

MONITORING OPEN DISCHARGE FREE INDIA

A Comprehensive Sanitation Matrix

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RESEARCH REPORT



Kimberly M. Noronha & Shubhagato Dasgupta

Centre For Policy Research



Abstract

This report, part of the Scaling City Institutions for India (SCI-FI): Sanitation initiative, is the product of an effort to develop an assessment framework or matrix to measure sanitation outcomes in India. We begin by examining international policy instruments on Open Defecation Free OD(F) status, trace the genealogy of the term, and then compare India's policy environment with the other top contributors to global open defecation in 2012 (Indonesia, Ethiopia, Nigeria, and Pakistan). We then outline the challenges in terms of defining OD(F) and using existing survey instruments available to India to develop such a framework. Subsequently, we present a proposal for a matrix to measure sanitation outcomes in India covering 9 sanitation outcomes, making a case for the full sanitation chain, especially open discharge free (ODF2) environs. Finally, we evaluate the emerging monitoring framework of Goal 6 of the Sustainable Development Goals (SDGs) and suggest the consideration of this framework as part of the ongoing global efforts to evolve a monitoring framework for sanitation.

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Author Profiles

Shubhagato Dasgupta is a senior fellow at CPR and director of the SCI-FI Sanitation initiative. His current research focuses on drinking water and sanitation in India and the world, with particular reference to flagship government programmes and service delivery challenges in smaller cities. Other major areas of work include urban infrastructure and service delivery financing, housing and slum rehabilitation, urban sector public finance, and urban environmental infrastructure planning, management, and investment alternatives. Before coming to CPR, Shubhagato led the Support to National Policies for Urban Poverty Reduction Project, a collaboration between the UK's Department for International Development (DFID) and India's Ministry of Housing and Urban Poverty Alleviation to develop pro-poor urban policies in 20 cities across 15 states. Prior to this, he has worked on issues of urban development with a wide range of other public, private, multilateral, and non-governmental organisations, including as Senior Urban Specialist at the World Bank, Assistant Vice President at the Infrastructure Development Finance Company (IDFC), the Housing and Urban Development Corporation (HUDCO), and The Action Research Unit. In addition, Shubhagato has been on private sector participation projects in urban and drinking water programmes in eastern and southern Africa for the International Finance Corporation (IFC) and the Acumen Fund. Shubhagato trained as an architect at the Centre for Environmental Planning and Technology (CEPT) in Ahmedabad, and holds an MSc in housing and development planning from the Development Planning Unit of the University College London. He is also currently undertaking a PhD at the Centre for Urban Studies at the University of Amsterdam.

shubhagato@cprindia.org

Kimberly M. Noronha is a senior researcher at CPR, working on urban drinking water and sanitation. Prior to joining CPR, Kimberly worked as a social development specialist with the Support to National Policies for Urban Poverty Reduction Project, a partnership between DFID and the Ministry of Housing and Urban Poverty Alleviation to support the development of pro-poor urban policies in 20 cities across 15 states. With more than 15 years in the development sector, she has also worked with central, state, and local governments, implementing agencies, and NGOs to coordinate programmes, formulate policy, and conduct research in areas including urban poverty, public health service delivery, primary and elementary education, and disability issues. She has an MPhil in African studies from the University of Delhi, and an MSc in Development Studies from the School of Oriental and African Studies, University of London.

kim@cprindia.org

Table of Contents

INTRODUCTION	6
INTERNATIONAL POLICY INSTRUMENTS ON OD(F)	6
GENEALOGY OF THE TERM OD(F)	8
INDIA VS. THE OTHER TOP 4 CONTRIBUTORS TO GLOBAL OD	9
Indonesia	10
Ethiopia	10
Nigeria	11
Pakistan	12
WHAT DO INDIAN POLICIES AND PROGRAMMES FOR SANITATION SAY ABOUT OD(F)?	12
CHALLENGES	17
Challenges in defining OD(F) in India	17
Challenges with using existing survey instruments in India	19
FRAMING THE INSTRUMENT	23
Developing the instrument	23
Key components of the index	24
Principles of the index	24
Elements of the index	25
Outcomes and indicators	25
SDG GOAL 6 MONITORING FRAMEWORK	31
CONCLUSION	33
ANNEXURE I: SANITATION MATRIX	34

List of Acronyms

AFRICASAN	African Conference on Sanitation and Hygiene	NITI Aayog	National Institution for Transforming India
BCC	Behaviour Change Communication	NSP	Nirmal Shahar Puraskar (Clean and Green City Prize)
CAPEX	Capital Expenditure	NSS	National Sample Survey
CEPT	Centre for Environment Planning and Technology	NUSP	National Urban Sanitation Policy
CLTS	Community-Led Total Sanitation	OD	Open Defecation
CLTSH	Community-led Total Sanitation and Hygiene	OD(F)	Open Defecation (Free)
CRSP	Central Rural Sanitation Programme	ODF2	Open Discharge Free
EaSAN	East Asia Ministerial Conference on Sanitation and Hygiene	O&M	Operations and Maintenance
FSM	Faecal Sludge Management	OPEX	Operational Expenditure
FSSM	Faecal Sludge and Septage Management	PATS	Pakistan Approach to Total Sanitation
GEMI	Global Expanded Monitoring Initiative, Integrated Monitoring of Water and Sanitation Related SDG Targets	PPP	Public-private Partnership
GLAAS	Global Analysis and Assessment of Sanitation and Drinking-Water	RCTs	Randomised Control Trials
Gol	Government of India	RUWSSA	Rural Water Supply and Sanitation Agency
GP	Gram Panchayat	SACOSAN	South Asian Conference on Sanitation
HP	Himachal Pradesh	SBM	Swachh Bharat Mission
HH	Household	SDGs	Sustainable Development Goals
ICT	Information and Communication Technology	SCI-FI Project	Scaling City Institutions for India: Sanitation Project
IEC	Information, Education and Communication	SGBSA	Sant Gadge Baba Swachhata Abhiyan
J&K	Jammu and Kashmir	SISS	State Incentive Scheme on Sanitation
JMP	Joint Monitoring Programme of the WHO & UNICEF for water and sanitation	SLTS	School-Led Total Sanitation
JNNURM	Jawaharlal Nehru National Urban Renewal Mission	SLWM	Solid and Liquid Waste Management
LATINOSAN	Latin American Conference on Sanitation	SMART	Specific, Measurable, Achievable, Realistic, Time-Bound
M&E	Monitoring & Evaluation	SQUAT Survey	Sanitation Quality, Use, Access and Trends Survey
MDWS	Ministry of Drinking Water and Sanitation	SWM	Solid Waste Management
MDGs	Millennium Development Goals	TN	Tamil Nadu
MIS	Management Information System	TSC	Total Sanitation Campaign
MVSSP	Maharishi Valmiki Sampurn Swachata Puruskar	TSSM	Total Sanitation and Sanitation Marketing
MoUD	Ministry of Urban Development	ULB	Urban Local Body
NDMC	New Delhi Municipal Corporation	UN	United Nations
NFHS	National Family Health Survey of India	UNICEF	United Nations Children's Fund
NBA	Nirmal Bharat Abhiyan	VIP	Ventilated Improved Pit
NGP	Nirmal Gram Puraskar	WASH	Water, Sanitation and Hygiene
		WASHCOM	Water, Sanitation and Hygiene Committee
		WHO	World Health Organization
		WSLIC	Water and Sanitation for Low Income Communities
		WWTP	Waste Water Treatment Plant

INTRODUCTION

Box 1: The sanitation ladder, JMP
Open Defecation
Open defecation: when human faeces are disposed off in fields, forests, bushes, open bodies of water, beaches, or other open spaces, or with solid waste
Unimproved facilities
Unimproved sanitation facilities: do not ensure hygienic separation of human excreta from human contact. Unimproved facilities include pit latrines without a slab or platform, hanging latrines, and bucket latrines
Shared
Shared sanitation facilities: sanitation facilities of an otherwise acceptable type shared between two or more households. Only facilities that are not shared or not public are considered improved
Improved
Improved sanitation facilities: are likely to ensure hygienic separation of human excreta from human contact. They include the following facilities: <ul style="list-style-type: none"> • flush/pour flush to: <ul style="list-style-type: none"> • Piped sewer system • Septic tank • Pit latrine • Ventilated improved pit (VIP) latrine • Pit latrine with slab • Composting toilet
Source: http://www.wssinfo.org/definitions-methods/watsan-ladder/

India has the dubious distinction of leading the world's statistics in the number of people who defecate in the open. Out of a total of 998.49 million people defecating in the open across the world, 60% or 597.48 million resided in India in 2012; Indonesia comes a far second with just 63 million people¹. Of the top 10 countries² contributing to the world's open defecation, barring India (S. Dasgupta and Jain 2014), the remaining 9 account for only 23% or 229 million people defecating in the open. This status has led the Government of India (GoI) to revise its programmes on urban and rural sanitation with a strong focus on eliminating open defecation (henceforth OD) through the Swachh Bharat Mission (SBM) (both Gramin³ and Urban). This report will show that while there is a cognisance of the problem, the issue of how to measure Open Defecation (Free) [OD(F)] status is still largely unresolved. This is a crucial question, especially in India, where the GoI has set a target for a 'Swachh Bharat' (Clean India), which is that 'no households engage in the practice of OD', by the year 2019. It is also a globally relevant topic because, as per the Sustainable Development Goals (SDGs), the world governments have set upon themselves the task to end OD by the year 2030.

This report is the product of an effort to develop an assessment framework or matrix to measure sanitation outcomes in India. We begin by examining international policy instruments on OD(F), trace the genealogy of the term, and then compare India's policy environment with the other top 4 contributors to global OD in 2012 (Indonesia, Ethiopia, Nigeria, and Pakistan). We then outline the challenges in terms of defining OD(F) and using existing survey instruments available to India to develop such a framework. Subsequently, we present a proposal for a matrix to measure sanitation outcomes in India covering 9 sanitation outcomes. Finally, we evaluate the emerging monitoring framework of SDG Goal 6 and suggest the consideration of this framework as part of the ongoing global efforts to evolve a monitoring framework for sanitation.

INTERNATIONAL POLICY INSTRUMENTS ON OD(F)

Over the last 35 years, there have been a number of international efforts towards improving the sanitation situation, particularly in poorly served areas. The World Health Organization (WHO) declared 1980-90 the International Drinking Water Supply and Sanitation Decade and recommended adequate action and strengthening of institutional mechanisms to deliver drinking water supply and sanitation services to the unserved population. Crucially, this declaration makes the connection between health on the one hand, and drinking water and sanitation on the other. It does not, however, mention OD as a separate issue for consideration (World Health Organisation 1981). Ten years later, the

¹ Comparative statistics sourced from the World Health Organization (WHO) and United Nations Children's Fund's (UNICEF) Joint Monitoring Programme (JMP): <http://www.wssinfo.org/data-estimates/tables/>. Data sourced only for the year 2012.

² In descending order of population defecating in the open, these include India, Indonesia, Pakistan, Nigeria, Ethiopia, Sudan, Niger, Nepal, China, and Mozambique.

³ 'Gramin' is the Hindi word for 'rural'.

United Nations (UN) Millennium Summit saw the agreement of the Millennium Development Goals (MDGs) (United Nations General Assembly 2000). Under Goal 7, i.e. ensuring environmental sustainability, Target 7.C requires halving the proportion of the population without access to what is referred to as 'sustainable access' to safe drinking water and 'basic sanitation' (United Nations 2014).

Progress under the MDG Target 7.C globally has been measured through the Joint Monitoring Programme (JMP) of the WHO and United Nations Children's Fund (UNICEF). Due to the scale of measurement of the indicators, the JMP depends on household survey data submitted by each member country, aggregated region-wise and subject-wise, and made available online. In keeping with the MDG target of 'sustainable access' to 'basic sanitation', JMP described adequate sanitation facilities as those that are not shared between households and that hygienically separate human excreta from human contact. From this basic definition of adequate sanitation, JMP graded sanitation on a scale/ladder from 'unimproved' to 'improved', where technologies that meet the definition of 'adequate sanitation' are considered improved sanitation, while those that do not are considered 'unimproved' (United Nations Children's Fund (UNICEF) & (WHO), 2006, p. 7). The JMP sanitation ladder moving from unimproved to improved sanitation with definitions and indicators is presented in Box 1; these definitions match those given in the National Family Health Survey of India, Round 3 (NFHS-3) of 2005-06. The JMP sanitation ladder is thus an international compendium that provides a definition of 'open defecation', while national survey instruments such as the Indian Census 2011 and NFHS-3 provide the source for its evaluation. A similar formulation is likely to be generated for the SDGs.

Following the MDG declaration, 2005-2015 was declared the Water for Life Decade (United Nations 2004), and 2008 was celebrated as the International Year of Sanitation (United Nations 2007). The fundamental goal of the Water for Life Decade was to promote efforts to fulfil international commitments made on water and water-related issues by 2015. In May 2014, the UN launched the End Open Defecation Campaign (2014-15) to end the practice of OD, with the intention of giving the sanitation agenda a push, which was a MDG target that was lagging, and improving access to toilets and latrines for people without basic-level sanitation⁴.

GENEALOGY OF THE TERM OD(F)

The concept of OD(F) has a recent genealogy in the evolution of sanitation policy, initially through local efforts in Bangladesh and India. The term 'open defecation free' was initially popularised between 2000 and 2003 in Bangladesh where the Community-Led Total Sanitation (CLTS) approach was adopted and OD(F) was seen as a measurable outcome of CLTS. CLTS is a sanitation promotion approach to

⁴ This appears to be mainly an information, education, and communication (IEC) campaign to garner support globally to end OD under the Water for Life Decade (<http://opendefecation.org>)

mobilise communities to change their behaviour towards safe sanitation practices. It focuses on sensitising the community to the ill effects of OD and encouraging them to take collective action to eliminate it; the emphasis thereby is peer pressure for OD(F) communities. In a departure from previous efforts, the campaign in Bangladesh emphasised confinement of faeces from the environment, rather than simply the construction of a sanitary latrine. In 2000, Bangladesh's programme started with Mosmoil village and was subsequently followed by a national focus on 100% sanitation to include no OD, hygienic latrines available to all, use of hygienic latrines by all, proper maintenance of latrines for continual use, and improved hygiene practices (Local Government Division Ministry of Local Government Rural Development and Cooperatives People's Republic of Bangladesh 2005, 7). Between 1990 and 2012 Bangladesh has moved from roughly 34% OD to just 3% OD, a 31 percentage point reduction (World Health Organization and United Nations Children's Fund (UNICEF) 2014, 22).

In India, the Sant Gadge Baba Swachhata Abhiyan (SGBSA) was launched during 1997-2000 in the state of Maharashtra to reward the cleanest villages in the state. The scheme offered a no-subsidy reward-based model of motivating local governments (using fiscal transfers) to tackle all aspects of environmental sanitation outcomes. Within 2 years of its launch, the campaign created public sanitation assets worth ₹200 crore⁵ without any government contribution (Sawai, 2014; Thakre, 2011; Water Supply and Sanitation Department, Government of Maharashtra, n.d.). Maharashtra's SGBSA was used as a best-practice example when designing the Nirmal Gram Puraskar (NGP) scheme in 2003-04. OD(F) finds policy mention in the revised Nirmal Bharat Abhiyan (NBA) of 2012, and as an explicit goal in the Swachh Bharat Mission (SBM) launched in 2014.

In an attempt to monitor the progress of the MDGs throughout the world, regional chapters for peer monitoring were developed, such as AFRICASAN⁶ for the African continent, EaSAN⁷ for East Asia, LATINOSAN⁸ for Latin America, and SACOSAN⁹ for South Asia covering the nations of Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka. The 5th conference was held in October 2013 in Nepal and resulted in the Kathmandu Declaration where member nations unanimously agreed and committed to 'an open defecation free South Asia by 2023' (4 years after India's own goal in 2019, and 7 years before the SDGs). In order to achieve this, member nations committed to the formulation, development, and implementation of SMART¹⁰ indicators to measure and report on processes and outcomes at all levels (households and institutions), with disaggregated reporting on gender, age, disability, marginalized, and vulnerable groups (SACOSAN, 2013, 1) to be developed by each member country specific to their context. The

⁵ Approximately US\$ 29.5 million (converted at Rs. 67.7 to US\$ 1).

⁶ African Conference on Sanitation and Hygiene.

⁷ East Asian Ministerial Conference on Sanitation and Hygiene.

⁸ Latin American Conference on Sanitation.

⁹ South Asian Conference on Sanitation.

¹⁰ SMART: Specific, Measurable, Achievable, Realistic, Time-Bound.

Dhaka Declaration from the 6th SACOSAN Conference in January 2016 does not mention OD(F) exclusively but discusses the importance of solid and liquid waste management (SLWM), faecal sludge management (FSM), and the wider environment, including climate resilient and safe sanitation facilities (SACOSAN 2016, 2).

As the successor to the MDGs, the SDGs in 2015-2030 have as their target (6.2) the availability and sustainable management of water and sanitation for all (proposed Goal 6), the achievement of 'adequate and equitable access to sanitation and hygiene for all, and end[ing] open defecation, paying special attention to women and girls'. Early discussions point to indicators for the percentage of population using safely managed sanitation services (progressive elimination of inequalities in access), and the percentage of population with access to a handwashing facility with soap and water in the household (progressive elimination of inequalities in access) (UN Water 2015).

OD(F) has gained purchase as a concept because of the clear recognition of the externality aspects of sanitation, and the acknowledgement that partial coverage and use of toilets has led to unsatisfactory public health outcomes as a result of poor sanitation. The term also clarifies the role of 'communities' in sanitation goals and sets up clearly identifiable stages in the sanitation improvement matrix with the aim of safely containing human excreta, thereby breaking the faecal-oral route of disease transmission.

INDIA VS THE OTHER TOP 4 CONTRIBUTORS TO GLOBAL OD

Of the top 5 contributors to the world's OD statistics, India is the only country that has a subsidy-linked supply-side intervention of toilet construction. The others – Indonesia, Pakistan, Nigeria, and Ethiopia – have gone the CLTS route. Of these 4, Indonesia, Nigeria, and Ethiopia have evolved strong protocols for the verification and certification of OD(F) status, while Pakistan has developed a fiscal incentive scheme very similar to the NGP and Nirmal Shahar Puraskar (NSP) in India, however without as clear a set of indicators¹¹. All 5 countries, it may be noted, use the strategy of conferring 'OD(F) status' on an administrative unit (urban or rural), with or without a financial incentive, rather than real-time programme monitoring of this status.

Indonesia

Unlike India, Indonesia's problem is not perceived to be a supply-side one; 73% of its population has access to household toilets. The sanitation programmes in Indonesia focusing on OD(F) status, such as WSLIC (Water and Sanitation for Low Income Communities) and TSSM (Total Sanitation and Sanitation Marketing), focus instead on behaviour change communication (BCC) to ensure toilet use

¹¹ The National Sanitation Policy for Pakistan only describes 4 awards; the indicators are not specified

and mandate investments in public sanitation infrastructure such as public toilets and solid waste management (SWM) (Colin et al. 2009; Colin 2011). The approach in the verification of 'total sanitation status' in Indonesia uniquely moves on a ladder of sanitation improvements that are linked to behaviour changes as inputs and an improved quality of the environment as outputs. Communities that feel they deserve OD(F) status apply for verification under the programme run by an external team, usually comprising local government functionaries and representatives of other communities declared OD(F). Indonesia's declaration of 'Community-based Total Sanitation' rests on 5 pillars – stop OD in every house; handwashing with soap; household drinking water and food management; household solid waste management; and household liquid waste management. OD(F) declaration is an achievement of Pillar 1 where 100% of households in a given village do not defecate in the open. Indonesia requires verification of status to be conducted by a 100% survey of all households in the village; for pillars 2-5, the sampling requirement is just 30% of the households (Directorate of Environmental Health General Directorate of Diseases Control and Environmental Health Ministry of Health Republic of Indonesia 2013). Communities that qualify for OD(F) status after verification are usually presented with formal certification by district authorities. Those that applied but were rejected are provided with a detailed explanation about why the OD(F) status/certification was denied, with the possibility for reverification when the situation has been rectified (United Nations Children's Fund (UNICEF) 2012).

Ethiopia

Ethiopia has adopted targets for water, sanitation, and hygiene (WASH) through its Universal Access Plan which aims to reach 98.5% access to safe drinking water and 100% access to sanitation by 2015 (International Federation of Red Cross and Red Crescent Societies 2015; United Nations Children's Fund (UNICEF) 2014; Thomas and Bevan 2014). This plan is implemented through its Community-led Total Sanitation and Hygiene (CLTSH) programme under which a detailed OD(F) verification and certification protocol has been developed. OD(F) status is declared on the basis of the criteria listed in the table below.

Table 1: Protocol for verification of OD(F) status, Ethiopia

#	Variables	Indicators	Sources of information
1	No OD practised	No fresh faeces observed	Household (HH), institutions and transect walks
2	Availability of latrines	Availability of latrines meeting minimum standards	HH, communal areas and institutions
3	Cover for latrine drop-hole	Safe cover on latrine hole	HH, communal areas and institutions
4	Latrines in use	Faeces in pits, visible access, latrines maintained, presence of spider webs	HH, communal and institutions
5	Separate blocks or rooms for males and females	Separate rooms or clearly marked [fe]male facilities	HH, communal and institutions

Source: Ministry of Health, Federal Democratic Republic of Ethiopia 2012, 8.

Nigeria

Nigeria has 3 policies that provide an enabling environment to meet the target of constructing 1 million latrines every year beginning from 2008. Public toilets and institutional toilets (e.g. in schools and health centres) are to be constructed by the government, while household toilets remain the individual responsibility of the household and are motivated through CLTS. The National Water-Sanitation Policy, 2004, the Rural Water and Sanitation Strategic Framework, 2004, and the National Environmental Sanitation Policy, 2005, all have as their goal the elimination of OD and are predicated on the assumption that increasing access to sanitation infrastructure can tackle the problem of OD and improve public health (Federal Ministry of Agriculture and Water Resources Government of Nigeria 2008). Two major outcomes for these programmes are OD(F) status and total sanitation. OD(F) is verified through a process that includes reporting of claimed OD(F) status by communities by the Water, Sanitation and Hygiene Committee (WASHCOM). This is followed by two levels of verification – first by WASHCOM conducted by the local government's WASH Unit through unscheduled visits, and the second conducted by the State Rural Water Supply and Sanitation Agency (RUWASSA). Validation of this process is conducted by the National Task Group on Sanitation, and OD(F) certification is issued by the State Task Group on Sanitation. Detailed guidelines on these have been issued through the Protocol for Certification and Verification of OD(F) and Total Sanitation Communities in Nigeria. OD(F) status is measured on the following indicators:

1. All households use hygienic latrines.
2. Latrines are always kept clean.
3. Latrines, handwashing facilities, and urinals are provided and being used in schools, health centres, markets, and other public places, where available.
4. Hands are washed properly with soap, ash and water at critical times (after defecating, before eating and feeding children, after packing children's faeces, before preparing food, and after coming in contact with dirt).
5. Food is always kept covered.
6. Drinking water is always kept covered.
7. Surroundings of water points (boreholes, hand-dug wells, etc.) surroundings are always kept sanitary.
8. Households, abattoirs, and community environment are always kept sanitary.
9. There is proper disposal of solid and liquid waste including animal waste.
10. Waste water is properly disposed.
11. Latrines are safely located at least 30 metres/100 ft away (where there is enough space) and downhill of groundwater sources.

The Nigerian protocol document defines OD(F) as ‘when no faeces are openly exposed to the environment. Achieving OD(F) might involve the use of any form of latrines that prevent exposure of faeces to the environment with provision for moving up the sanitation ladder’ (United Nations Children's Fund (UNICEF) 2012; Government of Nigeria and United Nations Children's Fund (UNICEF) 2012).

Pakistan

Pakistan's National Sanitation Policy, 2006, envisages creating OD(F) states. The Pakistan Approach to Total Sanitation (PATS) includes CLTS, School-Led Total Sanitation (SLTS), component sharing, sanitation marketing, and disaster response approaches to attain its target. As an incentive it rewards all tehsils and towns in 4 categories – 100% OD(F), 100% sanitation coverage, the cleanest tehsil /towns, and the cleanest industrial estate/cluster. The premise for determining OD(F) tehsils and towns is the eradication of OD and the availability of functional SLWM. Indicators for sanitation includes questions on types of toilet used by households and types of sanitation systems used (Ministry of Environment Government of the Islamic Republic of Pakistan 2006).

WHAT DO INDIAN POLICIES AND PROGRAMMES FOR SANITATION SAY ABOUT OD(F)?

While sanitation is a state subject,¹² and some states have had innovative sanitation programmes¹³ that reward sanitised¹⁴ villages, the push towards sanitation policy and programme implementation has come primarily from the central government, initially focusing on rural sanitation outcomes. There are close linkages between international policy debates and the way in which national programmes for sanitation have evolved. During the International Water and Sanitation Decade (1980-1990), the GoI started the Central Rural Sanitation Programme (CRSP) solely with the objective of improving sanitation coverage in rural India and providing safe and private toilet facilities (Ministry of Rural Areas & Employment 1993). In 1999, with the launch of the Total Sanitation Campaign (TSC) in rural areas, sanitation was expanded to include personal hygiene, home sanitation, safe water, garbage disposal, excreta disposal, and waste water disposal. The TSC campaign in 2011 asked Gram Panchayats (GPs) for a plan of action to attain OD(F) status, and in its revised avatar of the Nirmal Bharat Abhiyan (NBA) in 2012, the programme stated that GPs would be monitored for their sustained ‘Nirmal’ status.

During the Water for Life Decade (2005-2015), the GoI launched an award-based incentive scheme for fully sanitised and OD(F) GPs, blocks, districts and states

¹² According to the Constitution of India, subjects that can be legislated on are divided into three lists – the central list (legislated by the Parliament of India), the state list (legislated by the state/provincial legislatures), and the concurrent list (legislated by both).

¹³ E.g. Andhra Pradesh's Shubhram, Maharashtra's Sant Gadge Baba Swachhata Abhiyan (described earlier), Haryana's State Incentive Scheme on Sanitation (SISS), Himachal Pradesh's Maharishi Valmiki Sampurn Swachata Puruskar (MVSSP), and Karnataka's Nairmalya (CMS Research House 2011).

¹⁴ The word ‘sanitised’ is being used here because a wide variety of policy instruments use the term. This is defined differently in different documents, but broadly indicates a geographical area where no OD is to be found, all households have access to household toilets and are using them, the area has strong solid and liquid waste management practices, and the floating population has access to community and/or public toilets, which are functional and well maintained.

called Nirmal Gram Puraskar (NGP) in October 2003 as a component of its flagship scheme, TSC. NGP is an incentive scheme that offers rewards to GPs that achieve OD(F) status. The NGP has detailed criteria to measure OD(F) status. Under the broad head of 'Individual Household Latrine' in its mandatory criteria, the NGP assigns (Ministry of Drinking Water & Sanitation, 2012, pp. 2-5):

1. 30 out of 50 marks: for 'toilet usage by all households, migrant labour at public places, and no open defecation found in the GP'.
2. 5 marks: for construction of toilets in such a way 'that safely confines faeces' (measuring improved/safe sanitation).
3. 5 marks: for safe disposal of children's stools.
4. 5 for no manual scavenging evinced in the GP.

Out of all the indicators for OD(F) status, therefore, toilet construction is graded only in as much as it ensures that the construction safely confines faeces. This goes beyond the usual definition of OD where the main actor is the individual going out into the open to defecate, and also includes discharge of existing toilets/sanitation facilities into the open environment. In India, out of a total of 250,261 GPs, just over 11% (28,589 GPs) have been awarded the NGP between 2005 (the first year of the awards) and 2014 (the last year for which the awards were given)¹⁵.

The focus on urban sanitation service delivery was first evinced with the declaration of 'Provision of Universal Sanitation in Urban India' at the 16th meeting of the Urban Think Tank in Pune on 19-20 March 2004. The Pune declaration acknowledged that 3 out of the 8 MDGs are directly dependent on the provision of sanitation, and that the current sanitation situation in urban areas is serious. The declaration stressed that improvements in urban sanitation, especially for the poor, would positively impact public health, livelihood, and the environment. While there are successes in urban sanitation, these are in pockets and very few have been scaled up to a city level. The declaration stressed large-scale capacity enhancement of various stakeholders for the achievement of universal urban sanitation in India and the crucial role of the urban-oriented Central ministries – the Ministry of Urban Development and the Ministry of Housing and Urban Poverty Alleviation – as enablers in this goal. The text of the declaration itself does not mention OD. However, the report presents it as a key challenge that is at the heart of the matter, further outlining that OD is a standard and accepted practice and its problems are not being adequately appreciated (WSP 2004).

Although the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), launched in 2005, has resulted in the most coordinated effort towards funding urban renewal in India, without a concerted focus on elimination of OD in the scheme, urban sanitation service delivery under JNNURM was funded mainly through projects for underground sewerage in cities. India's cities would have to

¹⁵ <http://nirmalgrampuraskar.nic.in/Reports.aspx>

wait till 2008 for a policy on urban sanitation that had OD(F) cities as its goal, and till 2014 for a TSC/NBA type scheme for individual household toilets linked to the elimination of OD.

During the International Year of Sanitation in 2008, the government brought out the National Urban Sanitation Policy (NUSP), which focuses on the need for separate policy attention to urban sanitation by noting that it is distinct from rural sanitation and water supply issues (S. Dasgupta and Jain 2014). The vision of NUSP is for cities to become totally sanitised, healthy, and liveable, and ensure and sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and affordable sanitation facilities for the urban poor and women (Ministry of Urban Development, Government of India, 2008, 7).

While the phrase OD is not defined as explicitly as under JMP, the term is understood in two ways in NUSP 2008. The first is as a contributor to unsafe sanitation, thus contravening the vision of the policy. In its definition of sanitation as ‘safe management of human excreta, including its safe confinement treatment, disposal and associated hygiene-related practices’ (Ministry of Urban Development, Government of India, 2008, 6), NUSP implies that unsafe management of human excreta through its disposal into the open environment is unacceptable. Second, in its goals, OD is seen as a practice to be stopped: for NUSP, achieving OD(F) cities means that ‘All urban dwellers will have access to and use safe and hygienic sanitation facilities and arrangements so that no one defecates in the open’ (Ministry of Urban Development Government of India 2008, 8). This is the most explicit policy statement from the GoI, prior to the launch of the Swachh Bharat programme, which links access and use of sanitation infrastructure to the practice of OD. As will be demonstrated in the subsequent section on measurement and indicators for OD, this link has likely stemmed from the manner in which OD is measured in India through the Census and other household surveys.

NUSP 2008 also recommends an objective rating for sanitation in cities. Cities are to be rated based on three indicators totalling 100 points, namely output-related, process-related, and outcome-related indicators:

1. Within output-related indicators, 16 out of 50 points are assigned to access and use of toilets (for both individuals and institutions) and no visible OD.
2. 4 out of 30 points under process-related indicators are assigned to ensure monitoring and evaluation (M&E) systems for OD(F) status.
3. Outcome indicators (20 points in total) take into account the quality of drinking water in the city, its surrounding water bodies, and reduction in water-borne diseases – indirect indicators of OD.

NUSP recommended 4 categories of rating for cities based on their score – Red (33% or less), Black (between 34% and 66%), Blue (between 67% and 90%), and Green (between 91% and 100%) (Ministry of Urban Development Government of India 2008, 36). The MoUD used this to develop the NSP (Clean and Green City Prize). The first national rating was carried out in 2009 on the basis of a survey commissioned¹⁶ by the MoUD between December 2009 and May 2010, 4 years after its rural counterpart, the NGP. The exercise rated 423 cities (with population greater than 100,000) for their performance across these indicators. Of the 423 cities, only 4 cities got a Blue ranking, namely Chandigarh, Mysore, Surat, and New Delhi Municipal Corporation (NDMC) (Ministry of Urban Development Government of India 2010c; Ministry of Urban Development Government of India 2010b; Ministry of Urban Development Government of India 2010a).

In October 2014, the GoI launched a consolidated mission for urban and rural sanitation with clear goals for a ‘Swachh Bharat’ (Clean India). The SBM (Gramin) and SBM (Urban) emphasized the elimination of the practice of OD at the level of outcomes with a deadline of 2019 (5 years after the launch of the initiative). For toilet construction at the household level SBM has a household subsidy in the form of an ‘incentive grant’ from the central government of Rs. 4,000 in urban areas and ₹9,000¹⁷ in rural areas, with the balance amount to be sourced from state government share and identified beneficiaries. In tacit recognition of the fact that supply-side interventions of toilet construction alone will not result in OD(F) status, SBM also has a very strong funded emphasis on information, education, and communication (IEC) activities and behaviour change communication (BCC). In SBM (Urban), this is 15% of the central allocation (with 3% set aside for the central government), while in SBM (Gramin), the corresponding allocation is 8% of central allocation. SBM (Gramin) states that community incentive, if any, will be released after the village unit is OD(F) for a significant length of time. SBM (Urban) only requires that no households engage in the practice of OD (Ministry of Drinking Water & Sanitation, 2014; Ministry of Urban Development, Government of India, 2014).

While both programmes require that GPs and Urban Local Bodies (ULBs) develop plans for sanitation at the local level, which includes a situational analysis including of OD, and in the case of SBM (Urban), a phased plan for 5 years on incremental achievement of targets towards OD(F) status, neither programme explicitly states ‘how’ they would like to measure this status. The implication here seems to be, therefore, that physical progress on the number of toilets constructed, and possibly the number of IEC and BCC campaigns conducted, as well as financial expenditure on these components, are likely to be measured.

Both SBM (Gramin) and SBM (Urban) have detailed guidelines on monitoring of individual household toilet construction. Beneficiary households are required

¹⁶ The states of Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Uttarakhand, Uttar Pradesh, part of Andhra Pradesh (AP), Chhattisgarh, Madhya Pradesh, and Odisha were covered by the firm A. C. Nielsen. Assam, Bihar, Jharkhand, Manipur, Meghalaya, Mizoram, Tripura, West Bengal, part of AP, Karnataka, Kerala, Tamil Nadu, and Pondicherry were covered by the firm Development & Research Services. The Centre for Environment Planning and Technology (CEPT) University covered the states of Gujarat, Maharashtra, and Rajasthan.

¹⁷ Approximately US\$ 59 for urban and approximately US\$ 133 for rural areas (converted at ₹67.7 per US\$).

to feed geo-tagged photographic evidence of construction progress into the respective online Management Information System (MIS) as proof of progress and for subsequent release of tranches of 'incentive funding' (Ministry of Urban Development, Government of India, 2014).

As has been demonstrated in this section, policy and programme instruments in India exhibit an understanding of the notion that 'usage' of toilets will need to be measured as a gauge of progress on the OD(F) status of GPs and ULBs. This is demonstrated by the NUSP's recommendation that toilet usage be part of the rating scale. However, SBM is silent on the manner in which (or even whether) 'usage' will be measured. What SBM does state, however, is that detailed evaluations of the programme will be carried out, usually through independent surveys; perhaps the inference possible here is that toilet usage surveys (which by character are necessarily in-depth and time consuming) would be conducted as part of impact evaluation studies of SBM rather than as regular day-to-day programme implementation monitoring (physical and financial).

In 2015, the MoUD announced the Swachh Bharat Mission Urban Awards; the website claims to have received over 300 entries from 21 states across the country across the 7 categories¹⁸. At present details of the methodology for evaluation are publicly unavailable; once made public, it will be interesting to see how these compare to previous efforts. Two state governments, Maharashtra and Odisha, are early movers in the incentivising of ODF communities in urban areas, both having evolved a 3-stage evolution of cities and wards from OD to ODF communities. Maharashtra's 3 stages cover action for elimination of OD practices, access to toilets, and conveyance and treatment of faecal waste. At the ODF stage (stage 1) itself, it is expected that OD practices will be eliminated. However, it is in stages 2 (ODF+) and 3 (ODF++) that around 80-95% of the city will be expected to have access to household latrines in residential properties, and by stage 3 all aspects of faecal sludge and waste water management system would be in place for the city (Swachh Maharashtra Mission 2016, 2).

Odisha's draft Urban Sanitation Policy, 2016-26, defines ODF as the termination of faecal-oral transmission determined by: (a) There is no observed open defecation; (b) All city residents have access to and use of household, community, and/or public latrines; (c) There is adequate access and use of latrines in all institutions; (d) All insanitary latrines (including single pit latrines) are converted to sanitary latrines, and no incidence of manual scavenging is observed; (e) All city residents are engaged in safe hygiene practices, including handwashing; (f) There is no open discharge of faecal and liquid waste or raw sewage into the open drains or environment; (g) There is safe containment, collection, transportation, treatment, and disposal of sewage, septage, and waste water (Housing & Urban Development

¹⁸ These include (1) innovative practices in improving access – individual latrines, community latrines, mobile latrines, SHE toilets, institutional sanitation, model wards, etc.; (2) SWM – door-to-door collection, source segregation, reuse, recycle, treatment, and disposal; (3) IEC and public awareness – prevention of OD, elimination of manual scavenging, improved hygiene, and maintenance of toilets; (4) public-private partnership – provision of services, new models of O&M, management expertise; (5) innovative financing – capital expenditure, operational expenditure, cost recovery, user charges, micro-finance; (6) innovative O&M – community-led O&M, technology options, and preventative maintenance options; and (7) information and communication technology in urban sanitation and regulation – technology-led service delivery improvements in SWM, toilet maintenance, identification of beneficiaries, monitoring progress, monitoring and evaluation, etc. (<http://swachhbharaturbanawards.in>).

Department Government of Odisha 2016a). Stage 1 or Basic OD(F) covers the first 4 aspects of the OD(F) definition. Stages II and III allow for the development of treatment infrastructure for FSM and waste water: at stage II, no undesignated discharge of septage, sewage, and black water will be permitted, while by stage III, no open discharge human faecal and liquid waste will be permitted. It is expected that there will be safe containment, transport, treatment, and disposal of all human faecal waste and waste water (black and grey) (Housing & Urban Development Department Government of Odisha 2016b). In addition to these documents, the state government is in the process of developing a law to cover the management and disposal of waste water and faecal waste in urban areas.

CHALLENGES

Challenges in defining OD(F) in India

India's current policy statements in sanitation (both urban and rural) are tied to the twin schemes of Swachh Bharat (Urban) and SBM (Gramin). This deals with a view of sanitation that is residential, tied to the goal of behaviour change towards an OD(F) India, and does not fully encompass the full spectrum of sanitation within and outside the household, especially in the wider environment. The following challenges warrant mention:

- 1) **Lack of a clear and uniform understanding of OD(F):** In a 9 June 2015 circular, the MDWS observed that there is *'no uniform definition of OD(F) across the country' and 'OD(F) that is the main outcome of the mission, must be defined uniformly and precisely, so that there is a clear focused effort in achieving the same'*. Attempting to address this gap, the MDWS circular further defined OD(F) as *'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 institutions using safe technology option for disposal of faeces'*. While this definition marks a step towards promulgating a common understanding of OD(F) in the Indian context, in reality, the definition is not fully aligned with the way that SBM is being monitored and implemented on the ground. The programme's focus is on toilet construction and monitoring efforts towards the same, while the definition is broader, covering the termination of faecal-oral transmission. Just under a year later, in March 2016, the MoUD, released a definition of OD(F) that reads: *'A city/ward is notified as OD(F) city/ward if, at any point of the day, not a single person is found defecating in the open'* (Ministry of Urban Development Government of India 2016a). Corresponding protocols were also released based purely on self-declaration with third-party verification (Ministry of Urban Development Government of India 2016b). The circular released by MDWS applies to rural areas, whereas the one released by MoUD applies to urban areas. The two departments are yet to align their definition and monitoring of OD(F) under SBM.
- 2) **Need for a monitoring framework to track OD(F) on an ongoing basis:** With these definitions of OD(F) in hand, it is necessary to ensure that the monitoring framework is geared to measure OD(F) in practice, and is able to

track OD(F) on an ongoing basis. One-time measurement of OD(F) status is not sufficient, as slip-back is highly probable; OD(F) status can be confirmed only after a few years of consistent OD(F) results.

- 3) **Measurement challenges beyond OD(F):** The measurement challenges are not restricted to OD(F). SBM has a number of components (e.g. capacity building, BCC and SWM), the results of which need to be regularly monitored and reported with a clear understanding of how these will contribute to overall goals.
- 4) **Monitoring 'Swachh Bharat' (Clean India) beyond the Mission:** Even beyond the Mission, the idea of 'Swachh Bharat' requires a clearly defined monitoring plan with a set of indicators that measure what this means in practice. There are a number of underlying indicators that could be/are being used to measure sanitation, and it is important to identify which indicators are most relevant to track the achievement of the government's goals. This includes how to define and measure outcomes from the safe collection, disposal, and treatment of solid and liquid waste, which are essential components of the idea of 'Swachh Bharat'.
- 5) **International and other commitments:** In addition to national-level policies, India is signatory to commitments on sanitation, including the SDGs; the MoUD has recently signed the National Declaration on Faecal Sludge and Septage Management (FSSM)¹⁹ on 9 September 2016 with commitments to establish a national-level task force on FSSM and, by January 2017, declare goals for adoption at the local, state, and national government levels. It is expected that this will result in a policy and framework with guidelines and support systems.

Challenges with using existing survey instruments in India

Although policy struggles to uniformly define OD(F) as a concept, it is prudent to examine existing survey instruments and their ability to feed into the research, monitoring, and policy discussions covering sanitation in urban and rural India. This has implications for the nature of information being fed into the policy debates on sanitation and the structure of a sanitation matrix. In examining their designs, the following elements are evinced.

Scale and depth of existing survey instruments: On one end of the scale, there are low intensity surveys such as the 100% household surveys of the Census, which are based on self-declaration and where limited²⁰ independent verification of interviewed households is undertaken. The advantage is that this is not a sample and as such Census results can be used to gauge and compare trends for the entire country. Other sample surveys such as the National Sample Survey (NSS), and the NFHS survey, or even programme impact evaluations for NGP and JNNURM are more in-depth investigations of issues. These may or may not be supported by

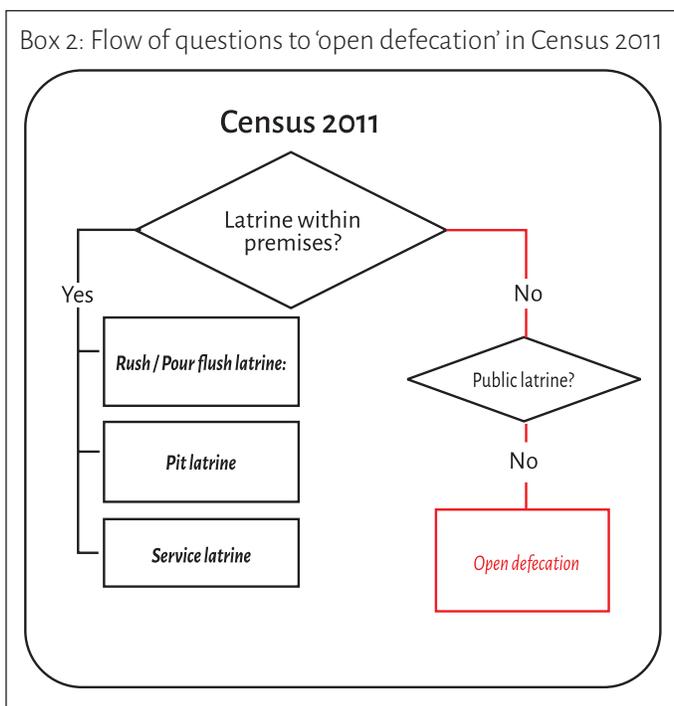
¹⁹ The declaration was signed on 9 September at the National Workshop on 'City's Journey beyond OD(F) – Faecal Sludge & Septage Management' held in New Delhi, India.

²⁰ This is limited to spot verification of household-based responses to questions, usually of a sample of surveyed households, rather than independent verification of the existence and use of sanitation infrastructure by the enumerators.

other forms of research/investigation. However, by virtue of their being a sample, the nature of the sample has an impact on the extent to which the surveys can be aggregated at the state and national levels, especially in India with its diverse cultures and practices. Other aggregator surveys such as NGP surveys or baseline sanitation surveys undertaken at the start of programmes have a programme-specific focus and cannot always be universally applied to the population in the way that Censuses lend themselves.

On the other end of the scale, there are the high intensity surveys of Randomised Control Trials (RCTs) undertaken by different organisations such as the London School of Hygiene and Tropical Medicine for Helminths' infection, for sanitation and stunting in Indonesia, as well as in Odisha, and Maharashtra in India, and for TSC to determine defecation behaviour and health linkages. The methodology of RCTs was imported from the pure sciences, particularly the field of drug testing in medicine, into policy to determine whether and which policy interventions have the effects desired in their design. They are particularly useful in pointing to particular trends, e.g. the design of household toilets that would induce people to use them. However, RCTs by themselves do not provide a full analysis of cultural preferences, e.g. why people with household toilets do not use them, or the combination of variables such as caste, class, gender, and community that come to bear on decisions of sanitation infrastructure creation and use; ethnographic studies would be needed for these.

Box 2: Flow of questions to 'open defecation' in Census 2011



Linking household sanitation infrastructure and OD:

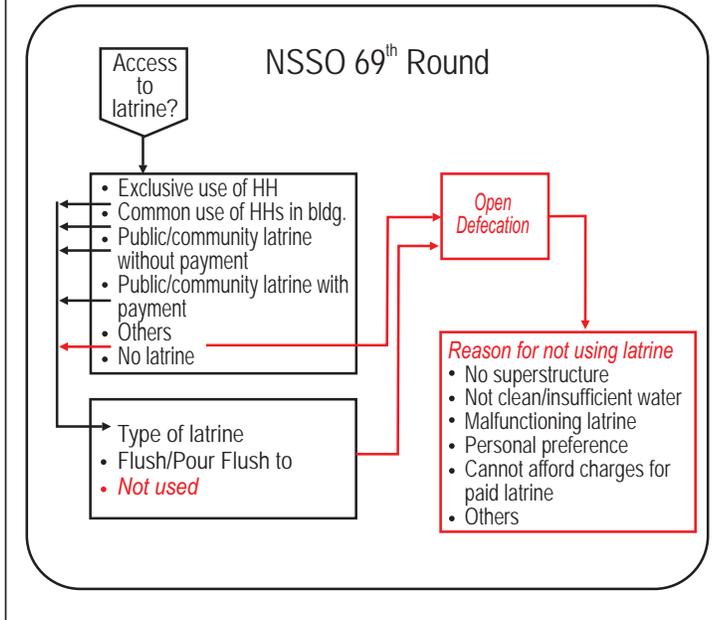
Equally important is the manner in which these instruments are designed to determine OD status. This is important because national and international policy instruments are heavily dependent on these surveys. The SBM has been designed on the basis of figures (crucially those of OD) from the Census 2011; and the Census 2011 and NSS (69th round) from India and censuses of other countries have fed into the JMP, which reports international sanitation status to the UN.

OD is linked to the presence or absence of household-level sanitation infrastructure. Therefore, the Census and sample surveys at the national level do not explicitly ask whether individuals or families defecate in the open. OD is presumed after all other forms of access to sanitation infrastructure (household toilets, community toilets, public toilets) have been negated.

India has 3 surveys that feed into the JMP – Census 2011, the NSS 69th Round (July–December 2012), and NFHS-3 (2004-05)²¹. These surveys follow the same trajectory as their international counterparts, where there is a

²¹ The 4th round of the NFHS (2015-16) is currently underway; full survey data is yet to be released.

Box 3: Flow of questions to 'open defecation' in NSSO, 69th Round



presumption of OD only if there is no household access to a latrine, including public latrines (Registrar General & Census Commissioner of India 2011; National Sample Survey Office 2013). (See Boxes 2 and 3 for the flow of questions leading to OD status in the Census 2011 and NSS 69th Rounds.) This is not limited to Indian survey instruments. For instance, Indonesia and Ethiopia presume that if there is 'no toilet' as an answer to the question on 'what kind of toilet facility does the household have?', then the household defecates in the open. Pakistan and Nigeria have an added option of 'no facility / bush/field'. But even here, the option is reached after eliminating other forms of household toilet facilities.

This presumption, however, does not always hold true as has been witnessed through the many years of programme implementation.

Toilet structures being used as storehouses or abandoned have been discussed in each of the evaluation reports. More recently, small sample surveys, such as the SQUAT²² survey in villages with a sample size of 3,235 households in 13 districts in Bihar, Haryana, Madhya Pradesh, Rajasthan, and Uttar Pradesh, reveal that of the over 40% of households with a working latrine that were surveyed, at least one member defecates in the open (Coffey, Gupta, Hathi, Khurana, Srivastav, et al. 2014; Coffey, Gupta, Hathi, Khurana, Spears, et al. 2014). If the trend of individuals with household latrines still defecating in the open was to be investigated for the whole country, large-scale surveys may not yield appropriate samples. The solution is not to go towards larger samples; rather, as researchers at CPR recommend, the government will need to build networks with anthropologists, sociologists, political scientists, and others familiar with qualitative surveys to track usage effectively (Aiyer, Kapur, and Srinivas 2016).

Institutional sanitation infrastructure missing from the equation: Institutional latrines are not linked to the OD question. Surveys presume that individuals live and work in or close to their homes such that their need to defecate during the day is serviced by the household toilet. However, in both rural and urban areas, individuals' access to the household toilet at all times during the day cannot be presumed. There may be incidences where OD takes place because of lack of access to non-household public toilets at the place of work or while travelling. These instances of OD, which are also likely to be linked to the presence or absence of sanitation infrastructure, are not tracked by established survey instruments that feed into policy.

²² SQUAT: Sanitation Quality, Use, Access and Trends Survey.

Census information is household-specific: The Census presumes an equal status of OD for all members of the household, i.e. the OD status assigned, often based on the interview of one individual (usually the head of the household), is ‘presumed’ by extension for all other members of the household. This does not indicate whether some members use the household toilet and whether others defecate in the open. India’s stated figure of 597.48 million open defecators in the Census is actually a report of 119.5 households (presuming 5 members to a household²³). It should be pointed out that the NSS disaggregates data for household members; however, the Census and the NSS are not fully comparable.

Disaggregated information limited: The survey design generally does not disaggregate for gender or reason for OD (e.g. personal preference). The Gol’s SBM (Gramin) radio campaign, for example, uses ‘shame’ to target households to construct toilets so that the women of the household do not have to defecate in the open.²⁴ While this may be a communication campaign to incentivise household toilet construction before targeting widespread, universal use, there is anecdotal evidence from practitioners to suggest that where toilets have been constructed in houses that had defecated in the open, these toilets are now used primarily by women. The male members of the household view the toilet as the domain of women and still defecate in the open. If there was survey evidence to support this anecdotal evidence, IEC campaigns could be tailored to incentivise male members to use the household toilets as well. Additionally, this anecdotal evidence also supports the notion of personal or cultural preference for OD, where the process of OD is seen as a communal gathering and the use of a private household toilet would restrict access to the community. Again, if there was survey evidence available about why people defecate in the open, i.e. if the results showed personal or cultural preference, then IEC and BCC could be appropriately tailored.

Limited measurement of usage of sanitation infrastructure: Survey instruments are designed to measure the presence of toilets, not their usage and reasons thereof, presuming therefore that the mere presence of household sanitation infrastructure is good enough to ensure elimination of the practice of OD. One of the key reasons for slippage back to OD from OD(F) status is the fact that toilets are not functional – either they have not been maintained properly, or essential services such as water supply to the toilets are problematic. The danger in monitoring the presence of sanitation infrastructure tied purely to government programmes is that the assessment then tends to focus only on funding infrastructure and the gaps thereof, rather than understanding the outcomes of such investments. In a survey undertaken by CPR in 7,500 rural households in India, of the toilets constructed in the surveyed households, 29% were found to exist only on paper, and of those constructed, 36% were considered unusable by the surveyed households (Aiyar and Kapur 2016). Determining not just presence but use of toilets, and reasons for non-use of toilets in any assessment surveys will provide valuable inputs for the kind of interventions and incentives needed

²³ The mean household size has reduced from 5.3 members per household in 1971 to 5.1 in 2001 (Registrar General & Census Commissioner of India 2001) and, as per the Census 2011, this has gone down to 5.0 members per household (http://www.censusindia.gov.in/census_Data_2001/Census_Data_Online/Household_Population/Normal_Households_by_Household_Size.aspx).

²⁴ Some early version of this focusing on OD includes advertisements with the Bollywood actress Vidya Balan (e.g. <https://youtu.be/oBKeZmJeoy4>).

in urban and rural sanitation. Additionally, the information on infrastructure only peripherally speaks to quality of technology and does not fully inform open discharge. For instance, single pit latrines are widely considered to be insanitary (Ministry of Urban Development Government of India 2014, 24), but the condition of septic tanks or the mixing of waste water with faecal waste streams is not immediately evident from Census data.

Focus on OD(F) at the cost of the other aspects of sanitation: Depending purely on OD(F)-based assessment frameworks divorces the behaviour aspects of safe sanitation practices from the wider sanitation chain itself. Environmental concerns related to human faecal matter being discharged untreated into the environment get ignored in policy and implementation. Any assessment framework must consider both current policy focus and future issues to ensure that both household sanitation behaviour and wider environmental concerns are taken care of.

In the development of an assessment framework, it is pertinent to note that India is among the few countries to have a large toilet subsidy programme. It is also the only country that has an incentive and financial reward scheme for sanitation; other countries have recognition schemes or awards. In this schema, slip-back is highly probable, so social mobilisation (and engagement) and other special efforts towards maintaining and improving status are needed. The past decade of interventions, particularly on the rural side, has shown us that a one-time measurement and declaration of OD(F) status has not worked well enough.²⁵ The status can be confirmed only after years of consistent results. Sanitation advances cannot be achieved and improvements maintained as a one-time effort but need ongoing programmes. Programme survey and aggregator biases are difficult to control, so an independent ongoing measurement system is needed to monitor and record sanitation status along a matrix on OD(F), SLWM, hygiene, and safe drinking water.

FRAMING THE INSTRUMENT

It is, therefore, our recommendation that a non-programme-linked annual survey be developed towards informing a sanitation matrix to gauge the sanitation situation from the perspective to which waste (human excreta, liquid and solid waste) is disposed off safely such that there are no adverse effects on health. The matrix could also be used to understand how different states in the country rank on a sanitation index (constructed through the survey) so that the efficacy of their sanitation efforts can be reflected upon. This will also need to account for the fact that the approach may vary for rural and urban areas.²⁶ This effort feeds into existing government efforts to grapple with the wider issue of monitoring and evaluating progress on the ground. The Sub-Group of Chief Ministers on Swachh Bharat (2015, 65) recommended that the NITI Aayog (National Institute

²⁵ Over the years of implementation of NBA, a number of research studies have been conducted that talk of both 'slippage' from OD(F) status (Snehalatha et al. 2012; Hueso and Bell 2013; Toppo et al. 2014) as well as 'missing toilets' (Kumar 2015; Singh and George 2015). All these point to the fact that sustained action for maintenance of OD(F) status is needed. This has been acknowledged by the MDWS itself in a 2011 document detailing a 10-year strategy going forward (Department of Drinking Water and Sanitation Ministry of Rural Development 2011). This phenomenon is not restricted to India; a field evaluation of Mali's OD(F) triggering exercise by UNICEF (Toubkiss 2015) found that merely focusing on a site with intensive action without adequate follow-up could result in slippage as fast as 1.5-2 years after triggering.

²⁶ The SBM itself also has a separate set of guidelines for SBM (Urban) and SBM (Gramin). The former were issued by the MoUD (2014), while the latter were issued by the MDWS (2014). Also, as pointed out earlier, the definitions of OD(F) differ from one another.

for Transforming India) evolve verification protocols and national-level guidelines to ensure that a uniform procedure is followed by states in acknowledging OD(F) status. Additionally, the global conversations around SDG monitoring frameworks for Goal 6 (see section below) also aim to look past programmatic interventions towards more sustainable outcomes. It is hoped that this report will feed into such debates and efforts.

Developing the instrument

With this objective in mind, a workshop with select experts and practitioners was organised by CPR's SCI-FI: Sanitation Project team in July 2015 to develop a results chain for sanitation, including defining activities, outputs, and outcomes, and the linkages between them. This saw participation from researchers, practitioners, and representatives from the GoI and select state governments working on both rural and urban sanitation. Based on the fact that the urban frame of investigation would have to be drawn afresh, the first step was developing a flow chart of processes, outputs, and outcomes encompassing both the SBM (Urban)'s stated objectives and the wider sanitation chain. This flow chart was discussed at the workshop, and a similar framework for rural India was also developed. This was followed by simulations populating the indices for two states. Wherever available real state-level data from Census 2011 was used as a starting point; wherever data was not available, for the purposes of the simulation, dummy data was put in. This exercise emphasised the importance of conducting regular primary surveys for such an instrument. The resultant outcome index was then presented and discussed with representatives of key government departments, including the NITI Aayog, and the MDWS in November 2015 and January 2016. These discussions were instrumental in getting feedback as well as matching the outcomes defined with government policy priority.

Key components of the index

This section details the key components of the recommended index, including the principles, elements, outcomes, and indicators. The matrix has been detailed in Annexure 1.

Principles of the index

- a. **Outcomes vs outputs:** It is our recommendation that the index focus on outcomes of sanitation in urban and rural India, rather than process-based (government) programme tracking. While recognising that outputs and processes are important, the priority of the index would be to focus attention on critical outcomes or results that are of international (covering SDGs), national (covering the NUSP and SBM objectives), as well as state-level importance. With this in mind, an emphasis on process may distract time, budget, and attention away from outcomes. Furthermore, objective state-level comparisons (which the index is expected to enable) could be made more consistent by focusing on outcomes rather than process indicators, as each state may follow or prioritise different processes to achieve these

outcomes. The index, therefore, could be neutral towards a given state or central government programme, thus opening up evaluation of the outcomes to a wider non-government audience, such as academics and policy researchers. This has the added advantage of being able to provide a feedback loop to inform government policy and programme formulation about the outcomes and track impact across programmes and policies.

- b. Flexibility:** Not only are the challenges of sanitation different in urban and rural India, but even within these broad categories, there are classifications based on size of settlement and geographical conditions (soil and water table, to name a few), as well as physical proximity to other settlements (e.g. peri-urban areas or satellite cities to large metropolitan areas) that could have an impact on the outcomes. A report on FSM in South Asia presented at the 6th SACOSAN meeting demonstrated how the prevalence of small towns in South Asia mean that non-networked solutions for urban sanitation (FSM rather than underground sewerage) are the prevalent solution across the region (S. Dasgupta et al. 2016). The index has been designed to allow flexibility in contextualising indicators and weights to various categories of settlements such as urban and rural, size of settlements (e.g. small or big towns or villages), or even locations of settlements (e.g. remote villages, peri-urban areas, and so on).
- c. Multiple sources of data:** Verifying sanitation outcomes would require a variety of methodologies, including, but not restricted to, physical verification of the condition and use of infrastructure, household interviews, participant observation, copies of government notifications, and possibly even key informant interviews – thus going beyond the traditionally available data with existing survey instruments (see challenges with existing instruments discussed above).
- d. Regular monitoring:** We recommend an annual cycle of data collection. This will allow sufficient time for data collection as well as allow for the monitoring of changes over short and long periods of time.
- e. Comparability:** It is very important that the index allow for comparison over time, over geographies, and across outcomes, the latter lending itself to a ranking-based comparison of settlements (urban and rural) across outcomes. This will allow policy to respond to changes, as well as monitor implementation. It also provides flexibility for researchers to conduct independent analysis on the data, thus widening its scope of use.

Elements of the index

- a. Outcomes statement:** Each outcome is expressed in the form of a brief statement of the expected outcome change in sanitation.
- b. Indicator:** With each outcome statement, a corresponding indicator or combination of indicators is suggested; these indicators can be adjusted depending on policy and research priority, as well as for type of settlement.

- c. **Sources of data:** This refers to the source/s from which data would be collected to inform the indicators.
- d. **Weights:** While these have not been detailed in the annexure, the index has been designed to incorporate weights that can be assigned to each outcome; these weights can be adjusted depending on policy and research priority, as well as for type of settlement, and comparison across and within states.

Outcomes and indicators

Following the broad structure outlined, this section describes in more detail the specific indicators and outcomes which comprise the index. The index we propose focuses on two kinds of outcomes: those that are likely to inform the immediate OD(F) focus of the GoI up to 2019, and those that go beyond this to cover prevention of open discharge of untreated waste into the environment or ODF2. The full set of indicators can be seen in Annexure I.

- a. **Defecation is not visible:** This indicator is the first visible means of checking whether OD as a behaviour choice has been overcome. Most verification protocols, including the urban and rural protocols under SBM for India, recommend this. For urban areas, this is measured by a combination of two indicators: whether OD is practised in the area (i.e. how often is it observed by households – few instances or rampant instances of OD), and the percentage of population using toilets (listing names of individuals, both men and women, and asking about frequency of usage for each). For rural areas this is measured by whether sign and/or smell of OD is evinced around the villages (including the frequency of these observations), and whether public or community toilets exist in the village. This is further categorised by type of institutional/community toilet, and followed by an assessment of usage, maintenance, availability, and segregated stalls for men and women.

Indicators

- A. Whether OD is practised in the area (how often it is observed by households/ enumerators)? (at least one implies prevalence):
 - i. No sign of OD or smell around the village
 - ii. Few instances of OD
 - iii. Rampant instances of OD
- B. Percentage of population using toilets – listing names of individuals (segregated by gender and other demographic characteristics), and asking about frequency of usage for each:
 - i. Percentage of population using toilets in-house
 - ii. Percentage of population using toilets outside the house
- C. Public or community toilets – if existing in the village (including institutional toilets, e.g. schools, Anganwadis, Panchayat ghars, bus stands); whether segregated for men/women; access:
 - i. Usage
 - ii. Maintenance
 - iii. Water availability
 - iv. Segregated toilets for men and women

- b. Solid waste is safely managed:** The recently released Solid Waste Management Rules (2016) provide a very stringent environmental management framework for the reduction, reuse, recycle, collection, transportation, storage, treatment, and disposal of solid waste in rural and urban areas. For the purpose of the matrix, solid waste shall follow the definition given in the Rules,²⁷ and shall exclude human excreta, urine, and waste water (black water). For the purpose of the urban index, safe disposal of solid waste is measured by indicators observing littering in the area, percentage of safely managed solid waste in the city, and percentage of solid waste (inert matter) reaching landfill sites. For the rural index, the management of animal and organic waste by the household is measured separately from the management of inorganic waste either by the household or the Panchayat. Organic waste (e.g. vegetable peel, food, farm waste, and so on) can be decomposed by biological processes; it can be recycled. Inorganic waste (e.g. paper, glass, metal, and so on) cannot be broken down by biological processes; it may be recyclable or non-recyclable.

Urban Indicators	Rural Indicators
A. No solid waste littered in the area (observation by households/ enumerators)	A. Management of animal and other organic solid waste by the household: <ol style="list-style-type: none"> Percentage left to litter Percentage put to productive use, e.g. making of dung fuel cakes/ manure, feeding kitchen waste to domestic animals
B. Percentage of solid waste safely managed (reused, recycled, and treated)	B. Management of inorganic solid waste by the household and/or Panchayat: <ol style="list-style-type: none"> No arrangements made (%) Kept in specified places and left there or burned (%) Transported to the nearest town (%) Deposited in landfills (%)
C. Percentage of solid waste (inert matter) reaching landfill sites	

- c. Residents and floating population have access to a toilet at home and/or in public spaces:** While the discussion above has reflected that measuring toilet access alone is not enough to guarantee OD(F) communities, the access of residents and the floating population in cities and villages to toilets at home and/or in public spaces is a crucial first step in promoting safe sanitation behaviour. To this end, in both the rural and urban index, the access of residents and the floating population (tourists/visitors, etc.) to toilets within the residential premises, public and community toilets, and institutional toilets at places of work will be gauged. Access of public, community, and institutional toilets will also be investigated for whether they are segregated

²⁷ Solid waste' means and includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste, and other non-residential wastes, street sweepings, silt removed or collected from surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste, and e-waste, battery waste, radio-active waste generated in the area under the local authorities and other entities mentioned in Rule 2 (Ministry of Environment Forest and Climate Change Government of India 2016, sec. 3(46)).

for men/women, followed by an assessment of: usage, maintenance, water availability, and especially whether informal sector workers have free access to these facilities.

Indicators

- A. Access of a household and floating population (tourists/visitors, etc.) to a toilet facility in the following spaces:
 - i. Within the residential premises
 - ii. Public toilets – and whether these are segregated for women and men
 - iii. Community toilets – and whether these are segregated for women and men
 - iv. Within the formal place of work – especially for the informal sector and whether these are segregated for men and women

- d. *Residents and floating population are using toilets in residential and / or public spaces:*** This is a crucial measure of the outcome of safe sanitation behaviour of OD(F) communities. This is measured by asking the frequency of use of toilets in residential and public spaces, the observance of OD, and the presence of soap and water for use within the toilet premises.

Indicators

- A. The percentage of population using toilets – listing names of individuals (segregated by gender and other demographic characteristics), and asking about frequency of toilet usage for
 - i. Toilet(s) within the residential premises
 - ii. Public toilets – and whether these are segregated for women and men
 - iii. Community toilets – and whether these are segregated for women and men
 - iv. Within the formal place of work – especially for the informal sector and whether these are segregated for men and women
- B. Also linked to the practice of OD (1A above).
- C. Observation of whether soap and water is available for use within the toilet premises.

- e. *Human faecal and liquid waste is safely treated:*** This outcome will measure open discharge of human faecal matter and liquid waste (black water) into the open drains or environment, especially into water bodies, storm water drains, rivers, and nallahs. For both urban and rural areas, the matrix measures the presence of human faecal and liquid waste (black water) in the open environment, i.e. not flowing through a sewerage system or a faecal sludge/septage management system. In particular, it will note whether untreated liquid waste/black water is observed flowing through open drains, meant for storm water, into the open environment (streets/fields), in low-lying areas, and into water bodies. This will also include the safe disposal of child/infant faeces in toilets.

Indicators

- A. Presence of human faecal waste and liquid waste (black water) in the open environment, i.e. not flowing through a sewerage system or a faecal sludge/septage management system:
 - i. Whether untreated human faecal and liquid waste/black water is observed flowing through open drains meant for storm water drainage
 - ii. Whether untreated human faecal and liquid waste/black water is observed flowing in the open environment (streets/fields) in low-lying areas
 - iii. Whether untreated human faecal and liquid waste/black water is observed flowing into water bodies (ponds/nallahs/rivers)
 - iv. Whether child/infant faeces is thrown into an open area (including open drains)

- f. Solid waste and faecal waste is safely handled:** In 2013, the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act and rules (Ministry of Social Justice & Empowerment Government of India 2013b; 2013a) were amended to include all those who work without adequate physical safety protection and through direct human contact to manually clean human faecal waste from sanitation facilities. This is an important outcome to ensure safety and dignity of work, as well as tackle social inequities that arise out of such practices. The index measures the outcome as the percentage of formal and informal workers who use safety equipment (as defined in the Rules²⁸) to work with waste – both solid and liquid waste. This will be done through both survey and observation.

Indicators

- A. Percentage of formal and informal workers who use safety equipment (as defined in the Rules) to work with waste.
- B. Observations made by enumerators and households of sanitation workers (drain cleaners, street sweepers, toilet cleaners, septic tank workers, ragpickers) working in the normal course of the day and their handling of waste.

- g. Human settlements (cities and villages) are not waterlogged:** In the event of open discharge of human faecal and liquid waste, and in times of flooding, there is a significantly increased risk of faecal-oral transmission, and by extension water-borne excreta-related infections. This link has been elaborated by the Food and Agricultural Organization (FAO) (Fritsch 1997) which cites unlined open drains, stabilisation and evaporation ponds, and wetlands as particularly dangerous transmission sites of water- and vector-borne diseases. Emergency-linked disease burden as a result of poor sanitation has also been established; of these diarrhoea has been identified as the main risk in emergency settings due to faecal-oral transmissions (Frazier 2007). The index will track the number of incidents of waterlogging per survey period (1-year minimum) where waterlogging was observed for longer than 4 hours in and around the settlements surveyed. This will

²⁸ Chapter II of the Rules specify obligations of employers towards employees engaged in the cleaning of septic tanks and/or sewers (Ministry of Social Justice & Empowerment Government of India 2013a, 20–24).

also be supported by observations of the quality of the standing water, the access to water by the population in the settlement (especially by children), and the incidents of diarrhoea and vector-borne diseases during periods of waterlogging.

Indicators

- A. Number of incidents of waterlogging per survey period (normal and wet/monsoon season) – observations by households about whether water tends to stand for more than 4 hours in and around the settlement.
- B. These can be supported by observations of the quality of standing water – colour, smell, and whether people, especially children, traverse through or play in it.
- C. Recall of household health and disease burden during those periods – focusing particularly on incidents of diarrhoea and vector-borne diseases.

- h. Hygienic behaviour is adopted:** The reduction of faecal-oral transmission is not dependent only on infrastructure and usage, but also on the adoption of safe sanitation and hygiene practices linked to evacuation and disposal of human faecal and liquid waste, and other daily activities including, but not limited to, cooking, bathing, playing, and storing and using drinking water, among others. The matrix will focus on household adoption of hygienic behaviour chiefly through interviews about such practices, supported by observations of the use of soap and water near latrine facilities, the incidence of water-borne diseases (for the link with faecal-oral transmission), as well as the safe storage of potable water for the household.

Indicators

- A. Household adoption of hygienic practices such as handwashing before meals, handwashing with soap after defecation or urination, etc.
- B. Observations of household handling of potable water and its separation and use from the latrine facility, and handling after defecation
- C. Observation of whether soap and water is available for use within the toilet premises (linked to 4C above).
- D. Recall of household health and disease burden during those periods – focusing particularly on incidents of diarrhoea and vector-borne diseases (linked to 7C above).

- i. Women access safe menstrual hygiene management:** The lack of menstrual hygiene²⁹ has been found to be a significant health risk for menstruating women of all ages, especially in communities where menstruation is a social taboo and diseases due to poor menstrual hygiene often go untreated. A study on menstrual hygiene among adolescent girls in Singur, West Bengal, found the lack of menstrual hygiene to be a very important risk factor for reproductive tract infections (A. Dasgupta and Sarkar 2008). Additionally,

²⁹ Studies emphasise the importance of menstrual hygiene management throughout the developing world and its link to safe sanitation and hygiene practices (Nayab 2005; Kothari 2010; Mahon and Fernandes 2010).

in small cities and villages where non-networked sanitation systems are prevalent, menstrual hygiene material is often disposed directly in pits and tanks, or even mixed with solid waste (Ross et al. 2016). This results in what is essentially untreated bio-medical waste being left in the open environment, leading to possibilities of a further health and disease burden for those interacting with this waste (e.g. ragpickers and solid waste workers) and the wider environment. The matrix will, therefore, focus on households' practices of storage and disposal of menstrual hygiene material/waste, the location of final disposal of such material, the access of women to institutional menstrual hygiene management in their places of work, and the disease burden of poor menstrual hygiene.

Urban Indicators	
A.	Household practices of storage and disposal of menstrual hygiene material/waste prior to, during, and after menstruation.
B.	Location of final disposal of menstrual hygiene material/waste – e.g. household toilets, burial in/around the household, with solid waste, in community/public toilets, in communal incinerators.
C.	Whether women in the formal and informal sectors have access to adequate facilities for menstrual hygiene management in their places of work.
D.	Incidents of reproductive tract infections during the period of menstruation (recall).

SDG GOAL 6 MONITORING FRAMEWORK

Over the past 1 year, there have been intense rounds of discussions on monitoring Goal 6 of the SDGs in general, i.e. ensure availability and sustainable management of water and sanitation for all, and Target 6.2 in particular, i.e. by 2030, achieve access to adequate and equitable sanitation and hygiene for all, and end OD, paying special attention to the needs of women and girls and those in vulnerable situations. The monitoring framework for Goal 6 as divided between the JMP, the new global monitoring initiative GEMI (Global Expanded Monitoring Initiative, Integrated Monitoring of Water and Sanitation Related SDG Targets), and GLAAS (Global Analysis and Assessment of Sanitation and Drinking-Water) may be seen in Box 4.

The stated priorities for the post-2015 monitoring of water and sanitation include addressing hygiene, eliminating inequalities, improving service levels, going beyond the household, and addressing sustainability of services. Of the 6 essential elements to be addressed in the post-2015 WASH targets, elimination of OD and universal access to basic drinking water, sanitation, and hygiene retain the first 2 positions (JMP of WHO and UNICEF 2015, 7–8). Sanitation is defined as 'the provision of facilities and services for [the] safe management and disposal of human urine and faeces', and OD is defined as 'excreta of adults or children [that] are deposited (directly or after being covered by a layer of earth) in the bush, a field, a beach, or other open area; discharged directly into a drainage channel,

Box 4: New Global Monitoring Framework for Goal 6 of the SDGs	
TARGETS	
6.1	By 2030, achieve universal and equitable access to safe and affordable drinking water
6.2	By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end OD, paying special attention to the needs of women and girls and those in vulnerable situations
6.3	By 2030, improve water quality by reducing pollution, eliminating dumping, and minimising release of hazardous chemicals and materials, halving the proportion of wastewater, and at least doubling recycling and safe reuse globally
6.4	By 2030, substantially increase water use efficiency across all sectors, ensure sustainable withdrawals and supply of fresh water to address scarcity, and substantially reduce the number of people suffering from water scarcity
6.5	By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
6.6	By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers, and lakes
6a	By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, waste water treatment, and recycling and reuse technologies
6b	Support and strengthen the participation of local communities in improving water and sanitation management
Source: (UN-Water for the Inter-agency and Expert Group on Sustainable Development Goal Indicators (IAEG-SDGs) 2016, 2–5)	

SDG 6 MONITORING

JMP

GEMI

GLAAS (with 6.5 Integrated Water Resources Management (IWRM))

river, sea, or other water body; or are wrapped in temporary material and discarded' (JMP of WHO and UNICEF 2015, 11). The former covers the full sanitation chain covering FSM with the ultimate goal of safe disposal and reuse of faecal waste.

'Safely managed' in the JMP framework covers households using a basic sanitation service whose excreta:

- a) Are carried through a sewer network to a designated location (e.g. treatment facility);
- b) Are hygienically collected from septic tanks or pits by a suction truck (or similar equipment that limits human contact) and transported to a designated location (e.g. treatment facility or solid waste collection site); or
- c) Are treated at a waste water treatment plant (WWTP) with at least secondary treatment (or primary treatment with long ocean outfall) for sewer networks, septic tanks or pit latrines. Excreta are treated at a managed disposal site or co-treated at a WWTP or stored on-site (e.g. in a sealed latrine pit) until they are safe to handle and reuse (e.g. as agricultural input). (JMP of WHO and UNICEF 2015, 27–28).

In the GEMI framework, safely managed sanitation is understood to be 'population using basic sanitation facility at the household level³⁰ ... which is not shared with other households and where excreta is safely disposed in situ or treated off-site'.

It must be acknowledged that this is the first attempt to cover the full sanitation chain; the inclusion of not just 'management' but 'safe management' widens the scope of responsibility beyond the household. However, the FSM framework could be further strengthened. For instance, designated location of disposal could mandate a treatment facility of some kind. This would address the issue of open discharge. Additionally, 'limiting' human contact could be strengthened to include the use of safety gear while handling faecal waste. This would increase the focus on safety and dignity of work. Finally, while focusing on septage, the flow of waste water from institutions and households has not been included in this framework and

³⁰ 'Improved' sanitation facilities used for MDG monitoring, i.e. flush or pour flush toilets to sewer systems, septic tanks, or pit latrines, ventilated improved pit latrines, pit latrines with a slab, and composting toilets, the same categories as improved sources of drinking water used for MDG monitoring).

Box 5: Emerging ladder for JMP global reporting of progress in access to sanitation at home	
Service Level	Indicator
Sustainable	Percentage of population using a safely managed facility that reliably provides expected levels of service, and is subject to robust regulation and a verified risk management plan
Safely managed	Percentage of population using a basic sanitation facility where excreta is safely disposed in-situ or safely transported and treated off-site
Basic	Percentage of population using an improved sanitation facility* not shared with other households
Shared	Percentage of population using an improved sanitation facility shared with other households
Unimproved	Percentage of population using a sanitation facility that does not hygienically separate human excreta from human contact or is shared with other households
No service (OD)	Percentage of the population practising OD (defecating in bushes, fields, open water bodies or other open spaces)
<p>*Basic sanitation facilities are not shared, and of the following types: flush or pour flush toilets to sewer systems, septic tanks, or pit latrines, ventilated improved pit latrines, pit latrines with a slab, and composting toilets. Source: JMP of WHO and UNICEF 2015, 30.</p>	

has implications for wider environmental sanitation. The JMP Green Paper does acknowledge the challenges where elements of the faecal flow diagram³¹ are difficult to estimate but could be approximated with utilities, researchers, and other relevant stakeholders. It further agrees that while assessments have been made in cities, rural assessments are not widespread, and combining data for global monitoring purposes could be difficult.

The emerging sanitation ladder (see Box 5) against which provision will be based, goes beyond the access to sanitation ‘facilities’ measurement of the MDGs (see Box 1). However, only ‘safely managed’ and above (immediate long-term goals) categories include ‘safe disposal’ whether in-situ or off-site. Most medium and small towns, and rural areas, do not have safe disposal options; waiting to address this issue at the intermediate levels of monitoring may not be conducive to a long-term achievement of both OD and ODF2 environments.

Finally, the sanitation ladder and monitoring framework for the SDG Goal 6 does not make the link between health outcomes and poor sanitation. Health is certainly mentioned, but in terms of the sanitation facilities available at health institutions. Further, while the prevention of diseases as a result of poor hygiene is mentioned, the emphasis in terms of hygiene remains basic handwashing facilities with soap and water, and not the disease burden as a result of faecal-oral transmission; of course, this could be a factor of the nature of data available to the framers through national censuses and sample surveys.

³¹ Also variously referred to as the ‘sludge flow diagram’, ‘septage flow diagram’, or ‘shit flow diagram’. (latrines with a slab, and composting toilets, the same categories as improved sources of drinking water used for MDG monitoring)

CONCLUSION

This proposal for a matrix to measure sanitation outcomes in India comes at a time when the Gol and state governments are grappling with the goal of achieving an OD(F) India by 2019, 11 years before the SDG target of 2030. Many state governments are beginning to think in terms of FSM and waste water management for both urban and rural areas, and the governance and legislative frameworks that are needed to support sanitation service delivery across the country. These debates are interspersed with wider debates of defecating in the open as a behaviour choice that needs to be changed, and the manner in which the efficacy of these efforts are to be evaluated. The justification for OD(F) funding tied to the SBM is predicated on a normative idea of OD as a 'national shame'.

The narrative of injustice tied to the Prime Minister's speech launching SBM, with the emotional appeal to build toilets so as to spare women the injustice of defecating in the open, ties the programme and its monitoring dangerously to a singular, seemingly single goal of OD(F). This is often to the exclusion of other goals, or only focusing on them inasmuch as they are linked to OD(F) achievements. In this narrative focus, the full sanitation chain can get lost. This matrix represents a unique opportunity to move beyond just the measure of all aspects of OD(F) towards ODF2. Indian policy is also heavily dependent on the assumption that government provision (or oversight of provision) of sanitation service delivery and infrastructure is the only way to serve unserved and poorly served areas. A sanitation matrix focused on outcomes is delivery mechanism-neutral and will survive new means of aggregating sanitation service delivery, whether formal or informal, private or public. These national debates are juxtaposed with international debates on framing adequate global monitoring frameworks that will cover the spirit of the SDG Goal 6 while dealing with the (likely) available data from national governments that will be used to measure it.

It is in this space that the matrix being proposed would prove useful. We propose a matrix of 9 outcomes that measure critical results indicative of processes in place for successful and sustainable sanitation service delivery in urban and rural areas. The matrix is flexible in that it allows for changes in the choice and measurement of indicators for comparison within states and across the country. It also allows researchers to look at habitations of different sizes, densities, and geographical characteristics, and provide comparisons beyond just governance boundaries (of urban and rural). Additionally, it combines multiple sources of data and methodologies beyond the traditional questionnaire survey methodology; this allows for observation of characteristics of the settlement to be factored into the determination of outcomes. It also goes beyond the presence of infrastructure and covers issues of equity of access, access of sanitation to all members of the household within and outside the premises of the house, and issues of health (disease burden as a result of poor sanitation), hygiene, and menstrual hygiene management.

ANNEXURE I: SANITATION MATRIX

#	Outcome Statement	Indicator(s) – Urban	Indicator(s) – Rural	Weights ³²
1.	Defecation is not visible	<p>A. Whether open defecation is practised in the area (how often it is observed by households/enumerators)? (at least one implies prevalence):</p> <ol style="list-style-type: none"> No sign of OD or smell around the city Few instances of OD Rampant instances of OD <p>B. Percentage of population using toilets – listing names of individuals (segregated by gender and other demographic characteristics), and asking about frequency of usage for each:</p> <ol style="list-style-type: none"> Percentage of population using toilets in-house Percentage of population using toilets outside the house <p>C. Public or community toilets – including institutional toilets, e.g. schools, Anganwadis, bus stands); whether segregated for men/women; access:</p> <ol style="list-style-type: none"> Usage Maintenance Water availability Segregated toilets for men and women 	<p>A. Whether open defecation is practised in the area (how often it is observed by households/enumerators)? (at least one implies prevalence):</p> <ol style="list-style-type: none"> No sign of OD or smell around the village Few instances of OD Rampant instances of OD <p>B. Percentage of population using toilets – listing names of individuals (segregated by gender and other demographic characteristics), and asking about frequency of usage for each:</p> <ol style="list-style-type: none"> Percentage of population using toilets in-house Percentage of population using toilets outside the house <p>C. Public or community toilets – if existing in the village (including institutional toilets, e.g. schools, Anganwadis, Panchayat <i>ghars</i>, bus stands); whether segregated for men/women; access:</p> <ol style="list-style-type: none"> Usage Maintenance Water availability Segregated toilets for men and women 	
2.	Solid waste is safely managed	<p>A. No solid waste littered in the area (observation by households/enumerators)</p> <p>B. Percentage of solid waste safely managed (reused, recycled, and treated)</p> <p>C. Percentage of solid waste (inert matter) reaching landfill sites</p>	<p>A. Management of animal and other organic solid waste by the household:</p> <ol style="list-style-type: none"> Percentage left to litter Percentage put to productive use, e.g. making of dung fuel cakes/manure, feeding kitchen waste to domestic animals <p>B. Management of inorganic solid waste by the household and/or the Panchayat:</p> <ol style="list-style-type: none"> No arrangements made (%) Kept in specified places and left there or burned (%) Transported to the nearest town (%) Deposited in landfills (%) 	

³² While these have not been specified, the index has been designed to incorporate weights that can be assigned to each outcome; these weights can be adjusted depending on policy and research priority, as well as for type of settlement, and comparison across and within states.

#	Outcome Statement	Indicator(s) – Urban	Indicator(s) – Rural	Weights ³²
3.	Residents have access to a toilet in residential and/or public spaces	<p>A. Access of a household and floating population (tourists/visitors, etc.) to a toilet facility in the following spaces:</p> <ul style="list-style-type: none"> i. Within the residential premises ii. Public toilets – and whether these are segregated for women and men iii. Community toilets – and whether these are segregated for women and men iv. Within the formal place of work – especially for the informal sector and whether these are segregated for men and women 	<p>A. Access of a household and floating population (tourists/visitors, etc.) to a toilet facility in the following spaces:</p> <ul style="list-style-type: none"> i. Within the residential premises ii. Public toilets – and whether these are segregated for women and men iii. Community toilets – and whether these are segregated for women and men iv. Within the formal place of work (if non-agricultural) – especially for the informal sector and whether these are segregated for men and women 	
4.	Residents and floating population are using toilets in residential and/or public spaces	<p>A. The percentage of population using toilets – listing names of individuals (segregated by gender and other demographic characteristics), and asking about frequency of toilet usage for:</p> <ul style="list-style-type: none"> i. Toilet(s) within the residential premises ii. Public toilets – and whether these are segregated for women and men iii. Community toilets – and whether these are segregated for women and men iv. Within the formal place of work – especially for the informal sector and whether these are segregated for men and women <p>B. Also linked to the practice of OD (1A above).</p> <p>C. Observation of whether soap and water is available for use within the toilet premises.</p>	<p>A. The percentage of population using toilets – listing names of individuals (segregated by gender and other demographic characteristics), and asking about frequency of toilet usage for:</p> <ul style="list-style-type: none"> i. Toilet(s) within the residential premises ii. Public toilets – and whether these are segregated for women and men iii. Community toilets – and whether these are segregated for women and men iv. Within the formal place of work – especially for the informal sector and whether these are segregated for men and women <p>B. Also linked to the practice of OD (1A above).</p> <p>C. Observation of whether soap and water is available for use within the toilet premises</p>	
5.	Human faecal and liquid waste is safely treated	<p>A. Presence of human faecal waste and liquid waste (black water) in the open environment, i.e. not flowing through a sewerage system or a faecal sludge/septage management system:</p> <ul style="list-style-type: none"> i. Whether untreated human faecal and liquid waste/black water is observed flowing through open drains meant for storm water drainage ii. Whether untreated human faecal and liquid waste/black water is observed flowing in the open environment (streets/fields) in low-lying areas iii. Whether untreated human faecal and liquid waste/black water is observed flowing into water bodies (ponds/nallahs/rivers) iv. Whether child/infant faeces is thrown into an open area (including open drains) 	<p>A. Presence of human faecal waste and liquid waste (black water) in the open environment, i.e. not flowing through a sewerage system or a faecal sludge/septage management system:</p> <ul style="list-style-type: none"> i. Whether untreated human faecal and liquid waste/black water is observed flowing through open drains meant for storm water drainage ii. Whether untreated human faecal and liquid waste/black water is observed flowing in the open environment (streets/fields) in low-lying areas iii. Whether untreated human faecal and liquid waste/black water is observed flowing into water bodies (ponds/nallahs/rivers) iv. Whether child/infant faeces is thrown into an open area (including open drains) 	

#	Outcome Statement	Indicator(s) – Urban	Indicator(s) – Rural	Weights ³²
6.	Solid waste and faecal waste is safely handled	<p>A. Percentage of formal and informal workers who use safety equipment (as defined in the Rules) to work with waste.</p> <p>B. Observations made by enumerators and households of sanitation workers (drain cleaners, street sweepers, toilet cleaners, septic tank workers, ragpickers) working in the normal course of the day and their handling of waste.</p>	<p>A. Percentage of formal and informal workers who use safety equipment (as defined in the Rules) to work with waste.</p> <p>B. Observations made by enumerators and households of sanitation workers (drain cleaners, street sweepers, toilet cleaners, septic tank workers, ragpickers) working in the normal course of the day and their handling of waste.</p>	
7.	Human settlements (cities and villages) are not water-logged	<p>A. Number of incidents of waterlogging per survey period (normal and wet/monsoon season) – observations by households about whether water tends to stand for greater than 4 hours in and around the settlement.</p> <p>B. These can be supported by observations of the quality of standing water – colour, smell, and whether people, especially children, traverse through or play in it.</p> <p>C. Recall of household health and disease burden during those periods – focusing particularly on incidents of diarrhoea and vector-borne diseases.</p>	<p>A. Number of incidents of waterlogging per survey period (normal and wet/monsoon season) – observations by households about whether water tends to stand for greater than 4 hours in and around the settlement.</p> <p>B. These can be supported by observations of the quality of standing water – colour, smell, and whether people, especially children, traverse through or play in it.</p> <p>C. Recall of household health and disease burden during those periods – focusing particularly on incidents of diarrhoea and vector-borne diseases.</p>	
8.	Hygienic behaviour is adopted	<p>A. Household adoption of hygienic practices such as handwashing before meals, handwashing with soap after defecation or urination.</p> <p>B. Observations of household handling of potable water and its separation and use from the latrine facility, and handling after defecation.</p> <p>C. Observation of whether soap and water is available for use within the toilet premises (linked to 4C above).</p> <p>D. Recall of household health and disease burden during those periods – focusing particularly on incidents of diarrhoea and vector-borne diseases (linked to 7C above).</p>	<p>A. Household adoption of hygienic practices such as handwashing before meals, handwashing with soap after defecation or urination.</p> <p>B. Observations of household handling of potable water and its separation and use from the latrine facility, and handling after defecation.</p> <p>C. Observation of whether soap and water is available for use within the toilet premises (linked to 4C above).</p> <p>D. Recall of household health and disease burden during those periods – focusing particularly on incidents of diarrhoea and vector-borne diseases (linked to 7C above).</p>	
9.	Women access safe menstrual hygiene management	<p>A. Household practices of storage and disposal of menstrual hygiene material/waste prior to, during, and after menstruation.</p> <p>B. Location of final disposal of menstrual hygiene material/waste, e.g. household toilets, burial in/around the household, with solid waste, in community/public toilets, in communal incinerators.</p> <p>C. Whether women in the formal and informal sector have access to adequate facilities for menstrual hygiene management in their places of work.</p> <p>D. Incidents of reproductive tract infections during the period of menstruation (recall).</p>	<p>A. Household practices of storage and disposal of menstrual hygiene material/waste prior to, during, and after menstruation.</p> <p>B. Location of final disposal of menstrual hygiene material/waste, e.g. household toilets, burial in/around the household, with solid waste, in community/public toilets, in communal incinerators.</p> <p>C. Whether women in the formal and informal sector have access to adequate facilities for menstrual hygiene management in their places of work.</p> <p>D. Incidents of reproductive tract infections during the period of menstruation (recall).</p>	

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The Scaling City Institutions for India: Sanitation (SCI-FI: Sanitation) Project falls under the urbanisation vertical at CPR. The project aims to inform and support the formulation and implementation of the Government of India's urban sanitation programmes and investments. The research programme will study cities and states to understand the reasons for poor sanitation, and inform and support the state and city governments in modifying their urban sanitation programmes so that they are supportive of alternative technologies and service delivery models, with the goal of increasing access to safe and sustainable sanitation in urban areas.