 29 (4% districts) where 10 to 40% of the villages and another 52 (7.4% districts) where 40 to 60% of the villages are yet to be covered with toilets. It would be possible that if earnest efforts are made, these villages might be covered within the target date. 36 districts (5.2%) still have to cover 60 to 70% of villages. In 167 districts (24% of total districts) more than 70% villages are uncovered. Even if some progress can be achieved it would rather be impossible to cover the last two categories of districts within the time frame. It could be plausible that these are far away districts and innumerable problems of implementation exist in these areas. Even a war footing effort on the part of the implementing agency would be futile considering the large number of villages that need to be covered and those too more difficult villages. This still remain as a matter of challenge.

If one compares the scenarios with NFHS 4 and monitoring data of Ministry of Drinking Water and Sanitation (MDWS) on 30-6-2018, almost one third (33%) remain to be covered. It could catch up only around 10% within 2 years at end of 2018, leaving only one more year to reach the final set target date. On any account it will be a herculean task to achieve full coverage. However, the efforts made are laudable comparing with the past.

A state wise distribution of number of districts where more than 60% of villages uncovered are depicted in Table 6. They are largely concentrated in Bihar, Uttar Pradesh, Madhya Pradesh and Odisha. A large number of these villages could be in inaccessible areas. The picture that emerged from these data are also more or less akin to the picture from NFHS 4. Now let us examine the results of one of the flagship programmes of the government viz. Namami Ganga.

2 The number of districts shown is according to the latest number of districts as adopted by the MDWS in their Monitoring reports.

Table 6: No of Districts where more than 60% of villages uncovered as on 30-6-2018

States	NO of Districts
Assam	10
Bihar	29
J&K	14
Jharkhand	9
Karnataka	7
Madhya Pradesh	24
Manipur	3
Nagaland	1
Orissa	25
Telangana	15
Tripura	11
Uttar Pradesh	46
West Bengal	4
India	198

Source: Computed by Author from the data of MDWS.

Namami Ganga

One of the flagship programmes of Swachh Bharat is to convert the holy river, Ganga, pollution free in all respects. Several measures have been initiated as part of the Swachh Bharat programme both by the Ministries of Drinking Water and Sanitation, Urban Affairs and the Ministry of Water Resources of the Government of India. Personal experience of the author on a visit to many of the cities and villages on the banks of River Ganga in Uttarakhand, Bihar and Jharkhand reveals that many of the sewerage systems of cities and the rural and urban latrines are directly opened and connected to the Ganga River, that too even through pipes. A large number of tanneries also pollute the river in Uttar Pradesh. Although both Government of India and state governments have taken serious efforts to install sewerage systems, it might get operationalised only after a span of 3 to 4 years on an average. Writings of Victor Mallot (2017), Doron and Jeffry (2018), and Chaplin (2011) vividly depict the scenario, particularly by Mallot in much detail and attempt to depict a picture of how difficult and hazardous task it is to convert the river Ganga pollution free. The urban scenario will be analysed in the section dealing with Urban. In this we concentrate on rural alone. Table 7 below details the percentage of type of toilet in the 200 Namami Ganga villages. The table represents the state wise findings regarding the type of toilet installed. Although Ganga river covers almost 5 states, Uttarakhand,

Uttar Pradesh, Bihar, Jharkhand, and West Bengal, the samples are drawn only from 2 states of U.P and Bihar leaving 3, unrepresented. Even if one assumes that the entire Ganga basin will be covered with Individual Household Latrines as programmed, the following table provides a rosy picture of the coverage. The report of the Quality Council of India 2017 shows that substantial coverage has been achieved. But the following Table extracted from QCI report as well as the personal visits to some of the villages of the author in Sahibganj district of Jharkhand and some of the villages in Uttarakhand state gives us the clue that the purpose of IHHL will not be achieved functionally. Approximately 75% of the IHHL constructed are either single pit or double pit. It may be noted that these are all constructed in river valley villages, where the water level is almost just 1 metre or even less in depth.

TABLE 7: Type of Toilet Waste Disposal in 200 Namami Ganga villages

Type of toilet installed	over all	Bihar	UP
Single pit	42%	24%	51%
Double pit	31%	19%	38%
Septic tank	27%	57%	11%
Ecosan	0%	0%	0%
Flushes to a closed drain	0%	0%	0%
Flushes to an open area	0%	0%	0%
Flushes to open drain	0%	0%	0%
Unlined hole in the ground	0%	0%	0%

Source: QCI report 2017-MDWS.

Literature and studies carried out earlier suggest that in many cases the constructions cannot be made use of by the beneficiaries because of water logging, both inside the latrines as well as inside the pit. Further, the bacteria present in the latrines, mostly e-coli can freely travel up to a distance of 10 to 50 meters in sandy regions. As such, there is every possibility that unless alternate technologies available like that of ecosan toilets or bio digester toilets are not used the purpose might be defeated. Authors own personal observation³ in Sahibganj district in some of the rural villages reveal that the latrines constructed were not being used since even the seat and pans were completely submerged in the river water, leave alone the story of how the pit would be in such toilets. Possibly since the slopes of terrains in the Ganga basin excepting that of the hills is very low there is every possibility that these toilets may not provide the desired results. A similar situation existed in the Kuttanad areas of Alleppey district in Kerala and in some of the coastal villages of Trivandrum, wherein only ecosan toilets and bio digestible toilets could come to rescue, after a series of researches. Situations akin to this can be found in the

3 Personal observation during field visit in Sahibganj district of Jharkhand.

banks of almost all river valleys. Many of the villages are situated on the banks and not much far. However in places where sufficient distance exists between the ground water table and the villages it may not be a problem. The pictures below give an idea of the gravity of the problem in these areas.



Sahib ganj District Bada Tufir Village Latrines constructed by PHED

V

Usage Practices

Having noticed the coverage, another problem in many of the rural districts, particularly in districts that are poor in literacy is the usage of the constructed hardware. Studies carried out by Coffey and Spears (2014), and Viswanathan Radhika (2017) points to the problems in the measurement and need for the measurement of the usage practices to correctly assess the benefits of sanitation and toilet coverage. People have different motivations for using or not using toilets (see Chambers and Myers 2016). The nature of the question determines the answer: those surveys that aggregated to the household level or by household member groups reveal lower levels of partial usage, whereas the surveys on individual latrine use found a higher prevalence of the same. However, the exact answers to the questions depend on the level of hygiene knowledge and diffusion of IEC strategies adopted.

Following details provide the scenario as revealed from many of the recent studies on levels of usage.

Table 8: Consolidated Table of Partial Usage Data

% of rural households with functioning toilets not being used by any member of the household) - 2013 Barnard et al 2013

Puri- Odisha 39%

% of members still openly defecating once a day in rural households with functional toilets / 2014 Jenkins et al 2014

Puri- Odisha 27%

% of rural households with functioning toilets with signs of usage\ - 2014 Clasen et al 2014

Puri - Odisha 37%

% of rural households with improved sanitation facilities reporting daily open defecation by adult men or women& - 2014 Patil et al 2014

Dhar and Khargone& - Madhya Pradesh 41%

% of rural households with working latrine but at least one member practising open defecation - 2014 Coffey and Spears 2014*

Rajasthan* 66.2%

Bihar* 54.2%

Uttar Pradesh* 42.5%

Madhya Pradesh* 40.8%

SQUAT (Qualitative) North India 56%

% of rural households with functioning toilets with "mixed usage of home toilets and open defecation" ^ - 2016 Hajra and Dutta 2016

Jalpaiguri^ - West Bengal 32.6%

% of rural households with fully constructed toilets where at least one member defecates in the open - 2016\$ Aiyar et al 2016

Udaipur \$- Rajasthan 26%

Sagar\$- Madhya Pradesh 17%

Nalanda\$- Bihar 13%

Satara\$- Maharashtra 2%

Jhalawar\$- Rajasthan 2%

Purnea\$- Bihar 1%

Kangra\$ - Himachal Pradesh 1%

Udaipur\$- Rajasthan 26%

Solan\$ - Himachal Pradesh 1%

% partial usage in households with SBM-G toilets (see below for categories. HH with complete usage are not included) > - 2017

Public Affairs Foundation 2017

	Some members use all the time	Some members use during certain seasons	Nobody uses the toilet
Dhenkanal > - Odisha	12%	5%	16%
Sambalpur > - Odisha	4%	6%	17%
Baleshwar > - Odisha	14%	3%	3%
Angul > - Odisha	12%	4%	7%
Ganjam > - Odisha	14%	2%	3%
Cuttack > - Odisha	7%	2%	2%
Dharmapuri > - Tamil Nadu	4%	1%	7%
Krishnagiri > - Tamil Nadu	4%	1%	3%
Perambalur > - Tamil Nadu	4%	1%	2%
Tiruchirapalli > - Tamil Nadu	2%	2%	2%
Tirunelveli >- Tamil Nadu	1%	0%	0%
Kanyakumari >- Tamil Nadu	0%	0%	0%

% of rural households with toilets has at least one member practicing open defecation - 2017# Wateraid 2017

Korba# - Chhattisgarh	56%
Durg#- Chhattisgarh	15%
Kanker#- Chhattisgarh	1%

% of open defecation villages despite ODF declared status (rounded off) volunteer verification - 2017

Sambhal~- Uttar Pradesh	60%
Amroha~ - Uttar Pradesh	60%
Moradabad~ - Uttar Pradesh	50%
Bijnor~ - Uttar Pradesh	30%

Sources: ~ Volunteer verifications as informed in IDS interviews and field investigations; #Wateraid Verification Survey 2017; \$Aiyar et al 2016 / Accountability Initiative; >Public Affairs Foundation,2017; ^Hajra and Dutta, 2016; *Coffey et al, 2014; \Clasen et al 2014; /Jenkins et al 2014; &Patil et al 2014;)Barnard et al 2013. Not included in the table are anecdotal figures received between 20-25% of partial usage in North Karnataka districts / 97% in Tamil Nadu and findings from the QCI Swachh Survekshan Gramin report 2017.

Table 8 gives a range of scenarios and durations of many surveys that repeatedly says about the nature and characteristics of the people and their approach towards open defecation. It should be noted that many of these districts are declared as open defecation free and it ranges from 1% to 60%, so wide a gap that in many districts it is very difficult to reduce the gap. It should also be flagged that the situation is mostly in states with low rates of female literacy and development. Further, it is mostly in the districts of Northern states that the prevalence of open defecation is prominent. Although immediately after the declaration of Swachh Bharat movement there exists some 1/3rd of households do practice open defecation, persistence of the same in 2017 and that too with more of prevalence is a matter of concern and shows the ineffectiveness of IEC implementation in these districts.

In order to further explore a 2019 study by Gupta, Khalid et al. of r.i.c.e institute shows the patterns of open defecation in North India despite constructing latrines and brings out the salient reasons for such practices.

Table 9: Open Defecation in Rural North India 2019

Sample	Latrine owners	weight	focus states	Bihar	Madhya Pradesh	Rajasthan	Uttar Pradesh
All	Owners & not	no weight	42%	59%	24%	52%	38%
All	Owners & not	Census	44%	60%	25%	53%	39%
All	Owners & not	DHS weights	57%	77%	29%	62%	53%
Adults	Owners & not	no weight	41%	57%	23%	52%	38%
Adults	Owners & not	Census	43%	57%	23%	54%	38%
Adults	Owners & not	DHS weights	54%	73%	27%	61%	50%
All	Latrine owners	Census	23%	21%	16%	40%	21%
Adults	Latrine owners	Census	23%	19%	15%	41%	21%
Adult F	Owners & not	Census	41%	57%	21%	53%	34%
Adult F	Latrine owners	Census	20%	18%	13%	39%	17%
Adult M	Owners & not	Census	44%	56%	25%	56%	41%
Adult M	Latrine owners	Census	25%	21%	17%	43%	24%

Note: F = Females. M = Males Source: Gupta, Khalid, Deshpande, Spears, Hathe, Kapur, Srivasthava, Vyas, Coffee. 2018.

The above study carried out in the focus states of Bihar, Rajasthan, Madhya Pradesh, and Uttar Pradesh shows that on any account a minimum of 20% of households go for open defecation. Even Adult females are forced to defecate in the open as per the study to an extent of 20% shows to what extent IEC could penetrate or rather not administered at all. This does not mean that there is no progress at all. Despite that, there are numerous problems in making the people to bring under the

open defecation free status. This essentially points to the direction that complete coverage will be rather impossible though there can have remarkable progress. Varying proportions under different weights are shown in the table. The study also makes an in-depth analysis and brings out the change in open defecation from that of the situation in 2014 to that of 2018. As laid down in Table 10.

Though altogether there is a change of 26 percentage points in aggregate among the focus states, there is considerable variation, with the least achievement of 15percentage points in Bihar and a maximum of 43 percentages in Madhya Pradesh. It is also a reflection of the relative efforts that the states Institutions have taken to eliminate open defecation and also the reflection of the activities of IEC. They further attribute that the change is predominantly due to change of ownership of latrines and not to a great extent to behaviour change, denoting two important factors, failure in the implementation of IEC and its spread on the one hand and issues of sustainability of the practices on the other. Both these are important for the full success of the program.

Further in 2018, at the state level, open defecation ranged from 25% in Madhya Pradesh to 60% in Bihar. These results contrast with government claims that these states are entirely or largely provided with latrines and open defecation free (for example, GoI, 2018).

In the region as a whole, open defecation declined from approximately 70% of people over two years old in 2014, to approximately 44% of people over two years old in 2018. Further, the lowest decline is in Bihar despite hectic efforts and financial flow to the state. Improvements in latrine ownership are also poor in Bihar compared to other states. It goes without saying that primarily open defecation depends on two factors: (1) latrine ownership and (2) behaviour change among latrine owners and non-owners. The exercise of Kitagawa decomposition carried out by the authors' show that the entire change in open defecation between 2014 and 2018 comes from increases in latrine ownership, rather than from changes in behaviour, which is only 1PP. This shows the ineffectiveness of the implementation, particularly on IEC and also a failure on the part of Government of India as they have provided complete autonomy to the states on implementation.

One should also remember that latrines that were constructed by the households themselves and subsidized by the government ("government money") in general. There are also large instances of contractors build latrines, despite government financing it ("government built"). In Rajasthan, households were almost exclusively subsidised for constructing their own latrines (including, in some cases, for latrines that existed before the SBM). In Bihar, Madhya Pradesh, and Uttar Pradesh some households constructed their own latrines, while other households had latrines constructed for them by contractors hired by local government officials. It is observed that contractor-constructed latrines are typically less well-constructed than latrines that households build for themselves (See Gupta et al. 2019). Local officials who organise contractors may also have had an easier time skimming funds off of latrine construction in Adivasi areas than non-Adivasi areas, giving them more of an incentive to organise contractor-built latrines in these areas.

Table 10 : Change in Open Defecation, 2014-2018

	Focus states	Bihar	Uttar Pradesh	Madhya Pradesh	Rajasthan
Census weighted means					
Open defecation,2018	44%	60%	39%	25%	53%
Open defecation, 2014	70%	75%	65%	68%	76%
Open defecation Change	26pp	15pp	28pp	43pp	26pp
Latrine ownership, 2018	71%	50%	73%	90%	78%
Latrine ownership, 2014	37%	29%	42%	43%	31%
Latrine ownership Change	33pp	21pp	31pp	47pp	47pp
Kitawaga Decomposition					
OD Due to Behaviour	1pp	1pp	3pp	7pp	-7pp
OD Due to ownership	25pp	15pp	23pp	37pp	30pp
% change due to Ownership	96%	97%	89%	84%	130%

Note: Pp stands for percentage points.

Source: Gupta, Khalid, Deshpande, Spears, Hathe, Kapur, Srivasthava, Vyas, Coffee. 2019.

The quality of construction, as pointed out in the case in Namami Gangai areas, will definitely tell upon the rate of its use by the villagers, quite often in many cases they are not usable at all. Now we move on to the challenges faced by the program

VI

Challenges

The Tables narrated above and the discussions reveal that there are many challenges for the effective and successful implementation of the programme in many states. Table 11 below shows the pattern of construction of latrines that take place. It is by and large a single pit in most of the states, excepting Rajasthan where the percentage is low. A large number of the villagers use containment chambers too. Both together constitute more than 70% of the newly constructed toilets. However in both cases there could be a fear among the users on pit filling on shorter duration and there by the users may go for open defecation, unless proper and repeated IEC are administered in an appropriate way so as to make the ODF if at all declared to be sustainable. It also shows that even though almost two decades have elapsed since the invention of the twin Pit type technology has not diffused much among villagers in the country. It is strange that there is one category others, which does not provide a clear idea of the technology followed nor the acceptance of the technology is unknown leave alone its success rate, yet some of them like bio digester toilets have proved to be successful if maintained properly.

Table 11 : Latrine ownership, type, and provision by state, 2018

	Focus states	Bihar	Uttar Pradesh	Madhya Pradesh	Rajasthan
Pit type, among households that own a latrine					
Twin Pit	25%	16%	22%	7%	35%
Single Pit	40%	49%	50%	69%	22%
Containment Chamber	31%	30%	26%	17%	38%
Other	5%	5%	2%	8%	5%
Pit type, among households that own a latrine and received government support					
Twin pit	42%	33%	32%	11%	61%
Single Pit	34%	40%	51%	64%	13%
Containment Chamber	21%	26%	16%	22%	21%
Other	3%	1%	1%	4%	5%

Note: Notes: Weighted by 2011 Census.

Source: Gupta, Khalid, Deshpande, Spears, Hathe, Kapur, Srivasthava, Vyas, Coffee. 2019.

The above studies purport to not only the in effectiveness with which the programme is implemented in the rural areas, more specifically the behavioural change effectiveness is shown in the figures above. Further, a "**twin pit**" allows faecal sludge management to be done safely, sustainably, and inexpensively without resorting to manual scavenging. The technology itself can care the system and after lapsing the lag period for composting the manure generated can be used in cultivation.

"**Single pit**" latrines, on the other hand, cannot be emptied safely. The cost of emptying ranges from Rs 4000 to Rs 12000 per emptying. Disposal of the faecal matter emptied from these with live e-Coli bacteria is yet another issue. The cost per removal is also quite high that ordinary villagers who find very difficult to spare money even for constructing their own toilets would find difficult to finance, switching back to open defecation at the end.

"**Containment chambers**" are typically the most expensive type of pit to construct, and when they fill up, they are typically emptied by a suction machine. This is not at all a suitable technology but for the easiness in installation and is readily available. Moreover even in waterlogged areas, one may go for bio digester toilets than the containment chambers. This method of faecal sludge management is expensive and is done when faecal sludge is fresh. There are only a few sewage treatment plants in rural India, sludge from containment chambers is typically disposed of unsafely in open places, river banks and even in unoccupied places, inviting more havocs than open defecation itself.

In states like Bihar and Uttar Pradesh, swachhagrahis had been recruited. The idea behind such recruitment of swachhagrahis envisaged in the Government of India guidelines is to disseminate benefits

and use of sanitation methods including that of technologies among villagers through IPC and facilitate a sustainable sanitation system. Swacchagrahis attempt to convince people to build toilets and assisted them in filing paperwork and geo-tagging for the release of subsidies. In practice, they worked more or less as facilitators for routing subsidy. In many other states like that of Madhya Pradesh and Rajasthan, swacchagrahis had not been hired. Rather, in these states, block panchayat officials direct the Grama Panchayat officials to form "Nigrani Samitis" or "vigilance committees". These Nigrani Samithis usually consist of the Sarpanch, Secretary of the Panchayat, village health and nutrition workers (ASHA and AWW), chowkidars or other village officials, teachers etc. These samithis never function successfully as repeated doses of IEC are required for behaviour change. Further many of these office bearers are despotic in their attitude and behaviour to the common man.

Yet another impediment in the successful implementation of the program is its staffing in rural villages. Even though the SBM guidelines recommend a full-time sanitation officer for each block, neither the block-level positions nor recommended district-level positions were found to be filled. There are many reasons for this too. In some states, the required man power is not available, whereas in some other places the bureaucracy does not give importance to these functionaries. This definitely will tell upon the quantum and amount of IEC that had taken place, which reflects on the usage and on the quality of construction. Since many doubts of the poor villagers still remain in their minds they refrain from using the toilets on the fear of filling of pits easily, and the abominable cost of cleaning the pits acts as another deterrent from using it, or making it a reserve for the weaker sections of people within the household. Another attendant challenge is the prevalence of corruption.

Corruption

Though it is very difficult to find evidence to the leakages of money from the system, indirect evidence of operating through contractors and in many cases the elected representatives themselves resort to corruption, yet the money is very small per household. In a rural setting those who are incapable of constructing their own; due to lack of resources may even willing to forego a portion of the amount that they get as subsidy to have the facility, thinking that whatever they get is free and the providers quite often makes the poor villagers believe that it is because of their special efforts that the same was made available and a portion have to be shared on any account. Further; according to Gupta et.al (2019) different village-level officials were involved in managing verification of latrine construction and applications for subsidies in different states. In Rajasthan, Madhya Pradesh, and Uttar Pradesh, Sarpanches,/Pradhans and Secretaries were relied upon for providing and processing subsidies. In Bihar, this task fell primarily to ward members. Those officials whose signatures were required for applying for the latrine subsidy were often able to collect informal payments from households. The authors are of the view that in their field survey carried out during 2018 they encountered instances of corruption in all states, it was most evident in Bihar, where a 2,000 rupee bribe to the ward member, much of which was likely passed on to higher-level officials too, was almost uniformly required to

secure a subsidy transfer. (see Gupta, Khalid, Deshpande, Spears, Hathe, Kapur, Srivasthava, Vyas, Coffee Jan. 2019).

In Bihar, Madhya Pradesh, and Rajasthan, subsidy payments were almost uniformly made to beneficiary accounts; whereas, in Uttar Pradesh, pradhans and secretaries wrote checks to beneficiaries. Invariably in both cases, there were some leakages, and the entire money couldn't be spent on the construction of latrines. When contractor latrines were built in Uttar Pradesh, village officials could also pay contractors without routing funds through beneficiary accounts; in other states, when contractors built latrines, local officials typically collected the subsidy money from households after they received it in their bank accounts.

Coercion and threats by local officials were commonplace. Violence and bullying sometimes occurred. The CPR survey 2017- found that only 45% of people in households where the primary reason for building a latrine was pressure from village officials. All these points to leakages in the system of subsidies, directly telling upon the quality of the latrines constructed and in sometimes even the quantity, which may not be sustainable on many accounts.

Threats

As years pass on the number of latrines, particularly the one with single pit and Container Chambers, increase and this constitute almost 70% of the total toilets in the country. Sustainable faecal sludge management practices in the years to come is a question that needs to be addressed, failing which it could possibly have effects in contravention to what is desired. All these could tell upon the capabilities and levels of “functionings” achievements that is desired to attain.

Further, the cultural and religious factors among Hindus in latrine-owning households are such that they want to have the latrines outside the premises and are also a question of impurity, more likely to defecate in the open than Muslims or Christians. Since a large proportion of households are Hindus and that too where caste and community differentiation is more prominent in the absence of continuous and appropriate behaviour change possibility for slipping back to open defecation in the future is very much.

Another important aspect is the pit depth and misbelief among the beneficiaries or rather fears among them on pit filling. Open defecation is much less common in households with larger latrine pits, especially among Hindu households. Cost of construction of such latrines is to the tune of Rs 35000/- One reason for this pattern is that smaller pits are perceived to require frequent emptying, an activity which is associated with caste impurity on the one hand and the associated cost involved on the other. Large pits, in contrast, do not require emptying as frequently, and therefore their use does not invoke the same worries about contact with faeces or hiring a manual scavenger. Further, the excessively high cost of pit emptying also prompts the beneficiaries to construct large pits as they are completely ignorant of twin pit latrine technologies. It also shows that the swachgrahis/nigrani samithy's

have not properly carried out their work of disseminating the technology of twin pit, many of them are even ignorant of it. Rather in many cases the authors feeling on field visit is that they have not been informed of the advantages of twin pit, again pointing to a failure of IEC and very low importance of it.

Availability of adequate water at a reasonable distance from the dwelling units, is another problem quite often in rural scenarios. In water-scarce districts toilets are used only during monsoon and post-monsoon period when there is availability of water "aspiration districts". Even in such districts mostly men would go outside and defecate than women. Once the villagers switch back to open defecation it is very difficult to bring back whatever be the effort they would make water as the excuse. As a result, toilets built earlier became dysfunctional adding to the problem. The village functionaries and officials involved are also helpless in such circumstances.

Apart from all these the declaration of ODF status is a slippery issue as the rush to achieve targets has led to false claims in the past. Later field verifications carried out shows that in many villages that were declared to be ODF in the past 100 % coverage have not taken place, left over and re-emergence were very common in these ODF declared villages.

MDWS guidelines recommend the involvement of the state officials/departments concerned for nine months during verification of the construction. During this period they focus on different activities in the village, like availability of water, cleanliness of water sources, water bodies, decentralised solid-liquid waste management, maintenance of drains, maintenance of school and Anganwadi toilets, hand washing, awareness and training on pit emptying and faecal sludge management. In practice in many cases, the entire official engagement was limited to toilet construction and other activities have not been measured. Availability of the personnel required for the entire verification process is an issue that has been confounding the states that could derail the ODF status like in the past. How would India dispose of the solid and liquid waste generated out of the new toilets? This is a bigger problem than open defecation as the household faecal matter would be closer to people's homes while defecation sites are at a distance from inhabited areas. Sustainability of toilets depends on the ease with which households will be able to clear the sludge in a single pit. IEC is not prioritised at all in many states.

With the number of new toilets constructed: there will at least be a generation of 1,00,000 tonnes of shit every day. The high density of pit latrines and poorly made and maintained septic tanks can render the shallow aquifer water, unfit for drinking because of nitrate and bacterial contamination, as the case in Kerala's well water. The deep pits do not need emptying but can contaminate groundwater if they are very deep. Moreover, in many areas, there may not be having an adequate lining of pits. People are concerned about the faecal sludge removal but give little importance to the proper disposal of faecal sludge matter, nor the local bodies are aware of the protocols for such disposal of faecal sludge. At present, there are almost 2.4 million dysfunctional toilets with Uttar Pradesh, Bihar, Assam, Tamil Nadu, Madhya Pradesh and Jharkhand being the top six states with this dubious distinction. During SBM almost 54 per cent of the dysfunctional toilets were converted to functional ones-the

maximum conversion happening in West Bengal (92 per cent) and Tamil Nadu (86 per cent). Bihar has a huge problem of dysfunctional toilets, during SBM only 18 per cent of the 0.75 million dysfunctional toilets were converted.

The issue of **dysfunctional toilets** itself is because of the faulty single pit construction in the past. Technical guidance was lacking, and there are not many trained personnel to work in the field. Masons are the technical experts available to the poor villagers, and they use their own judgments to prescribe technical specifications, faulty and defective in many circumstances as they are not updated with technologies. Adequate attention should go to this, particularly in providing training on construction of twin pit pour flush toilets. Swachh Bharat Ghosh funds are underspent. Many of the states are not even aware of the existence of such funds. Flooding of too many activities to one agency itself is another problem, and the agency possibly provides concentration only on the construction of new leaving other activities of renovation to another period. In order to reach the target, it is doubted by a parliamentary committee that there is huge confusion over data as dysfunctional toilets are also included in the list of completed toilets. IEC is totally neglected in many states, and coverage targeting alone is practiced, which goes against the aims of Swachh Bharat.

Large number of faulty and defective latrines and lack of IEC drives on sustainability of the program which is in stake, unless remedial measures are adopted during post 2019 at least.

School Sanitation: Although almost all the schools are covered with Toilet system, based on a Supreme court direction use of them by children is doubtful. Field visits carried out by the author shows that it is being used by teaching staff in many places and is kept under lock and key.

For effectiveness of IEC MDWS can think of a sanitation army of children. Training and educating them could possibly bring in more fruitful results. Single pits must be converted to twin pit dry compost latrines, which not only generates revenue by converting the fecal matter to manure but can also avoid of the catastrophe of pit cleaning and disposal of raw fecal matter and the attendant problems. Now let us move on to the scenario of handling Solid and Liquid Waste in the rural districts.

VII

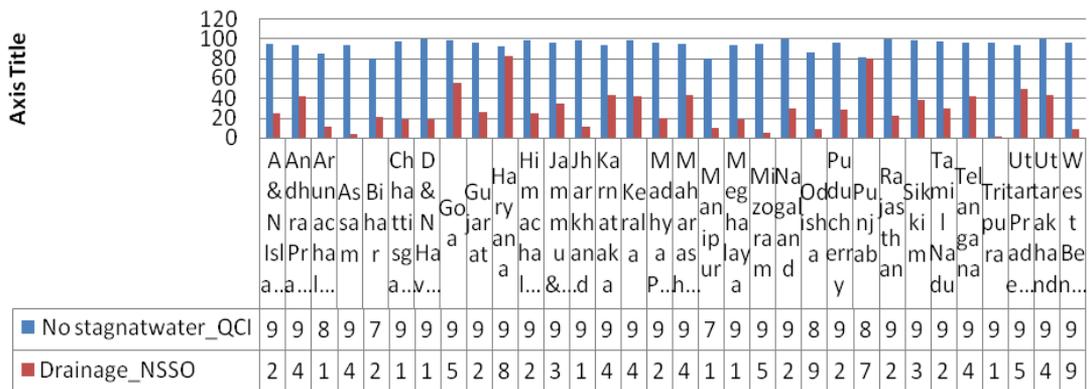
Solid Liquid Waste Management

Solid and Liquid waste in rural area are not that complicated as in the Urban. Though there can have both bio degradable and non bio degradable wastes in rural areas it is by and large bio degradable and some quantities of non bio degradable waste exist. No nationwide authentic data on this exist except the 69th round of NSSO report. Since the main thrust of Swachh Bharat is to convert the villages to be open defecation free, importance is comparatively less. It is also the responsibility of the local Grama Panchayat to deal with the matter. A large number of technologies exist to handle with

this waste. Here also diffusion of innovative technologies is abysmally poor. The scenario as of 2012 is shown in Table 12. Although drainage facility in the rural areas are comparatively less; not even 25% of rural households are covered in states of Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Himachal Pradesh, Manipur, Jharkhand, Madhya Pradesh, Meghalaya, Mizoram, Odisha, Rajasthan, Tripura, West Bengal, Andaman & Nicobar, and Dadra Nagar Haveli. However compared to that of 2008 -09 there is a 7 % improvement in the average performance. However the data shows that the same is completely neglected in states like Assam, Manipur, Mizoram, Odisha, Tripura and West Bengal where the total coverage itself is 10% or less in many cases.

Moving on to garbage disposal arrangements, it is usually the household's responsibility in rural areas. Some arrangement exists in all states as it is the primary responsibility of local body as per the 73rd, 74th Amendment. Many households have coverage of less than 25%, While a maximum of more than 75 % only in Delhi, Haryana, Nagaland and Chandigarh. Garbage disposal facilities are less than the national average in states of Bihar, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Kerala, Madhya Pradesh, Meghalaya, Odisha, Sikkim, Tripura, West Bengal, Dadra & Nagar Haveli, and Daman and Diu, the national average itself is only 1/4th of the households.

**Bar chart showing coverage of Drainage -States
NSSO 2012 and QCI 2016**



Bar chart showing the coverage of Garbage NSSO 2012 and QCI2016

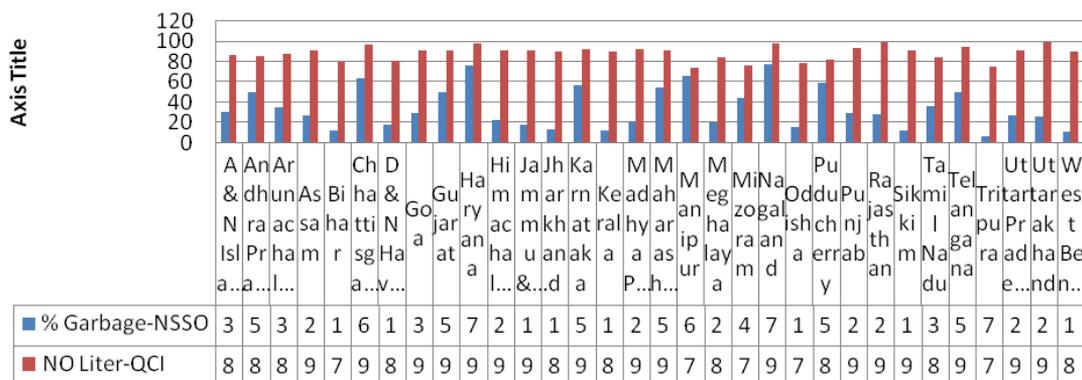


Table 12: Some Key Indicators of households on micro environment during 2012

State/UT - RURAL	% with improved drainage facility	% garbage disposal arrangement	State/UT	% improved drainage facility	% garbage disposal arrangement
(1)	(2)	(3)	(1)	(2)	(3)
Andhra Pradesh	42.2	50.2	Mizoram	4.8	43.9
Arunachal Pradesh	11.2	35.3	Nagaland	28.8	76.7
Assam	4.1	27.5	Odisha	9.1	16.3
Bihar	20.6	12.8	Punjab	79.3	28.9
Chhattisgarh	18.2	63.9	Rajasthan	22.2	28.5
Delhi	91.3	77.5	Sikkim	37.4	11.9
Goa	55	29.5	Tamil Nadu	29	36.3
Gujarat	26.1	49.6	Tripura	1.2	7.1
Haryana	81.7	76	Uttarakhand	42.5	26.2
Himachal Pradesh	24	22.7	Uttar Pradesh	49.5	27.6
Jammu & Kashmir	34.2	18.5	West Bengal	8.7	11.2
Jharkhand	11	14.1	A & Nicobar Is.	24.1	30.6
Karnataka	43.3	56.9	Chandigarh	95.4	97.6
Kerala	41.3	12.3	D & Nagar Haveli	18.1	18.6
Madhya Pradesh	19.7	21.5	Daman & Diu	59.8	22.5
Maharashtra	43	54.9	Lakshadweep	32.2	56.4
Manipur	10	66.1	Puducherry	27.9	59.4
Meghalaya	17.9	20.6	all-India (2012)	31.7	32
			all-India (2008-09)	24.5	24.3

Source: NSSO 69th Report Number: 489.

Compared to the scenario of 2008-09, though it is absolutely inadequate; there is an improvement to the tune of 8%, in a span of 4 years, averages out to only 2% per annum. This also pin points the inadequacy of importance on the part of the local self governments in propagating garbage handling and disposal.

The most recent data available from the Ministry of Drinking Water and Sanitation shows the following picture as on 2016. However, its credibility and authenticity is a serious issue as it is not an independent evaluation, though the work has been carried out by a third party. Almost all states

Table 13: Statewise table on no litter no stagnant water

States	No litter	No stagnant water	States	No litter	No stagnant water
A & N Islands	86%	94%	Maharashtra	90%	94%
Andhra Pradesh	85%	93%	Manipur	74%	79%
Arunachal Pradesh	87%	85%	Meghalaya	84%	93%
Assam	91%	93%	Mizoram	76%	94%
Bihar	79%	79%	Nagaland	97%	99%
Chhattisgarh	96%	97%	Odisha	78%	86%
D & N Haveli	80%	99%	Puducherry	82%	95%
Goa	90%	98%	Punjab	93%	81%
Gujarat	91%	96%	Rajasthan	98%	99%
Haryana	97%	92%	Sikkim	90%	98%
Himachal Pradesh	90%	98%	Tamil Nadu	84%	97%
Jammu & Kashmir	90%	96%	Telangana	94%	96%
Jharkhand	89%	98%	Tripura	75%	96%
Karnataka	92%	93%	Uttar Pradesh	91%	93%
Kerala	89%	98%	Uttarakhand	98%	99%
Madhya Pradesh	92%	95%	West Bengal	89%	96%

Source: QCI report 2017-MDWS web page.

show a rosy picture of more than 75% in solid waste management and more than 80% in liquid waste. Thus, within a span of just 4 years such remarkable improvement itself is doubtful, although some earnest efforts were made by many states as part of the Swachh Bharat. If the field visits are carried out during summer days it is plausible that stagnant water may not normally be available resulting in a wrong conclusion that may be arrived at, whereas if it is during rainy season because of excessive water logging it is possible to conclude that it is momentary and may last only for few days. In both scenarios it can't be taken as conclusive evidence and as such the data itself could possibly be erroneous to arrive at conclusions.

VIII

Capabilities and Sanitation

Now let us examine whether the efforts and figures have really transformed the lives of the people, using the Capabilities Approach as discussed at the beginning. Literature on impact evaluation of Sanitation gives evidence that this scenario of low coverage of latrines in India is the major cause of stunting among children up to 5 years age. This has far reaching consequences both for the present generation and for the future generations as well. Using the district wise data available from NFHS 4 we attempt to depict a picture of the scenario of child stunting in the country, summarised in Table 7. Lesser levels of stunting (Up to 20%) in the age of 0 to 59 months are prevalent only in just 5 % of the districts. In another 13.8% districts 25% of children are stunted. More than 75% of the districts in the country have child stunting of 25 to 50% of the children shows the severity of the situation and to what extent the process of human development is crippled. 31.2% of the districts do have children with a range of stunting from 30 to 50%. In around 11 % of the districts the severity of stunting is quite high, more than 50% children are stunted, in some cases even reaching up to 70%. It should be noted that in such districts almost the entire population is crippled, and this affects the entire development process, as it is primarily affecting the cognitive capabilities of children, as suggested in many of the epidemiological studies.

Table 14: Distribution of child stunting (0 to 59 months) across districts - Rural India

	Frequency	Percent	Cumulative Percent
1.to 20	30	4.9	4.9
20.01 to 25	54	8.9	13.8
25.01 to 30	82	13.4	27.2
30.01 to 40	186	30.5	57.7
40.01 to 50	187	30.7	88.4
50.01 to 60	67	11.0	99.3
60.01 to 70	4	.7	100.0
Total	610	100.0	

Source: NFHS 4.

Figure 3 shows the areas of concentration where the children 0 to 59 months age are largely stunted. It is the same districts where open defecations or uncovered districts are largely concentrated. It could be taken as evidence to the non-coverage of sanitation and its attendant problems. Further, nutritional supplementation also might be limited in these districts. It could also be plausibly because of leakages in targeting systems.

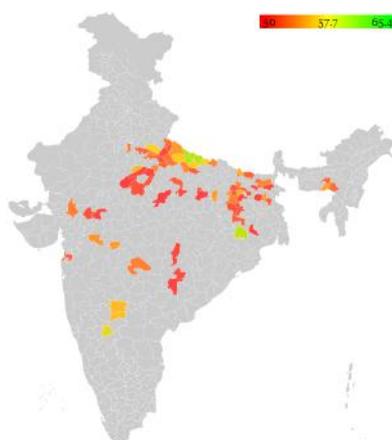
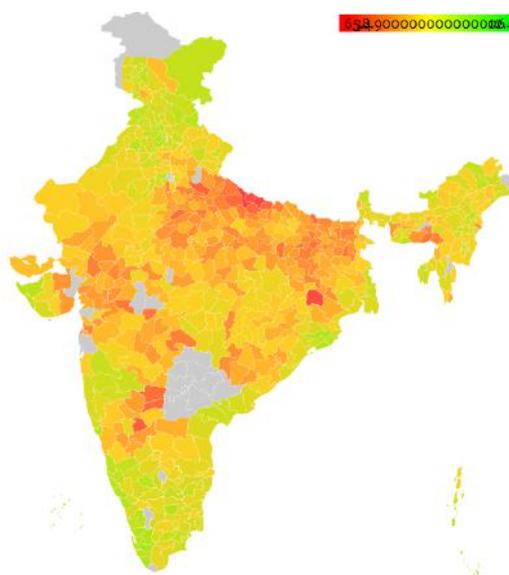
Fig-3: India - RURAL Districts with Percentage of children stunted more than 50

Table 15 shows that it is mostly concentrated in the districts of Uttar Pradesh followed by Bihar, Madhya Pradesh and Jharkhand. Stunting exists in other districts too but relatively very few in numbers though it can't be discounted, as the relative quantum is substantially large that it is more than 50% of children. Figure above confirms the table. Figure below shows the general nature of stunting among children across districts. The darker shades give evidence to higher rates of stunting, which are almost parallel to the open defecation districts. Lighter shades are more or less co-terminus with the higher levels of sanitation coverage.

Table 15: Status of child stunting

State	No of districts where Child stunting > 50%
Bihar	17
Chhattisgarh	3
Gujarat	2
Haryana	1
Jharkhand	7
Karnataka	3
Madhya Pradesh	9
Maharashtra	1
Meghalaya	3
Rajasthan	2
Uttar Pradesh	24



Source: Computed from NFHS 4.

% Child stunting in Indian Districts - NFHS 4

Having examined the gravity of the situation of stunting and sanitation in the country we have also attempted to analyse to what extent sanitation and latrine influence stunting in the rural areas of the country. We hypothesise as follows.

$$CHST_{0-59} = \alpha_1 + \alpha_2 OD + \alpha_3 IMP_WS + \alpha_4 WBI < N + \epsilon$$

where

CHST = percentage of Child stunting 0-59 months age in the districts

OD = percentage of Open defecation and unimproved latrines in the district

IMP_WS = percentage of households in the district with Improved water supply.

WBI < N = percentage of women with BMI less than normal.

We have attempted to analyse to what extent child stunting is influenced by Open defecation, controlling for percentage of households using improved water supply in the district, and percentage of Women in the district whose BMI is less than normal. Since almost more than 80% of the rural population are covered with improved sources of water supply in almost all districts one would assume that there is no problem as far as water supply is concerned, though there are issues of water quality that prevail in many districts. The results are as follows.

$$CHST_{0-59} = 11.78 + 0.19OD + 0.06IMP_WS + 0.36WBMI < N$$

$$(5.40)^{***} (11.20)^{***} (3.02)^{***} (8.52)^{***}$$

*** = Significant at 1%

t- Statistics are shown in the parenthesis.

N=610, R² = 0.50 F = 195.51, D.W = 1.41

The equation shows that child stunting in the initial age of growth of children is considerably influenced by Open defecation and the quality of water that is being used by households along with the BMI of women in the households. All influence the relationship positively. This is consistent with the findings of Coffey and Spears (2017, 2014, 2018). The percentage of literacy among women also is important but because of problems of multicollinearity the variable has not been used. Coffey and Spears (2018) found that stunting has declined when compared to NFHS 3. A study by BMGF (2017) in five states of Karnataka, Madhya Pradesh, Rajasthan, Uttar Pradesh, and West Bengal by drawing samples from households situated in ODF and Non ODF villages also attempt to depict a picture that there is glaring difference in the Stunting of children, Wasting and underweight children and in the body mass index of women between ODF and Non ODF villages. A study carried out by Coffee, Geruso and Spears (2017) in Nepal indicates that sanitation a public good significantly contributes to preventing anaemia. Anaemia impairs physical and cognitive development in children and reduces human capital accumulation. Another study by Duh and Spears (2016) also demonstrates the effect of poor sanitation on disease exposure and infant mortality and on low-calorie consumption.

IX

Conclusions

This commentary paper attempts to make an evaluation of the implementation of Swachh Bharat in Rural India, its achievements and pitfalls and the final transformation towards building 'capabilities' and 'functionings' as Sen points out, using data from independent sources and from sources of Government of India as well. Among the positive achievements, it is taken as an unprecedented mass movement with possible involvement of almost all stakeholders and the political willingness to take forward and achieve the targets. To a great extent this has culminated in accelerating the speed of achievements partly, enormous construction of toilets have taken place, although with lesser speed in its use, in the rural areas, which people were looking with a shying eye to do for many reasons. This attempt within a short period although inspired by the initiatives in the international movement itself is a laudable one. This does not connote that it is devoid of pitfalls and shortcomings. There are several pitfalls too in its progress implementation and the technology followed. The autonomy provided by the Centre to the States in choosing their own pathways of implementation has given way to new generation secondary problems of sludge removal and faecal disposal which in effect is as good as scavenging itself. Similar is the case in rural garbage handling though lesser in scale and proportions.

Further, the analysis shows that the importance has gone to hardware mostly and in that process, the software of social engineering is completely negated in many districts. Although the programme existed for a long time since the first Five Year Plan, since the boost to it was launched all on a sudden with such a massive scale, there are many inadequacies and shortages in many respects, specifically on appropriate manpower. It also gives us the lesson that innovation in engineering issues alone cannot bring in mass solutions to problems, though it exists in part. It should be harnessed with social engineering, cultural beliefs and institutions to achieve enough spread and popularity, reemphasising the theoretical propositions laid down in Fig 1. The results presented show that adequate attention has not been paid to popularise such institutions, which itself is not that easy, considering the diversities in the country and the vast spread, and also from the lessons learned from many parts of India and other countries. Though innovations exist since the nineties which can easily provide better results, in combination with that of recent innovations in toilet technology, absence of appropriate institutions and initiatives in many places has usurped the new generation issues that could have been avoided with careful planning and guidance in the states and districts. Further, the bureaucracies were also quite unwilling to hear the opinions of experts in the area and were working as masters of all.

The final analysis using district wise data from independent sources of NFHS 4 give evidence that Sanitation; as defined by the Water Supply and Sanitation Collaborative Council; do play an important role in achieving human development right from the womb and finally to the culmination of it through care so as to achieve a healthy and prosperous young generation to come.

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