

Republic of India

Data Collection and Clarification Study on Sanitation Facilities (Latrines) in India

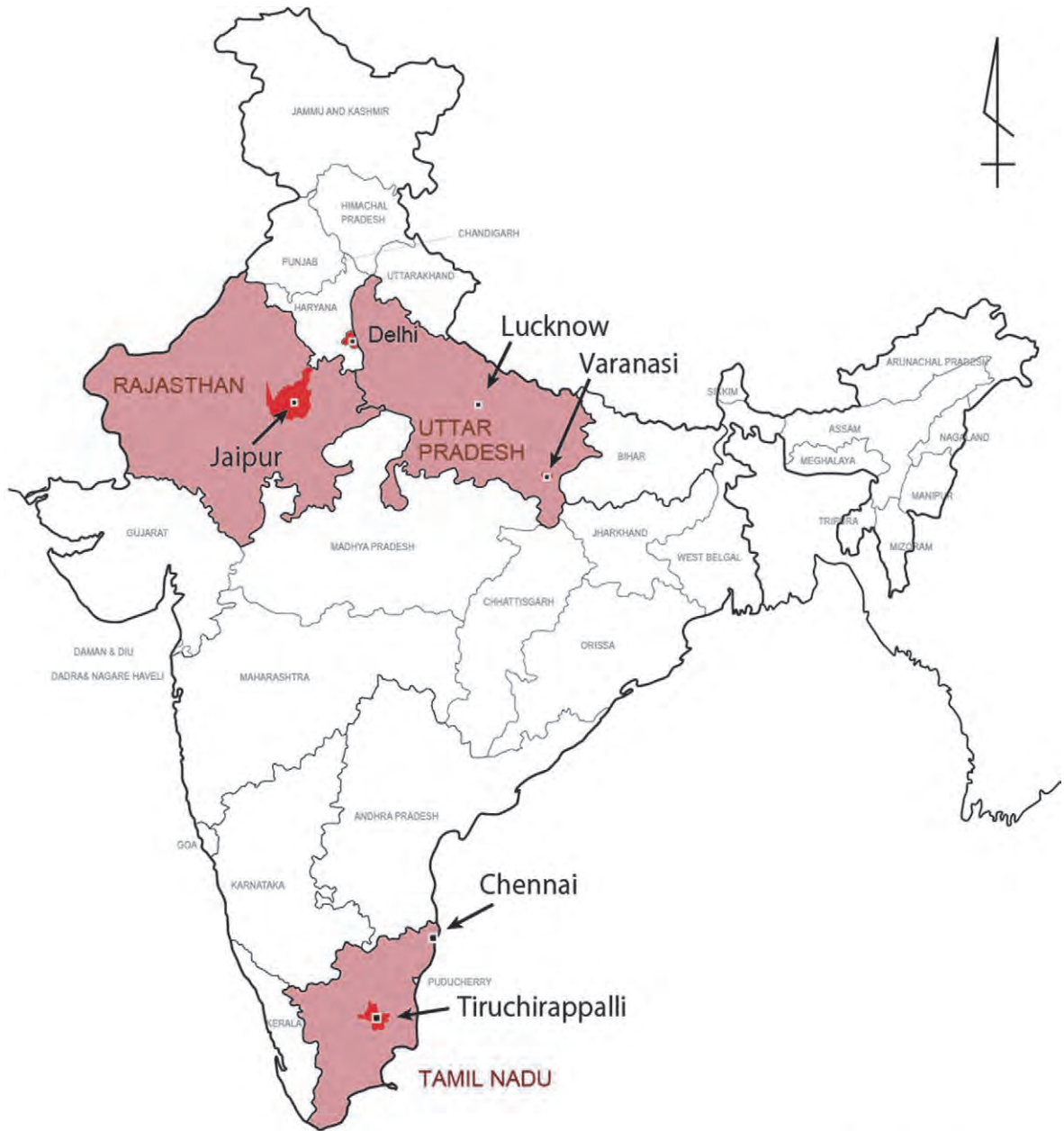
Final Report (Summary)

March 2015

**Japan International Cooperation Agency(JICA)
Kokusai Kogyo Co.,Ltd.**

SAD
JR
15-021

Exchange Rate (As of Nov. 2014)
Indian Rupees 1 Rs = Japanese Yen 1.885
Indian Rupees 1 Rs = US\$ 0.015



- Target States for Rural Area Studies
- Target City for Urban Area Studies

Data Collection and Clarification Study on Sanitation Facilities (Latrines) in India
Locations of the Target States (Plan)

Contents

1	Outline of the Study.....	1
1.1	Background.....	1
1.2	Objectives.....	1
1.3	Proposed Study Areas.....	1
1.3.1	Selection Criteria of States.....	2
1.3.2	Selection Criteria of Urban and Rural Areas.....	3
1.4	Study Team Members.....	3
1.5	Study Schedule.....	3
1.6	Contents of the Study.....	4
2	Outline of India.....	8
2.1	GENERAL.....	8
2.1.1	Overview.....	8
2.1.2	Climate.....	10
2.1.3	Rivers.....	11
2.1.4	Population and population density.....	11
2.1.5	Situation of urbanization.....	12
2.1.6	GDP and GDP growth ratio.....	12
2.1.7	Poverty rate.....	13
2.1.8	Governance.....	14
2.2	Public Sanitation in India.....	15
2.2.1	Open Defecation Rate and its Changes.....	15
2.2.2	Percentages of Households with IHHLs and its Changes.....	18
2.2.3	Fecal Management and Public Health.....	22
2.2.4	Sanitation Infrastructure.....	24
2.3	Gender Issues.....	29
2.3.1	Basic Gender-related Statistics.....	29
2.3.2	Sanitation and Gender.....	34
3	Government Policy and Projects on Improvement of Sanitation Facilities.....	38
3.1	Background.....	38
3.2	Swachh Bharat Mission.....	38
3.2.1	Swachh Bharat Mission in Rural area (SBM(GRAMIN)).....	38
3.2.2	Swachh Bharat Mission (SBM (Urban)).....	39
3.3	National Policy for Empowerment of Women.....	41
3.3.1	Women and Development in the Twelfth Five-year Plan.....	41

3.3.2	National Policy for the Empowerment of Women	42
4	Foreign and Domestic Support in Development of Latrines	44
4.1	The World Bank and Asian Development Bank (ADB)	44
4.2	United Nations	45
4.3	Department for International Development (DFID) (United Kingdom)	45
4.4	Japan.....	46
4.5	Local NGOs and other	47
4.6	International NGOs	47
5	Japanese Night Soil Treatment System.....	48
5.1	Japanese Domestic Wastewater Treatment	48
5.2	Japanese Night Soil Treatment Methods.....	48
5.3	Comparison of Centralized Treatment and Decentralized Treatment	
System.....		49
5.4	Cost Comparison for Decentralized Treatment System	50
6	Field Work in India.....	51
6.1	First Field Work in India	51
6.2	The Second Field Work in India	51
6.2.1	Activities under the Second Field Work in India	51
6.3	Third Field Work in India.....	54
7	Compilation of Study Results.....	56
7.1	Outline of Field Studies	56
7.1.1	Interview Survey and Field Investigation	56
7.1.2	Knowledge, Attitude and Practice (KAP) Survey on Latrine Use and Open	
Defecation		56
7.2	Open Defecation Practice.....	59
7.2.1	Reasons of prevalent open defecation	59
7.2.2	The Result of KAP Survey	60
7.2.3	Views on open defecation	64
7.3	Analysis of Latrine Needs and IHHL.....	64
7.4	Public toilets /community toilets.....	69
7.4.1	Field Study Results	69
7.4.2	Operation and Maintenance	75
7.4.3	Treatment of Night Soil.....	78
7.5	Awareness Raising and IEC Activities for Behavioral Change	81
7.6	Sanitation and Gender Considerations	85

7.7	Main Findings	90
7.7.1	Importance of Comprehensive Approach.....	90
7.7.2	Realization of Gender Needs.....	92
7.7.3	Applicability of Japanese Technology.....	93
7.7.4	Administrative capacity of local bodies	94
8	Future Cooperation Projects	97
8.1	Cooperation Strategies	97
8.2	Future Cooperation Projects	99

List of Tables

Table 1-1 : Selection Criteria for Urban and Rural Areas	3
Table 1-2 : Study Team Member	3
Table 1-3 : Tentative Schedule during First Work in India.....	5
Table 1-4 : Data Collection Plan during the First Work in Japan	5
Table 1-5 : Data Collection Plan during the Second Work in India	6
Table 2-1 : Percentage of households with latrines & prevalence of open defecation (state-wise)	15
Table 2-2 : Percentage of households having latrines & prevalence of open defecation (rural-urban)	16
Table 2-3 : Change in the Distribution of Types of Toilet by States and by Household Background Characteristics	18
Table 2-4 : Distribution of households by type of latrine facilities and sludge disposal (state-wise)	19
Table 2-5 : Decadal changes in access to household latrines (state-wise).....	21
Table 2-6 : Countries accounting for three-quarters of deaths due to diarrhoeal in the developing regions of the world, 2004	22
Table 2-7 : Top 10 causes of death for children under five	23
Table 2-8 : Top 10 causes of death for people of all ages.....	23
Table 2-9 : Availability of drinking water facilities (2011)	24
Table 2-10 : Percentage of households connected to piped sewer system (2011).....	26
Table 2-11 : Capacity of wastewater treatment by city size	27
Table 2-12 : Monitoring items of surface water and groundwater	27
Table 2-13 : Groundwater quality in Rajasthan (2011)	29
Table 2-14 : Maternal Mortality Rate (per 100,000 live births)	30
Table 2-15 : Enrollment ratio (2013-2014)	31
Table 2-16 : Trends of working population	32
Table 2-17 : Sector-wise female workforce.....	32
Table 2-18 : Acceptance of wife beating (%)	33
Table 2-19 : Violence against women	33
Table 2-20 : School toilets.....	34
Table 2-21 : Community Toilet Complex under the then MCD (as of 2007).....	36
Table 3-1 : National policies and programs for gender empowerment	41
Table 4-1 : Latrine related projects of the World Bank and ADB	44
Table 4-2 : Latrine related projects of United Nations	45
Table 4-3 : Latrine related projects of DFID	45
Table 4-4 : Latrine related projects of Japan	46
Table 4-5 : Latrine constructed under Various Projects.....	46
Table 4-6 : Latrine related projects by local NGOs.....	47
Table 4-7 : Latrine related projects by international NGOs	47

Table 5-1 : Comparison of Centralized Treatment System and Decentralized Treatment System .	49
Table 5-2 : Indicative Cost for Japanese Onsite Treatment	50
Table 5-3 : Indicative Cost for Indian Onsite Treatment	50
Table 6-1 : Schedule of the First Field Work in India	51
Table 6-2 : Survey Schedule in New Delhi	51
Table 6-3 : Survey Schedule in Rajasthan.....	52
Table 6-4 : Survey Schedule in Uttar Pradesh.....	52
Table 6-5 : Survey Schedule in Tamil Nadu.....	53
Table 6-6 : Field Investigation on Public Toilets.....	54
Table 6-7 : Outline of KAP Survey	54
Table 6-8 : Third Field Work in India.....	55
Table 7-1 : Sampling sites	57
Table 7-2 : Respondents' sexes	57
Table 7-3 : Respondents' religions	57
Table 7-4 : Caste composition	57
Table 7-5 : Average number of household members	57
Table 7-6 : Land ownership.....	58
Table 7-7 : Average household annual income.....	58
Table 7-8 : Ownership of IHHL	58
Table 7-9 : Respondents' defecation practice	59
Table 7-10 : Places to defecate	60
Table 7-11 : Distance to the open defecation places from houses	61
Table 7-12 : Satisfaction level of open defecation	61
Table 7-13 : Satisfaction level of open defecation (Jaipur District in Rajasthan)	61
Table 7-14 : Satisfaction level of open defecation (Varanasi District in Uttar Pradesh).....	62
Table 7-15 : Satisfaction level of open defecation (Tiruchirappalli District in Tamil Nadu).....	62
Table 7-16 : Percentages of positive and negative responses to open defecation.....	62
Table 7-17 : Defecation places for men and women	62
Table 7-18 : Difficulties faced while going to open defecation.....	63
Table 7-19 : Disadvantages of open defecation.....	63
Table 7-20 : Advantages of open defecation	64
Table 7-21 : Advantages of owning a latrine.....	65
Table 7-22 : Disadvantages of owning a latrine	65
Table 7-23 : Reasons for not owning a household latrine	65
Table 7-24 : Acceptable latrine type of public-toilet users.....	66
Table 7-25 : WTP by acceptable latrine types.....	66
Table 7-26 : Acceptable latrine type of OD households (state-wise)	67
Table 7-27 : Acceptable latrine type of OD households (sampling site-wise).....	67

Table 7-28 : WTP by acceptable latrine types (state-wise)	67
Table 7-29 : WTP by acceptable latrine types (sampling site-wise).....	67
Table 7-30 : Average annual household income (all respondents).....	67
Table 7-31 : Public-toilet users' WTP for operation and maintenance (Rs.).....	68
Table 7-32 : OD households' WTP for operation and maintenance (Rs.) (state-wise)	68
Table 7-33 : OD households' WTP for operation and maintenance (Rs.) (sampling site-wise)	68
Table 7-34 : Reasons for constructing IHHL	68
Table 7-35 : Decision makers of IHHL construction	69
Table 7-36 : Conditions of public toilets in MCJ jurisdiction	70
Table 7-37 : Field investigations on public toilets in Jaipur City	71
Table 7-38 : Construction plan of public toilets in Varanasi	71
Table 7-39 : Field investigations on public toilets in Varanasi City.....	72
Table 7-40 : Conditions of public toilets in Tiruchirappalli, Tamil Nadu	73
Table 7-41 : Field investigations on public toilets in Tiruchirappalli City.....	73
Table 7-42 : Average distance to community toilets (minutes)	75
Table 7-43 : Managers of community toilets.....	75
Table 7-44 : User satisfaction by different management	75
Table 7-45 : Operation and Maintenance of PTs by Sulabh International (SI) (Management Lease)	76
Table 7-46 : General Terms of BOT Contract	76
Table 7-47 : Integrated Women's Sanitary Complex (IWSC) in Tamil Nadu	78
Table 7-48 : Night Soil Treatment in India.....	78
Table 7-49 : Experience of Extraction of Sludge	79
Table 7-50 : Where to Send the Extracted Sludge.....	79
Table 7-51 : Average Sludge Extraction Cost.....	80
Table 7-52 : Operative Guidelines for Septage Management for Local Bodies in Tamil Nadu	80
Table 7-53 : Public advertisement through TV and Radio	81
Table 7-54 : Information source of sanitation for the past one year (multiple answers)	84
Table 7-55 : Trustworthiness of information sources	84
Table 7-56 : Use of community toilets by gender	85
Table 7-57 : Satisfaction level of community toilet users by gender	86
Table 7-58 : Satisfaction level of community toilet users by gender	86
Table 7-59 : Difficulties faced while going to open defecation.....	87
Table 7-60 : Reasons for constructing IHHL	88
Table 7-61 : Consideration of IHHL construction.....	88
Table 7-62 : Decision makers of IHHL construction.....	88
Table 7-63 : Issues needed urgent improvement	91
Table 7-64 : List of urban and rural local bodies visited.....	95

List of Figures

Figure 1-1 : Study Schedule	4
Figure 2-1 : Administrative division of India.....	8
Figure 2-2 : Cultural Zones of India.....	9
Figure 2-3 : Distribution of language groups	9
Figure 2-4 : Distribution of major crops	10
Figure 2-5 : Climate zones of India.....	10
Figure 2-6 : Major rivers of India.....	11
Figure 2-7 : State Population.....	11
Figure 2-8 : State population density	11
Figure 2-9 : Urbanization rates.....	12
Figure 2-10 : State GDP	13
Figure 2-11 : State GDP growth rate	13
Figure 2-12 : Percentage below poverty line.....	13
Figure 2-13 : Number of people who practice open defecation (unit: million people)	15
Figure 2-14 : Open defecation rate.....	16
Figure 2-15 : Access to household latrines.....	16
Figure 2-16 : Access to household latrines (urban).....	17
Figure 2-17 : Access to household latrines (rural).....	17
Figure 2-18 : Latrine connected to sewer system (urban)	19
Figure 2-19 : Latrine connected to sewer system (rural).....	19
Figure 2-20 : Latrine connected to septic tank (urban)	20
Figure 2-21 : Latrine connected to septic tank (rural).....	20
Figure 2-22 : Hypothesized causal pathways for intervention impact (Sumeet R. Patil, et al (2014)).....	23
Figure 2-23 : Access to safe drinking water	25
Figure 2-24 : Sex ratio (unit: female population per 1,000 males).....	30
Figure 2-25 : Trend of literacy rate (%)	31
Figure 2-26 : Schools with girls toilets (%)	34
Figure 2-27 : Numbers of school toilets constructed under TSC	35
Figure 5-1: Japanese Domestic Wastewater Treatment System	48
Figure 5-2 : Night Soil Treatment Flow in Japan	49
Figure 7-1 : Respondents' defecation practice	59
Figure 7-2 : Reasons for constructing IHHL.....	69
Figure 7-3 : Trustworthiness of information sources	85
Figure 7-4 : Flow of NBA.....	89
Figure 7-5 : Disadvantages of open defecation	90
Figure 7-6 : Advantages of owning a latrine	91

Figure 7-7 : System of Local Governments 95

1 Outline of the Study

1.1 Background

According to the 2011 Census, percentage of households with a latrine is 46.9% while that of households resorting to open defecation is as high as 49.8%. This means that half of the Indian population is still accustomed to defecate in the open. In such a situation, diarrhoeal diseases, which are known to be mainly transmitted orally from contaminated food and drinks, are ranked as the third death cause of Indian children under five. Not only that low availability of individual household latrines and prevalence of open defecation hinder achieving health-related Millennium Development Goals. In addition, lack of household latrines exposes women to the risk of gender-based violence while they walk long distances at night to openly defecate in an attempt to avoid peoples' attention¹.

Another yet important reason of highly common open defecation in India is because people are not used to using latrines. Total Sanitation Campaign (TSC) being implemented since 1999 by GOI supports construction of sanitary facilities as well as awareness raising activities which facilitates behavioral changes of rural people and aims to completely eradicate open defecation by 2022. As a part of TSC activities, Gram Panchayats that achieved zero open defecation are awarded prize with money named Nirmal Gram Puraskar. TSC including this incentive scheme "Nirmal Gram Puraskar" has been actively implemented all over India.

To date, the experience of Japanese ODA in India has been limited to supporting installation of public latrines as a part of sewerage improvement programs. Currently, the government of Japan (GOJ) is considering much wider support than ever before, including construction of sanitary facilities in non-urban areas, promotion of individual household latrines, introduction of Japanese technology appropriate to the Indian situation, i.e. installation of *johkasou* (an advanced septic tank originally developed in Japan) and strengthening institutional frameworks and sanitary governance. This study intends to contribute to developing support programs of JICA by providing latest and detailed information in these regards.

1.2 Objectives

The study primarily reviews public health and sanitation policies of GOI, related programs of GOI and state governments, and also the status of donor-aided programs; then carries out field surveys to decipher actual conditions of latrine usage and its O&M status, etc. Such information is utilized to analyze how lack of latrines and prevalence of open defecation negatively impact on women's' life, health and social advancement. Finally the study aims to contribute to developing future support programs of JICA in this regards.

1.3 Proposed Study Areas

The Study will select three states and carry out detailed field surveys planned in **one urban area** and **three rural areas in each of three states** during the second study period (mid Oct. to the end

¹ According to the article of Times of India "Gender crimes haunt women who head to field for nature's call"
<http://timesofindia.indiatimes.com/india/Gender-crimes-haunt-women-who-head-to-field-for-natures-call/articleshow/20942886.cms> introduced a NGO's figure, estimating 75% of all rape cases occurred while women openly defecated.

of Nov., 2014) The result of field survey, i.e. focus group discussions and questionnaire survey will be utilized for problem analysis of public health and that of women's empowerment. The selection criteria of states and rural and urban areas are as follows. Tentatively, the study team proposes three states based on the selection criteria mentioned below.

1.3.1 Selection Criteria of States

There are many indicators related to sanitary facilities and women's empowerment, i.e. percentage of households with latrines, other health indicators, female literacy rate, etc., and in fact many of those indicators manifest variation among states as well as between rural and urban. However, those variations do not show harmonious trends; thus it is rather unrealistic to come up with definite recommendations based only on those existing macro indicators.

Thus, by re-focusing on the objectives of the study, the team will propose to select states from the following three perspectives, i.e. **(i) perspective to explore applicability of a wider range of technical options**, **(ii) perspective to focus on female-friendly sanitary facilities** and **(iii) perspective to focus on demand-driven approach/ awareness raising/ behavioral change**.

Proposed State 1: Uttar Pradesh

Based on the 2011 Census, the team proposes Uttar Pradesh (U.P.) whose percentage of households with latrines is 35.7%, and whose rate of open defecation is 63.0%, which is much lower and higher than the national average respectively. U.P. is located in northern India, and is the largest state in terms of population size; and also it is among worst rate of increase in number of households with latrines over the last 10 years of all states in India. Also, its poverty rate is high while the female literacy is among the lowest; and is known as the state with lingering traditional customs and values. It is suitable not only to fathom the actual usage of latrines and the status of facilities but also to examine **the importance of awareness raising and the difficulties of behavioral changes**, which is highly correlated to the social status of women and the cultural values of a society.

Proposed State 2: Rajasthan

According to the 2011 Census, the team proposes Rajasthan, whose percentage of households with latrines is 35.0% and whose rate of open defecation is 64.3%. In Rajasthan, the progress of the Total Sanitation Campaign (TSC) is also slower than the ideal; thus it is suitable to investigate possible hindrances such as entrenched attitudes towards latrine use and difficulty of behavioral change. In addition, Rajasthan, which is largely located in an arid area, is able to provide the study with opportunities to explore how different climate types affect latrine use, environment, health and **technical options**.

Proposed State 3: Tamil Nadu

According to the 2011 Census, the team proposes Tamil Nadu in southern part of the country whose percentage of households with latrines as well as rate of open defecation is closest to the national average. While it is obvious that further efforts are urgently needed from its actual figures of percentages of households with latrines (48.3%) and rate of open defecation (45.7%), the progress of TSC in Tamil Nadu is well acclaimed. In fact, the number of Nirmal Gram Puraskar (NGP)-awarded gram panchayats is as high as 2,385, the second highest after Maharashtra. In addition, the state started own programs such as **Integrated Sanitary Complexes for Women which highly focus on women's privacy and safety** since 2001 and Namma Toilet,

a public toilet, whose maintenance is carried out by neighboring communities. Tamil Nadu is able to provide the study with opportunities to examine the current hindrances as well as to extract good practices unique to the state.

1.3.2 Selection Criteria of Urban and Rural Areas

After selecting three states, one urban area and three rural areas will be selected from each of the selected states. The same three perspectives are for selecting those areas, namely **(i) perspective to explore applicability of a wider range of technical options**, **(ii) perspective to focus on female-friendly sanitary facilities** and **(iii) perspective to focus on demand-driven approach/ awareness raising/ behavioral change**. For details, please see Table 1.3.1.

Table 1-1 : Selection Criteria for Urban and Rural Areas

Selection Criteria by Each Perspective	
(i) perspective to explore applicability of a wider range of technical options	
a.	Percentage of household with dry latrine and flush latrine (by district)
b.	Rate of flush latrine connected to piped sewer system (by district)
c.	Rate of flush latrine connected to septic tank (by district)
(ii) perspective to focus on female-friendly sanitary facilities	
d.	Sanitary complex for women (of good maintenance and of poor maintenance)
e.	School toilets for female students (of good maintenance and of poor maintenance)
f.	Public toilets for women (of good maintenance and of poor maintenance)
(iii) perspective to focus on demand-driven approach/ awareness raising/ behavioral change	
g.	Awareness raising activities (of good performance and of poor performance)
h.	Any other activities facilitating behavioral changes (of good performance and of poor performance)

1.4 Study Team Members

This study is implemented by the following members.

Table 1-2 : Study Team Member

Assignment	Name
Leader/ Sanitation policy	Mr. Ichiro KONO
Sub-leader/ Gender/ Community activities	Ms. Misa OISHI
Sanitary technology/ Cost analysis	Mr. Haruobu KOBKI

1.5 Study Schedule

As seen in Figure 1.5.1, this study begins its preparation from early September 2014. The team analyses and summarizes the information gathered during three times of “Work in India” and three times of “Work in Japan”, and prepares several reports, i.e. an inception report (IC/R), a progress report (P/R), a draft final report (DF/R) and a final report (F/R). The F/R will be submitted to JICA by the middle of March 2015.

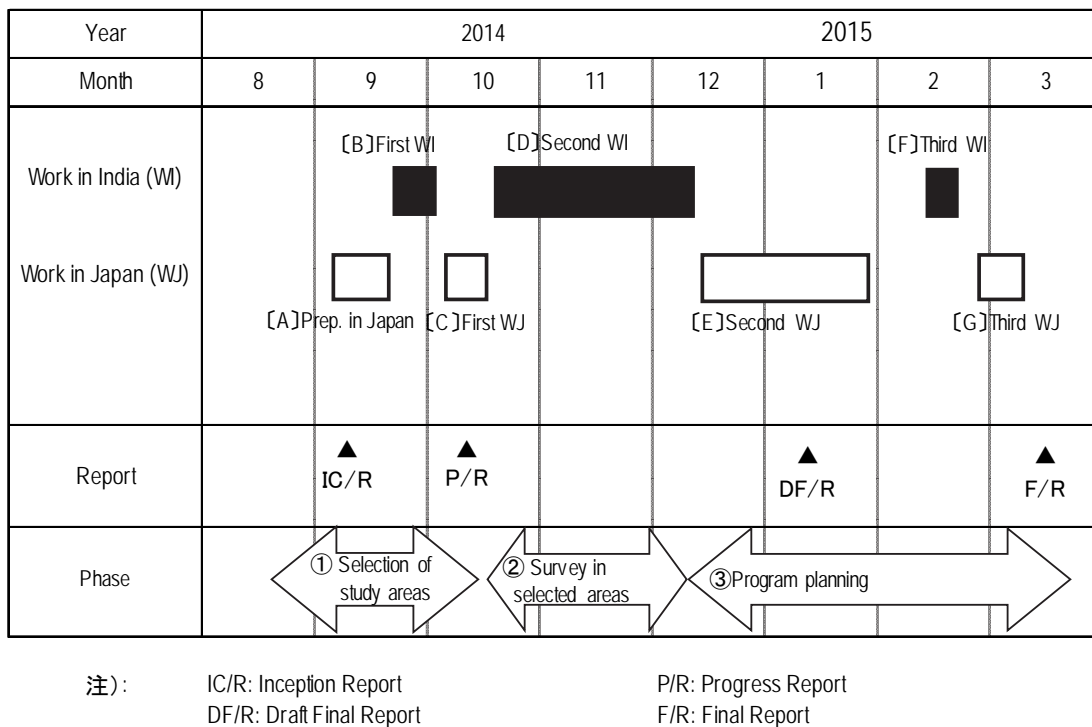


Figure 1-1 : Study Schedule

1.6 Contents of the Study

A Preparatory work in Japan (early September 2014)

- Preparation of IC/R and discussion on its contents with relevant departments of JICA.

B First Work in India (15 days from September 20, 2014)

- Explanation of IC/R to Ministry of Drinking Water and Sanitation (MDWS) and JICA India Office, and discussion on its contents.
- Confirmation of GOI's preference on survey areas.
- Observatory survey on programs by states and local governments neighboring to NCT of Delhi (i.e. Haryana's initiative, "no toilet, no bride" campaign).
- Observatory survey on other interventions by donors and NGOs.
- Interview survey to the related business entities.

Table 1-3 : Tentative Schedule during First Work in India

Days	Date	First Work in India (15 days from September 20)
1	9/20	From Japan to India
2	9/21	Day off/ Internal meeting
3	9/22	Visiting JICA India Office: Explanation of IC/R and discussion
4	9/23	AM: Visiting MDWS: Explanation of IC/R and discussion PM: Visiting TSC office to collect information
5	9/24	Visiting Ministry of Urban Development and other national programs such as JnNURM to collect information
6	9/25	Visiting Ministry of Women and Child Development and National Mission for Empowerment of Women to collect information
7	9/26	Visiting (i) other donors, i.e. WB, (ii) NGOs i.e. Sulabh International and WaterAid and (iii) related private firms i.e. Sintex
8	9/27	Meeting with Indian consultants (Confirmation of TOR and contracts)
9	9/28	Day off/ Documentation
10	9/29	Visiting Rural Development Dept. of Government of Haryana to collect information on Haryana initiatives
11	9/30	Observatory survey on Haryana Initiative i.e. "no toilet, no bride" campaign
12	10/1	Visiting municipalities in Haryana, i.e. Municipal Cooperation(MC) of Haryana or MC of Faridabad to collect information
13	10/2	Observatory survey on municipal initiatives
14	10/3	Visiting JICA India Office: Summaries the findings of first work in India
15	10/4	From India to Japan

C First Work in Japan (From early to mid. October, 2014)

- Discussion with JICA HQ regarding the findings from the first work in India.
- Selection of the survey areas (states/ rural and urban areas)
- Data collection on the selected states as seen in the following table.
- Preparation of questionnaires
- Listing up Japanese technology and knowledge applicable to the survey areas
- Preparation and submission of P/R and discussion on its contents with JICA HQ and JICA India Office.

Table 1-4 : Data Collection Plan during the First Work in Japan

Items	Sources	Survey method
A. Institutional framework and policies of the selected three states (hereinafter referred as the States)		
<ul style="list-style-type: none"> • State policies of both sanitation sector as well as gender empowerment sector • State institutions which implement the above mentioned policies 	<ul style="list-style-type: none"> • States governments of Bihar, Rajasthan and Tamil Nadu 	<ul style="list-style-type: none"> By document review By Internet search
B. Programs by the states as well as local governments		
<ul style="list-style-type: none"> • Details of programs, budgets, implementation mechanism, etc. 	<ul style="list-style-type: none"> • Rural Development and Panchayat Raj Dept. (Bihar, Rajasthan and Tamil Nadu) • Public Health and Engineering Department, Bihar • Bihar State Water & Sanitation Mission, Bihar • Municipal Administration and Water Supply Department, Tamil Nadu • Municipal Corporations of Chennai, etc. 	<ul style="list-style-type: none"> By document review By Internet search
B. Situation and problem analysis of current sanitary programs and gender employment programs		
<p>【Necessary basic information and indicators】 <u>Sanitation</u></p> <ul style="list-style-type: none"> • Access to sanitary infrastructure, i.e. safe water, sewer system, septic tanks, etc. • Percentage of households with latrines by 	<ul style="list-style-type: none"> • Census2011 • Reports by Central Bureau of Health Investigation • TSC Evaluation Report • Census2011 	<ul style="list-style-type: none"> By document review By Internet search

<ul style="list-style-type: none"> type, and prevalence of open defecation Attitudes towards open defecation Institutional settings, i.e. roles and duties of state governments, local governments, and their administration, ward committee, Gram Panchayat, local community, etc. <p><u>Gender empowerment</u></p> <ul style="list-style-type: none"> Indicators for gender empowerment, i.e. sex ratio of population, girls' enrolment rates, access rates to girls' toilets at schools, gender-specific crime rates, etc.) <p><u>Situation and problem analysis</u></p>	<ul style="list-style-type: none"> National Family and Health Survey (NFHS), etc. 	
C. Supports from other donors and NGOs		
<p>【Donors】</p> <ul style="list-style-type: none"> Status of related programs with special focus on community-level O&M mechanisms 	<ul style="list-style-type: none"> World Bank UICEF 	<ul style="list-style-type: none"> By document review By Internet search
<p>【NGOs】</p> <ul style="list-style-type: none"> Status of related programs with special focus on community-level O&M mechanisms 	<ul style="list-style-type: none"> Indian NGO (SHARE Sulabh International) International NGO (WaterAid, Gates Foundation) 	<ul style="list-style-type: none"> By document review By Internet search

D Second Work in India (from mid Oct. to the end of Nov., 2014)

- Explanation of P/R to Ministry of Drinking Water and Sanitation (MDWS) and JICA India Office, and discussion on its contents,
- Situation and problem analysis of the selected survey areas (one urban and three rural per state)
- Extraction of challenges and good practices based on the field survey.
- Survey on applicability of and demand for Japanese technology and knowledge.

Table 1-5 : Data Collection Plan during the Second Work in India

Items	Sources	Survey method
A. Situation and problem analysis of current sanitary programs and gender employment programs (survey areas)		
<p>【Necessary basic information and indicators】</p> <p><u>Sanitation</u></p> <ul style="list-style-type: none"> Implementation of policies and programs relating to latrine construction, including, including budgeting and implementation mechanisms Access to sanitary infrastructure, i.e. safe water, sewer system, septic tanks, etc. Percentage of household with latrines by type, and prevalence of open defecation O&M status of existing latrine facilities, and O&M system Current status of scavengers/ wet sweepers Institutional settings, i.e. roles and duties of state governments, local governments, and their administration, ward committee, Gram Panchayat, local community, etc. <p><u>Gender empowerment</u></p> <ul style="list-style-type: none"> Indicators for gender empowerment, i.e. sex ratio of population, girls' enrolment rates, access rates to girls' toilets at schools, gender-specific crime rates, etc.) 	<ul style="list-style-type: none"> Rural Development and Panchayat Raj Dept. (Bihar, Rajasthan and Tamil Nadu) Public Health and Engineering Department, Bihar Bihar State Water & Sanitation Mission, Bihar Municipal Administration and Water Supply Department, Tamil Nadu Municipal Corporation of Chennai, etc. 	<ul style="list-style-type: none"> By document review By Internet search By Field survey

<ul style="list-style-type: none"> • Diseases triggered by low access rate to clean latrines/ high prevalence of open defecation <p><u>Situation and problem analysis</u></p> <ul style="list-style-type: none"> • Analysis for sanitation improvement • Analysis for gender empowerment 		
<p>【 Attitude toward latrine use and open defecation】</p> <ul style="list-style-type: none"> • Demand survey, incl. willingness to pay • Capacity assessment of O&M • Current place of defecation and awareness towards public health • Demand for latrine construction • Challenges for latrine construction • Any other hindrance i.e. people's awareness on public health and behavioral changes 	<ul style="list-style-type: none"> • Field survey Approx.. 450 households (50 household per panchayat) 	<p><u>FGD/ Questionnaire survey at field by Indian experts</u> Partially, the team will accompany.</p>
<p>【Status of public toilets】</p> <ul style="list-style-type: none"> • Places of public latrines (male-female separate types, station toilets, etc.) and their conditions • O&M mechanism • Disposal of sludge <p>【Status of school toilets】</p> <ul style="list-style-type: none"> • Conditions of school latrine • O&M mechanism • Disposal of sludge 	<ul style="list-style-type: none"> • Case study by Indian experts (three from each three urban area is expected, i.e. one from high income area, one from middle income area and the other from low income area) 	<p><u>Case study at field by Indian experts</u> Partially, the team will accompany.</p>
<p>【Varieties of awareness raising activities】</p> <ul style="list-style-type: none"> • Prevalence of TV, radio and mobile phone • Social video clips at radio, TV and theatre. • Human resources necessary for effective awareness raising • Possible dissemination centers such as cultural and religious institutions 	<ul style="list-style-type: none"> • MOUD • MODWS • MOHFW • Survey areas 	<p>By document review By Internet search <u>Case study at field by Indian experts</u></p>

E Second Work in Japan (early Dec. to the end of Dec. 2014)

- Discussion with JICA HQ regarding the findings from the second work in India.
- Support-needs analysis in the field of sanitation and gender empowerment; preparation of recommendation to JICA.
- Preparation and submission of DF/R and discussion on its contents with JICA HQ and JICA India Office

F Third Work in India (mid. Feb. to the end of Feb. 2015)

- Explanation of DF/R to Ministry of Drinking Water and Sanitation (MDWS), Ministry of Urban Development (MOUD) and JICA India Office, and discussion on its contents,
- Further information collection on JICA's support programs in future.

G Third Work in Japan (early March. 2015)

- Revision of DF/R
- Preparation and submission of F/R to JICA HQ

2 Outline of India

2.1 GENERAL

2.1.1 Overview

India, officially the Republic of India (*Bharat Ganarajya*) is a country in South Asia. It shares borders with Pakistan, People’s Republic of China, Nepal, Bhutan, Bangladesh and Myanmar on land, and with Sri Lanka, Maldives and Indonesia on the sea. Its area is 3,287,590 km² with a population of 1,210,570,000 (2011).



Figure 2-1 : Administrative division of India

India is a federation composed of 29 states and 7 union territories. By “Panchayat” system, the states are divided into Sub-divisions in some states, Districts and Zilas. They are divided into Tehsil, Taluka, Mandal, and further divided into Gram Panchayats, or villages.

In 1985, Ministry of Cultural Affairs divided India into seven cultural zones: North, North Central, East, North East, West, South Central and South. A city is assigned as the cultural centre in each

of the cultural zones to protect and promote indigenous cultures.²

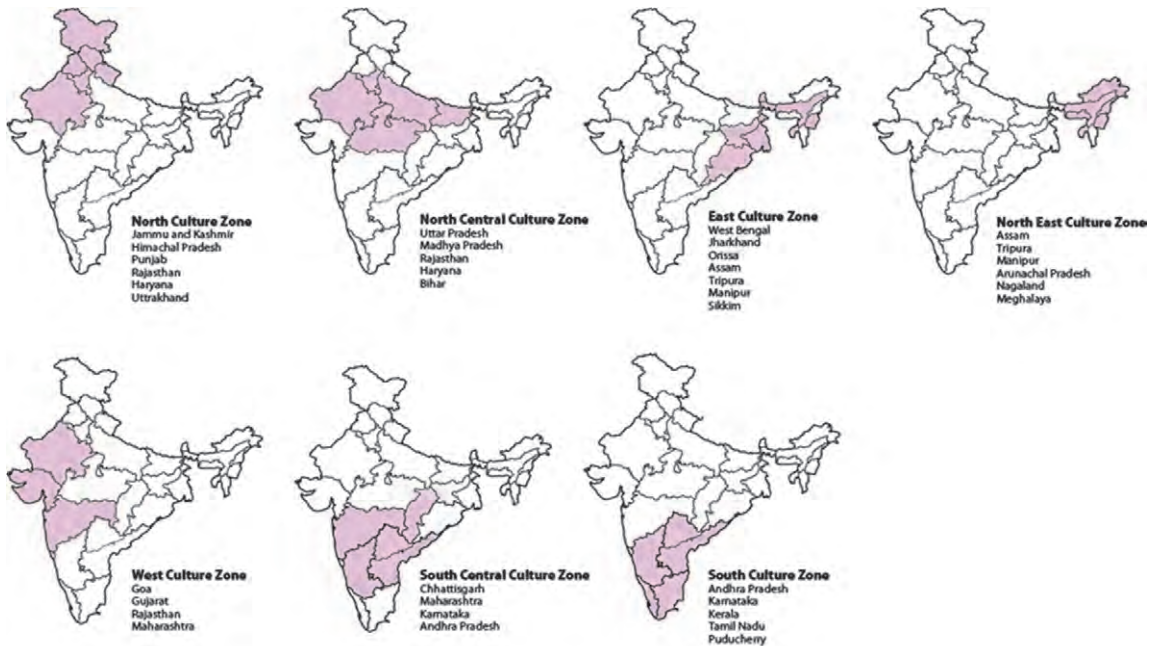


Figure 2-2 : Cultural Zones of India

Each of the cultural zones have foundation in rich diversity of languages, represented by Indo-Aryan language groups of Hindi and Urdu in the north, Dravidic language groups of Marayam and Tamil in the south, with other assortments of languages including Tibeto-Burmese and Austro-Asiatic language groups. (Fig. 4, Table 6d)

All of the language groups are divided into more than 870 languages according to some studies. According to the constitution of India, Hindi/Devanagari is the official language, however, each of the states determine different languages as official. Also English is used extensively in all aspects of society.

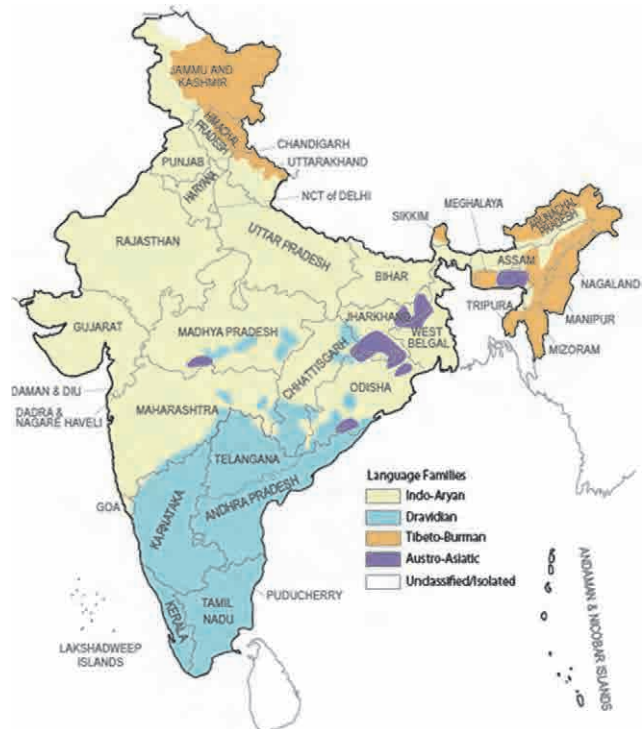


Figure 2-3 : Distribution of language groups

² http://en.wikipedia.org/wiki/Cultural_Zones_of_India

Major crops in different regions, which influence the culture and influenced by natural environment, are separated as follows: Rice (southern coasts to eastern half), sorghum, peanuts and finger millets (inner south), wheat (north central), millet (western arid) and others such as barley, chickpea and corn.

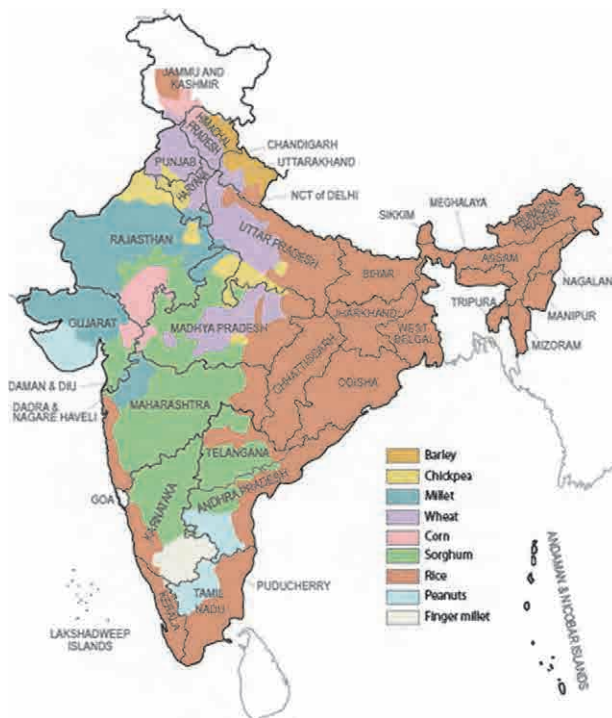


Figure 2-4 : Distribution of major crops

2.1.2 Climate

According to the Köppen classification system, India can be separated into six zones; Arid (the far west), semi-arid (west and central south), tropical wet (southwest coast), tropical wet and dry (most of the southern half), humid subtropical (north) and montane (northern fringe)³.

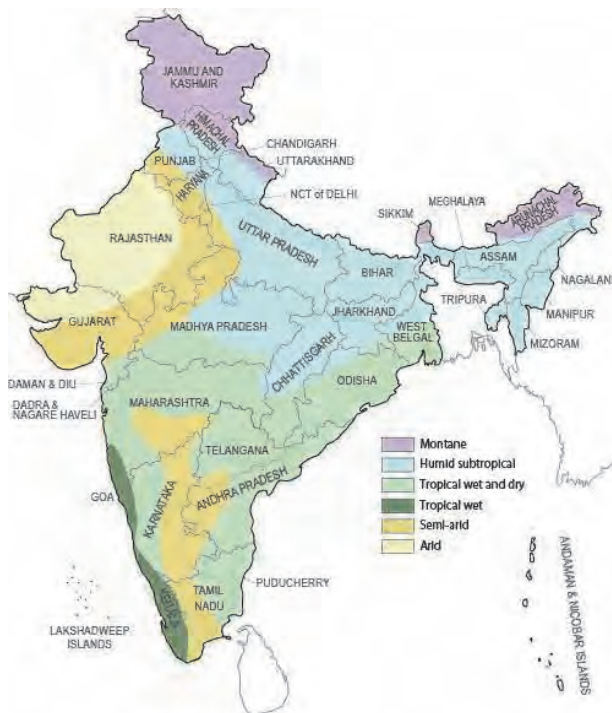


Figure 2-5 : Climate zones of India

³ Climatic zones in India, based on the Köppen classification system

2.1.3 Rivers

The main river systems in India include Indus river system, Ganga/Yamuna river system and Brahmaputra river system, all of them originating from Himalaya/Karakoram mountain range, covering more than 1,100,000km² of watershed.

Vindhya/Satpura Range is the origin of some of the tributaries of the Ganges River, but the area also is the origin of Narmada river system. Other river systems in the south, such as Godavari, Krishana, and Kaveri river systems originate from Western Ghats Mountains flowing east to the Bay of Bengal.



Figure 2-6 : Major rivers of India

2.1.4 Population and population density

India has a population of 1.2 billion, making it the second most populous nation in the world. Population of each state in India as of 2011 is shown below (Fig. 8, Table 6g). States with more than average population density (382 people per km²) include Kerala and Tamil Nadu at the south and states of Indo-Gangetic Plain, from Punjab to West Bengal (Fig. 9, Table 6h). National Capital Territory of Delhi has the highest population density of 11,297 people per km².⁴

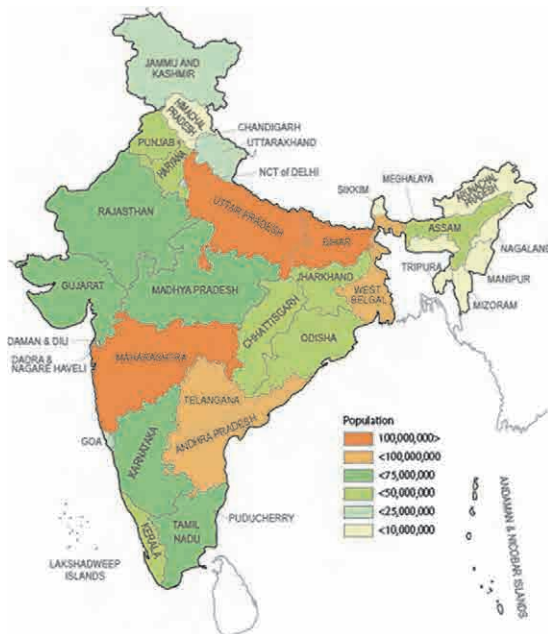


Figure 2-7 : State Population

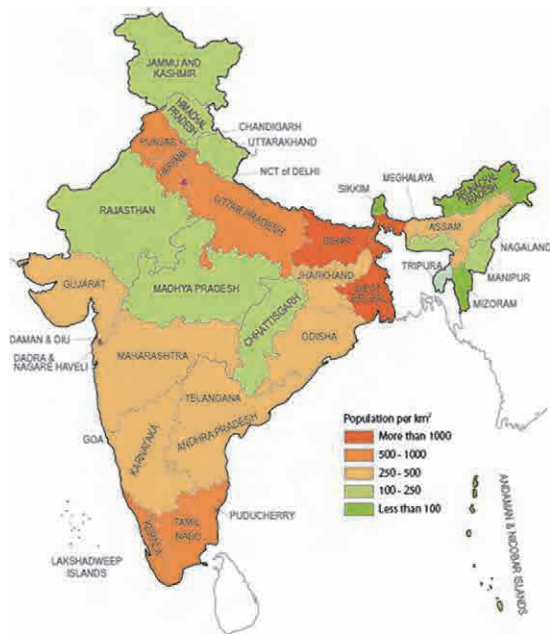


Figure 2-8 : State population density

⁴ <http://indiafacts.in/india-census-2011/urban-rural-population-o-india/>

2.1.5 Situation of urbanization

According to the 2011 census, rate of urban population is 31.16% (27.81% in 2001) and the rate of rural population is 68.84% (72.19%) and noticeably, the increase rate of urban population surpassed that of rural population for the first time since India's independence. The highest rate of urban population is at Goa (62.17%), followed by Mizoram, Tamil Nadu, Kerala, Gujarat, and Maharashtra⁵.

Reserve Bank of India classifies the cities according to the population into six Tiers:

- Tier-1 100,000 and above
- Tier-2 50,000 to 99,999
- Tier-3 20,000 to 49,999
- Tier-4 10,000 to 19,999
- Tier-5 5,000 to 9,999
- Tier-6 less than 5000

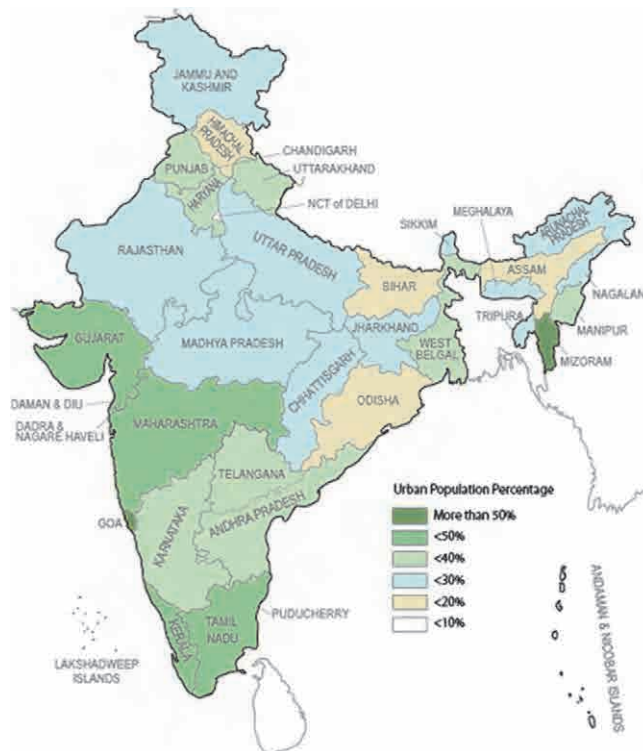


Figure 2-9 : Urbanization rates

2.1.6 GDP and GDP growth ratio

In recent years, India shows continuous growth. Industrial structure is also changing; service sector occupies more than 50% of GDP. ITC sector particularly is growing rapidly, and 'backward agriculture country' is transforming into an 'ITC mega power.' However, even nominal GDP of 1,800 billion USD in 2013 place India in 10th rank in the world nations, GDP per capita is ranked 144th in the world due to overwhelmingly large low-income population.

For State GDP from 2012 to 2013, Maharashtra is leading as having the largest GDP, followed by Uttar Pradesh and Andhra Pradesh, whereas for GDP growth rate, Bihar shows the most growth.

⁵ <http://indiafacts.in/india-census-2011/urban-rural-population-o-india/>

All states except for Goa had GDP growth rates of more than 10%, showing drastic economical growth of India.

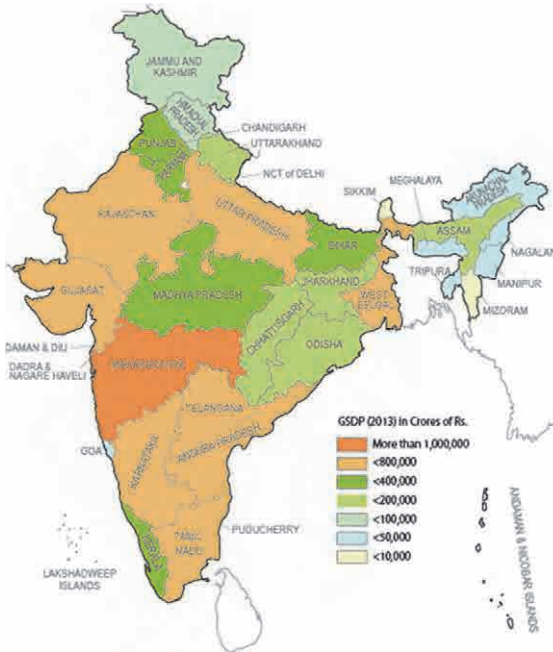


Figure 2-10 : State GDP

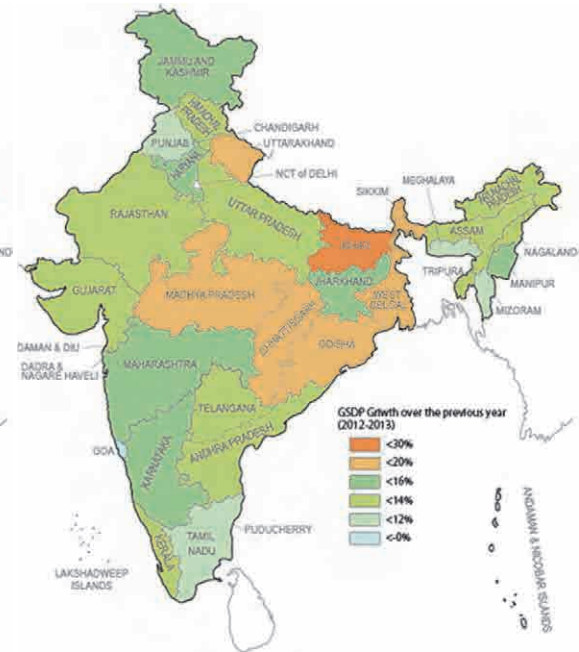


Figure 2-11 : State GDP growth rate

2.1.7 Poverty rate

According to the Reserve Bank of India, poverty rate of India in 2012 was 21.92% (13.7% in urban area, 25.7% in rural area). Jharkhand and Chhattisgarh states are the worst, more than seven times that of Goa, which is 5.09%. It is noteworthy, however, that there is a rapid decline in the population below the poverty line nationwide (29.8% in 2009 to 2010 compared to 37.2% in 2004 to 2005⁶).

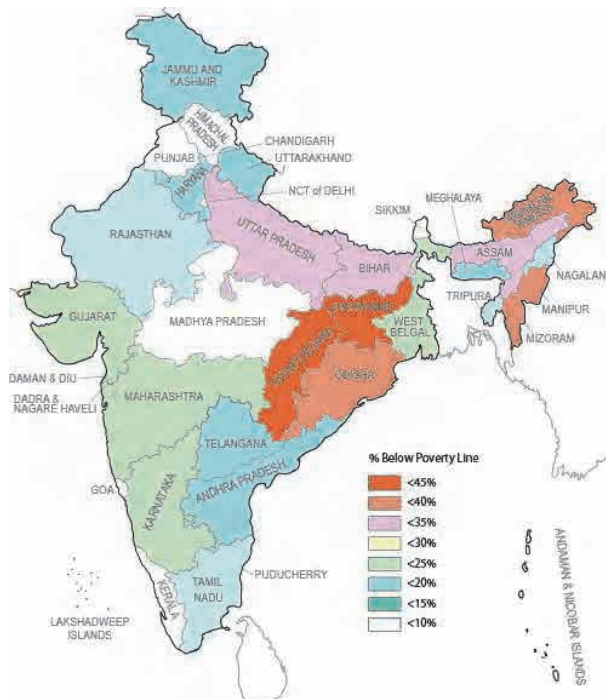


Figure 2-12 : Percentage below poverty line

⁶ Reserve Bank of India, Government of India. 2013, "Table 162, Number and Percentage of Population Below Poverty Line"

2.1.8 Governance

India, one of the largest nations in the world, is recently enlarging its economy and social development, and expecting further progress. At the same time it is pursuing upgrading its governance and renovation of social systems. It is making efforts towards de-centralization and transfer of power of authority to different levels of local governments, and structural transformations of industries, from agriculture to manufacturing and to service industry. Local administrations, once notorious for corruption, political intervention and negligence, are slowly but surely changing, following the already advanced state of governance index for private corporations.^{7 8 9}

Constitution of India clarifies structure of local self-governance. Urban and rural local bodies have different systems, both comprised of three levels. In India, the word 'local governments' refer to these three levels of establishment under the state governments.

a. State government

Article 246 of Indian constitution of 1950, separates legislative power of the central government and the state government, and gives states the responsibility to security, police, prison, local governments (local and urban), public sanitation, water supply and sewage, irrigation, agriculture, land rights, property tax, other taxes (agricultural income, quality goods, entertainment, alcohol beverages, gambling and others), education, hospital, and unemployment policy. Issues on criminal action and procedure, marriage and divorce, contracts, economical and social planning, social security, labour, civil suits and electricity are shared under both central government and the states, while unmentioned issues are under authority of the central government.

b. Local governments

Organization and decentralization of local governments bodies used to be under jurisdiction of each state, however, the states were reluctant to decentralize and transfer of power and funds were not realized. In order to improve the matter, the new system for local government was stated in the 73rd and 74th amendment of the constitution (1992).

【Municipalities】

Article 243Q of the constitution stipulate self-governing urban bodies into three categories; 'Municipal Corporation' for state capital sized large cities, 'Municipal Council' for middle sized cities with population of 10,000 to 25,000, and 'Nagar Panchayat' (for smaller cities). Each state has jurisdiction in deciding of actual categorization. Municipal Corporations have larger degree of autonomy and taxation and beneficial in funding but Municipal Council and Nagar Panchayat generally have lesser autonomy and are under supervision and directions of the state governments.

【Rural self-governing bodies (Panchayat)】

Article 243Q of the constitution stipulate self-governing rural bodies in into three levels; 'Zilla (District) Panchayat' including plural blocks, 'Panchayat Samiti (Block)' including several villages, and 'Gram (Village) Panchayat' for a village unit.

⁷ World Bank, World Data Bank

(<http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=Worldwide-Governance-Indicators>)

⁸ National Institute of Public Finance and Policy, "The Quality of Governance : How Have Indian States Performed?"

⁹ World Bank, "Governance in India"

2.2 Public Sanitation in India

2.2.1 Open Defecation Rate and its Changes

Improvement in Sanitation is still a huge challenge in India despite her rapid economic growth in recent years. High prevalence of open defecation shows the fact most clearly. According to the study done by WHO and UNICEF jointly, approximately 60% (597 million persons) of all the people who usually defecate in open in the world (1,008 million persons) are Indians. The same study introduced the top 10 countries that have achieved the highest reduction in open defecation since 1990, and neighboring Nepal, Bangladesh and Pakistan are included in those 10 countries. As for reduction in open defecation, India is far behind compared with neighboring countries.

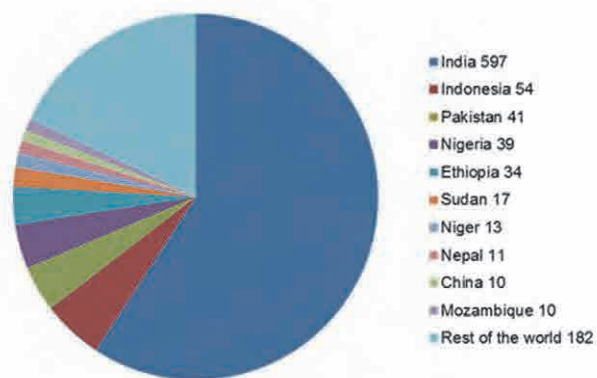


Figure 2-13 : Number of people who practice open defecation (unit: million people)

High prevalence of open defecation and less-successful eradication efforts are clearly shown in Census 2011, too. As shown in the table below, the percentage of households who do not own individual household latrines (IHL) reduced only from 63.6% to 53.1%, and most of those who do not own IHL resort to defecate in open. Also as seen in Table 2-1, as for the open defecation rate, the gap between rural and urban is substantial.

Table 2-1 : Percentage of households with latrines & prevalence of open defecation (state-wise)

States	Total households		Percentage of households having													
			Latrine in premises				Water closet				Pit latrine		Other latrine		No latrine	
	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001
INDIA	246,692,667	191,983,935	46.9	36.4	36.4	18.0	9.4	11.5	1.1	6.9	53.1	49.8	63.6			
1 Jammu & Kashmir	2,015,088	1,551,768	51.2	53.1	33.0	8.8	5.5	17.4	12.7	26.9	48.8	46.1	46.9			
2 Himachal Pradesh	1,476,581	1,240,633	69.1	33.4	60.7	11.4	8.1	14.6	0.3	7.4	30.9	29.7	66.6			
3 Punjab	5,409,699	4,265,156	79.3	56.8	59.3	20.4	19.2	24.3	0.8	12.1	20.7	19.5	43.2			
4 Uttarakhand	1,997,068	1,586,321	65.8	45.1	53.2	15.4	11.9	18.7	0.7	11.0	34.2	33.1	54.8			
5 Haryana	4,717,954	3,529,642	68.6	44.5	50.4	10.9	17.4	22.3	0.8	11.3	31.4	29.8	55.5			
6 Rajasthan	12,581,303	9,342,294	34.9	29.0	27.6	11.9	6.5	10.5	0.8	6.6	65.0	64.3	71.0			
7 Uttar Pradesh	32,924,266	25,760,601	35.7	31.5	29.8	8.0	4.2	10.3	1.7	13.2	64.4	63.0	68.6			
8 Bihar	18,940,629	13,982,590	23.1	19.2	20.1	7.9	2.5	6.5	0.5	4.8	76.9	75.8	80.8			
9 Sikkim	128,131	104,738	87.2	63.4	75.0	32.1	12.0	26.3	0.2	5.0	12.8	11.3	36.6			
10 Arunachal Pradesh	261,614	212,615	62.0	56.2	38.4	11.0	18.8	25.8	4.8	19.4	38.0	34.8	43.7			
11 Nagaland	399,965	332,050	76.5	70.5	47.7	8.7	27.7	45.9	1.1	15.9	23.5	16.5	29.4			
12 Manipur	507,152	397,656	89.2	82.1	46.6	8.7	34.6	66.9	8.0	6.5	10.7	8.9	18.0			
13 Mizoram	221,077	160,966	92.0	89.0	60.8	19.5	30.6	62.2	0.6	7.3	8.1	6.6	11.0			
14 Tripura	842,781	662,023	86.0	81.5	24.8	11.7	60.2	62.1	1.0	7.7	14.0	11.5	18.6			
15 Meghalaya	538,299	420,246	63.0	51.1	38.2	12.3	23.3	30.5	1.5	8.3	37.1	34.3	48.8			
16 Assam	6,367,295	4,935,358	65.0	64.6	28.5	15.9	34.7	43.9	1.8	4.8	35.1	33.2	35.4			
17 West Bengal	20,067,299	15,715,915	58.9	43.6	31.9	20.9	25.6	17.5	1.4	5.2	41.2	38.6	56.3			
18 Jharkhand	6,181,607	4,862,590	22.1	19.7	20.4	10.7	1.4	3.3	0.3	5.7	78.0	77.0	80.3			
19 Odisha	9,661,085	7,870,127	22.0	14.9	17.7	8.8	3.5	4.0	0.8	2.1	78.0	76.6	85.1			
20 Chhattisgarh	5,622,850	4,148,518	24.7	14.2	21.0	8.9	3.5	2.4	0.2	2.9	75.4	74.0	85.8			
21 Madhya Pradesh	14,967,597	10,919,653	28.8	24.0	26.1	12.5	2.3	5.9	0.4	5.6	71.2	70.0	76.0			
22 Gujarat	12,181,718	9,643,989	57.4	44.6	52.6	31.1	4.5	8.7	0.3	4.8	42.7	40.4	55.4			
23 Maharashtra	23,830,580	19,063,149	53.2	35.1	43.5	21.9	8.8	8.9	0.9	4.3	46.9	34.0	64.9			
24 Andhra Pradesh	21,024,534	16,849,857	49.6	32.9	43.1	18.1	5.4	8.5	1.1	6.3	50.4	48.0	67.0			
25 Karnataka	13,179,911	10,232,133	51.2	37.5	36.9	18.6	13.6	13.4	0.7	5.5	48.8	45.0	62.5			
26 Goa	322,813	279,216	79.7	58.6	74.1	29.8	4.4	18.8	1.2	10.0	20.3	16.4	41.4			
27 Kerala	7,716,370	6,595,206	95.2	84.1	66.7	65.2	28.3	12.4	0.2	6.5	4.8	3.8	16.0			
28 Tamil Nadu	18,493,003	14,173,626	48.3	35.1	41.2	23.2	6.0	7.3	1.1	4.6	51.7	45.7	64.8			

(Source) Census of India 2001, Census of India 2011

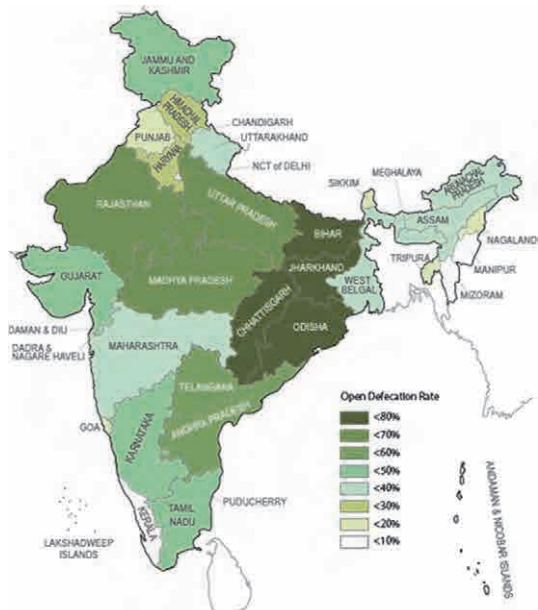


Figure 2-14 : Open defecation rate

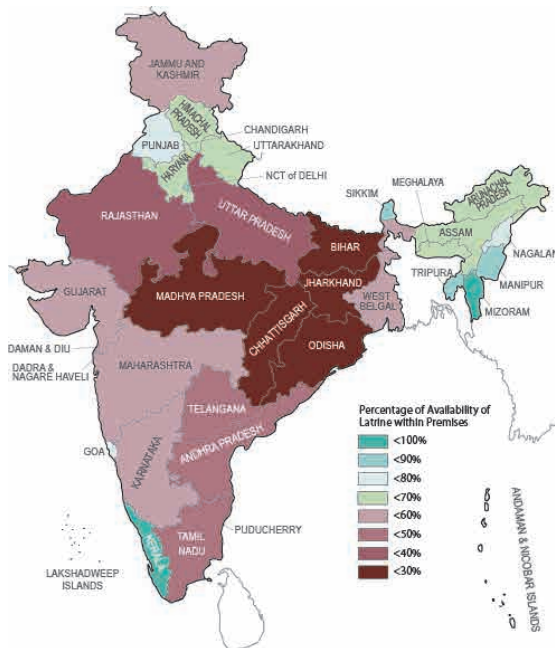


Figure 2-15 : Access to household latrines

Table 2-2 : Percentage of households having latrines & prevalence of open defecation (rural-urban)

States	Percentage of households having															
	Water closet				Pit latrine				Other latrine				No latrine			
	2011		2001		2011		2001		2011		2001		2011		2001	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
INDIA	19.4	72.6	7.1	46.1	10.5	7.1	10.3	14.6	0.8	1.7	4.5	13.0	69.3	18.6	78.1	26.3
1 Jammu & Kashmir	20.7	68.5	2.9	26.5	5.9	4.3	16.4	20.2	12.0	14.7	22.5	40.2	61.4	12.5	58.2	13.1
2 Himachal Pradesh	57.4	87.0	6.4	49.7	9.0	0.8	15.0	12.0	0.1	1.3	6.4	15.5	33.4	10.9	72.3	22.8
3 Punjab	42.7	85.6	6.4	46.5	27.1	6.8	26.4	20.5	0.6	1.0	8.2	19.5	29.6	6.6	59.1	13.5
4 Uttarakhand	39.4	85.9	7.2	40.8	14.1	6.5	16.1	26.7	0.5	1.1	8.3	19.3	45.9	6.4	68.4	13.1
5 Haryana	32.6	80.5	2.1	31.0	23.1	7.7	20.5	26.5	0.3	1.7	6.1	23.2	43.9	10.1	71.3	19.3
6 Rajasthan	12.6	73.7	3.2	40.6	6.8	5.4	8.1	18.2	0.2	2.9	3.3	17.3	80.4	18.0	85.4	23.9
7 Uttar Pradesh	15.9	77.2	1.9	32.0	4.5	2.9	8.3	18.1	1.3	3.0	8.9	30.0	78.2	16.9	80.8	20.0
8 Bihar	14.9	63.4	4.2	43.4	2.3	4.6	6.0	11.4	0.4	1.0	3.8	14.9	82.4	31.0	86.1	30.3
9 Sikkim	68.5	91.8	24.3	87.0	15.4	3.3	29.8	1.9	0.2	0.1	5.3	2.9	15.9	4.8	40.6	8.2
10 Arunachal Pradesh	26.1	74.9	6.0	28.1	20.4	13.9	24.0	32.1	6.1	0.7	17.3	26.8	47.3	10.5	52.7	13.0
11 Nagaland	35.0	79.1	5.9	19.9	32.8	15.0	47.3	40.5	1.4	0.5	11.5	33.8	30.8	5.4	35.4	5.9
12 Manipur	37.9	63.7	4.6	20.5	40.4	23.3	66.8	67.0	7.6	8.8	6.0	7.8	14.0	4.2	22.5	4.7
13 Mizoram	38.5	80.9	4.1	34.5	45.4	17.2	70.2	54.5	0.7	0.5	5.5	9.0	15.4	1.5	20.3	2.0
14 Tripura	15.1	50.0	4.6	43.1	65.3	47.0	66.0	44.8	1.0	0.9	7.3	9.0	18.5	2.1	22.1	3.0
15 Meghalaya	25.9	82.9	3.7	43.5	26.3	12.3	29.8	33.1	1.7	0.6	6.5	14.9	46.1	4.3	59.9	8.4
16 Assam	20.6	71.0	8.6	58.9	37.2	21.0	46.9	26.4	1.8	1.7	4.0	9.3	40.4	6.3	40.4	5.4
17 West Bengal	18.2	61.6	7.0	55.2	27.0	22.5	15.3	22.9	1.6	0.9	4.6	6.8	53.3	15.0	73.1	15.2
18 Jharkhand	6.2	64.7	2.2	41.2	1.3	1.8	2.1	7.4	0.2	0.6	2.2	18.0	92.4	32.8	93.4	33.3
19 Odisha	10.0	58.8	3.3	43.1	3.4	4.2	3.1	9.5	0.7	1.8	1.3	7.2	85.9	35.2	92.3	40.3
20 Chhattisgarh	10.3	58.7	1.8	38.8	4.1	1.1	1.8	5.2	0.1	0.4	1.6	8.6	85.5	39.8	94.8	47.4
21 Madhya Pradesh	10.4	71.5	2.6	41.1	2.5	1.7	3.9	11.9	0.2	1.0	2.4	14.7	86.9	25.8	91.1	32.3
22 Gujarat	26.5	85.2	11.3	62.1	6.3	2.1	8.1	9.8	0.2	0.4	2.3	8.7	67.0	12.3	78.3	19.5
23 Maharashtra	23.7	67.3	5.3	44.4	14.1	2.4	10.2	7.1	0.3	1.6	2.7	6.6	62.0	28.7	81.8	41.9
24 Andhra Pradesh	25.8	79.4	8.6	47.0	6.0	4.1	6.4	15.1	0.4	2.6	3.1	16.0	67.8	13.9	81.9	21.9
25 Karnataka	13.4	71.6	4.7	44.9	14.7	12.0	9.5	20.7	0.3	1.4	3.3	9.7	71.6	15.1	82.6	24.8
26 Goa	63.8	80.6	20.8	38.9	5.8	3.5	18.9	18.7	1.3	1.1	8.5	11.6	29.1	14.7	51.8	30.8
27 Kerala	59.1	75.3	62.0	74.8	34.0	21.9	12.8	11.1	0.2	0.3	6.6	6.2	6.8	2.6	18.7	8.0
28 Tamil Nadu	17.7	66.5	7.4	45.5	5.2	6.8	4.6	11.2	0.4	1.8	2.4	7.7	76.8	24.9	85.6	35.7

(Source) Census of India 2001, Census of India 2011

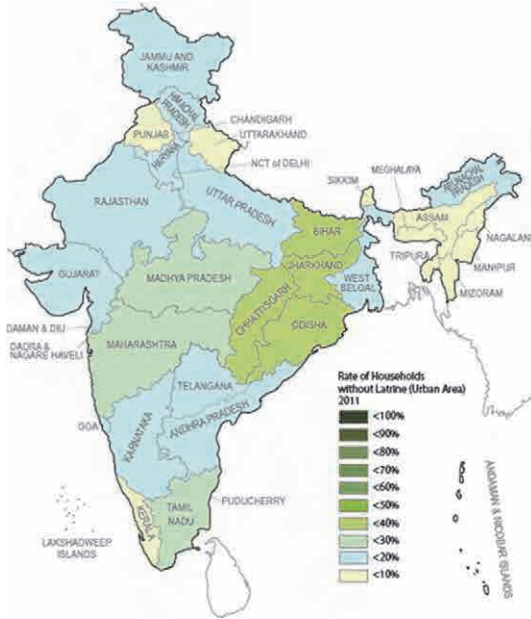


Figure 2-16 : Access to household latrines (urban)

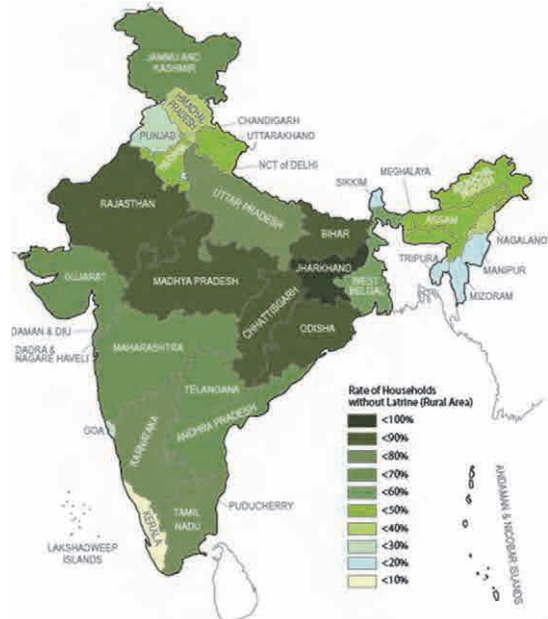


Figure 2-17 : Access to household latrines (rural)

In India, there are large scale of sample surveys such as National Sample Survey (NSS) and National Family Health Survey (NFHS), and these surveys included the questions on access to sanitation facilities. The table below shows the access trends between three survey periods, i.e. NFHS-1 (1992-1993), NFHS-2 (1998-1999) and NFHS-3 (2005-2006). Interestingly, significant caste-based differences, wealth-based differentials and education-based differentials persist in open defecation practices.

Table 2-3 : Change in the Distribution of Types of Toilet by States and by Household Background Characteristics

	Flush Toilets			Pit Toilets			Others			No Facility (open defecation)		
	1992- 1993	1998- 1999	2005- 2006	1992- 1993	1998- 1999	2005- 2006	1992- 1993	1998- 1999	2005- 2006	1992- 1993	1998- 1999	2005- 2006
All India	21.6	24.0	39.2	8.6	12.1	4.7	0.1	0.1	0.8	69.7	63.7	55.4
Residence												
Urban	60.1	63.9	78.7	15.6	16.9	3.4	0.2	0.0	1.0	24.1	19.2	16.8
Rural	6.9	8.8	20.0	6.0	10.3	5.3	0.0	0.1	0.7	87.1	80.8	74.0
State												
Andhra Pradesh	16.7	18.0	38.5	7.7	9.3	3.3	0.1	0.0	0.7	75.6	72.7	57.6
Assam	15.1	14.5	35.4	34.4	48.4	40.6	0.0	0.2	0.4	50.4	36.9	23.6
Bihar	13.2	13.3	21.8	3.1	3.6	2.7	0.1	0.0	0.2	83.5	83.2	75.4
Delhi	72.5	85.4	91.4	11.2	9.0	0.2	0.4	0.0	0.9	15.9	5.6	7.5
Goa	26.1	38.0	69.9	21.8	20.9	0.4	0.0	0.0	5.7	52.0	41.1	24.0
Gujarat	33.7	31.3	53.2	2.1	13.6	0.3	0.0	0.2	1.1	64.2	54.9	45.4
Haryana	14.2	30.4	48.9	12.7	8.7	3.5	0.0	0.1	0.0	73.1	60.8	47.6
Himachal Pradesh	10.3	24.2	44.6	2.2	2.5	0.8	0.1	0.3	1.0	87.5	73.1	53.5
Jammu and Kashmir	13.7	22.2	33.3	5.4	28.9	25.0	0.0	0.1	3.4	80.9	48.9	38.2
Karnataka	17.7	21.8	39.0	13.4	16.8	7.4	0.0	0.0	0.3	68.9	61.4	53.4
Kerala	62.6	17.9	93.0	8.2	67.3	3.0	0.1	0.0	0.2	29.1	14.8	3.8
Madhya Pradesh	16.4	20.3	23.7	4.9	1.9	1.0	0.0	0.0	0.1	78.7	77.8	75.1
Maharashtra	35.0	41.8	52.4	5.8	4.1	0.5	0.0	0.1	0.2	59.2	54.0	46.9
Nor th-East	21.6	21.7	50.3	59.8	58.6	34.7	0.2	0.1	3.3	23.8	19.9	11.7
Orissa	6.6	10.9	13.0	5.5	2.6	6.3	0.1	0.0	0.1	87.8	86.5	80.6
Punjab	22.8	36.2	63.2	13.7	15.2	7.4	0.2	0.0	0.3	63.3	48.6	29.1
Rajasthan	15.8	22.7	28.6	4.0	5.1	1.9	0.0	0.3	0.3	80.2	71.8	69.2
Tamil Nadu	25.5	32.8	42.7	3.8	1.2	0.1	0.0	0.1	0.2	70.7	65.9	57.1
Uttar Pradesh	12.7	10.3	29.5	9.9	16.3	2.0	0.3	0.2	3.0	77.1	73.2	65.6
West Bengal	28.5	33.9	48.6	11.8	11.0	10.8	0.1	0.3	0.2	59.6	54.9	40.4
Wealth quintile												
Poorest quintile	0.1	0.2	1.4	0.8	1.4	2.6	0.0	0.1	0.5	99.2	98.3	95.5
Second quintile	0.4	2.4	7.8	3.8	6.8	6.3	0.0	0.2	1.0	95.7	90.6	84.9
Middle quintile	4.8	8.9	25.4	9.2	13.2	6.8	0.1	0.2	1.3	85.9	77.8	66.5
Fourth quintile	22.1	33.1	67.1	15.5	23.4	5.6	0.2	0.1	1.0	62.3	43.5	26.4
Richest quintile	80.1	77.2	95.2	13.8	17.0	2.4	0.1	0.0	0.2	6.0	5.8	2.3
Education (head of household)												
Illiterate	6.2	8.8	17.5	5.7	8.0	4.0	0.1	0.1	1.1	88.1	83.1	77.4
literate – primary	19.3	19.9	33.4	9.5	14.1	6.0	0.1	0.1	0.7	71.1	66.0	59.9
Middle complete	29.3	29.6	44.5	12.5	15.7	5.1	0.1	0.2	0.7	58.1	54.5	49.8
High school +	54.7	54.2	67.2	11.9	15.3	4.7	0.1	0.1	0.5	33.3	30.4	27.6
Household caste												
Scheduled caste	9.0	13.9	27.6	4.3	7.6	3.9	0.1	0.1	0.5	86.7	78.4	68.0
Scheduled tribe	6.6	7.9	13.1	5.8	8.8	4.0	0.0	0.1	0.7	87.6	83.2	82.2
Others	25.4	28.7	45.3	9.6	13.7	5.0	0.1	0.1	0.9	64.9	57.4	48.9
Household religion												
Hindu	na	22.7	36.9	na	9.5	3.5	na	0.1	0.4	na	67.7	59.2
Muslim	na	27.8	45.6	na	25.7	10.9	na	0.2	3.5	na	46.3	40.1
Christian	na	29.3	59.9	na	30.7	9.1	na	0.0	1.1	na	40.0	29.8
Sikh	na	35.7	63.6	na	17.2	9.7	na	0.0	0.3	na	47.1	26.5
Others	na	41.5	42.9	na	9.3	3.5	na	0.1	1.4	na	49.2	52.2

(Source) Sanitation in India, South Asia Occasional Paper Series 2 (2009) ADB

2.2.2 Percentages of Households with IHHLs and its Changes

Access to improved sanitation is essential in order to eradicate open defecation and improve public health. Due to its importance, access to improved sanitation is set as one of the Millennium Development Goals, and worldwide efforts to achieve the goal have been made. Census 2011 shows percentages of having IHHLs and its changes by not only types of latrine facilities but also types of sludge disposal as seen in the table below.

Table 2-4 : Distribution of households by type of latrine facilities and sludge disposal (state-wise)

Indian States	Distribution of Households by type of latrine facility												
	Total No. of Households (Excluding institutional households)	Latrine facility Available within premises	Flush/pour flush latrine connected to			Pit latrine		Other latrine			Latrine Not available within premises		
			Piped sewer system	Septic tank	Other system	With slab/ventilated improved pit	Without slab/open pit	Night soil disposed into open drain	Night soil removed by human	Night soil serviced by animal	Total	Public latrine	Open
INDIA	246,692,667	46.9	12.0	22.2	2.3	7.6	1.8	0.5	0.2	0.3	53.1	3.2	49.8
1 Jammu & Kashmir	2,015,088	51.2	10.0	17.7	5.3	3.3	2.2	3.2	8.9	0.7	48.8	2.7	46.1
2 Himachal Pradesh	1,476,581	69.1	7.4	51.6	1.7	7.1	1.0	0.2	0.0	0.0	30.9	1.2	29.7
3 Punjab	5,409,699	79.3	28.3	27.7	3.3	16.0	3.2	0.5	0.1	0.2	20.7	1.2	19.5
4 Uttarakhand	1,997,068	65.8	11.8	40.0	1.4	11.3	0.6	0.3	0.2	0.1	34.2	1.1	33.1
5 Haryana	4,717,954	68.6	21.9	25.4	3.1	14.5	2.9	0.7	0.0	0.1	31.4	1.5	29.8
6 Rajasthan	12,581,303	35.0	7.2	18.6	1.9	4.0	2.5	0.8	0.0	0.1	65.0	0.7	64.3
7 Uttar Pradesh	32,924,266	35.7	8.1	19.9	1.8	3.4	0.7	0.5	1.0	0.2	64.4	1.3	63.0
8 Bihar	18,940,629	23.1	1.8	16.0	2.3	1.7	0.8	0.2	0.1	0.2	76.9	1.1	75.8
9 Sikkim	128,131	87.2	11.8	59.8	3.4	6.6	5.5	0.1	0.0	0.1	12.8	1.5	11.3
10 Arunachal Pradesh	261,614	62.0	6.0	22.4	10.0	4.4	14.4	0.7	0.4	3.7	38.0	3.2	34.8
11 Nagaland	399,965	76.5	3.3	34.4	10.0	11.2	16.4	0.3	0.2	0.6	23.5	7.0	16.5
12 Manipur	507,152	89.3	6.1	24.7	15.9	15.7	19.0	5.5	2.0	0.6	10.7	1.8	8.9
13 Mizoram	221,077	91.9	5.7	48.4	6.7	15.1	15.5	0.3	0.1	0.3	8.1	1.5	6.6
14 Tripura	842,781	86.0	3.5	14.2	7.2	44.8	15.4	0.5	0.1	0.4	14.0	2.5	11.5
15 Meghalaya	538,299	62.9	5.8	23.7	8.6	6.9	16.4	0.3	0.4	0.8	37.1	2.8	34.3
16 Assam	6,367,295	64.9	5.2	14.9	8.4	10.5	24.2	0.9	0.4	0.6	35.1	1.9	33.2
17 West Bengal	20,067,299	58.9	5.6	20.7	5.6	22.3	3.2	0.4	0.7	0.4	41.2	2.5	38.6
18 Jharkhand	6,181,607	22.0	3.7	15.7	1.0	1.1	0.3	0.2	0.0	0.1	78.0	1.0	77.0
19 Odisha	9,661,085	22.0	2.5	13.6	1.6	2.1	1.4	0.3	0.3	0.3	78.0	1.4	76.6
20 Chhattisgarh	5,622,850	24.6	2.5	16.6	1.9	2.1	1.3	0.1	0.0	0.1	75.4	1.4	74.0
21 Madhya Pradesh	14,967,597	28.8	5.8	19.1	1.3	1.7	0.7	0.3	0.0	0.1	71.2	1.2	70.0
22 Gujarat	12,181,718	57.4	29.0	22.8	0.8	4.2	0.3	0.2	0.0	0.0	42.7	2.3	40.4
23 Maharashtra	23,830,580	53.1	18.4	23.5	1.6	8.3	0.5	0.7	0.0	0.2	46.9	12.9	34.0
24 Andhra Pradesh	21,024,534	49.6	12.4	29.7	1.0	5.0	0.5	0.8	0.1	0.3	50.4	2.5	48.0
25 Karnataka	13,179,911	51.2	22.7	13.0	1.2	13.2	0.3	0.5	0.1	0.2	48.8	3.8	45.0
26 Goa	322,813	79.7	14.5	56.5	3.3	3.7	0.7	0.2	0.0	1.0	20.3	3.9	16.4
27 Kerala	7,716,370	95.2	12.0	50.3	4.4	27.6	0.7	0.2	0.0	0.0	4.8	1.1	3.8
28 Tamil Nadu	18,493,003	48.3	14.4	25.7	1.1	5.7	0.3	0.8	0.2	0.1	51.7	6.0	45.7

(Source) Census of India 2011

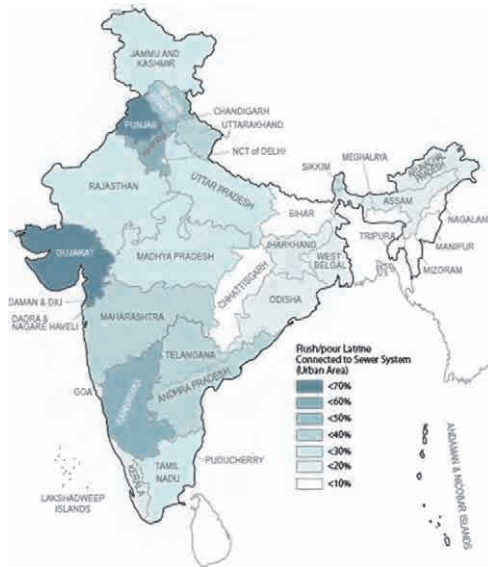


Figure 2-18 : Latrine connected to sewer system (urban)

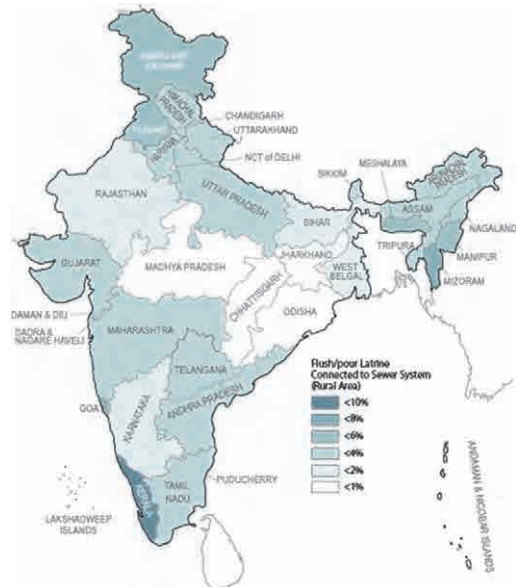


Figure 2-19 : Latrine connected to sewer system (rural)

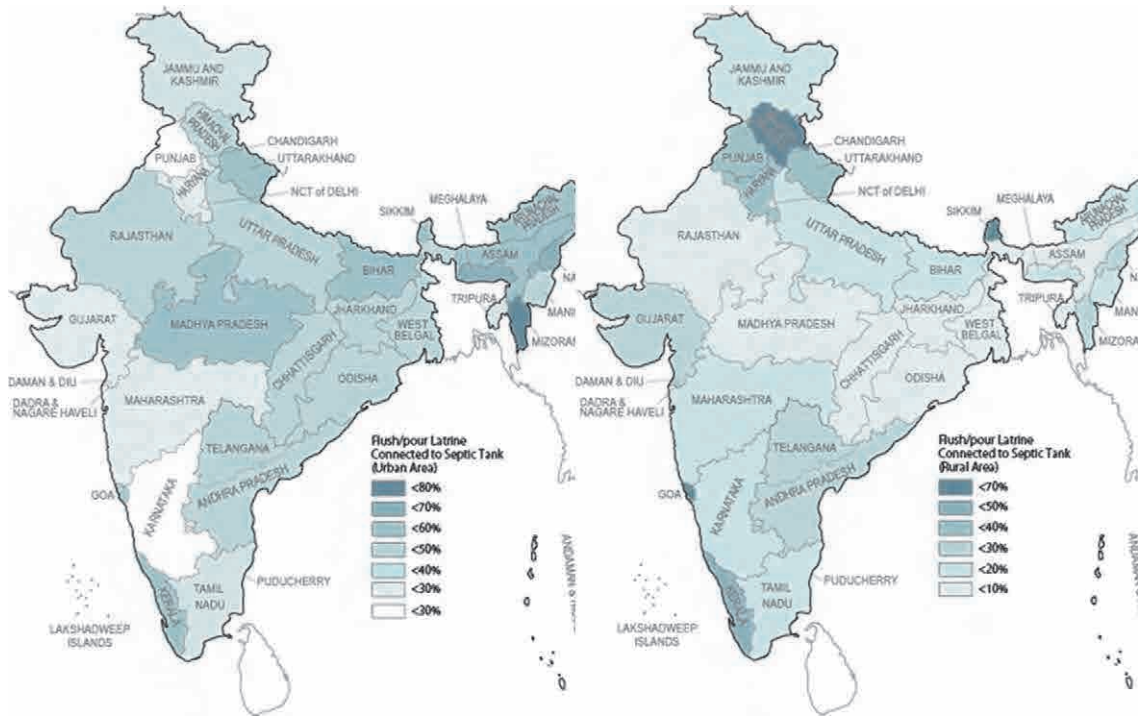


Figure 2-20 : Latrine connected to septic tank (urban)

Figure 2-21 : Latrine connected to septic tank (rural)

The table below shows the decadal changes in access to household latrines. The percentage of households with water-closet latrines increased by 18.4 points over the last 10 years, while households with pit latrines declined 2.1 points and households with other latrines declined 5.8 points. In total, the percentage of households with latrines increased 10.5 points; however its share is 46.9%. Still more than half of the entire population lack access to sanitation.

This trend, a rapid increase of water-closet latrines and decrease of other latrines, can only be explained by the attempts to fight against caste-based discrimination. It is said that significant numbers of scavengers, who are predominantly women, still work in their traditional caste-based occupation of manually cleaning dry latrines and carrying human excreta in cane baskets upon their heads.

After independence, the government has continued its attempts to improve scavenging conditions by terminating their customary rights to scavenging. First, several committees to enquire the conditions such as the Scavenging Conditions Enquire Committee (1957) and the Committee on Customary Rights were established to find out the effective measures to liberate scavenging communities.

As practical measures, conversion of dry latrines that require manual scavenging to flush latrines has been accelerated through implementing government projects since the 1980s. Major such projects are Integrated Low Cost Sanitation Scheme from 1980/81 to December 2007 and National Scheme of Liberation of the Scavengers and their Dependents from March 1992 to 2001/2002. A series of efforts made by the government culminated in the parliamentary approval of Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act in 1993. Although some reports by international organizations and NGOs point out the failure of complete eradication of manual scavenging, the government efforts contribute to the increase of flush latrines and decrease of other latrines including dry latrines.

Table 2-5 : Decadal changes in access to household latrines (state-wise)

States	Total households		Households having			
			Latrine in premises	Water closet	Pit latrine	Other latrine
	(Change in points between 2001 and 2011)					
INDIA	246,692,667	191,963,935	10.5	18.4	-2.1	-5.8
1 Jammu & Kashmir	2,015,088	1,551,768	-1.9	24.2	-11.9	-14.2
2 Himachal Pradesh	1,476,581	1,240,633	35.7	49.3	-6.5	-7.1
3 Punjab	5,409,699	4,265,156	22.5	38.9	-5.1	-11.3
4 Uttarakhand	1,997,068	1,586,321	20.7	37.8	-6.8	-10.3
5 Haryana	4,717,954	3,529,642	24.1	39.5	-4.9	-10.5
6 Rajasthan	12,581,303	9,342,294	5.9	15.7	-4.0	-5.8
7 Uttar Pradesh	32,924,266	25,760,601	4.2	21.8	-6.1	-11.5
8 Bihar	18,940,629	13,982,590	3.9	12.2	-4.0	-4.3
9 Sikkim	128,131	104,738	23.8	42.9	-14.3	-4.8
10 Arunachal Pradesh	261,614	212,615	5.8	27.4	-7.0	-14.6
11 Nagaland	399,965	332,050	6.0	39.0	-18.2	-14.8
12 Manipur	507,152	397,656	7.1	37.9	-32.3	1.5
13 Mizoram	221,077	160,966	3.0	41.3	-31.6	-6.7
14 Tripura	842,781	662,023	4.5	13.1	-1.9	-6.7
15 Meghalaya	538,299	420,246	11.9	25.9	-7.2	-6.8
16 Assam	6,367,295	4,935,358	0.4	12.6	-9.2	-3.0
17 West Bengal	20,067,299	15,715,915	15.3	11.0	8.1	-3.8
18 Jharkhand	6,181,607	4,862,590	2.4	9.7	-1.9	-5.4
19 Odisha	9,661,085	7,870,127	7.1	8.9	-0.5	-1.3
20 Chhattisgarh	5,622,850	4,148,518	10.5	12.1	1.1	-2.7
21 Madhya Pradesh	14,967,597	10,919,653	4.8	13.6	-3.6	-5.2
22 Gujarat	12,181,718	9,643,989	12.8	21.5	-4.2	-4.5
23 Maharashtra	23,830,580	19,063,149	18.1	21.6	-0.1	-3.4
24 Andhra Pradesh	21,024,534	16,849,857	16.7	25.0	-3.1	-5.2
25 Karnataka	13,179,911	10,232,133	13.7	18.3	0.2	-4.8
26 Goa	322,813	279,216	21.1	44.3	-14.4	-8.8
27 Kerala	7,716,370	6,595,206	11.1	1.5	15.9	-6.3
28 Tamil Nadu	18,493,003	14,173,626	13.2	18.0	-1.3	-3.5

(Source) Census of India 2001, Census of India 2011

In addition to the national survey such as Census and NFHS, an independent body called research institute for compassionate economics (rice) carried out the SQUAT Survey, a large scale sample survey, targeting 3,235 households in 13 districts of Bihar, Rajasthan, Uttar Pradesh, Madhya Pradesh and Haryana. The key findings of the SQUAT Survey are as follows.

Lack of demand for simple, affordable latrines

Respondents conceive expensive latrines, and the demand for simple and affordable latrines are negligible. Generally, the situation improves along with a “sanitation ladder” from open defecation up to flush toilets with a piped sewer. The result of SQUAT Survey and other data clearly shows a “missing middle”.

Latrine use as an individual practice

The SQUAT Survey report says that measuring sanitation behavior at the household-level has created a blind spot for many studies. In rural North India, many people who live in households that own a latrine nevertheless defecate in the open, and mostly open defecation is preferred by men.

Use of government latrines

Among the respondents, majority of them do not own latrines and resort to open defecation. As for latrine owners, 79% of them built latrines without any external support. The survey says that while latrines that were built entirely by the government, rather than constructed in part using government money or materials, are least likely to be used, the latrines constructed by themselves are more likely to be used. The same survey found a strong preference of people for larger pits, saying privately-constructed latrines have much larger pits below ground.

Stated preference for open defecation

The survey found that there are persistent preferences for open defecation in rural northern India. The respondents explain that there are many pleasant advantages of open defecation and that using a latrine is probably healthier than going outside.

2.2.3 Fecal Management and Public Health

Human excreta and the lack of adequate personal and domestic hygiene have been implicated in the transmission of many infectious diseases including cholera, typhoid, hepatitis, polio, cryptosporidiosis, ascariasis, and schistosomiasis. The World Health Organization (WHO) estimates that 2.2 million people die annually from diarrhoeal diseases and that 10% of the population of the developing world are severely infected with intestinal worms related to improper waste and excreta management. Human excreta-transmitted diseases predominantly affect children and the poor. Most of the deaths due to diarrhoeal occur in children and in developing countries.

In India, diarrhoeal is serious especially among children. The table below shows that India lost as many as 535 thousand lives of children.

Table 2-6 : Countries accounting for three-quarters of deaths due to diarrhoeal in the developing regions of the world, 2004

Country	Deaths due to diarrhoea (thousands)
1 India	535
2 Nigeria	175
3 Democratic Republic of the Congo	95
4 Ethiopia	86
5 Pakistan	77
6 China	74
7 Bangladesh	69
8 Afghanistan	65
9 Indonesia	39
10 Angola	34
11 Niger	33
12 Uganda	28
13 Myanmar	26
14 United Republic of Tanzania	25
15 Mali	24
Total of 15 countries	1384

(Source) Cynthia Boschi-Pinto et al. 2008¹⁰

According to the health statistics of India, as seen in the tables below, the third highest cause of death of children under five is diarrheal diseases. Diarrheal diseases are also the third highest cause of death for people of all ages; and this implies that not only children under five but also children from five to 14 years and elders over 70 years are also vulnerable to diarrheal diseases. In India, diarrheal is still a deadly disease for young and elder people. Since the Millennium Development Goals focus on child mortality under five, more attention is paid to children under five, but looking at the national health statistics, it is clear that the appropriate fecal management and access to improved sanitation benefit wider population in India.

¹⁰ Cynthia Boschi-Pinto et al. 2008 Estimating child mortality due to diarrhoea in developing countries, Bulletin of the World Health Organization 86 (9)

Table 2-7 : Top 10 causes of death for children under five

Rank	Cause of Death	Male	Female	All person
1	Perinatal conditions	36.9	29.2	33.1
2	Respiratory infections	20.7	23.3	22.0
3	Diarrheal diseases	12.3	15.3	13.8
4	Other infectious and parasitic disease	9.8	11.2	10.5
5	Symptoms sings and ill-defined conditions	3.5	3.4	3.4
6	Unintentional injuries	3.4	2.9	3.2
7	Nutritional deficiency	2.4	3.2	2.8
8	Malaria	2.4	3.0	2.7
9	Congenital anomalies	3.0	2.3	2.7
10	Fever of unknown origin	1.5	1.6	1.5

(Source) Registrar General of India. Report on causes of death in India 2001-2003

Table 2-8 : Top 10 causes of death for people of all ages

Rank	Cause of Death	Male	Female	All person
1	Cardiovascular diseases	20.3	16.9	18.8
2	COPD, asthma, other respiratory diseases	9.3	8.0	8.7
3	Diarrheal diseases	6.7	9.9	8.1
4	Perinatal conditions	6.4	6.2	6.3
5	Respiratory infections	5.4	7.1	6.2
6	Tuberculosis	7.1	4.7	6.0
7	Malignant and other neoplasms	5.4	6.0	5.7
8	Senility	4.0	6.5	5.1
9	Unintentional injuries	5.2	4.5	4.9
10	Symptoms sings and ill-defined conditions	4.6	5.0	4.8

(Source) Registrar General of India. Report on causes of death in India 2001-2003

Mechanisms of how access to basic sanitation improves health is described in the figure below. The studies targeting certain countries and areas have been carried out and the reports are also available on the Internet.

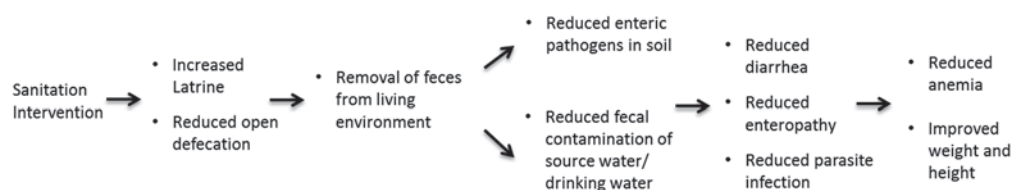


Figure 2-22 : Hypothesized causal pathways for intervention impact (Sumeet R. Patil, et al (2014))

The research done by Limin Wang (2003) “Determinants of child mortality in LDCs: Empirical findings from demographic and health surveys” found that the mortality rates under five improve substantially with access to pit latrines. Another research done by A. Kumar et. al. (2014), “Drinking water and sanitation facilities in India and its linkages with diarrhoeal among children under five: Evidences from recent data” found that the households using unimproved latrines are more susceptible to diarrheal diseases than the households with improved latrines.

In recent years, researches focusing on the effects of open defecation upon stunting childhood development has been started. These researches analyze the issue of open defecation not only from the public health perspectives but economic perspectives, saying the country is losing full

potential of human resources.

Also the *Economic Impacts of Inadequate Sanitation in India* published by Water and Sanitation Program (WSP) estimates that the total economic impacts of inadequate sanitation in India, i.e. health-related impact, domestic-water related impact, access time impact and tourism impacts, amounts to Rs. 2.44 trillion (US\$53.8 billion) a year; this was the equivalent of 6.4 percent of India's GDP in 2006. This means a per person annual impact of Rs. 2,180

2.2.4 Sanitation Infrastructure

a. Water supply

Due to its importance, access to safe drinking water is set as one of the MDGs. The Indian rate is as high as 93% (2012), and this is the second highest in south Asian countries after Sri Lanka (94%), and already achieved the target set as MDGs.

As seen in the table below, Census 2011 reveals that each state utilizes different water sources depending on their natural endowment. Also Census 2011 clarifies that there is less variation of access to safe drinking water among states due to the efforts made by each state.

With the further population expansion and economic development, not only water for domestic use but also water for industrial use will be demanded increasingly. In this regard, it will become fundamentally important to explore new water sources, to use groundwater in a sustainable manner and to mitigate groundwater pollution.

Table 2-9 : Availability of drinking water facilities (2011)

Indian States	Distribution of households by availability of drinking water facility														Availability of Drinking Water Source		
	Total No. of Households (Excluding institutional households)	Tap water			Well			Handpump	Tubewell	Spring	River, Canal	Tank, Pond, Lake	Any other source	Safer drinking water	Within the premises	Near the premises	Away
		Total	From treated source	From un-treated source	Total	Covered well	Un-covered well										
INDIA	246,692,667	43.5	32.0	11.6	11.0	1.6	9.4	33.5	8.5	0.5	0.6	0.8	1.5	96.5	46.6	35.8	17.6
1 Jammu & Kashmir	2,015,088	63.9	34.7	29.2	6.5	1.9	4.7	11.4	1.5	6.2	6.7	0.7	3.1	83.3	48.2	28.7	23.1
2 Himachal Pradesh	1,476,581	89.5	83.9	5.6	2.9	1.6	1.3	3.6	0.7	0.7	0.3	0.5	1.9	96.7	55.5	35.0	9.5
3 Punjab	5,409,699	51.0	41.1	9.9	0.5	0.2	0.2	24.7	21.9	0.0	0.2	0.1	1.7	98.1	85.9	10.0	4.1
4 Uttarakhnad	1,997,068	68.2	53.9	14.3	1.1	0.7	0.4	22.0	2.0	1.1	0.9	0.7	4.0	93.3	58.3	26.6	15.2
5 Haryana	4,717,954	68.8	55.9	12.9	3.0	0.7	2.3	12.0	12.9	0.0	0.3	0.9	1.9	96.7	66.5	21.4	12.1
6 Rajasthan	12,581,303	40.6	32.0	8.5	10.8	1.2	9.6	25.3	12.2	0.1	0.8	5.9	4.3	88.9	35.0	39.0	25.9
7 Uttar Pradesh	32,924,266	27.3	20.2	7.1	4.0	0.6	3.4	64.9	2.9	0.0	0.1	0.1	0.7	99.1	51.9	36.0	12.1
8 Bihar	18,940,629	4.4	3.1	1.3	4.3	0.7	3.7	86.6	3.0	0.0	0.2	0.1	1.4	98.3	50.1	37.9	12.0
9 Sikkim	128,131	85.3	29.2	56.1	0.6	0.5	0.2	0.0	0.0	11.1	0.4	0.6	2.0	85.9	52.6	29.7	17.7
10 Arunachal Pradesh	261,614	65.5	26.4	39.1	5.7	1.4	4.3	10.7	2.4	5.7	6.0	0.9	3.2	84.3	41.1	37.4	21.6
11 Nagaland	399,965	47.2	6.1	41.1	25.7	6.6	19.1	2.2	4.5	5.6	2.0	10.3	2.7	79.6	29.3	42.4	28.3
12 Manipur	507,152	38.6	25.6	13.0	7.5	2.8	4.7	6.5	0.4	5.6	15.0	23.2	3.4	53.0	16.1	46.2	37.8
13 Mizoram	221,077	58.7	39.4	19.3	4.7	2.0	2.7	0.8	0.9	18.4	7.7	1.8	6.9	65.1	31.2	46.7	22.2
14 Tripura	842,781	33.2	20.3	12.9	27.4	2.9	24.5	18.1	16.3	1.9	1.8	0.5	0.9	95.0	37.1	30.5	32.4
15 Meghalaya	538,299	39.3	27.8	11.5	25.4	6.9	18.5	2.8	2.6	19.0	2.6	5.7	2.6	70.1	24.1	43.2	32.7
16 Assam	6,367,295	10.5	9.2	1.3	18.9	1.7	17.2	50.2	9.2	1.3	3.4	4.6	2.0	88.8	54.8	26.7	18.5
17 West Bengal	20,067,299	25.4	21.0	4.4	6.0	0.7	5.4	50.1	16.7	0.5	0.3	0.2	0.8	98.2	38.6	34.7	26.6
18 Jharkhand	6,181,607	12.9	10.0	2.9	36.5	1.9	34.6	43.8	3.5	0.8	1.6	0.2	0.8	96.7	23.2	44.9	31.9
19 Odisha	9,661,085	13.8	10.0	3.9	19.5	2.2	17.3	41.5	20.0	1.8	1.7	0.9	0.8	94.8	22.4	42.2	35.4
20 Chhattisgarh	5,622,850	20.7	12.3	8.4	11.4	0.8	10.6	58.4	7.2	0.7	0.9	0.2	0.5	97.7	19.0	54.5	26.5
21 Madhya Pradesh	14,967,597	23.4	16.5	6.9	20.0	1.1	18.9	47.1	7.6	0.3	0.7	0.4	0.6	98.1	23.9	45.6	30.5
22 Gujarat	12,181,718	69.0	39.9	29.2	7.1	2.3	4.8	11.6	9.6	0.1	0.3	0.2	2.0	97.3	64.0	23.5	12.4
23 Maharashtra	23,830,580	67.9	56.3	11.6	14.4	2.2	12.2	9.9	5.7	0.4	0.4	0.4	1.0	97.9	59.4	27.6	13.1
24 Andhra Pradesh	21,024,534	69.9	49.0	20.9	6.4	0.5	5.9	13.7	6.9	0.5	0.3	0.3	2.1	96.9	43.2	37.3	19.5
25 Karnataka	13,179,911	66.1	41.2	24.8	9.0	1.0	8.0	5.5	16.0	0.3	0.8	1.0	1.4	96.6	44.5	37.3	18.2
26 Goa	322,813	85.4	82.1	3.4	11.1	4.0	7.1	0.1	0.3	1.2	0.3	0.4	1.3	96.9	79.7	15.5	4.8
27 Kerala	7,716,370	29.3	23.4	6.0	62.0	14.6	47.4	0.5	3.7	1.4	0.2	0.7	2.1	95.5	77.7	14.1	8.2
28 Tamil Nadu	18,493,003	79.8	55.8	24.0	5.1	1.2	3.8	4.6	8.2	0.2	0.2	0.5	1.5	97.7	34.9	58.1	7.0

(Source) Census of India 2011

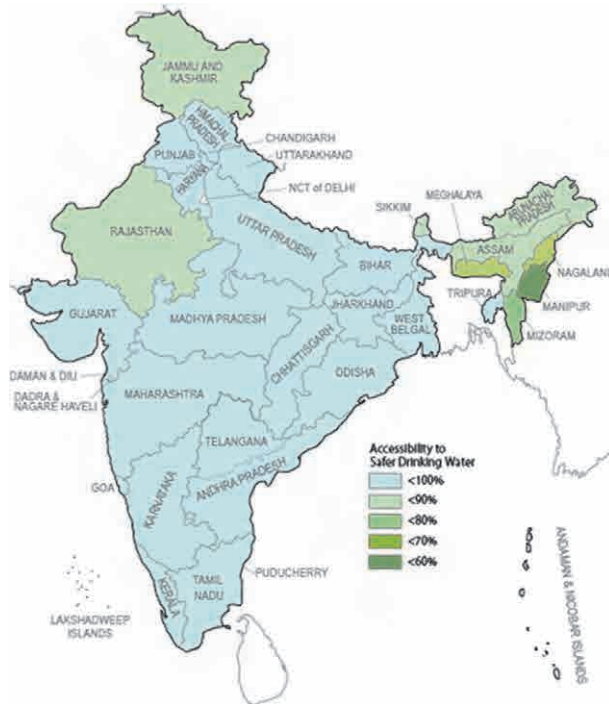


Figure 2-23 : Access to safe drinking water

b. Wastewater management

The table below shows the percentage of households connected to piped sewer system with a flush/pour flush latrine. The percentage in urban is approximately 32.7%, that in rural is as low as 2.2%.

Also the same table shows the following; i) percentage of households connected to piped sewer system in rural area is low in every state, ii) percentage of households connected to piped sewer system in urban varies substantially among states.

Table 2-10 : Percentage of households connected to piped sewer system (2011)

Indian States	Total			Rural			Urban		
	Flush/pour flush latrine connected to	Flush/pour flush latrine connected to	Flush/pour flush latrine connected to	Piped sewer system	Septic tank	Other system	Piped sewer system	Septic tank	Other system
INDIA	11.9	22.2	2.3	2.2	14.7	2.5	32.7	38.2	1.7
1 Jammu & Kashmir	10.0	17.7	5.3	4.7	10.8	5.3	25.3	37.9	5.3
2 Himachal Pradesh	7.4	51.6	1.7	3.2	52.4	1.8	40.7	45.3	0.9
3 Punjab	28.3	27.7	3.3	5.9	32.6	4.2	63.7	19.9	1.9
4 Uttarakhand	11.8	40.0	1.4	3.4	34.5	1.5	31.7	53.1	1.2
5 Haryana	21.9	25.4	3.1	2.5	26.4	3.7	54.8	23.8	2.0
6 Rajasthan	7.2	18.6	1.8	1.2	9.8	1.7	25.6	45.6	2.4
7 Uttar Pradesh	8.1	19.9	1.8	2.2	12.0	1.7	28.3	46.9	2.0
8 Bihar	1.8	16.0	2.3	1.2	11.6	2.2	7.2	52.7	3.5
9 Sikkim	11.8	59.8	3.4	3.0	61.4	4.0	34.4	55.7	1.8
10 Arunachal Pradesh	6.0	22.4	10.0	3.3	11.9	10.9	13.8	53.6	7.5
11 Nagaland	3.3	34.4	10.0	2.8	21.1	11.1	4.5	67.3	7.4
12 Manipur	6.0	24.7	15.9	5.4	15.4	17.2	7.4	43.1	13.2
13 Mizoram	5.7	48.4	6.7	6.4	23.0	9.1	5.1	71.3	4.4
14 Tripura	3.5	14.2	7.1	2.3	5.1	7.7	6.7	37.6	5.7
15 Meghalaya	5.8	23.7	8.6	4.7	11.4	9.8	9.7	68.7	4.5
16 Assam	5.2	14.9	8.4	3.3	8.3	8.9	15.0	50.3	5.8
17 West Bengal	5.5	20.7	5.6	1.8	9.3	7.1	13.6	45.4	2.5
18 Jharkhand	3.7	15.7	1.0	0.4	5.0	0.8	14.0	49.2	1.5
19 Odisha	2.5	13.6	1.6	0.9	7.8	1.4	11.5	45.0	2.3
20 Chhattisgarh	2.5	16.6	1.9	0.6	7.6	2.1	9.1	48.6	1.0
21 Madhya Pradesh	5.8	19.1	1.3	0.8	8.3	1.3	20.2	50.1	1.2
22 Gujarat	29.0	22.8	0.8	3.9	21.6	1.0	60.4	24.2	0.5
23 Maharashtra	18.4	23.5	1.6	2.2	19.2	2.3	37.8	28.6	0.9
24 Andhra Pradesh	12.4	29.6	1.0	2.3	22.6	0.8	33.7	44.4	1.3
25 Karnataka	22.7	13.0	1.2	2.0	10.2	1.2	53.3	17.0	1.2
26 Goa	14.4	56.4	3.2	7.8	51.9	4.2	18.6	59.3	2.7
27 Kerala	12.0	50.3	4.4	9.9	44.6	4.6	14.3	56.7	4.3
28 Tamil Nadu	14.4	25.7	1.1	2.2	14.4	1.1	27.4	37.9	1.1

(Source) Census of India 2011

There is no survey on nation-wide wastewater treatment capacity, but there is one which only covers urban local bodies carried out by Central Pollution Control Board (CPCB) in 2009. The survey reveals that the estimated wastewater generation of 908 cities is 38,254 million liters per day, while the sewage treatment capacity is only 11,787 million liters per day, only 30% of the total wastewater generation.

In India, on the contrary to the water supply, appropriate treatment of wastewater has been somewhat neglected. This is now widely recognized in the country and the Twelfth Five-year Plan clearly stated that the water supply project would not be implemented without components of wastewater treatment. In reality, piped sewer system is not feasible in many parts of India. Thus the study explores the possibility to introduce Japanese wastewater technology, well-known as *Johkasou*. In this regards, the attention should be paid to wastewater treatment and O&M systems of public toilets in urbanized and semi-urbanized areas.

Table 2-11 : Capacity of wastewater treatment by city size

(unit)		Metropolitan cities (over 1million)	Class I cities (0.1 to 1 million)	Class II Cities (50,000 to 99,999)	Total
No. of cities under each category		35	463	410	908
Wastewater generated	million litters per day	15,644	19,914	2,697	38,255
Waste Treatment Capacity	million litters per day	8,040	3,514	234	11,788
Treatment coverage	%	51.4%	17.6%	8.7%	30.8%

(Source) Central Pollution Control Board (2009)

c. Groundwater

Comparing with surface water, groundwater is said to be less susceptible to pollution and contamination. However, in India where groundwater is extensively used for irrigation and industry, contamination of groundwater is becoming serious.

CPCB along with the state governments publicizes the qualities of both surface water and groundwater, after examining its quality once in a month for surface water and once in six months for groundwater. There are 2,500 and 807 monitoring points respectively for surface water and groundwater in 28 states and six union territories. Monitoring items are shown in the table below.

Table 2-12 : Monitoring items of surface water and groundwater

Type	Frequency	Monitoring Items
Surface Water	Perennial rivers and Lakes : Four times a year Seasonal rivers : 3-4 times (at equal spacing) during flow period. Lake: 4 times a year	(A) Pre-monsoon: Once a year Analyze 25 parameters as listed below : (a)General : Colour, odour, temp, pH, EC, DO, turbidity, TDS (b) Nutrients : NH ₃ -N, NO ₂ + NO ₃ , Total P (c)Organic Matter : BOD, COD (d)Major ions : K, Na, Ca, Mg, CO ₃ , HCO ₃ , Cl, SO ₄ , (e)Other inorganics : F, B and other location-specific parameter, if any (f)Microbiological : Total and Fecal Coliforms (B)Rest of the year (after the pre-monsoon sampling) at every three months' interval: Analyze 10 parameters: Colour, Odour, Temp., pH, EC, DO, NO ₂ + NO ₃ , BOD, Total and Fecal Coliforms.
Under Ground Water	Twice a year in Pre & Post Monsoon season. The frequency may be reviewed after 3 years of monitoring	(A)Pre & Post Monsoon season: Analyze 20 parameters as listed below : (a)General : Colour, odour, temp, pH, EC, TDS (b)Nutrients : NO ₂ + NO ₃ , ortho- phosphate (c) Organic Matter : COD (d)Major ions : K ⁺ , Na ⁺ , Ca ⁺⁺ , Mg ⁺⁺ , CO ₃ , HCO ₃ , Cl, SO ₄ , (e) Other inorganics : F, B and other location-specific parameter(s) if any

According to CPCB, contamination by fluoride and e-coli is reported in many monitoring points, and pollution source is estimated as chemical fertilizer and insecticide used in farm lands.

The table below shows the groundwater quality in Rajasthan. The table clearly shows that contamination by fluoride is predominant and the maximum values of 10 monitoring points out of 20 exceed the environmental standard 1.0mg/l. As for e-coli, although the monitored value

exceeds the environmental standard at only one monitoring point, there are several points that can be considered as being contaminated by e-coli to a certain extent. As for BOS, two monitoring points show values exceeding the environmental standard of 3mg/l.

The above findings indicate that priority should be given to identify pollution sources of fluoride and enforce strict regulation for industrial wastewater to mitigate fluoride contamination. It is also said that fluoride contamination is partly originated from geological conditions of India, and the efforts should be made to meet quality of drinking water first.

Table 2-13 : Groundwater quality in Rajasthan (2011)

STATION CODE	LOCATIONS	B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA		< 3 mg/l						< 5000 MPN/100ml			< 1.0 mg/l		
2477	NEAR ARYA KANYA INTER COLLEGE, JALAU	0.5	0.9	0.7	0.36	0.42	0.39						
1736	GW QUALITY STATION SARDARNAGAR	5	5.6	5.3				100	180	140			
1737	GW QUALITY STATION CAPTANGANJ	3.8	3.9	3.85	3.34	4.36	3.85	60	60	60			
1738	SITE 1, INDUSTRIAL AREA NEAR M/S WOODWARM CHEMICAL LTD., UNNAO	1	1	1	3.64	3.9	3.77	1.8	1.8	2	1.6	1.6	1.6
1739	SITE 2, INDUSTRIAL AREA NEAR M/S AMIN SONS, UNNAO, U.P	0.6	0.6	0.6	5.5	5.5	5.5	1.8	5400	2701	1.8	1.8	1.8
1740	AT ROADWAYS BUS STATION, UNNAO	0.4	1	0.7	0	20.6	10.3	1.8	3500	1751	2.45	2.45	2.45
1741	MAGAWARA INDUSTRIAL AREA NEAR M/S JAMJAM TANNERS, UNNAO, U.P	1	1	1	0	25.2	12.6	1.8	1.8	2	2.1	2.1	2.1
1742	CHINHAT INDL AREA IN LUCKNOW NEAR M/S INDIA PESTICIDES LUCKNOW	1	1	1	0	9.2	4.6	1.8	1.8	2			
1744	JAJMAU INDL AREA No. 6 KANPUR	2.4	2.4	2.4	2.5	3.2	2.85	20	20	20	2.95	2.95	2.95
1745	PANKI INDUSTRIAL AREA NEAR INDUSTRY OF AMMONIA FERTIZER KANPUR, U.P	0.8	0.8	0.8	34.5	34.5	34.5				1.22	1.22	1.22
1746	NAGAR PALIKA TUBE WELL, SULTANPUR, U.P				8.66	8.66	8.66				1.28	1.68	1.48
1747	INDIA MARKA HAND PUMP IN SAROWNI BLOCK AT RAIBAREILLY				0.22	0.24	0.23	10	10	10	1.84	1.92	1.88
1751	TUBE WELL IN INDUSTRIAL AREA AT GAJRAULA, MORADABAD, U.P	1.6	1.8	1.7	0	0	0	310	340	325			
1752	SAHIBABAD INDUSTRIAL AREA, GHAZIABAD, U.P	1.8	1.8	1.8	0	0	0	4	4	4	0.68	0.68	0.68
1753	MEERUT ROAD INDUSTRIAL AREA GHAZIABAD, U.P	2.2	2.2	2.2	2.7	2.83	2.77				0.82	0.82	0.82
1754	HAPUR ROAD INDUSTRIAL AREA GHAZIABAD, U.P	2.4	2.4	2.4	1.25	1.33	1.29				0.64	0.64	0.64
1755	PILKHUA INDUSTRIAL AREA GHAZIABAD, U.P	3	3	3	0.07	0.08	0.08				0.6	0.6	0.6
1756	GOPIGANJ INDUSTRIAL AREA BHADOHI, VARANASI, U.P	1.8	1.8	1.8	1.71	1.77	1.74						
1757	MIRZAPUR INDUSTRIAL AREA, U.P	0.7	0.8	0.75	0	0	0				0.66	0.66	0.66
1758	GROUND AROUND STP DINAPUR, VARANASI, U.P	1.7	1.7	1.7	4.62	7.13	5.88						
1759	IFFCO, PHOOLPUR, ALLAHABAD, U.P	0.7	0.8	0.75	0	0	0				0.47	0.47	0.47
1760	M/S KANORIA CHEMICAL SONBHADRA, U.P	1	1.2	1.1	2.59	4.96	3.78				0.27	0.27	0.27
1761	TUBE WELL-SINGRAULI INDL AREA, U.P	1	1.1	1.05	20.25	26.67	23.46				0.3	0.3	0.3
2467	CHANDPUR INDUSTRIAL AREA, LAHARTARA, VARANASI	1.6	1.6	1.6	0.1	0.6	0.35						
2468	BHADOHI INDUSTRIAL AREA, DEVELOPMENT AUTHORITY, SANT RAVIDAS NAGAR	1.4	1.4	1.4	0	0	0						
2469	AT INDUSTRIAL AREA, NAINI, ALLAHABAD	0.8	0.8	0.8	0	0	0				0.36	0.36	0.36
2470	AT INDUSTRIAL AREA, FATEHPUR	1	1.1	1.05	5.48	7.17	6.33				0.42	0.42	0.42
2471	GORAKHPUR INDUSTRIAL DEVELOPMENT AUTHORITY AREA (GIDA), GORAKHPUR	1.8	2.2	2	1.25	5.22	3.24	80	100	90			
2474	UNCHAHAAR (NEAR THERMAL POWER PLANT)				0.28	0.28	0.28				1	1.3	1.15
2475	INDL AREA, SULTANPUR ROAD				0.36	0.38	0.37				1.08	1.26	1.17
2478	DEVA ROAD, INDUSTRIAL AREA, CHAINHAT, LKO NEAR UPTRON POLICE CHOWKI, LUCKNOW	2.8	2.8	2.8				1.8	1.8	1.8			
2479	NEAR M/S KUMAR INTER NATIONAL LAKDI FAZALPUR, DELHI RD, MORADABAD	1	1.2	1.1	5.8	5.8	5.8	300	340	320			
1748	HANDPUMP IN VILLAGE DAMAUDA AT KASHIPUR NEAR M/S INDIA GLYCOLES LTD., U.P	2	2.4	2.2	0.22	0.26	0.24						

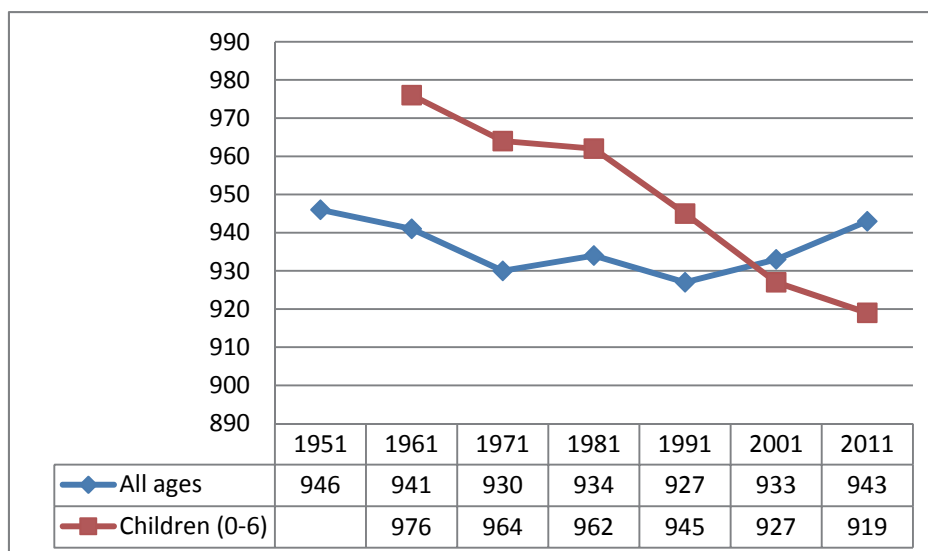
2.3 Gender Issues

2.3.1 Basic Gender-related Statistics

a. Sex ratio

Issue of missing women, raised by the prominent economist Amrtya Sen, evidently shows the persistent gender inequality in India. Previously sex ratio of the entire population was stressed, but currently more attention is paid to child sex ratio. On the contrary to the improvement of child mortality rate, child sex ratio is being deteriorated even now due to female infanticide with the availability of image diagnostic technology. This fact indicates the gender equality is far behind its reach despite the recent rapid economic development of the country.

The table below shows the sex ratio since 1901. The Twelfth Five-year Plan aims to improve child sex ratio to 950 by 2017.



(Source) Census of India 2011

Figure 2-24 : Sex ratio (unit: female population per 1,000 males)

b. Maternal mortality rate

As a part of Goal 5 of MDG “Improve Maternal Health”, the concrete target, “Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio” was set. As seen in the table below, despite the fact that the trend of maternal mortality ratio shows firm improvement, the maternal mortality rate achieved by 2015 is estimated as 140, which is 31 points short of the target.

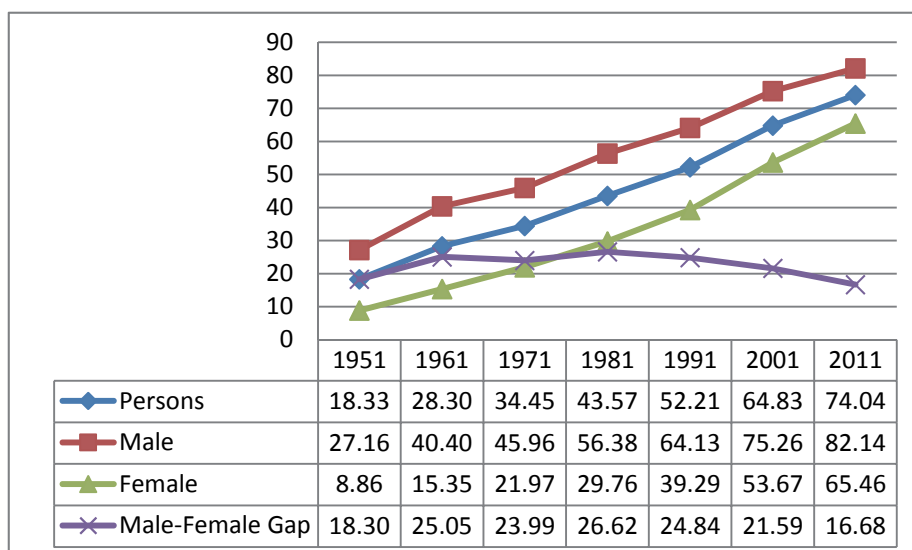
Table 2-14 : Maternal Mortality Rate (per 100,000 live births)

Area Name	1990	1997	1997-98	1999-2001	2001-03	2004-06	2007-09	2010-12	likely achieve ment 2015	target 2015
Andhra Pradesh	298	154	197	220	195	154	134	110	93	74
Assam	544	401	568	398	490	480	390	328	309	136
Bihar/Jahrkhand	736	451	531	400	371	312	261	219	167	184
Gujarat	308	-	-	202	172	160	148	122	106	77
Haryana	108	105	136	176	162	186	153	146	157	27
Karnataka	316	195	245	266	228	213	178	144	129	79
Kerala	279	195	150	149	110	95	81	66	50	70
Madhya Pradesh/ Chhatisgarh	603	498	441	407	379	335	269	230	192	151
Maharashtra	234	135	166	169	149	130	104	87	73	59
Odisha	482	361	346	424	358	303	258	235	202	121
Punjab	333	196	280	177	178	192	172	155	135	83
Rajasthan	725	677	508	501	445	388	318	255	215	181
Tamil Nadu	197	76	131	167	134	111	97	90	76	49
UttarPradesh/ Uttarakhand	855	707	606	539	517	440	359	292	242	214
West Bengal	667	264	303	218	194	141	145	117	85	167
India	437	408	398	327	301	254	212	178	140	109

(Source) Millennium Development Goals India Country Report 2014, Min. of Statistics and Programme Implementation

c. Literacy rate

As seen in the table below, although the both male literacy rate and female literacy rate have been improved steadily since 1951, the female literacy rate remains only 65.46% as of 2011 while the male literacy rate is as high as 82.14%. The gender gap in literacy rate is not yet narrowed enough.



(Source) Census of India from 1951 to 2011

Figure 2-25 : Trend of literacy rate (%)

d. School enrollment ratio

The Constitutional Amendment of 2002 and the Right of Children to Free and Compulsory Education Act of 2009 stipulates education as free and compulsory for children between six to 14 years old.

Relating to the MGDs, the enrollment ratio is an important indicator to see the gender gap. The latest figures shown in the table below reveal that the net enrolment ratio for boys in primary level is 87.2% while that for girls is 89.26%. It is worth noting here that the gender gaps at even secondary and higher secondary level are bridged, although the enrollment itself should be further encouraged at these levels.

Table 2-15 : Enrollment ratio (2013-2014)

	Primary			Upper Primary			Elementary			Secondary			Higher Secondary		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Gross Enrolment Ratio	100.20	102.65	101.36	86.31	92.75	89.33	95.11	99.09	97.00	76.80	76.47	76.64	52.77	51.58	52.21
Net Enrolment Ratio	87.02	89.26	88.08	67.82	72.89	70.20	86.57	90.26	88.31	45.53	45.74	45.63	30.25	30.62	30.43
Ratio of Girls' to Boys' Enrolment	0.93			0.95			0.94			0.9			0.89		

(Note) GER = Enrolled children of all ages / Total number of children in the official school age group
NER = Enrolled children in the official school age group / Total number of children in the official school age group

(Source) School Education in India (2014) National University of Educational Planning and Administration¹¹

e. Employment

In order to estimate the employment rate, first of all the working population shall be estimated. The study done by S. Bhalla et al. (2011), used National Sample Surveys (NSS) for the estimation of working population, reveals the decreasing trend for both the male and female working populations due to the increase of population under schooling, as seen in the table below. Also, the same figures are estimated for rural, urban and each sector, too.

¹¹ Source: District Information System on Education (DISE)

Table 2-16 : Trends of working population

	1983	1993/94	1990/00	2004/05	2007/08
All India	68.3	71.2	62.8	62.5	58.7
Male	90.5	90.2	85.6	85.5	84.6
Female	40.0	46.5	38.9	38.6	32.0
Rural India	70.5	75.5	66.3	65.9	61.7
Male	91.1	92.0	87.0	86.9	85.6
Female	45.1	53.1	45.2	44.7	37.6
Urban India	61.8	54.3	54.2	55.0	52.2
Male	88.6	82.4	82.4	82.7	82.5
Female	23.0	23.0	22.5	24.3	19.7

(Note) Working population is defined as population aged between 15 to 59, and those who are either working or seeking employment.

(Source) S. Bhalla et al. (2011)¹²

Table 2-17 : Sector-wise female workforce

	1983	1993/94	1990/00	2004/05	2007/08
% of Labour-force (Rural Female)					
in Agriculture	85.5	83.4	85.3	80.9	80.2
in Manufacturing	7.6	8.5	9.0	11.5	10.9
in Construction & Services	6.9	8.2	5.7	7.6	8.9
% of Labour-force (Urban Female)					
in Agriculture	21.2	17.5	14.6	15.2	11.5
in Manufacturing	29.6	24.2	28.0	31.6	30.3
in Construction & Services	49.2	58.3	57.4	53.2	58.2

(Source) S. Bhalla et al. (2011)

f. Gender-based violence

Violence against women is an extreme form of gender inequality. It is said that in India, women are susceptible to a series of violence throughout their lives, i.e. rape, domestic violence, female infanticide, dowry-based violence, violence against widows.

Indian government took initiatives in this regard by formulating policies and regulations, namely National Policy for Empowerment of Women (2001) and Protection of Women from Domestic Violence Act (2005). However, rape and domestic violence are seldom reported to police; thus it is difficult to see the real picture.

Majority of violence against women is domestic. In relation to this, the following table shows the acceptance level of wife beating. While “both disagree” is a majority of responses regardless of reasons, “wife only agrees” is higher than “husband only agrees”. This result shows that women themselves consider they deserve such violence from their husbands.

¹² LSE Asia Research Centre, Working Paper No.40 Labour Force Participation of Women in India: Some facts, some queries

Table 2-18 : Acceptance of wife beating (%)

Justification for wife beating	Agreement among couples				Total
	Both agree	Both disagree	Wife only agrees	Husband only agrees	
She goes out without telling him	10.0	52.8	23.2	14.0	100.0
She neglects the house or children	14.6	44.7	25.0	15.7	100.0
She argues with him	10.2	51.8	22.8	15.2	100.0
She refuses to have sex with him	2.0	77.9	14.8	5.3	100.0
She doesn't cook the food properly	4.0	69.0	18.9	8.2	100.0
He suspects her of infidelity	8.8	57.8	18.7	14.7	100.0
She shows disrespect for in-laws	18.6	38.4	25.9	17.2	100.0

(Source) NFHS-3 (2005-06) Gender Equality and Women's Empowerment in India, Mis. Of Health and Family Welfare

As for other types of violence against women, the increasing trend is observed from the statistics compiled by the National Crime Records Bureau, as seen in the table below. The rape case occurred on the bus in Delhi in December 2012 initiated nation-wide discussion on women's safety. While people sought toughening the laws, some experts said that toughening the laws alone would not be enough, but conviction rate should be improved. It is often said that women in lower social categories (castes) are susceptible to violence from men in higher social categories. The table below shows the increasing number of rapes, but even this figure is far less than the reality faced by Indian women.

Table 2-19 : Violence against women

Crime Category		2008	2009	2010	2011	2012	2013
Crimes under Indian Penal Code	Rape	21,467	21,397	22,172	24,206	24,923	33,707
	Kidnapping & abduction	22,939	25,741	29,795	35,565	38,262	65,461
	Dowry death	8,172	8,383	8,391	8,618	8,233	8,083
	Cruelty by husband and relatives	81,344	89,546	94,041	99,135	106,527	118,866
	Assault on women with intent to outrage her modesty	40,413	38,711	40,613	42,968	45,351	70,739
	Insult to the modesty of women	12,214	11,009	9,961	8,570	9,173	12,589
	Imprisonment of girl from foreign country	67	48	36	80	59	31
Sub-total of IPC Crimes		186,616	194,835	205,009	219,142	232,528	309,476
Crimes under Special Local Laws	Commission of Sati Prevention Act	1	0	0	1	0	0
	Immoral Traffic (Prevention Act)	2,659	2,474	2,499	2,435	2,563	2,579
	Indecent Representation of Women Act	1,025	845	895	453	141	362
	Dowry Prohibition Act	5,555	5,650	5,182	6,619	9,038	10,709
	Sub-total of SLL Crimes	9,240	8,969	8,576	9,508	11,742	13,650
Total		195,856	203,804	213,585	228,650	244,270	323,126

(Source) National Crime Records Bureau, Crime in India 2013 Statistics

In relation to sanitation, WaterAid published an exploratory paper titled *Nowhere to go*. The paper reveals that women who have to resort to open defecation often feel insecurity. Another NGO, SHARE (Sanitation and Hygiene Applied Research for Equity) also published a paper titled *Fear and anger: Perceptions of risks related to sexual violence against women linked to water and sanitation in Delhi*. The discussions relating to sanitation and women's security have been initiated by these experienced NGOs.

However, these papers are anecdotal and mainly compile personal experiences and opinions. Thus, under the study, it is necessary to clarify quantitatively how sanitation facilities improve women's security through the field surveys in three states.

2.3.2 Sanitation and Gender

a. School toilets

Access to safe drinking water and basic sanitation at every school is vital for children to learn good hygiene behavior, and also these facilities should be gender sensitive, too. The table below shows the schools with toilets for girls and boys separately. Although only 32.70% of schools have toilets for girls in 2004-05, the situation improved for the next 10 years and its rate increased to 86.69% in 2013-14.

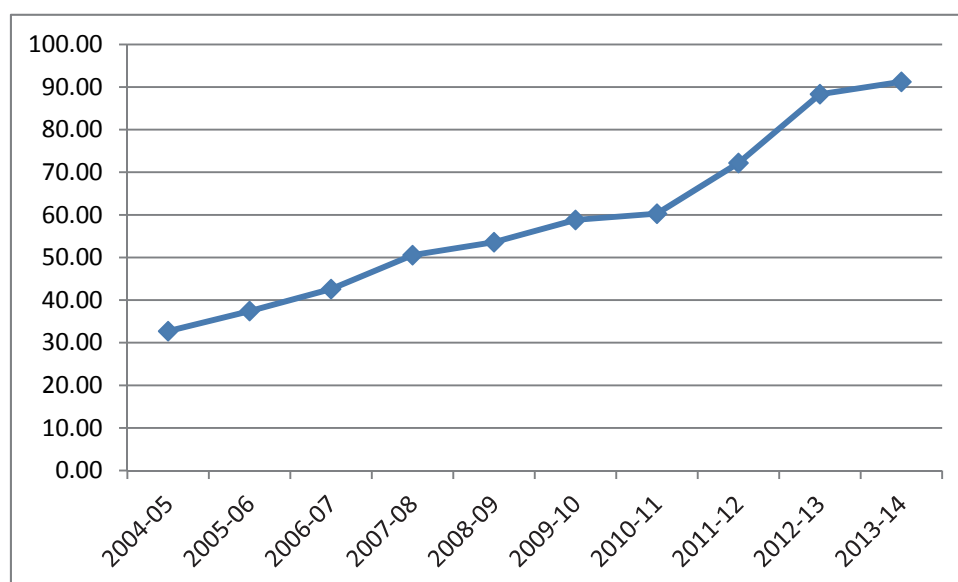
The biggest contributor for this improvement is Total Sanitation Campaign (TSC) implemented by MODWS. School toilets constructed under TSC is seen the figure below. Construction of school toilets has been accelerated by the efforts made under TSC, and now the issue seems to be its maintenance. Without proper operation and maintenance, the facility soon becomes unhygienic and insecure. Under the study, not only school toilets themselves but O&M system shall be clarified, and also the possibility of introducing school cleaning activities by children themselves shall be explored, too.

Table 2-20 : School toilets

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Girls' toilets	32.70	37.42	42.58	50.55	53.60	58.82	60.28	72.16	88.32	91.23
Boys' toilets	-	-	-	-	-	31.03	42.59	81.14	67.97*	86.69

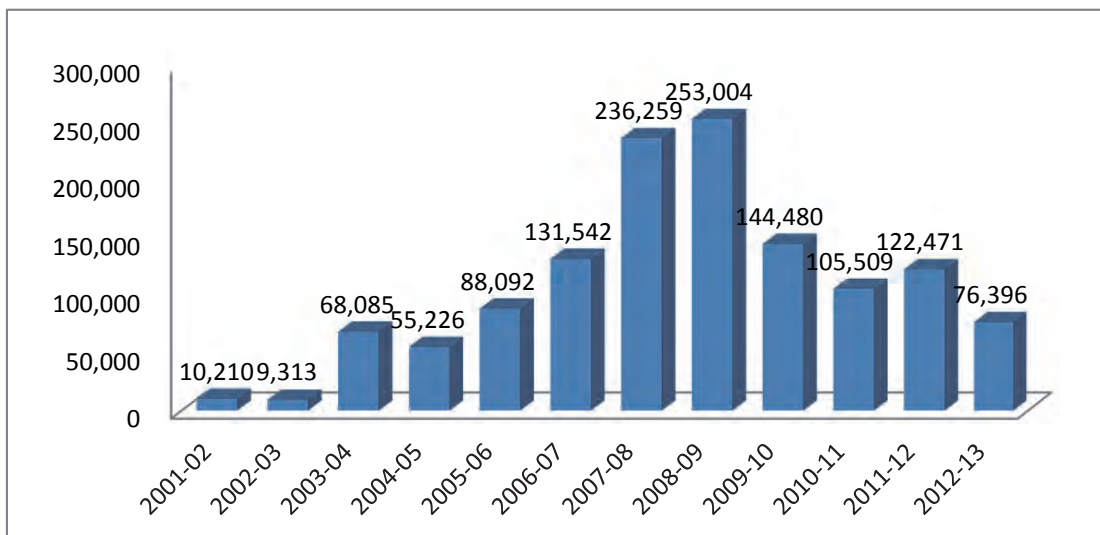
(Note) There is no category named boy's toilet before 2009-10. Also the definition of boys' toilets was changed from the year 2012-13.

(Source) Flash Statistics, DISE Annual Publication, National University of Educational Planning and Administration



(Source) Flash Statistics, DISE Annual Publication, National University of Educational Planning and Administration

Figure 2-26 : Schools with girls toilets (%)



(Source) <http://tsc.gov.in/TSC/Report/Physical/RptYearWiseCountryLevelAch.aspx?id=PHY>

Figure 2-27 : Numbers of school toilets constructed under TSC

b. Sanitation facilities for women

The Twelfth Five-year Plan clearly states that lack of sanitation, especially toilets, in rural areas is a major weakness and one that impacts most adversely on women. Also it says it will undertake a gender impact assessment of the Total Sanitation Campaign to assess whether it has reduced women's workload, provided security, improved hygiene and reproductive health of women, decreased school dropout rates for girls, and so on. The Plan will also ensure the provision of toilets with water in all schools and Anganwadi centres and the active involvement of women in determining the location of sanitation facilities. In relation to this, the Plan introduced an example of Kerala's women friendly infrastructure development.

Women Friendly Infrastructure Development in Kerala

In Kerala it was decided that in the year, 2010–11, a major focus would be on women friendly infrastructure. This included interventions like construction of toilets in public buildings, bus stations, construction of night shelters for fisherwomen, energy efficient gas stoves within EGS schemes, cheaper rental flats for women who commute, creation of domestic violence Counselling Desks in public hospitals, and so on. These measures helped promote convergence and are also examples of Gender Budgeting in mainstream Departments like Kerala State Road Transport Corporation (KSRTC), Public Works Department (PWD), Ports and Housing. With these interventions, the number of Departments with women specific schemes has increased from 10 in 2009–10 to 16 in 2010–11. Further, there has been an increase in allocations for women from 5.5 percent in 2009–10 to 8.6 percent in 2010–11 and to approximately about 10 percent in 2011–12.

Especially related to sanitation facilities, Evaluation Study on Total Sanitation Campaign (2013) by Planning Commission introduced Integrated Sanitary Complex for Women in Tamil Nadu as a good example.

Integrated Sanitary Complex for Women in Tamil Nadu

Integrated Sanitary Complex for Women (ISCW) with sanitary napkin incinerators are widely seen in all panchayats and are very popular among women in Tamil Nadu. The complexes consist of latrines, bathrooms and washing platforms with piped water supply and at many places, sanitary napkin incinerators. For safe and hygiene disposal of sanitary napkins, incinerators are found to be a simple, easy to operate, low-cost method installed in many ISCW and girls' school toilets. The entire incinerator is attached to the outer wall of the toilet. The waste gets converted into ash and other non-hazardous residues. A smoke vent is provided for the disposal of gaseous substances while firing the sanitary wastes. This helps to solve the problem of clogging of toilet traps and other components. Some complexes also have latrines for the disabled, old age and latrines for children and are run by local women's SHGs. There is usually a woman caretaker appointed by the SHG, who takes care of the daily maintenance of the complex. Funds towards this and other materials like phenyl, bleaching powder, etc. for day-to-day maintenance is raised from the users on a monthly basis ranging between Rs. 5 to Rs. 10 per household per month.

Public toilets are also important infrastructure to motivate women to participate in socio-economic activities more actively. Since the local governments are primarily responsible for their construction and O&M, there is statistics covering the entire India. Here, the conditions of public toilets in Delhi are introduced as an example.

Community Toilet Complex in Delhi

The table below shows the list of public toilets called Community Toilet Complexes (CTCs) in Delhi. CTCs in Delhi are mostly equipped with bathing facilities, and expected for use by the surrounding communities. As seen clearly from the table, even the CTCs that expect neighbors as main users are equipped with more male facilities than female facilities.

Table 2-21 : Community Toilet Complex under the then MCD (as of 2007)

Name of Zone in Delhi	Total CTCs (Nos.)	For Gens			For Ladies			For Disabled Persons		
		WC	Bath	Urinal	WC	Bath	Urinal	WC	Bath	Urinal
South	86	1,145	279	80	969	315	9	0	0	0
Sadar Pahar Ganj	57	525	66	51	412	32	0	0	0	0
Shahadara South	129	2,296	369	226	2,021	329	37	68	0	0
Civil Line	206	2,513	884	210	2,008	702	55	0	0	0
Karol Bagh	83	711	167	0	630	143	0	0	0	0
Rohini	120	1,681	674	282	1,387	264	0	79	0	0
Najafgarh	242	4,079	1,079	493	3,765	849	28	340	0	0
Central	141	1,871	277	48	1,534	229	0	0	0	0
City	98	801	99	170	463	82	22	0	0	0
West Bengal	138	1,835	323	127	1,443	308	18	0	0	0
Narela	61	1,032	203	107	839	179	38	0	0	0
Shabdara North	183	3,180	418	297	3,076	390	62	92	0	0
India	1,544	21,669	4,838	2,091	18,547	3,822	269	579	0	0

(Source) Shahana Sheikh, "PUBLIC TOILETS in Delhi: An emphasis on the facilities for Women in Slum/Resettlement Areas", Working Paper No.192, Centre for Civil Society, 2008

The study will carry out the survey on public toilets and community toilets with special attention to gender-friendliness in terms of location, design, O&M system, etc., to find out challenges and issues to be addressed.

c. Operation and Maintenance of Sanitation Facilities and Women

In case of ISCW in Tamil Nadu, its sustainability was secured by the following arrangements; i) O&M is carried out by women's groups in each region, and ii) O&M cost is born by user charges paid by each user. This case explicitly indicates the importance of user involvement and the detailed information with actual visits shall be collected during the field studies.

Government of India aims to eradicate open defecation as a final goal, and IHHL continues to be constructed with government support. Any toilets, either at individual homes or at schools, need regular cleaning and maintenance. Without regular and appropriate O&M, any sanitation facility will become unhygienic sooner or later, and naturally people stop using them. For the continuous use of a toilet facility, importance of regular and appropriate O&M cannot be over emphasized. At the same time, maintenance works are mostly done by female members of households. Sometimes, it is outsourced to the people belonging to scavenging castes, too. Under the study, how and by whom IHHLs are maintained regularly will be examined, too.

3 Government Policy and Projects on Improvement of Sanitation Facilities

3.1 Background

Government of India introduced the Central Rural Sanitation Programme (CRSP) in 1986 primarily with the objective of improving the quality of life of the rural people and also to provide privacy and dignity to women. From 1999, a “demand driven” approach under the “Total Sanitation Campaign” (TSC) emphasized more on Information, Education and Communication (IEC), Human Resource Development (HRD), Capacity Development activities to increase awareness among the rural people and generation of demand for sanitary facilities. This enhanced people’s capacity to choose appropriate options through alternate delivery mechanisms as per their economic condition. Financial incentives were provided to Below Poverty Line (BPL) households for construction and usage of individual household latrines (IHHL) in recognition of their achievements.

To generate awareness on sanitation, the first Nirmal Gram Puraskars (NGP) were awarded to recognize the achievements and efforts made at the GP level in ensuring full sanitation coverage and achieving other indicators of open defecation free GPs. While the award gained popularity in bringing about a desire in communities for attaining Nirmal Status, there have been issues of sustainability in some awardee GPs.

The “Nirmal Bharat Abhiyan” (NBA) the successor programme of the TSC, was launched from 1.4.2012. The objective was to accelerate the sanitation coverage in the rural areas so as to comprehensively cover rural communities through renewed strategies and saturation approach. Nirmal Bharat Abhiyan (NBA) envisaged covering the entire community for saturated outcomes with a view to create Nirmal Gram Panchayats. Under NBA, the Incentives for IHHLs were enhanced and further focused support was obtained from MNREGA. However there were implementation difficulties in convergence of NBA with MNREGA as funding from different sources created delays at the implementation mechanism.

3.2 Swachh Bharat Mission

To accelerate the efforts to achieve universal sanitation coverage and to put focus on sanitation, the Prime Minister of India launched the Swachh Bharat Mission on 2nd October, 2014. The Mission Coordinator shall be Secretary, Ministry of Drinking Water and Sanitation (MDWS) with two Sub-Missions, the Swachh Bharat Mission (Gramin) and the Swachh Bharat Mission (Urban), which aims to achieve Swachh Bharat by 2019, as a fitting tribute to the 150th Birth Anniversary of Mahatma Gandhi, which in rural areas shall mean improving the levels of cleanliness in rural areas through Solid and Liquid Waste Management activities and making Gram Panchayats Open Defecation Free (ODF), clean and sanitized. The Mission shall strive for this by removing the bottlenecks that were hindering the progress, including partial funding for Individual Household Latrines from MNREGS, and focusing on critical issues affecting outcomes.

3.2.1 Swachh Bharat Mission in Rural area (SBM(GRAMIN))

NBA will transfer to SBM and outline of SBM was described as follows.

1. SBM has two sub missions, the Swachh Bharat Mission (Gramin) and Swachh Bharat Mission (Urban). The Mission coordinator for Rural is MODWS and for Urban is MOUD.

2. Provision of Individual household latrines: Incentive of Rs. 9,000.- and 3000.- for each toilet is given by Central and State Government.
3. Construction of Community Sanitary Complexes will be allowed only when GPs can prove that operation and maintenance of CSC by themselves continuously. Public toilets also included in markets, bus terminals, peri-urban areas and census towns. Sharing pattern will be 60:30:10 (Centre: State: Community). PPP scheme for construction of CSC and PT will be encouraged.
4. 8 % of the total project cost will be utilised for IEC (Information, Education, Communication) and 3/8 for Centre and 5/8 for State.
5. 2% of the total cost will be utilised for management and operation and 3/4 will be provided by central government and 1/4 by state governments.
6. Subsidy from MGNREGA will be stopped and all the incentives for toilet construction will be from SBM.
7. Fund for Solid and Liquid Waste Management under NBA will be maintained and sharing pattern will be 75:25 (Centre: State)
8. Control of school toilets will be transferred to Department of School Education and Angawadi toilets to Ministry of Women and Child Development.
9. Behaviour change and triggering of the population shall be most priority issues for improvement of sanitary conditions in rural areas.
10. Strengthen monitoring system in order to observe construction and usage of toilet facilities. Integrated monitoring programme will be developed by the end of the 12th five year plan.
11. State Government shall formulate annual implementation plan and the States which implement according to the plan will be given incentives.
12. Technical options for type of toilets and solid waste management facilities will be shown to the state by this SBM. SBM will indicate minimum technical options and further advanced technology will be encouraged to be adopted based on the state's own financial arrangement.
13. This SBM will commence on 2nd October 2014.

As of January 2015, MODW has created a SBM homepage on the Internet and SBM Guidelines are open to the public.

3.2.2 Swachh Bharat Mission (SBM (Urban))

MOUD has created SBM explanation column on its homepage and is promoting SBM (urban). SBM guideline was formulated in December 2014 and now it is open to the public on its homepage. The following is an outline of SBM (urban) as stated in its guidelines.

1. The mission has the components.
 - Household toilets, including convergence of insanitary latrines into pour flush latrines.
 - Community Toilets
 - Public toilets
 - Solid Waste Management
 - IEC & Public Awareness
 - Capacity Building and Administrative & Office Expenses
2. Without a proper city sanitation plan and state sanitation strategy, comprehensive planning cannot be achieved to attain objectives of SBM. It is understood that although many states and cities have prepared these plans and strategy, many more have not done so. In order to give a quick start to the SBM, it is therefore, proposed that all states may submit a brief concept Note on state sanitation strategy as a part of initial proposals, in order to claim their

- first instalment for IHHL, IEC and Capacity building as well as the revolving fund for other components.
3. Overall project funds are estimated as 62,009 Rs Crore and public-private partnership (PPP) projects are encouraged. One possible source of funds is external assistance.
 4. The target group for construction of household units of toilets is; 1) 80% of urban households engaging in open defecation, 2) all households with insanitary latrines, 3) all households with single-pit latrines. Remaining 20 % of households practicing open defecation are assumed to be catered by community toilets due to constraints of space.
 5. 50% of central Government incentives will be released to the identified beneficiary household by the urban local bodies (ULB) as 1st instalment on approval by the ULB along with share of the state Government. The remaining 50% of incentives shall be released to the household along with state Government incentives upon verification of physical progress of construction of the household toilet.
 6. Under SBM (urban), it is estimated that about 20% of the urban households in cities, who are currently practicing open defecation are likely to use the community toilets as a solution due to land and space constraints in constructing IHHL. Community toilet blocks will consist of a given number of toilet seats, as per requirement, toilet superstructure including pan and water closet, and a substructure. All community toilets constructed under SBM must have a minimum 5 year maintenance contract. Central government incentives will be 40% and states shall contribute a minimum of 25%.
 7. Under SM (urban), States and ULBs will ensure that a sufficient number of public toilets are constructed in each city. All prominent places within the city attracting floating population should be covered. Care should be taken to ensure that these facilities have adequate provision for men, women and disabled. There will be no Central Government incentive support for construction of public toilets under SBM. State and ULBs are encouraged to identify land for public toilets, and leverage this land and advertisements to encourage the private sector to construct and manage public toilets through PPP agreements. All public toilets constructed under SBM must have a minimum 5 year maintenance contract.
 8. The manual on municipal solid waste management, 2000 published by MOUD and revised from time to time may be referred for DPR formulation and implementation. Central Government incentives will be a maximum of 20% for each project. States will contribute a minimum of 25% funds for SWM projects.
 9. A total of 15% of the total central allocation will be earmarked for IEC components. Of this, 12% will be earmarked for states to undertake massive public awareness campaigns on sanitation and establishing its link to public health, hygiene and the environment through various means including radio, social media, documentaries, plays, workshops, etc. The remaining 3% will be earmarked for the MOUD to draw a national media campaign and developing standard campaign tools for effective awareness and communication on sanitation. Expenditure on newspaper and TV is not an admissible item under this component for the state government or for the ULBs as this is taken care of by government of India ministries and organizations. State shall prepare an annual action plan and at least 50% of the IEC fund in each annual plan must go to the ULB's for IEC activities at the grass roots level.
 10. 3 % of the total Central Government allocation under the mission will be earmarked for capacity building, administrative and office expenses. 2% of the total Central Government allocation under SBM will be utilized at MOUD level for capacity building and the rest will be utilized by States and ULBs.
 11. A National Advisory and Review Committee (NARC) headed by the Secretary of MOUD and SBM National Mission Directorate headed by National Mission Director are the

responsible organization for National level. High Powered Committees (HPC) and State Mission Directorate are the responsible organization at state level.

3.3 National Policy for Empowerment of Women

Since the Sixth Five-year Plan (1980-1985), every five year plan has a chapter for women and their empowerment. In the latest Twelfth Five-year Plan (2012-2017), Chapter 23 titled Women's Agency & Child Rights is dedicated for socio-economic development policies and activities for women and children aiming at further upliftment of them.

Also National Policy for Empowerment of Women (2001) was enacted in order to accelerate empowerment of women. To realize the essence of this newly introduced policy, the department in charge was upgraded as a Ministry of Women and Child Development (MOWCD) in 2006.

3.3.1 Women and Development in the Twelfth Five-year Plan

Chapter 23, Women's Agency & Child Rights, of the Twelfth Five-year Plan (2012-2017) stipulates the following key elements as a strategic theme for realizing gender equity.

Table 3-1 : National policies and programs for gender empowerment

#	Key Elements	Details
1	Economic Empowerment	Employment generation with equity in work conditions, skill development, special promotion of enterprises of home-based workers/ small producers, Support for women in agriculture, in manufacturing and in the unorganized sector, etc.
2	Social and Physical Infrastructure	<u>Health</u> : improvement of child mortality and child sex ratio <u>Education</u> : Increase of female teachers, increase of enrollment rate with stronger monitoring system <u>Transportation</u> : Introduction of pre-project rapid gender assessment for road development <u>Sanitation</u> : the provision of toilets with water in all schools and Anganwadi centres and the active involvement of women in determining the location of sanitation facilities.
3	Enabling Legislations	Amend important legislations, i.e. The Pre-Conception and Pre-Natal Diagnostic Techniques Act (PCPNDT Act), Maternity Benefit Act, Equal Remuneration Act
4	Women's Participation in Governance	Women in Panchayat: capacity development of female panchayat members Women in Urban Local Bodies: capacity development of female councilors
5	Inclusiveness of all categories of vulnerable women	Special support programs for vulnerable women, i.e. scheduled caste women, scheduled tribe women, women of religious minorities, differently abled women, single women and widows, elderly women, women affected with HIV/AIDS, migrant female workers, etc.
6	Engendering National Policies/ Programmes	Gender mainstreaming at major national programs such as National Rural Livelihood Mission and

		MGNREGA, National Rural Health Mission, etc.
7	Mainstreaming gender through Gender Budgeting	Preparation of Gender Budgeting Statement by each ministry

The second key element, social and physical infrastructure, is especially important for the study. It clearly stated that lack of sanitation, especially toilets, in rural areas is a major weakness in India and one that impacts most adversely on women. Also, the Plan ensures the provision of toilets with water in all schools and Anganwadi centres and the active involvement of women in determining the location of sanitation facilities

It is worth noting here that enabling legislations are formulated one after another. In relation to violence against women, implementation of the Protection of Women from Domestic Violence Act is planned to be improved. In addition, during the period of the Twelfth Five-year Plan, amendments of The Pre-Conception and Pre-Natal Diagnostic Techniques Act (PCPNDT Act), Maternity Benefit Act and Equal Remuneration Act are planned. For amending legislations, National Commission of Women established in 1992 is supposed to provide advice and make sure the amendments are truly beneficial to women.

3.3.2 National Policy for the Empowerment of Women

National Policy for the Empowerment of Women enacted in 2001 specifically set the following objectives.

- Creating an environment through positive economic and social policies for full development of women to enable them to realize their full potential
- The *de-jure* and *de-facto* enjoyment of all human rights and fundamental freedom by women on equal basis with men in all spheres - political, economic, social, cultural and civil
- Equal access to participation and decision making of women in social, political and economic life of the nation
- Equal access of women to health care, quality education at all levels, career and vocational guidance, employment, equal remuneration, occupational health and safety, social security and public office, etc.
- Strengthening legal systems aimed at elimination of all forms of discrimination against women
- Changing societal attitudes and community practices by active participation and involvement of both men and women.
- Mainstreaming gender perspectives in the development process.
- Elimination of discrimination and all forms of violence against women and the girl child; and
- Building and strengthening partnerships with civil society, particularly women's organizations.

In order to attain the goals and objectives stipulated in the National Policy for the Empowerment of Women, MOWCD started the National Mission for Empowerment of Women (NMEW) in March 2010. Under the mission, the following six areas of activities are prioritized.

- Access to health, drinking water, sanitation and hygiene facilities for women
- Coverage of all girls especially those belonging to vulnerable groups in schools from primary to class 12
- Higher and Professional education for girls/women

- Skill development, Micro credit, Vocational Training, Entrepreneurship, SHG development
- Gender sensitization and dissemination of information
- Taking steps to prevent crime against women and taking steps for a safe environment for women

NMEW also stated that as a strategy to pursue the above activities, inter-sector convergence of schemes meant for women will be facilitated.

4 Foreign and Domestic Support in Development of Latrines

Under UN leadership, considerable progress has been made towards achieving the Millennium Development Goals and reducing the number of people living in extreme poverty. But one third of humanity (2.5 billion people) still does not have access to proper sanitation, including toilets or latrines. India, the second most populated nation in the world, also has a high rate of open defecation, and has been a target country of International Aid organizations, of bilateral aid and support and of NGOs, both local and foreign.

4.1 The World Bank and Asian Development Bank (ADB)

The World Bank, through International Development Association, has been cooperating with the Indian state governments to support Rural Water and Sanitation Scheme (RWSS) Programmes since 1991, including building and improvement of a large number of latrines in Karnataka and Kerala states. In 2014, they started RWSS Project for Low Income States to support building of household toilets, introduction of new technologies and awareness activities. ADB supports urban sanitation projects through loans.

Table 4-1 : Latrine related projects of the World Bank and ADB

Institution	Project Designation	Location	Starting	Ending	Project Cost
World Bank	Rural Water & Sanitation Scheme Project for Low Income States	Bihar, Jharkhand, Assam, Uttara Pradesh, MODWS	2014/3/15	2020/3/31	US\$1,000,000,000
	Uttarakhand WSS Project	Uttarakhand	2006/9/5	2015/12/31	US\$224,000,000
	Punjab WSS Project	Punjab	2007	2014/12/31	US\$261,400,000
	Second Karnataka RWSS Project	Karnataka	2001/12/18	2014/7/30	US\$193,440,000
	Maharashtra RWSS Program	Maharashtra	2014/3/12	2020/3/31	US\$1,440,000,000
	Second Kerala RWSS Project	Kerala	2011/12/15	2017/6/30	US\$222,300,000
	Andra Pradesh RWSS Project	Andra Pradesh	2009/9/22	2014/11/30	US\$300,000,000
ADB	Karnataka Integrated and Sustainable Water Resources Management Investment Programme	Karnataka (rural)	2014/9/25	NA	US\$150,000,000
ADB	Karnataka Integrated Urban Water Management Investment Programme	Karnataka (urban)	2014/3/28	NA	US\$150,000,000
ADB	MFF Assam Urban Infrastructure Investment Program	Assam	2012		US\$200,000,000
ADB/UN-HAB ITAT, national donors	Water for Asia Cities/Rejuvenation of Community Toilets	Madhya Pradesh			

4.2 United Nations

WHO/UNICEF started and are continuing the Joint Monitoring Programme for Water Supply and Sanitation to monitor accomplishment of Millennium Development Goals activities. Also, in association with a university in Tamil Nadu, they are supporting human resource development as well as performance evaluations and surveys for past and on-going activities with different Aid groups and organizations. Their methods include situation study, accomplishment survey, analyses, identification of problems, creation of 'key words' and 'branding' followed by organizing projects by aid groups and NGOs in collaboration through funds, human resources and technological support.

Table 4-2 : Latrine related projects of United Nations

Institution	Project Designation	Location	Starting
WHO/UNICEF	Joint Monitoring Programme for Water Supply and Sanitation	World	NA
UNICEF	Poo to the Loo Campaign	Various Media	2013
UNICEF/WSSCC	WASH Institute	Tamil Nadu	2011
UNICEF/DFID	Baseline Survey of UNICEF-DFID-Assisted Districts	Andhra Pradesh, Madhya Pradesh, Rajasthan, Orissa, Uttar Pradesh, West Bengal	2001

4.3 Department for International Development (DFID) (United Kingdom)

Baseline Survey of UNICEF-DFID-Assisted Districts was performed from 1999 to 2003, in relation to The Child's Environment Project (CEP) with the UNICEF. The projects are ongoing in different states such as Kolkata, Madhya Pradesh, Odisha and others.

Table 4-3 : Latrine related projects of DFID

Institution	Project Designation	Location	Starting	Ending	Project Cost
DFID	Baseline Survey of UNICEF-DFID-Assisted Districts	Andhra Pradesh, Madhya Pradesh, Rajasthan, Orissa, Uttar Pradesh, West Bengal	2001		
DFID	Kolkata Urban Services for the Poor (KUSP) Programme	West Bengal	2004 3	2015 3	£94,149,995.00
DFID	Madhya Pradesh Health Sector Support Programme	Madhya Pradesh	2008 1 16	2015 12 31	£119,999,994.00
DFID	DFID support to Water, Sanitation and Hygiene Programme for Madhya Pradesh & Odisha	Madhya Pradesh & Odisha	2012 12 5	2016 6 30	£13,399,999.00

4.4 Japan

Japan International Cooperation Agency (JICA) is supporting to build and operate public latrines in two large-scale aid projects in Ganga river system. Also it is supporting regional development in Tamil Nadu including a latrine-building component.

Table 4-4 : Latrine related projects of Japan

Institution	Project Designation	Location	Starting	Ending	Scheme	Project Cost
JICA	Ganga Action Plan (Varanasi) (ongoing)	Uttar Pradesh	2005/2	Contin.as of Oct 2014	Yen Credit	¥11,184,000,000
JICA	Yamuna Action Plan (III)	Uttarkand, Delhi, Haryana, Uttar Pradesh	2011/02	2018/04	Yen Credit	¥17,773,000,000
JICA	Regional development project through self-help and leadership training in Kovalam, Kanchipuram District, Tamil Nadu (finished in 2009)	Tamil Nadu	2009/06	2011/03	Grass Roots Technical Corporation	¥9,961,000
Japan Sanitation Consortium	1st Contact Mission	Delhi, Uttar Pradesh	2010/6/15	2010/6/20	Site Investigation	

Table 4-5 : Latrine constructed under Various Projects

Project Designation	Scheme	No. of Latrines Built	Note
Yamuna Action Plan (I) (<i>Finished</i>)	Yen Credit	75	Haryana Finished
		959	Delhi Finished
		246	Uttar Pradesh Finished
Ganga Action Plan (Varanasi) (ongoing)	Yen Credit	110	45 finished 65 to be built
Orissa Integrated Sanitation Improvement Project (ongoing)	Yen Credit	43	Finished
Restoration and Management of Hussainsagar Lake (ongoing)	Yen Credit	7	5 finished
Regional development project through self-help and leadership training in Kovalam, Kanchipuram District, Tamil Nadu (finished in 2009)	JICA partnership program	42	Finished (Ecosan toilet)

4.5 Local NGOs and other

Sulabh International is the largest of local NGOs in India whose primary interest is on latrine related aid projects. In rural areas they are building two-pit latrines and building and managing public toilets. They also organize schools for latrine managers and operate a ‘Toilet Museum’ to raise public awareness. Other NGO called SHARE is planning a project for safety and sanitation for women in Delhi slums. Hindustan Zinc planned to build 30,000 toilets in rural Rajasthan, of which 10,000 were already built as of October 2014.

Table 4-6 : Latrine related projects by local NGOs

Institution	Project Designation	Location
Sulabh International Social Service	Sulabh Sanitation Movement	All India
SHARE (Sanitation and Hygiene Applied Research for Equity)	Female-friendly sanitation project (planning stage)	Delhi
<u>Hindustan Zinc</u>	30,000 toilets in Rural Rajasthan Project	Rajasthan

4.6 International NGOs

Bill & Melinda Gates Foundation is sponsoring ‘Reinvent the Toilet Challenge’ programme to create innovative latrine design for improvement of sanitation and hygiene since 2011. They organized ‘Reinvent the Toilet Fair: India’ in 2014. There are numerous international NGOs aiming to solve the problems related to latrines and open defecation.

Table 4-7 : Latrine related projects by international NGOs

Institution	Project Designation	Location
Bill & Melinda Gates Foundation/Dept. of Biotechnology (DBT)	Reinvent the Toilet Challenge: India	Sponsoring of International Conference
Bill & Melinda Gates Foundation/ADB	Sanitation Financing Partnership Trust Fund	
World Toilet Organization	SaniShop Project	Odisha
Rotary Australia World Community Service LTD	Project Dignity, West Bengal India	West Bengal
3S Shramic	Portable Sanitation and Waste Water Management	
WaterAid India (Carolyne Wheeler)	Assisting the Government in “Smart Cities” and “Swachh Bharat Mission” in assisting planning and organizing local NGOs	Jharkhand, Orissa, Bihar, Uttar Pradesh, Chhattisgarh, Madhya Pradesh, Andhra Pradesh, Karnataka, Tamil Nadu and Delhi
OXFAM INDIA	Linking up the urban poor to essential services in Guwahati City	Assam

5 Japanese Night Soil Treatment System

5.1 Japanese Domestic Wastewater Treatment

Japanese domestic wastewater treatment system is shown below. There are two flows. One is to treat only night soil and the other is to treat liquid waste other than night soil.

Japanese Government has planned to treat such wastewater by sewerage system. But due to high investment cost and long period of time for development, an on-site treatment system, *johkasou*, is encouraged to use where sewerage systems are not connected.

At beginning, *johkasou*, which is known as *tandoku shori johkasou* (lit. independent advanced septic tank treatment system) treat only night soil but later, new type of *johkasou* treat both night soil and liquid wastes such as discharged waste water from kitchen, bath, and so on.

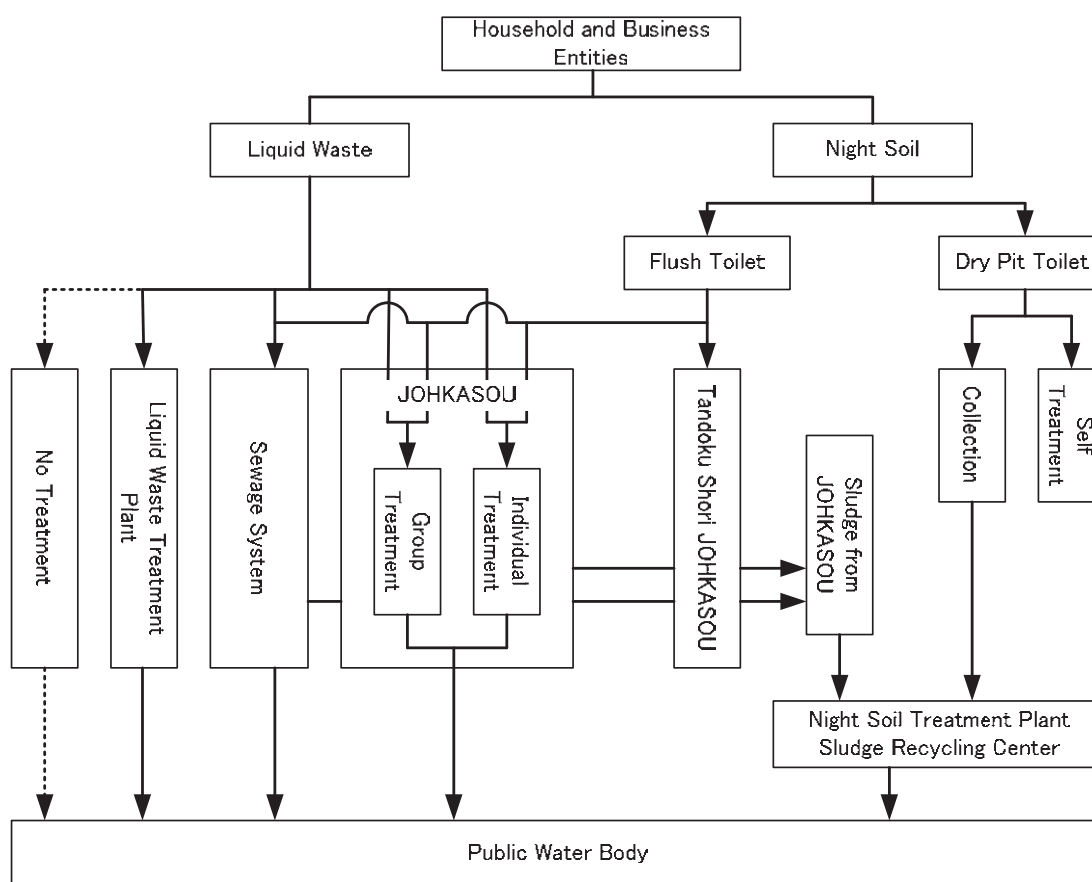


Figure 5-1: Japanese Domestic Wastewater Treatment System¹³

5.2 Japanese Night Soil Treatment Methods

Following figure indicates treatment methods of night soil.

¹³ 「Plan and Design for Sludge Recycling Center (2006)」 by Japan Waste Management Association,

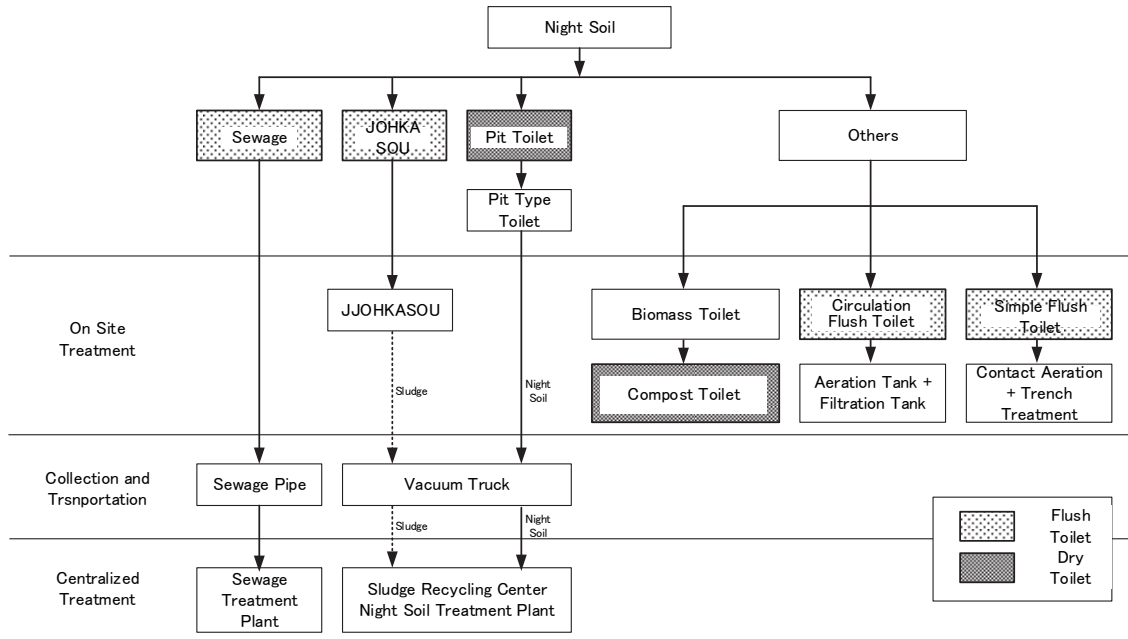


Figure 5-2 : Night Soil Treatment Flow in Japan

As of March 2014 in Japan, coverage rate by sewerage system is 77 % and coverage rate by *johkasou* is 8.9 %. These night soils are all treated finally either sewerage treatment plant or night soil treatment plant. Other minor treatment methods such as compost toilet are located at remote areas where there is no water or electricity supply.

5.3 Comparison of Centralized Treatment and Decentralized Treatment System

Centralized treatment plant will be required for sewerage system and pit toilet. Sewage pipe line or vacuum truck will be utilized for transportation of night soil.

Johkasou system is a decentralized treatment system that can be applied for individual households or household groups such as apartments.

Comparison of two systems is shown below.

Table 5-1 : Comparison of Centralized Treatment System and Decentralized Treatment System

	Centralized Treatment	Decentralized Treatment
Type of Toilet	Flush Toilet	Flush Toilet and Dry Pit Toilet
Advantage	<ul style="list-style-type: none"> ➤ Effectively discharge liquid waste and night soil ➤ Quality of treated waste water is reliable ➤ Operation and maintenance is relatively manageable ➤ Training and education to households is not required 	<ul style="list-style-type: none"> ➤ Initial investment cost is relatively low. ➤ Scale of system is changeable ➤ Target of liquid waste to be treated is adjustable. (Rain water and waste water, Grey water and black water, urine and fecal)
Disadvantage	<ul style="list-style-type: none"> ➤ Construction and maintenance of system require huge investment cost. ➤ Piped transportation system requires great amounts of water. ➤ Natural water circulation system might be affected. 	<ul style="list-style-type: none"> ➤ Incentive will be required in order for individuals to construct in their premises. ➤ Training and education will be required to individual household to operate properly. ➤ Quality of treated waste water is often lower than centralized systems.

	<ul style="list-style-type: none"> ➤ Quality of treated waste water is affected without appropriate operation control at STP ➤ High technology and cost will be required due to mixed waste water. 	<ul style="list-style-type: none"> ➤ Control and regulation of individual households are difficult. ➤ Health risk is high in case inadequate facility and operation.
Applicability in India	<ul style="list-style-type: none"> ➤ Provision of STP and sewage pipe line is progressing at big city area and populated area where environment load is high. ➤ There is future plan to provide more sewage systems. 	<ul style="list-style-type: none"> ➤ Decentralized system such as two pit latrine and septic tank system are encouraged to construct where sewage system does not exist. ➤ Septage management will be more important in future.

5.4 Cost Comparison for Decentralized Treatment System

Following table indicates rough cost estimation for Japanese decentralized treatment system such as *johkasou* system and compost toilet.

Table 5-2 : Indicative Cost for Japanese Onsite Treatment

Type of Onsite Treatment	Indicative Cost (for Reference only)	Remarks
<i>Johkasou</i> for 5 persons	885,000 yen	Including installation but excluding internal piping, toilet super structure.
<i>Johkasou</i> for 7 persons	1,027,000 yen	
Compost Toilet (80 to 100 person/day)	1,380,000 yen	Price at factory. Excluding transportation cost, installation cost, superstructure .

Note 1 : Cost for *johkasou* : http://www.town.mitake.gifu.jp/kouhou/2009_02/07.pdf

Note 2 : : Cost for Compost Toilet: <http://www.seiwa-denko.co.jp/price.html>

Following are the indicative construction cost for onsite treatment toilet in India. These costs were obtained from KAP survey conducted on site in November 2014. These costs include sub structure and super structure.

Table 5-3 : Indicative Cost for Indian Onsite Treatment

Type of Toilet	Construction Cost		Remarks
	Material + Construction Cost (INR)	Convert to Japanese Yen 2yen@ 1 Rs	
Pit Latrine	10,000~20,000Rs	20,000 to 40,000 Yen	Average cost of average private household toilet, incl. construction (findings of interviews in field)
Septic Tank	25,000 to 40,000Rs	50,000 to 80,000 Yen	
Ecosan Toilet	40,000 Rs	80,000 Yen	

6 Field Work in India

6.1 First Field Work in India

The first field work was carried out in New Delhi and Haryana, as per the schedule below.

Table 6-1 : Schedule of the First Field Work in India

Date		Organization	Classification
9/22 (mon)	AM	Toilet Museum	Local NGO
	PM	JICA India Office	-
9/23(Tue)		CMS	NPO
9/24(Wed)		Public Toilets in NDL (1)	Field Investigation
9/25(Thu)	AM	RICE (2)	Local NGO (USA)
	PM	MOUD (3)	GO
9/26 (Fri)	AM	PLAN (4)	Intl. NGO
	PM	B&M Gates Fdn (5)	Intl. NGO
9/27(Sat)		Individual Household Latrine (IHHL) and	Field Investigation
9/30(Tue)	AM	Sulabh International (7)	Local NGO
	PM	Water Aid (8)	Intl. NGO
10/1 (Wed)	AM	Center for Advocacy and Research (9)	Local NGO
	PM	JICA India Office	-

6.2 The Second Field Work in India

6.2.1 Activities under the Second Field Work in India

a. Interview with relevant officials

The team conducted interview survey in three states, i.e. Rajasthan, Uttar Pradesh and Tamil Nadu, in addition to New Delhi. The detailed schedule in each area is shown below.

a.1 Survey in New Delhi

Table 6-2 : Survey Schedule in New Delhi

	Department	Study Item
Central Government	<ul style="list-style-type: none"> Ministry of Drinking Water and Sanitation(MODWS) (Rural): Director of NBA 	<ul style="list-style-type: none"> About progress of Swachh Bharat Mission Donor projects regarding water and sanitation Others
UN	<ul style="list-style-type: none"> UNICEF: WASH Specialist 	<ul style="list-style-type: none"> Activities in India regarding water and sanitation Sanitation and Hygiene Advocacy and

		Communication Strategy Framework 2012-2017
NGO	<ul style="list-style-type: none"> CFAR (Centre for Advocacy and Research) 	<ul style="list-style-type: none"> Community toilets in New Delhi slums Women lead O&M of community toilets

a.2 Survey in Rajasthan

Table 6-3 : Survey Schedule in Rajasthan

	Department	Study Item
Rajasthan State Government	<ul style="list-style-type: none"> Department of Local Bodies (Urban): Principal Secretary Department of Panchayat Raj (Rural): Commissioner ICDS (Integrated Child Development Services): Director 	<ul style="list-style-type: none"> Progress of NBA Situation of toilet construction in rural areas About open defecation practices Possible Japanese assistance Special conditions in Rajasthan
Jaipur District Government	<ul style="list-style-type: none"> Zila Parishad (Rural): Additional CEO 	<ul style="list-style-type: none"> Organization Structure of Local Bodies Progress of NBA Issues of toilets in rural area
Municipal Corporation	<ul style="list-style-type: none"> Municipal Corporation of Jaipur: Commissioner-health 	<ul style="list-style-type: none"> Organisation structure Sanitation projects in municipal area including sewage pipe line and treatment plant
Villages	<ul style="list-style-type: none"> Block Development Officer, Dudu District 	<ul style="list-style-type: none"> Organization structures Progress of NBA Health and Sanitation Committee OD Practices
NGO	<ul style="list-style-type: none"> CFAR (Center for Advocacy and Research) PLAN 	<ul style="list-style-type: none"> Activities on gender gap Project to eliminate gender gap Project on construction of shared toilet in slums Improvement of school toilets OD practices

a.3 Survey in Uttar Pradesh

Table 6-4 : Survey Schedule in Uttar Pradesh

	Department	Study Item
Varanasi District Government	<ul style="list-style-type: none"> District Panchayat Raj (Rural) : DPRO (District Panchayat Raj Officer) 	<ul style="list-style-type: none"> Sanitation issues in rural area Request for JICA assistance
Municipal Corporation	<ul style="list-style-type: none"> Varanasi Municipal Corporation (Urban): Commissioner, Executive Engineer, Health Officer 	<ul style="list-style-type: none"> Sewage treatment system in Varanasi Issues on sanitation Organization structure Electricity supply Tourism and sanitation Waste collection in urban area
Municipality	<ul style="list-style-type: none"> Ramna Municipality 	<ul style="list-style-type: none"> Tax in municipality Environmental management in Municipality

	Department	Study Item
Village	<ul style="list-style-type: none"> • Ramana Village • Jayapura Village 	<ul style="list-style-type: none"> • Sanitation activities in rural • OD elimination activities • School toilets and NBA • Education on sanitation in schools • Rural IHHL
NGO	<ul style="list-style-type: none"> • Ray Welfare Trust 	<ul style="list-style-type: none"> • Environmental education at schools

a.4 Survey in Tamil Nadu

Table 6-5 : Survey Schedule in Tamil Nadu

	Department	Study Item
State Government (Chennai)	<ul style="list-style-type: none"> • Directorate of Rural Development and Panchayat Raj : Additional Director • Directorate of Town and Country Planning : Assistant Director • Commissionerate of Municipal Administration: Joint Director • Water Supply and Drainage Board: Engineer 	<ul style="list-style-type: none"> • NBA in Tamil Nadu • Community Toilet Complex in Tamil Nadu • Self Help Group • Monitoring System • Japanese <i>johkasou</i>
District Government	<ul style="list-style-type: none"> • District Rural Development Agency: Additional Collector/ Project Director 	<ul style="list-style-type: none"> • Progress of NBA • Application Procedure of NBA • Soak pit and underground water pollution
Municipal Corporation	<ul style="list-style-type: none"> • Varanasi Municipal Corporation (Urban): Commissioner, Executive Engineer, Health Officer • Tiruchi City Municipal Corporation: Commissioner 	<ul style="list-style-type: none"> • Sanitation issues in urban area • Sewage treatment systems in urban area • Request for JICA assistance • Community led total sanitation • Waste collection in urban area • About NAMMA Toilet • Elimination of ODs • Sewage treatment plants • Septage Management
Municipality	<ul style="list-style-type: none"> • Tambaram Municipality 	
Town Panchayat	<ul style="list-style-type: none"> • Musuri Town Panchayat: 	<ul style="list-style-type: none"> • Ecosan toilet • School toilet • IHHL • DEWAT system
Village	<ul style="list-style-type: none"> • Muncandam Village: Panchayat President 	<ul style="list-style-type: none"> • Community toilet • Green house scheme

	Department	Study Item
NGO	<ul style="list-style-type: none"> • CFAR • Aksha Ganga Trust • SCOPE • Gramalaya 	<ul style="list-style-type: none"> • Activities in Tamil Nadu • Gender empowerment activities in Tamil Nadu • Social welfare programme in India • Micro finance for toilet construction • OD elimination project

b. Field Investigation on Public Toilets

In each of the three target cities, i.e. Jaipur, Varanasi and Tiruchirappalli, the team visited the relevant departments of Municipal Corporations that are in charge of operation and maintenance of public toilets to find the number, locations and operational methods of public toilets within their jurisdictions. In addition, the team actually visited several of the public toilets.

Table 6-6 : Field Investigation on Public Toilets

Survey areas	Survey issues
One public toilet each from high, middle and low income areas in each three survey city	<ul style="list-style-type: none"> • Public toilets and near-by environment • Status of operation and maintenance • Profile of caretakers and their working conditions • Treatment of sludge and waste water • Any other important things

c. Knowledge, Attitude and Practice (KAP) Survey on Latrine Use and Open Defecation

KAP survey on latrine use and open defecation was carried out as explained below.

Table 6-7 : Outline of KAP Survey

Sampling sites	Fifty households each from census towns, outgrowths, rural
Sample numbers	Fifty households × three sampling sites in each state × three states = 450 households
Contents	Satisfaction level of current defecation practice/ facilities Reasons for constructing individual household latrines O&M status of individual household latrines Intention in constructing own household latrine and willingness to pay Gender issues relating to latrine use and open defecation Importance of IEC

6.3 Third Field Work in India

Third field work in India was conducted in New Delhi as follows.

Table 6-8 : Third Field Work in India

Date		Organization	Classification
2015/2/16 (Mon)	PM	World Bank (Water and Sanitation Programme)	International Donor
2/17 (Tue)	AM	Delhi Urban Shelter Improvement Bard	Local Government
2/18 (Wed)	AM	WASH Summit	Water Aid
	PM	Plan India CFAR	International NGO Local NGO
2/19(Thr)		CMS	Local Consultant
2/20 (Fri)	AM	Water Aid	International NGO
	PM	JICA India Office	

7 Compilation of Study Results

7.1 Outline of Field Studies

7.1.1 Interview Survey and Field Investigation

Throughout both the First Work in India (from 22nd Sep. to 1st Dec. 2014) and the Second Work in India (from 1st Nov. to 6th Dec. 2014), the team conducted a series of interviews with officials of both the central government and the state governments, officials of donor agencies, officials of local authorities, etc. and obtained qualitative data on sanitation issues. Also the team visited fields to investigate the status of public toilets and community toilets and the conditions of individual household latrines both in urban slums and rural villages.

7.1.2 Knowledge, Attitude and Practice (KAP) Survey on Latrine Use and Open Defecation

During the Second Work in India (from 1st Nov. to 6th Dec. 2014), Knowledge, Attitude and Practice (KAP) survey targeting 450 households in total in three states was carried out in order to analyze people's defecation practices and latrine use. Three sampling sites, i.e. urban, semi-urban and rural, are selected from each city, Rajasthan (Jaipur), Uttar Pradesh (Varanasi) and Tamil Nadu (Tiruchirappalli). The actual schedule of KAP survey is as follows.

- 1st week of Nov.: Implementation of pre-tests, finalization of questionnaire, translation of questionnaire into Hindi and Tamil
- 2nd week of Nov.: Implementation of KAP survey in Rajasthan (Jaipur)
- 3rd week of Nov.: Implementation of KAP survey in Uttar Pradesh (Varanasi)
- 4th week of Nov.: Implementation of KAP survey in Tamil Nadu (Tiruchirappalli)

a. Sampling sites

Three sampling sites, i.e. urban, semi-urban and rural¹⁴, are selected based on the consultation with state officers who are in charge of NBA. Actual sample size in each site is decided by considering state-specific conditions.

¹⁴ Urban indicates sites within boundary of municipal corporations, while semi-urban indicates ones within smaller urban local authorities such as Municipal Council and Nagar Palika and rural indicates sites within Gram Panchayats.

Table 7-1 : Sampling sites

Sampling sites	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Urban	52	30	60	142
Semi-urban	49	30	30	109
Rural	50	90	60	200
Total	151	150	150	451

b. Respondents' Sex and Religion, etc.

Tables below show respondents' sex, religion and caste. Since the differences of defecation practice and its preference between the sexes are highly expected, the respondents are chosen to be nearly one half each of them.

Table 7-2 : Respondents' sexes

Respondents' sexes	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Male	68	92	72	232
Female	83	58	78	219
Total	151	150	150	451

Table 7-3 : Respondents' religions

Religions	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Hindu	124	145	144	413
Muslim	27	5	0	32
Christian	0	0	6	6
Total	151	150	150	451

Table 7-4 : Caste composition

Caste composition	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
General Castes	35	19	10	64
Other Backward Classes	85	89	54	228
Scheduled Castes	26	40	86	152
Scheduled Tribes	5	2	0	7
Total	151	150	150	451

c. Average number of household members, land ownership and average household income

Average number of household members, land ownership and average household income are as follows.

Table 7-5 : Average number of household members

Avg. no. of household members	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Male	3.3	4.0	2.5	3.3
Female	3.1	3.3	2.5	3.0
Total	6.4	7.3	5.0	6.2

Table 7-6 : Land ownership

Land ownership	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Owned by family	107	148	145	400
Renting authorized land	5	2	4	11
Occupying unauthorized land	39	0	1	40
Total	151	150	150	451

Table 7-7 : Average household annual income

	Rajasthan	Uttar Pradesh	Tamil Nadu	All
Avg. household annual income (Rs.)	153,378	149,142	76,393	126,081
	Urban	Semi-Urban	Rural	All
	93,393	153,748	134,201	126,081

d. Ownership of Individual Household Latrines (IHHL)

Ownership of IHHL is shown in Table 55. While both in Rajasthan and Uttar Pradesh, some of the villages that succeeded in eradication of open defecation were especially visited, and therefore the rates of IHHL ownership are higher than the state averages in Tamil Nadu, since some of urban slums and villages where sustainably utilized community toilets were especially visited, the rate of IHHL ownership is lower than the state average.

Table 7-8 : Ownership of IHHL

Ownership of IHHL	Rajasthan		Uttar Pradesh		Tamil Nadu		Total	
Households with IHHL	117	77.5%	113	75.3%	53	35.3%	283	62.7%
Households without IHHL	34	22.5%	37	24.7%	97	64.7%	168	37.3%
Total	151	100.0%	150	100.0%	150	100.0%	451	100.0%

e. Respondents' defecation practice

Answers to a question regarding personal defecation practice, "Where do you most frequently go to defecate?" are summarized in the following Table¹⁵.

¹⁵ Please note that KAP Survey revealed that the respondents usually do not use the term "community toilet", although the toilets are mainly used by community members.

Table 7-9 : Respondents' defecation practice

Defecation practice/ places	Rajasthan		Uttar Pradesh		Tamil Nadu		Total	
	n	%	n	%	n	%	n	%
Community toilet	0	0.0	0	0.0	1	0.7	1	0.2
Public toilet	0	0.0	0	0.0	61	40.7	61	13.5
Open defecation - nearby house	20	13.2	5	3.3	18	12.0	43	9.5
Open defecation - field/forest	12	7.9	30	20.0	17	11.3	59	13.1
Household latrine	117	77.5	113	75.3	53	35.3	283	62.7
Other house's latrine	2	1.3	2	1.3	0	0.0	4	0.9
Total	151	100	150	100.0	150	100.0	451	100.0

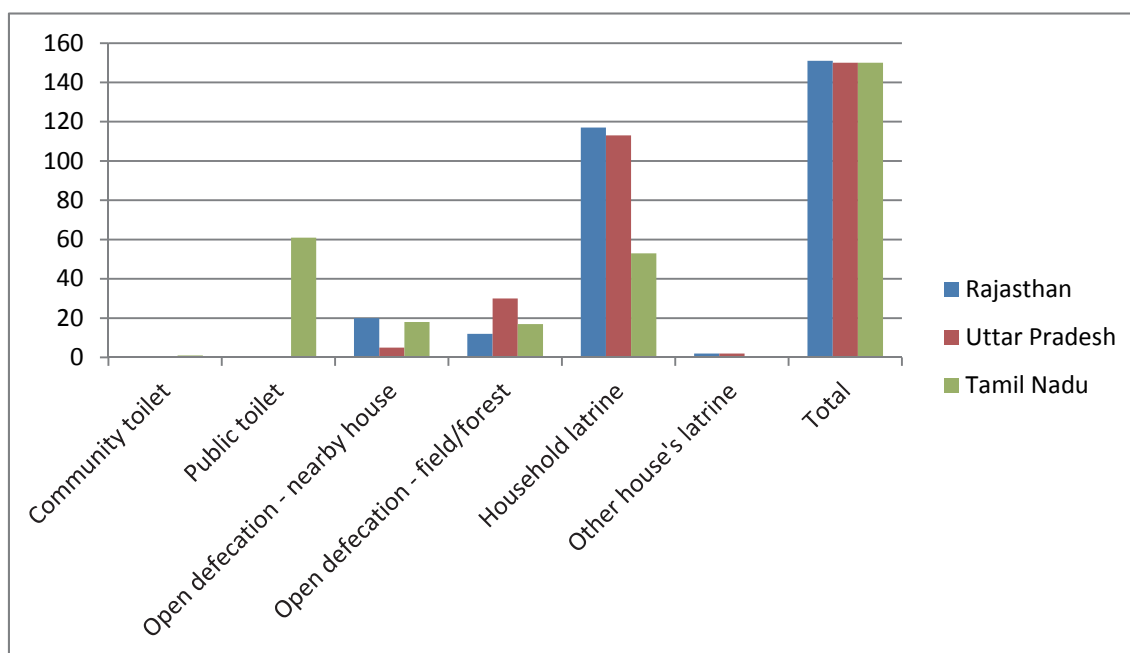


Figure 7-1 : Respondents' defecation practice

7.2 Open Defecation Practice

7.2.1 Reasons of prevalent open defecation

According to the estimate by WHO/UNICEF, 594 million Indians, or nearly half of its population, practice open defecation, and India is known to have the highest number of people practicing open defecation of any country in the world¹⁶. The government of India has endeavoured to eradicate open defecation through Central Rural Sanitation Programme (CRSP) started in 1986, TSC started in 1999 and NBA in 2012, however it has failed of complete eradication.

According to Dr. Bindeshwar Pathak, who is the founder of Sulabh International, open defecation is deep-rooted in Indian culture. The ancient law, i.e. the Laws of Manu, that regulates people's code of behavior based on purity and impurity says "human wastes, wastewater after washing feet, the remaining food and wastewater after bathing shall be disposed at the places far from houses.", and this idea still affects people's behavioral patterns whether consciously or not. Dr. Pathak continues that the way depicted in the Law of Manu might be the best way at that time, the same

¹⁶ <http://indiasanitationportal.org/19116>

is surely not appropriate in the present India. Anyway, firstly defecation practice around houses is refrained as impure; then open defecation in field has been considered as accepted. This understanding lingers till now in India.

In fact, a variety of opinions on why people continue practicing open defecation were collected during the field work as shown below.

1. Quality of latrines constructed with the government support is not good enough. They smell bad and look dirty due to inappropriate operation and maintenance. Some of them are even damaged and no longer functional. Moreover, the pit size of government-supported latrines is too small to use, and if they are used regularly, pits will be filled quickly. (The results of SQUAT Survey by rice, CFAR, DPRO in Varanasi District, Villagers in Rethooji in Haryana, Slum dwellers in Melakondayam Pettai Kiire Teru in Tiruchilapali)
2. Open defecation is more comfortable and hygienic, and going to the defecation field is good exercise. On the contrary, latrines are too small and dark without lighting. (The results of SQUAT Survey by rice, CFAR, DPRO in Varanasi District, Residents of Ramna Municipality, Varanasi District)
3. Open defecation is a manly activity. Latrines are for women, children and sick persons. (MODWS)
4. It is good for socialization. (The results of SQUAT Survey by rice, Villagers in Rethooji in Haryana)
5. No money for constructing latrine. No place for latrine. (Municipal Corporation of Jaipur, Villagers in Rethooji in Haryana)
6. It is bothersome. (DPRO in Varanasi District)
7. No latrines near-by. (A school in Jayapura village in Varanasi District)

7.2.2 The Result of KAP Survey

Open defecation practice was questioned during KAP Survey. The findings are as follows.

Table 7-10 : Places to defecate

	Rajasthan		Uttar Pradesh		Tamil Nadu		Total	
	n	%	n	%	n	%	n	%
Household latrine	117	77.5	113	75.3	53	35.3	283	62.7
Public toilets	0	0.0	0	0.0	61	40.7	61	13.5
Open defecation: field, forest	12	7.9	30	20.0	17	11.3	59	13.1
Open defecation: near house	20	13.2	5	3.3	18	12.0	43	9.5
Other house's latrine	2	1.3	2	1.3	0	0.0	4	0.9
Community Toilets	0	0.0	0	0.0	1	0.7	1	0.2
Total	151	100.0	150	100.0	150	100.0	451	100.0

Both in Rajasthan and in Uttar Pradesh, household latrine users dominate by reaching three fourth of total samples. On the contrary, public toilets users prevail most in Tamil Nadu. Those who practice open defecation (both field, forest and near house) reaches 21.2% in Rajasthan, and 23.3% in both Uttar Pradesh and Tamil Nadu.

Table 7-11 : Distance to the open defecation places from houses

Distance (m)	Answer (people)	Time (minutes)
10~99m :	6	10~15*
100~199m :	9	5~15
200~299m :	33	5~15
300~399m :	8	10~15
400~499m :	5	10~15
500~599m :	29	10~30
600~699m :	0	-
700~799m :	1	10
800~899m :	0	-
900~999m :	0	-
More than 1000m :	11	15~30

(Note) * This question is answered both in meters and in minutes. For some respondents, it might be difficult to answer correctly in meters; this case is interpreted that although defecation is practiced near-by houses, it is not very close, but a certain distance is kept at least..

Table 7-12 : Satisfaction level of open defecation

Answer	Male		Female		Total	
	n	%	n	%	n	%
Very satisfied	11	19.0	7	15.9	18	17.6
Satisfied	8	13.8	2	4.5	10	9.8
Unsatisfied	21	36.2	14	31.8	35	34.3
Very unsatisfied	18	31.0	21	47.7	39	38.2
Total	58	100.0	44	100.0	102	100.0

The sum of respondents who answered either “very satisfied” or “satisfied” are 19 (32.8%) for men and 9 (20.5%) for women, and 28 (27.5%) in total. In contrast, the sums of respondents who answered as either “unsatisfied” or “very unsatisfied” are 39 (67.2%) for men and 35 (79.5%) for women, and 74 (72.5%) in total. Although usually men are considered to prefer open defecation, the above result says that nearly 70% of men showed negative responses to open defecation. The summations by sampling sites are as follows.

Table 7-13 : Satisfaction level of open defecation (Jaipur District in Rajasthan)

Answer	Male		Female		Total	
	n	%	n	%	n	%
Very satisfied	0	0.0	0	0.0	0	0.0
Satisfied	1	6.7	2	11.8	3	9.4
Unsatisfied	9	60.0	9	52.9	18	56.3
Very unsatisfied	5	33.3	6	35.3	11	34.4
Total	15	100.0	17	100.0	32	100.0

Table 7-14 : Satisfaction level of open defecation (Varanasi District in Uttar Pradesh)

Answer	Male		Female		Total	
	n	%	n	%	n	%
Very satisfied	0	0.0	0	0.0	0	0.0
Satisfied	1	5.0	0	0.0	1	2.9
Unsatisfied	11	55.0	4	26.7	15	42.9
Very unsatisfied	8	40.0	11	73.3	19	54.3
Total	20	100.0	15	100.0	35	100.0

Table 7-15 : Satisfaction level of open defecation (Tiruchirappalli District in Tamil Nadu)

Answer	Male		Female		Total	
	n	%	n	%	n	%
Very satisfied	11	47.8	7	58.3	18	51.4
Satisfied	6	26.1	0	0.0	6	17.1
Unsatisfied	1	4.3	1	8.3	2	5.7
Very unsatisfied	5	21.7	4	33.3	9	25.7
Total	23	100.0	12	100.0	35	100.0

Table 7-16 : Percentages of positive and negative responses to open defecation

Answer		Male	Female	Total
Rajasthan	Positive responses	6.7%	11.8%	9.4%
	Negative responses	93.3%	88.2%	90.6%
Uttar Pradesh	Positive responses	5.0%	0.0%	2.9%
	Negative responses	95.0%	100.0%	97.1%
Tamil Nadu	Positive responses	73.9%	58.3%	68.6%
	Negative responses	26.1%	41.7%	31.4%

Surprisingly most respondents of Varanasi in Hindi Belt where old customs linger and open defecation is prevalent respond negatively to open defecation. On the contrary, nearly 70% of male respondents and 60% of female respondents in Tiruchirappalli, Tamil Nadu where many innovative approaches to improve sanitation are identified accept open defecation positively.

Table 7-17 : Defecation places for men and women

Answer	Urban		Semi-urban		Rural		Total	
	n	%	n	%	n	%	n	%
Different places	14	87.5	12	52.2	21	33.3	47	46.1
Same place	2	12.5	11	47.8	42	66.7	55	53.9
Total	16	100.0	23	100.0	63	100.0	102	100.0

Men and women tend to defecate in different places in urban areas,, whereas men and women defecate in same places in rural areas.

Table 7-18 : Difficulties faced while going to open defecation

Answer	Male		Female		Total	
	n	%	n	%	n	%
Bitten by snake, scorpion, dog, etc.	41	41.8	27	37.0	68	39.8
Hurting yourself or falling down	35	35.7	16	21.9	51	29.8
No difficulties	10	10.2	8	11.0	18	10.5
Someone attempted to molest you	3	3.1	11	15.1	14	8.2
Teased by someone	4	4.1	6	8.2	10	5.8
Molested by someone	0	0.0	2	2.7	2	1.2
Feel ashamed	2	2.0	1	1.4	3	1.8
Wasting time	2	2.0	1	1.4	3	1.8
Difficult to find appropriate places	1	1.0	0	0.0	1	0.6
See human wastes here and there	0	0.0	1	1.4	1	0.6
Total	98	100.0	73	100.0	171	100.0

Physical damages, i.e. bitten by an animal or falling down, dominate and account for 77.6 % for men, 58.9% for women and 69.6% for both. Regarding violence against women, the sum of respondents who answered “someone attempted to molest you”, “teased by someone” and/or “molested by someone” accounts for 26%.

Table 7-19 : Disadvantages of open defecation

Answer	Male		Female		Total	
	n	%	n	%	n	%
Cannot go during bad weather	46	23.7	33	23.1	79	23.4
Physical difficulties due to old age	33	17.0	26	18.2	59	17.5
Physical difficulties due to handicap	25	12.9	11	7.7	36	10.7
Physical difficulties due to pregnancy	25	12.9	22	15.4	47	13.9
Health burden for women since they are allowed to go open defecation either early morning and/or after dark	26	13.4	27	18.9	53	15.7
Wasting time to walk long distances	20	10.3	16	11.2	36	10.7
Creating environmental problem/ sanitation problem	19	9.8	8	5.6	27	8.0
Total	194	100.0	143	100.0	337	100.0

Answers indicating physical difficulties due to old age, those due to handicaps and those due to pregnancy dominate and account for 42.8% by men, 41.3% by women and 42.1% by both. Respondents who consider bad weather as a disadvantage account for only 20%. The number of respondents who are concerned about environmental or sanitation problems is even less, less than 10%.

Table 7-20 : Advantages of open defecation

Answer	Male		Female		Total	
	n	%	n	%	n	%
Good exercise for health	41	29.5	23	29.5	64	29.5
Occasion for social interaction	20	14.4	27	34.6	47	21.7
Requires less water	30	21.6	13	16.7	43	19.8
House will be cleaner without toilet	21	15.1	7	9.0	28	12.9
Time saving while working in farm land	11	7.9	6	7.7	17	7.8
No particular advantages	9	6.5	2	2.6	11	5.1
Occasion for breathing clean air	7	5.0	0	0.0	7	3.2
Total	139	100.0	78	100.0	217	100.0

Many consider occasions for good exercise and social interaction as advantages of open defecation.

7.2.3 Views on open defecation

As seen previously, whether it is rooted culturally or it is based on the practical needs, atmosphere that allows open defecation has prevailed. By confronting this environment, thanks to the efforts made by the government, donor agencies and NGOs, the steady improvement has been brought about, as partially indicated in the results of KAP survey. Mass construction of individual household latrines and continuous awareness raising contribute greatly to the improvement. In addition, the following are considered as important factors which affect adversely on open defecation.

- 1) In due course of globalization, the number of citizens, especially younger generations, who interpret open defecation as a disgraceful custom has increased.
- 2) Immigrant workers from rural villages who have become accustomed to toilet use in urban areas bring the custom back into rural areas when they go back home.
- 3) Toilet use and sanitary education are taught at schools.
- 4) Care and understanding toward female family members gained general recognition.

However, the SQUAT survey by rice presents an interesting finding, saying that although the proportion of rural population has decreased, the absolute rural population has increased; thus the situation has been aggravated in rural areas in terms of sanitation.

Construction of individual household latrines and effective awareness raising shall be further encouraged in order to eradicate open defecation. As for awareness raising, as seen in the result of KAP survey, it is undeniable that health effects of open defecation are not well recognized. IEC activities further focusing on the health effects of open defecation, i.e. stunting the growth of children, deadly diarrhea, are urgently needed.

7.3 Analysis of Latrine Needs and IHHL

a. Advantages and Disadvantages of IHHL

Needs and preferences as to IHHL were analyzed through the results of KAP Survey. Both latrine owners and non-owners acknowledged privacy, comfort, convenience and safety as major advantages. Thus, in addition to health benefits, other benefits of privacy, comfort, convenience and safety shall be emphasized during IEC activities for effective awareness raising. As for disadvantages, “no disadvantages” was the dominant answer among both owners and non-owners of latrines. However, a certain number of respondents raised issues such as bad smells and attracting flies as disadvantages.

Table 7-21 : Advantages of owning a latrine

Advantages of owing a latrine (multiple answers)	Owner	Non-owner
Improved hygiene/ health/ cleanliness	120	93
More privacy	193	105
More comfortable	213	114
Convenience/ save time	174	109
Improved safety	161	96
Improved status/ prestige	122	90
Guest can use it	44	51
No advantages	0	0
Don't know	0	1

Table 7-22 : Disadvantages of owning a latrine

Disadvantages of owing a latrine (multiple answers)	Owner	Non-owner
Bad smell	69	33
Attract flies, etc.	47	19
Cost to maintain it	11	19
Work to maintain it	23	9
Other people come to use it	13	12
Affects ground water quality	7	7
Overflows	6	7
More water consumption	36	24
Cause disease	6	0
No disadvantages	197	108
Don't know	3	2

b. Reasons for not owning a household latrine

Sixty two (62) households that use public toilets and 102 households that practice open defecation answered the reasons for not owning a household latrine as shown in the table below.

Table 7-23 : Reasons for not owning a household latrine

Reasons for not owning a household latrine (multiple answers)	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Too expensive/ don't have enough money	26	32	53	111
The government has not given us a subsidy yet	0	6	51	57
No entitlement to the land	10	0	26	36
Don't have enough space	7	5	37	49
Water shortage/ not enough water to pour	7	2	27	36
Satisfied with current practice/ don't see a need	4	0	21	25
Lack information on where to purchase, how to construct, etc.	0	0	9	9
Other priorities come first	4	1	1	6

In addition, non-owners were interviewed as to acceptable latrine types and the lowest amount needed to spend for the latrine by imagining constructing IHHL. The answers shown in the table in the next section revealed that the amount needed is more than the subsidies provided by the government scheme, and therefore it is understandable that many said “too expensive/ don’t have enough money.” Moreover, it is worth noting here that there are a certain number of respondents who raised issues of physical restrictions, i.e. “no entitlement to the land” and “don’t have enough space”.

c. Acceptable latrine types and willingness to pay (WTP) for construction

Acceptable latrine types and willingness to pay for constructing a latrine were asked to 62 households that use public toilets and 102 households that practice open defecation respectively. The results are shown in the table below.

All 62 households that use public toilets are located in Tamil Nadu. It is known from field observations that preference of septic tanks over pit latrines is strong in Tamil Nadu, and the strong preference is perceived from the result of KAP Survey, too, as seen below.

At the time of the study, the construction cost of latrine connected to septic tank was from Rs. 26,000 to Rs. 42,000. Although the WTP of urban respondents is approximately Rs. 6,000 short, the WTPs of semi-urban and rural respondents are enough for actual construction.

Table 7-24 : Acceptable latrine type of public-toilet users

Acceptable latrine type	Urban	Semi-urban	Rural	Total
Latrine connected to piped sewer system	28	1	0	29
Latrine connected to septic tank	14	18	1	33
	42	19	1	62

Table 7-25 : WTP by acceptable latrine types

Willingness to pay by acceptable latrine types (Avg. Rs.)	Urban	Semi-urban	Rural	Total
Latrine connected to piped sewer system	14,054	15,000	-	14,086
Latrine connected to septic tank	20,571	31,389	25,000	26,606
Total	16,226	30,526	25,000	20,750

Though even among 102 households that practice open defecation (hereinafter referred as OD households), preference towards septic tank type was observed, some households favor pit type in case of Rajasthan and Uttar Pradesh. By considering the fact that at the time of the study, the construction cost of latrine connected to improved pits was from Rs. 10,000 to Rs. 20,000, while that of latrine connected to septic tank was from Rs. 26,000 to Rs. 42,000 as noted previously, WTP shown below is enough to actually construct latrines with improved pits while there is a substantial gap between WTP and the actual construction cost of latrines connected to septic tanks. What is noteworthy here is the sampling-area wise WTP. Average WTP of semi-urban sites is higher than that of urban sites, and that of rural sites is even higher than that of semi-urban sites. WTP is highest in rural area. The fact shows that expensive latrine is especially favored in rural areas.

Table 7-26 : Acceptable latrine type of OD households (state-wise)

Acceptable latrine type	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Latrine connected to piped sewer system	4	6	1	11
Latrine connected to septic tank	23	17	34	74
Latrine connected to improved pit with slab	5	10	0	15
Latrine - discharged to road, drain, etc.	0	2	0	2
Total	32	35	35	102

Table 7-27 : Acceptable latrine type of OD households (sampling site-wise)

Acceptable latrine type	Urban	Semi-urban	Rural	Total
Latrine connected to piped sewer system	4	4	3	11
Latrine connected to septic tank	10	14	50	74
Latrine connected to improved pit with slab	2	3	10	15
Latrine - discharged to road, drain, etc.	0	2	0	2
Total	16	23	63	102

Table 7-28 : WTP by acceptable latrine types (state-wise)

Willingness to pay by acceptable latrine types (Avg. Rs.)	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Latrine connected to piped sewer system	25,750	27,333	20,000	26,091
Latrine connected to septic tank	17,000	37,118	30,941	28,027
Latrine connected to improved pit with slab	23,800	26,100	-	25,333
Latrine - discharged to road, drain, etc.	-	12,500	-	12,500
Total	19,156	30,886	30,629	27,118

Table 7-29 : WTP by acceptable latrine types (sampling site-wise)

Willingness to pay by acceptable latrine types (Avg. Rs.)	Urban	Semi-urban	Rural	Total
Latrine connected to piped sewer system	25,750	31,750	19,000	26,091
Latrine connected to septic tank	17,200	21,357	32,060	28,027
Latrine connected to improved pit with slab	17,000	35,000	24,100	25,333
Latrine - discharged to road, drain, etc.	-	12,500	-	12,500
Total	19,313	24,174	30,175	27,118

It is worth introducing here the average annual household income. It is known that respondents are willing to pay approximately 20% of annual household income for latrine construction.

Table 7-30 : Average annual household income (all respondents)

Avg. annual household income (Rs.)	Rajasthan	Uttar Pradesh	Tamil Nadu	All
	153,378	149,142	76,393	126,081
	Urban	Semi-Urban	Rural	All
	93,393	153,748	134,201	126,081

d. Willingness to pay for operation and maintenance

In addition to WTP for latrine construction, WTP for operation and maintenance was also asked under KAP Survey. The results are as shown below.

Table 7-31 : Public-toilet users' WTP for operation and maintenance (Rs.)

	Urban	Semi-urban	Rural	Total
Emptying a pit	769	898	200	800
Regular cleaning	142	167	100	149
Payment to cleaner	188	198	100	189

Table 7-32 : OD households' WTP for operation and maintenance (Rs.) (state-wise)

	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Emptying a pit	1,150	1,090	937	1,056
Regular cleaning	135	121	167	141
Payment to cleaner	135	132	188	152

Table 7-33 : OD households' WTP for operation and maintenance (Rs.) (sampling site-wise)

	Urban	Semi-urban	Rural	Total
Emptying a pit	993	1,247	1,002	1,056
Regular cleaning	111	146	147	141
Payment to cleaner	111	145	165	152

As described later, 44 households that have ever emptied pits were asked how much they have paid for such services. The actual average cost is Rs.1,193 and its discrepancy from the above Rs. 1,056 is minimal. This result shows that respondents know that not only construction of latrines but also their operation and maintenance require certain financial inputs.

e. Reasons for constructing IHHL

Reasons for constructing IHHL are asked to 283 households who own IHHL, and the result is summarized below.

The option "privacy and security for female members" was selected by most respondents and the other options "for sick / old relatives" and "pregnancy of female members" follow. Under KAP Survey, who made the final decision to build IHHL was questioned, too. From the results for that question, it became apparent that a head of household is a decision-maker in as many as 182 households (64.3% of 283 households). Understanding of a household head about women's needs is crucial for realization of IHHL construction.

Table 7-34 : Reasons for constructing IHHL

Reasons for constructing IHHL (multiple answers)	Urban	Semi-urban	Rural	Total
Program was offering subsidy	1	2	49	52
Someone told me that I had to	6	4	8	18
Had enough money to build	12	11	14	37
For sick/ old relatives	46	37	73	156
For privacy and safety of female members	63	61	96	220
Pregnancy of female household members	35	28	52	115
Children become physically mature	28	30	45	103
Social pressure	5	1	5	11
Construction of new house	10	15	6	31
Neighbor got one	0	0	0	0
Event (wedding/ funeral/ new year)	12	0	11	23
Had visitors from other villages	4	4	9	17

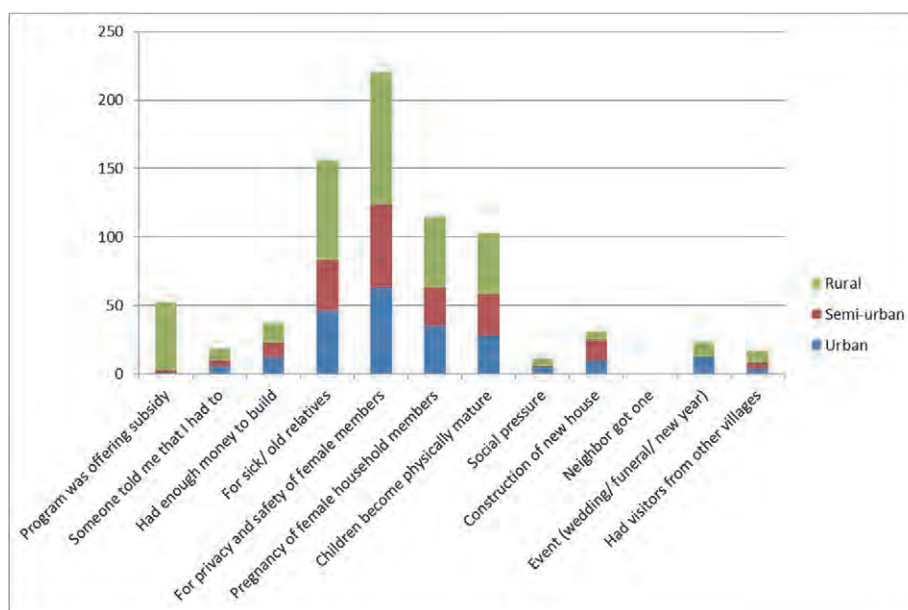


Figure 7-2 : Reasons for constructing IHHL

Table 7-35 : Decision makers of IHHL construction

Decision makers of IHHL construction	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Head of household	58	92	32	182
Head of household and spouse jointly	12	13	7	32
Spouse	3	1	0	4
Family together	41	7	14	62
Others	2	0	0	2
Don't know	1	0	0	1
Total	117	113	53	283

7.4 Public toilets /community toilets

7.4.1 Field Study Results

a. Public toilets

a.1 Jaipur City

One hundred fifty public toilets in total are under jurisdiction of Commissioner Health and Sanitation in Municipal Corporation of Jaipur (MCJ). There are three ways for construction, operation and maintenance (O&M) of those public toilets as detailed below.

- Type 1 : MCJ construct, and the same carry out O&M, too.
- Type 2 : MCJ construct, and O&M is outsourced to the private sector.
- Type 3 : Private sector construct, and carry out O&M too by BOT

User fee is not collected in Type 1, while Type 2 and 3 collect user fees and use them for O&M. As for Type 3, since private entities tend to use least money for O&M in order to recover their

investment in construction as soon as possible, the facilities are often poorly managed. Under such situations, MCJ decided to terminate the contractual relationships with these private entities and to outsource their O&M to a well-experienced organization, i.e. Sulabh International.

Table 7-36 : Conditions of public toilets in MCJ jurisdiction

Area	467 km ²
Population	3,073,350 as of Census 2011
No. of public toilets	150
Construction and O&M	Type 1 : MCJ constructs and carries out O&M Type 2 : MCJ constructs, and O&M is outsourced to the private sector Type 3 : Private sector constructs and carries out O&M too by BOT
Office in charge under MCJ	Commissioner Health and Sanitation
User fee	Type 1 : Free Types 2/3 : Free for urine, 2Rs. for defecation, 3Rs. for shower, Rs.5 for defecation and shower
Challenges	Not enough clean public toilets in the old city where tourist resources concentrate. Poor conditions of BOT-public toilets. Not enough spaces for latrine construction in urban slums.

In Jaipur City, many public toilets employ a user-pays system. Most of them are managed by Sulabh International. Although some expressed unfavorable views on Sulabh International due to its monopolistic nature, public toilets under the management of Sulabh International, where the team investigated, are all very well maintained.

It is worth noting that Sulabh International utilizes the profits for operation of public toilets in slum areas without charging user fees as seen in the next table (PT7). With its own organizational mission, Sulabh International greatly contributes to improvement of sanitary facilities in India.

Table 7-37 : Field investigations on public toilets in Jaipur City¹⁷

JAIPUR Public Toilet		PT1	PT2	PT3	PT5	PT6	PT7	PT8
Construction		1995	2000	2002	2014	2000	1993	-
Financed by		MC	MC	MC	JDA	Private	MC	MC
Cost of Construction	Rs	3,500,000	2,700,000	1,900,000	3,900,000	-	-	-
Contract System		Subcontract without payment	Subcontract without payment	Subcontract without payment	Subcontract with payment (18,000Rs/mth)	BOT	Cross Subsidy	Subcontract without payment
Operation by		NGO(SI)	NGO(SI)	NGO(SI)	NGO(SI)	Private Company	NGO(SI)	NGO(SI)
Pay or Free		Pay	Pay	Pay	Free	Pay	Free	Pay
Electricity and Water bill born by		MC	MC	MC	JDA	MC	-	MC
Charge	Urine	Rs 2	2	2		2		2
	Shower	Rs 3	3	3		2		3
	Shower+Feces	Rs 5	5	5		2		5
Operation Hour		5-22	5-22	5-22	8-22	5-22	9-21	5-22
Care Taker	人	2	2	2	1	1	1	1
Cleaner	人	3	3	3	1	0	0	2
Salary for Caretaker	Rs/mt	6,000	6,000	6,000	6,000	6,000	4,500	6,000
Daily Users	P/day	2,500	3,500	1,500	500	200	500	
Connect to		Sewage Pipe	Sewage Pipe	Sewage Pipe	Sewage Pipe	Septic Tank	Septic Tank	Septic Tank
Cleanliness		⊙	⊙	○	⊙	×	○	△
Female Toilet		○	○	○	○	×	○	○
MC: Municipal Corporation								
JDA:Jaipur Development Authority								
BOT: Built Operate and Transfer								
SI: Sulabh International								

a.2 Varanasi City

In Varanasi, public toilets are planned to be built under JICA-funded Ganga Action Plan (GAP). Forty five public toilets are scheduled to be constructed during the GAP Phase 1, and 35 among them will be connected to sewerage, while the remaining 10 will be connected to septic tanks. The total project cost is approximately Rs. 52 million; the average construction cost of public toilets is Rs. 1.16 million per facility.

The tender for Phase 1 was announced in 2013, and five private entities placed bids. However only one entity, i.e. Sulabh International, met the conditions of working experience in O&M of public toilets and the other four entities became disqualified. As of 17 Nov. 2014, the construction has been started in areas where land acquisition process is over.

Table 7-38 : Construction plan of public toilets in Varanasi

Area	79.79 km ²
Population	1,201,815 as of Census 2011
Construction plan of public toilets	Phase I: Construction of 45 public toilets (awarded to Sulabh International) Phase II: Construction of 40 public toilets (tender started 28 Nov. 2014)
Construction method	Both construction and O&M is outsourced to private entities. However, 85% of construction cost is born by the central government and the remaining is borne by the state government. As for O&M cost, user charges are expected to be utilized.
O & M method	By private entities. The cost is covered by user charges.
User charges	Rs.2, Rs.3, Rs.5 per use
Challenges	Not enough space for public toilet construction in urban slums.

¹⁷ Sewage fees of PT1-PT5 are born by municipal corporation whereas either NGO or the private company, whichever in charge, is responsible for emptying pits of pit latrines, i.e. PT6-8.

All public toilets in Varanasi City were constructed by public funds, while O&M of those are outsourced to private entities. All of them expect users to pay user fees. Generally speaking, public toilets maintained by Sulabh International were in good condition, and indeed highly appreciated by the Municipal Corporation of Varanasi.

The Municipal Corporation is in the process of sewerage construction, and most public toilets in the central part of the city are connected to sewerage system, while only a few are connected either to septic tanks or to pits.

Table 7-39 : Field investigations on public toilets in Varanasi City

Varanasi Public Toilet		PT1	PT2	PT3	PT5
Construction		-	2010		
Financed by		MC	MC(JICA)	NEDA	NEDA
Cost of Construction		Rs -	-	-	-
Contract System		Subcontract without payment	Subcontract without payment	Subcontract without payment	Subcontract without payment
Operation by		NGO(SI)	NGO(SI)	Private Company	Private Company
Pay or Free		Pay	Pay	Pay	Pay
Electricity and Water bill		MC	MC	MC	MC
Charge	Urine	Rs 2			1
	Shower	Rs 3	2	3	3
	Shower+Feces	Rs	5	5	
Operation Hour		24 hours	6-22		
Care Taker		人 1	2	1	1
Cleaner		人 1	3	1	0
Salary for Caretaker		Rs/M 3,200	4,500	3,000	1,800
Daily Users		P/D 1,000	300	150	Few
Connect to		Sewer Pipe	Sewer Pipe	Septic Tank	Pit Latrine
Cleanliness		○	○	×	×
Female Toilet		○	○	×	○
Remarks		Tourist Area	Tourist Area		
NEDA:New and Renewable Energy Development Authority					
MC: Municipal Corporation					

a.3 Tiruchirappalli City

The state government has constructed public toilets in urban areas and community toilet complexes (CTCs) in rural areas (one per GP) using state funds with an aim to eradicate manual scavenging and open defecation. Compared to the other two states, more progressive approaches are taken in Tamil Nadu.

As to public toilets and CTCs, not only construction cost but also costs for major repairs and sludge disposal are also borne by the public sector in Tamil Nadu.

Table 7-40 : Conditions of public toilets in Tiruchirappalli, Tamil Nadu

Area	167.23 km ²
Population	916,674 as of Census 2011
No. of public toilets	20 public toilets 395 CTCs
Construction method	Construction and O&M of public toilets are done by the City Corporation. CTCs are constructed by the City Corporation, and maintained by user/community groups.
O&M method	Basically, free to use. As for NAMMA toilets in the city center, O&M cost is born by private companies who advertise their businesses on the toilets.
User charges	Free
Challenges	Many good practices such as NAMMA toilets and CTCs

In Tamil Nadu, with the vision to clean the cities by eradicating open defecation by 2023, user-friendly, hygienic and safe public toilets, i.e. NAMMA toilets, were developed. Now the state government tries to diffuse these NAMMA toilets to all cities in the state.

Public toilets in urban areas are free to use and basically connected to sewerage system.

Table 7-41 : Field investigations on public toilets in Tiruchirappalli City

Tamil Nadu Public Toilet			PT1	PT2	PT3
Construction			2011		2000
Financed by			CC	CC	CC
Cost of Construction	Rs		1,000,000	-	-
Contract System		Direct Operation		Direct Operation	
Operation by			CC	CC	SHG
Pay or Free			Free	Free	Pay
Electricity and Water bill			CC	CC	CC
Charge	Urine	Rs			1
	Shower	Rs			2
	Shower+Feces	Rs			
Operation Hour			4-21	24 hours	4-23
Care Taker	人		1		1
Cleaner	人		3	2	2
Salary for Caretaker	Rs/M		2,000	-	2500
Daily Users	P/D				800
Connect to			Sewer Pipe	Sewer Pipe	Sewer Pipe
Cleanliness			○	○	○
Female Toilet			○	○	○
Remarks			NAMMA	NAMMA	Free for Child and Elder
CC: City Council					

b. Community Toilets

For those who do not have enough land to construct IHHL, the governmental organization, i.e. slum boards and NGOs have supported construction of community toilets in urban low income settlements, whereas TSC and NBA did so in rural areas. However, according to the evaluation report of TSC, compiled by the Planning Commission in 2013, utilization of community toilets are limited in several states such as Maharashtra, Gujarat, Tamil Nadu and a part of Haryana. In fact, community toilets investigated by the team were concentrated in Tamil Nadu. Also, all of the respondents of KAP survey who utilize community toilets were located in Tamil Nadu.

In this section, noteworthy examples of community toilets are introduced.

b.1 Shared individual latrines in slum areas in Jaipur City

As detailed in “Good Practices”, women in Jalan Kunda of Jaipur City formed women’s group named Jagrati Mahila Munch (Awareness Women’s Platform) with the support of an NGO, and tried to improve sanitation in the area. Jagrati Mahila Munch motivated women in the slum to build individual household latrines, but which are shared by neighbouring four to five households. The households we visited had built two-soak-pit latrines at a cost of Rs. 8,000 to Rs. 10,000 within their premises, and the latrine is shared with other four families living nearby. Water for flushing is brought by users, and latrine is regularly cleaned by the households using it in turn. Cost of sludge disposal is borne by all the families jointly.

b.2 Community toilets in urban slum in Tiruchirappalli City

This is a slum of 180 households that achieved status of becoming the first open-defecation-free slum in India. A community toilet was constructed in 2000 with support of Gramalaya (local NGO) and WaterAid. User fee is Rs. 1 for the slum dwellers and Rs. 2 for outsiders. The elderly, people with handicaps and children under 10 years old can use it free of charge. O&M is done by seven self-help groups (SHG) in this area. Female cleaners for female toilets and male cleaners for male toilets, who are also dwellers in this slum, are employed to clean the toilets; Rs. 2,500 are paid to them monthly. Sewerage charge and electricity are paid by the city corporation.



View of the community toilet



Children’s toilets

b.3 Integrated Sanitary Complex for Women (ISCW) in Tamil Nadu

In Tamil Nadu, ISCW was constructed in every GP with support from the state government. User groups were encouraged to be formed and to undertake O&M to ensure the sustainability of the ISCW. The pictures below are of ISCW (facility with toilets, bathing space and laundry space) of Munikandam GP in Tiruchirappalli District. Opening hours are from 6 a.m. to 7 or 8 p.m., and approximately 40 households who do not have IHHL in this GP use this ISCW regularly. It is free to use and O&M including cleaning is carried out by members of the user group in turn. Cost for sludge disposal is born by the GP.



b.4 Findings from KAP Survey

Among 450 households of KAP Survey, 62 households of Tamil Nadu use community toilets regularly. The answers of KAP Survey to those 62 households are summarized below. Importance of ownership (own management) is clearly seen in the fact that the satisfaction level is high for community toilets managed by SHGs whereas that is low for community toilets managed by local authorities.

Table 7-42 : Average distance to community toilets (minutes)

Distance to community toilet (minutes)	Urban	Semi-urban	Rural	Total
	6.1	7.6	10.0	6.6

Table 7-43 : Managers of community toilets

Manager of community toilets	Urban	Semi-urban	Rural	Total
NGOs	10	2	0	12
Local authorities	13	17	1	31
SHGs	19	0	0	19
Total	42	19	1	62

Table 7-44 : User satisfaction by different management

Satisfaction level by different management	By NGO	By Local authorities	By SHGs	Total
Very satisfied	5	4	13	22
Satisfied	5	7	6	18
Unsatisfied	1	6	0	7
Very unsatisfied	1	14	0	15
Total	12	31	19	62

7.4.2 Operation and Maintenance

a. Public Toilet

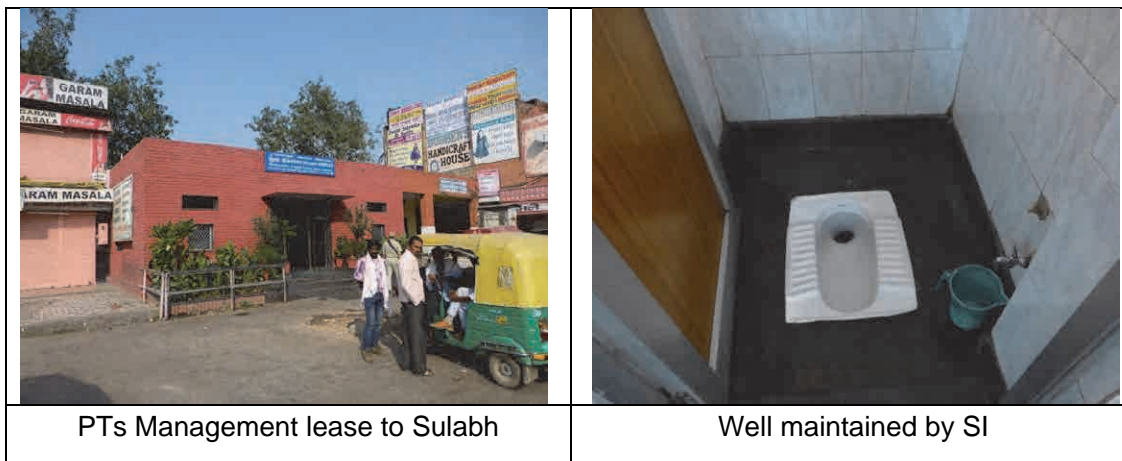
There are several types of operation and maintenance of PTs in India. One of these is Sulabh Method.

In late of 1980's, Sulabh International has introduced a user-pays PT concept. Many local governments prefer this operation and maintenance system, since there were a lot of problems for local government to operate by themselves.

Table 7-45 : Operation and Maintenance of PTs by Sulabh International (SI) (Management Lease)

Stakeholders	Role, Responsibilities
Municipality	Acquisition of land Construction cost Extraction of night soil from PTs either by sewerage pipe or extraction of sludge from septic tank, pit latrine and so on Electricity and water bills
NGO (Sulabh International)	Design and construction of PTs Management lease contract for 30 years with municipalities Collection of fees from toilet users Maintenance of PTs Cleaning and minor repairs of PTs
Remarks	Fee will be proposed by SI and approved by municipalities. SI will not pay any money to municipalities.

It was found that PTs that are appropriately operated and maintained were manageable with fees collected from toilet users in case they were located in certain urban areas¹⁸.



In 1990's, some of local governments considered operation of PTs as being profitable and stopped investing in construction of PTs with their own budget, and instead, started utilizing private funds. Build-operate-transfer (BOT) is a contract system that utilizes private funds for infrastructure development.

Under this system, a PT will be constructed by a private company, then private company is also responsible for maintaining, operating, re-investing in certain years. At the end of the contract period, PTs will be handed over to the local government.

Table 7-46 : General Terms of BOT Contract

Stakeholders	Role and Responsibility
Municipality	Acquisition of land Technical specifications (setting maximum fee) Approval of design of PTs Monitoring

¹⁸ PTs in certain urban area have around 1000 users a day. Assuming the average fee is 2 Rs/person/times, monthly income will be 2Rs x 1000 persons x 30 days =60,000 Rs/month. This is more than enough to cover cost of cleaning worker and/or controller.

Contractor	Money for initial investment (for construction of PTs) Construction of PTs Fee collection rights for certain period. Collection of fees from users Repairing of damages caused Daily cleaning, maintenance and operation of the toilets Electricity and water bills Discharging of night soils from septic tank and pit latrine
Remarks	Contractor should submit performance bond before signing contract PR rights might be included.

The study team visited a PT which was constructed and maintained under a BOT contract in Jaipur in November 2014. Following are the pictures taken during the team visit and both operation and maintenance condition were observed to be poor. It seems not much funds are utilized to maintain PTs in good conditions. Furthermore, quality of the caretaker is also below standard.



PT constructed and operated by BOT



Conditions of facilities are poor

According to Jaipur Municipal Corporation, after the BOT contract period is over, operation contract will not be renewed with current contractor. JMC's intention is to conclude a contract with a better and politer PT operator such as SI.

b. Community Toilets (CTs)

Many CTs were constructed at slum areas in urban area where there is no space for constructing individual toilets. In rural areas, many CTs were constructed at people gathering place such as local government offices and so on. These toilets are provided free for users, there was less ownership of community people, as a result, there were problems with operation and maintenance.

Indian Government has changed its policies for providing CTs which all the CTs should be operated and maintained by the community that uses the CT and not by local government.

In Tamil Nadu State, women groups were formulated and they are responsible for operation and maintenance of CTs. Then, state government has prepared fund to construct one CT in every GP. CTs are well operated and maintained in Tamil Nadu State and the following is an outline of one

type of CT in Tamil Nadu.

Table 7-47 : Integrated Women’s Sanitary Complex (IWSC) in Tamil Nadu

Stakeholders	Role and Responsibilities
State Government	Construction cost (one in each GP) Standard specifications and design (70m ² /complex, 8~14 toilets, showers, washing table) Monitoring
Gram Panchayat	Connections of electricity and water Electricity and water bill Monitoring Supervising construction of IWCT
User Group	Formulation of user group from Woman Self Help Group Operation and maintenance of IWSC Collection of users fees Minor repairs of damaged CTs Cleaning and maintenance of CTs Extraction of sludge
Remarks	Construction started in 2001 (Cost 225,000Rs/CT) Major repairs in 2011 (1.7 billion Rs)



Washing facilities are provided



Front view of IWSC

7.4.3 Treatment of Night Soil

a. Treatment of Night Soil in India

In India, night soil is treated as shown below.

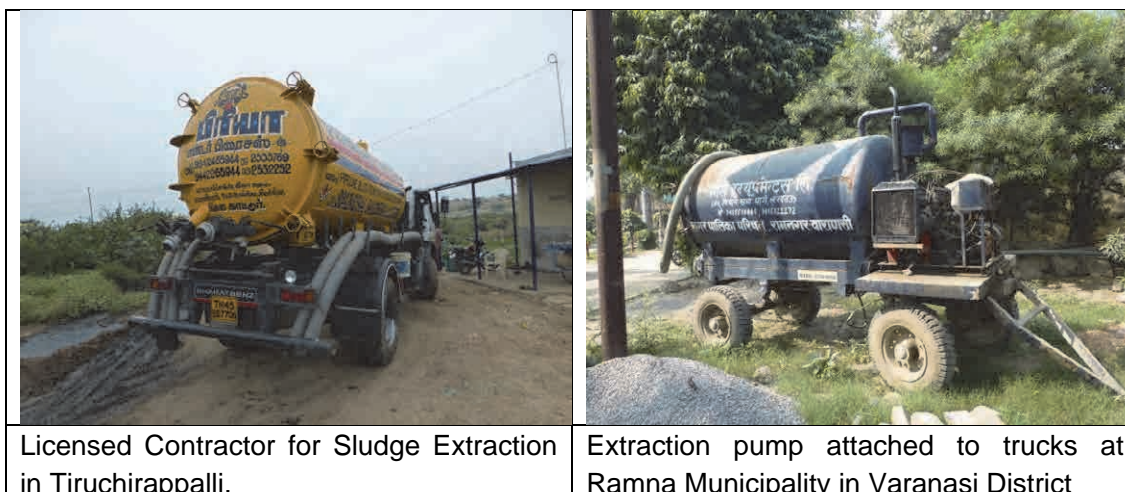
Table 7-48 : Night Soil Treatment in India

	Connection to	Treatment	Necessity of Desludging
Off-site Treatment	Sewer pipe	STP (sewerage treatment plant)	—
	Sewer Pipe	Discharge to open drain	—
On-site Treatment (Decentralized)	Septic Tank	Anaerobic treatment	Yes
	Soak pit latrine	Anaerobic treatment	Yes, but less frequent

Treatment)	Compost latrine (ecosan)	Anaerobic treatment	No, but need to remove compost
Open Defecation	Ground surface	Natural decomposition	No

In general, the greater the treatment applied to the night soil, the greater the volume of sludge that will be generated. It might be critical that septage management in urban area became more and more important to prevent environmental pollution to surroundings.

Following equipment are used to extract sludge from septic tank or pit latrine in urban area.



These equipment are available in India and it is possible for local government to conduct septage management practically. Important issue for the local government is to control extracted sludge to transport appropriate treatment plant.

b. Maintenance of IHHL

The following are the results obtained through KAP study in terms of IHHL.

Table 7-49 : Experience of Extraction of Sludge

Extraction of Sludge	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Yes, Conducted	7	26	11	44
So far, No.	110	87	37	234
Do not know	0	0	1	1
Others	0	0	4	4
Total	117	113	53	283

Table 7-50 : Where to Send the Extracted Sludge

Extraction of Sludge	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Used as a Fertilizer	3	12	1	16
Disposed to Bush	0	9	1	10
Disposed to river, lake	0	2	1	3

Disposed to excavated pit	1	1	2	4
Ask local government to receive	1	0	0	1
Do not know	2	2	6	10
Total	7	26	11	44

234 households (HH) out of 283 HH who own individual latrines have never extracted sludge so far. And only 44 HH have experienced sludge extraction.

Regarding the question regarding treatment methods of extracted sludge, only one HH replied that he has asked local government to treat, and others are treated it by themselves or disposed in a nearby empty place.

Following are the average cost of sludge extraction.

Table 7-51 : Average Sludge Extraction Cost

Average Cost	Rajasthan	Uttar Pradesh	Tamil Nadu	Average
Urban Area	-	319	800	327
Semi Urban Area	2,160	5,000	1,125	2,030
Rural Area	1,600	827	1,750	1,135
Average	2,000	833	1,367	1,193

c. Guide Line on Septage Management in Tamil Nadu¹⁹

Tamil Nadu State Government has formulated “Guideline of Septage Management” in September 2014 and the following are the contents. In fact this is the first guideline on septage management prepared among all of the states in India.

Table 7-52 : Operative Guidelines for Septage Management for Local Bodies in Tamil Nadu

Table of Contents	Contents
1. Introduction	The need for decentralized septage management system in Tamil Nadu
2. Operative Guidelines	
2-1. Design and Construction of Septic Tank	Appropriate and standard design of septic tank
2-2. Pumping and De-sludging	Periodic and routine de-sludging based on capacity of septic tank
2-3. Septage Transportation	Location of STP for transportation and certified and licensed transporter.
2-4. Treatment and Final Disposal	Typical design of decantation facility and quality check of incoming sludge
2-5 . Information Education and Communication	IEC for municipal staff, residents, and private vendors.
2-6. Fee and Charges	Standard treatment fee
2-7. Record Keeping	Monitoring system

This guideline was distributed from Tamil Nadu State Government, Commissioner of Municipal

¹⁹ MOUD has published ‘Advisory Note on Septage Management’ on January 2013 and distributed to each state to enhance septage management to be part of City Sanitation Plan. Each city will formulate City Sanitation Plan referring both this advisory note and guideline.

Administration, to every urban and local government in Tamil Nadu State. Therefore, each and every urban and local government should follow this guideline and formulate necessary plant to implement appropriate septage management.

7.5 Awareness Raising and IEC Activities for Behavioral Change

a. Sanitation and Hygiene Advocacy and Communication Strategy Framework (SHACSF)

MODWS formulated Sanitation and Hygiene Advocacy and Communication Strategy Framework (SHACSF) for five years from 2012 to 2017 with support from UNICEF. Four critical sanitation and hygiene behaviors targeted in SHACSF are as follows.

- Building and use of toilets.
- The safe disposal of child faeces.
- Hand washing with soap after defecation, before eating or preparing food and after handling child faeces.
- Safe storage and handling of drinking water.

SHACSF also states that the actual activities to raise awareness and encourage behavioral change are divided into three distinct phases, i.e. raising awareness at national level, advocacy at state level, and social and behavioral change communication at district, block, village/GP level.

b. Raising awareness at national level

Throughout TSC and NBA, MODWS along with UNICEF have carried out awareness raising activities at national level rather actively. Especially from 2000 onwards with the rapid dissemination of TV and radio, public advertisements employing famous personalities became popular. The major activities are listed in the table blow.

Table 7-53 : Public advertisement through TV and Radio

Year	Programme	Agency	Name of Personalities involved, if any
2014	Swachhh Bharat Abhiyaan	MODWS	<ul style="list-style-type: none"> • Mary C Kom (Boxer) • Amitabh Bachchan (Actor) • Salman Khan (Actor) • Aamir Khan (Actor) • Priyanka Chopra (Actress) • Sachin Tendulkar (Cricket player)
2014	Poo to Loo Initiative- aimed at encouraging children to use the lavatory	UNICEF	<ul style="list-style-type: none"> • Animation
2013	UNICEF's Brand Ambassador in India, Pakistan, Sri Lanka, Bangladesh and Nepal.	UNICEF	<ul style="list-style-type: none"> • Sachin Tendulkar (Cricket player)
2012	Propagating construction and use of toilets, etc.	UNICEF/ MoRD, (Deptt. Of Drinking Water and Sanitation)	<ul style="list-style-type: none"> • Vidya Balan (movie actress)

Year	Programme	Agency	Name of Personalities involved, if any
2010	National School Sanitation Initiative to promote cleanliness in all Central Board of Secondary Examination (CBSE) schools	Ministry of Human Resources Development	• Aamir Khan (movie actor)
2010	Incredible India with focus on the ubiquitous problems of littering and sullyng public spaces have spots on television and radio, to take on litterbugs and the practice of urinating and spitting in public places.	Ministry of Tourism	• Aamir Khan (movie actor)
2009	Disposal of child excreta - Clean India Radio Public Service Advertisement (PSA)- in different Indian languages	Ministry of Rural Development (MoRD)/UNICEF	---
2009	Pride in a toilet for women - Clean India Campaign TV PSA-in different Indian languages	MoRD/ UNICEF	---
2009	Toilet use - Clean India Campaign TV PSA-in different Indian languages	MoRD/ UNICEF	---
2008-09	Use a bin - Clean India Campaign TV PSA-in different Indian languages	MoRD/ UNICEF	---
2008	Hand washing day TV/Radio PSA-in different Indian languages	MoRD/UNICEF	• Sachin Tendulkar (Cricket player)
2004	Six TV spots based on the classic Hindi film Sholay. The treatment is humour and parody based and focuses on hand washing after defecation. The PSA series features Kapil Dev for the take-away message	MoRD/ UNICEF	• Kapil Dev (Cricket player)

c. Advocacy at state level

According to SHACSF, the purpose of advocacy at this level is to mobilize state-level officials, media, civil society, etc. and to increase knowledge of them on sanitation issues and influence key decision makers.

In addition, the Constitution clearly stipulates that the water and sanitation is under state jurisdiction, and in fact, the state initiative matters tremendously even for the national program such as TSC and NBA. The enormous difference in the IHHL rate between states revealed in

Census 2011 is partly because of the fact that the progress of TSC/NBA differed among states. From now on, the advocacy at state level becomes more important for the effective implementation of SBM.

d. Social and behavioral change communication at district, block, village/GP level

After the awareness raising at national level and advocacy at state level, social and behavioral change communication at district, block, village/GP level shall be taken up seriously.

The biggest challenge at district and block level is said to be lack of human resources, i.e. capable district-level and block-level officers according to MODWS and UNICEF. The state government of Tamil Nadu and NGOs are now trying to converge with other schemes that have been successful in behavioral changes to confront the same problems.

On the other hand, there are many good examples of effective behavioral change communication initiated by villages/ GPs. Success at GP level shall be communicated to other GPs through district-level/ block-level institutions.

Under KAP Survey, information sources for sanitation were questioned; the findings are summarized below. From the questions, it became apparent that TV-based awareness raising dominates other sources, and reliance on TVs is high from the table below²⁰.

²⁰ According to Census 2011, the diffusion rates of TV are as follows.

TV penetration rate	Rajasthan	Uttar Pradesh	Tamil Nadu	India
Rural	25.56	23.54	85.32	33.37
Urban	74.48	66.30	88.70	76.70
Total	37.58	33.21	86.95	47.22

Table 7-54 : Information source of sanitation for the past one year (multiple answers)

Sources	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Village chief/ panchayat members	26	24	51	101
Neighbor	63	34	20	117
Government officers	6	18	37	61
ASHA	44	33	19	96
ANM	46	27	49	122
Anganwadi worker	61	54	32	147
Relatives	45	37	12	94
Schools/ teachers	25	41	66	132
Religious leaders	23	11	3	37
NGO/ agency workers	12	9	49	70
Radio	19	33	66	118
Poster/ picture	67	6	29	102
Billboard advertisement	28	13	34	75
Television advertisement	134	123	115	372
Community meetings	6	0	16	22
Health center	14	8	50	72
Anganwadi	17	4	13	34
Others	2	5	1	8
No particulars	3	3	0	6

Table 7-55 : Trustworthiness of information sources

Sources	Rajasthan	Uttar Pradesh	Tamil Nadu	Total
Village chief/ panchayat members	1.18	1.36	1.47	1.37
Neighbor	1.09	0.96	1.33	1.13
Government officers	0.76	1.11	1.64	1.23
ASHA	1.21	1.42	1.65	1.43
ANM	1.30	1.39	1.75	1.49
Anganwadi worker	1.40	1.64	1.47	1.50
Relatives	1.40	1.06	1.36	1.28
Schools/ teachers	1.10	1.64	1.77	1.52
Religious leaders	0.71	0.89	0.62	0.72
NGO/ agency workers	0.96	0.91	1.42	1.13
Radio	1.05	1.40	1.67	1.41
Poster/ picture	1.69	1.13	1.10	1.31
Billboard advertisement	1.36	0.74	1.23	1.11
Television advertisement	1.83	1.87	1.77	1.82
Community meetings	1.15	1.07	1.53	1.25
Health center	0.92	1.36	1.67	1.35
Anganwadi	1.22	1.03	1.63	1.28

(Note) Respondents give points zero to two, while zero indicates "least trustworthy" and two indicates "most trustworthy." The figures are average points for each source.

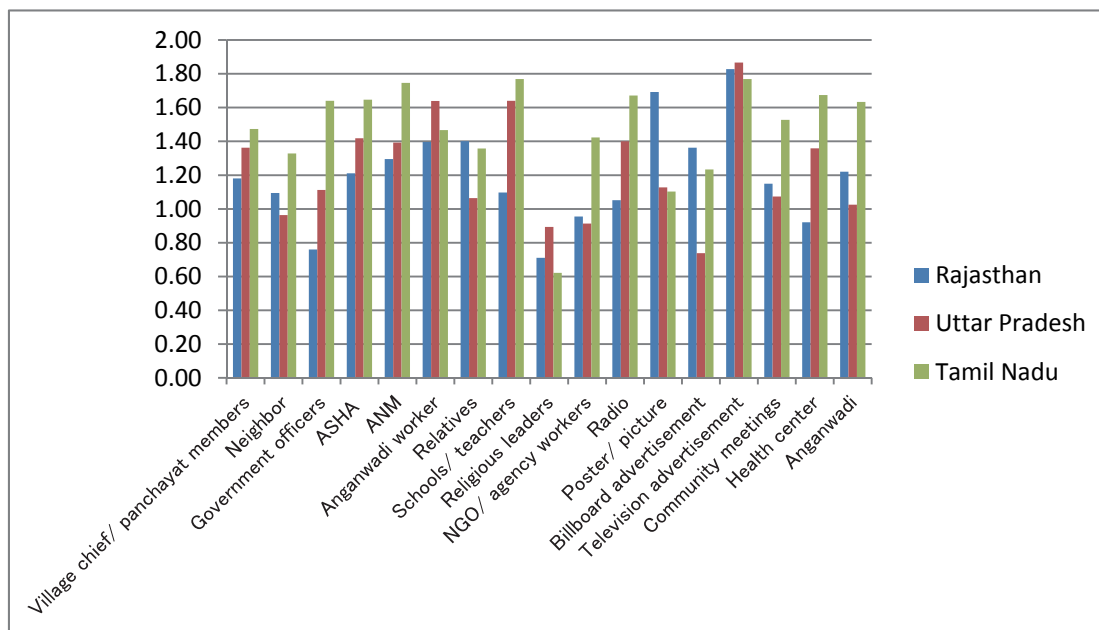


Figure 7-3 : Trustworthiness of information sources

In Tamil Nadu, the public channels, i.e. government officers, ASHA and ANM, gained higher points after TV advertisement and it indicates that the trust in the public sector is firmly built there.

7.6 Sanitation and Gender Considerations

a. Difficulties faced by women

Through KAP Survey, information regarding difficulties especially faced by women was collected. The following parts explain the findings of the survey.

a.1 Difficulties faced by women when using public toilets/ community toilets

As already stated, all of the 62 respondents who utilize community toilets identified in the KAP survey were from Tamil Nadu. The disaggregation by gender is as seen in the table below.

As to satisfaction level, that of women is a little higher than that of men. Among 62 users, 20 users have ever experienced the situation that although they went, they were unable to use it. The reasons for such inconvenience are mainly physical, i.e. “closed down” and “some parts are missing” but other reasons such as “smelly, dirty and impure” and “not safe/ no privacy” were raised by a few, too.

Table 7-56 : Use of community toilets by gender

Use of community toilet	Urban		Semi-urban		Rural		Total	
	Male	Female	Male	Female	Male	Female	Male	Female
	19	23	10	9	0	1	29	33

Table 7-57 : Satisfaction level of community toilet users by gender

Satisfaction level	By NGO		By Local authorities		By SHGs		Total		
	Male	Female	Male	Female	Male	Female	Male	Female	Total
Very satisfied	2	3	1	3	3	10	6	16	22
Satisfied	2	3	5	2	3	3	10	8	18
Unsatisfied	1	0	4	2	0	0	5	2	7
Very unsatisfied	1	0	7	7	0	0	8	7	15
Total	6	6	17	14	6	13	29	33	62

Table 7-58 : Satisfaction level of community toilet users by gender

Reasons	By NGO		By Local authorities		By SHGs		Total			
	Male	Female	Male	Female	Male	Female	Male	Female	Total	
Closed down	0	0	0	5	5	0	1	5	6	11
Some parts are missing/ broken	0	0	0	0	0	2	0	2	2	2
Smell/ dirty/ impure	1	1	2	3	1	1	4	5	9	
Not safe/ no privacy	0	0	0	2	1	0	1	2	3	
Didn't have money	0	0	0	1	0	0	0	1	1	
Total	1	1	7	11	2	4	10	16	26	

While the result of KAP Survey indicates that both men and women face the similar difficulties with regard to use of community toilets, the following views and opinions on difficulties especially faced by women were shared with the team during field investigation and interaction with villagers.

- In urban slums and low-income settlements, incidents of purse snatching and harassment are common. Women who usually wear gold are targeted.
- Since many people live in urban slums and low-income settlements, public toilets/ community toilets are very crowded especially in the morning time and in the evening time. Usually female members of households are busy in the morning, and they are unable to wait for long to use such crowded toilets, and therefore tries to refrain from defecation.
- Young people are vulnerable to teasing and harassment. When the situation is serious, police patrols are arranged.
- In order to secure safety, women usually go to community toilets with others. Especially children were accompanied by mothers.

a.2 Difficulties faced by women who practice open defecation

Difficulties especially faced by women while going to open defecation were asked during KAP Survey, and the results are summarized in the table below. While both men and women have faced physical difficulties, i.e. bitten by animals or being hurt or falling, women have experienced serious safety problems, i.e. someone attempting to molest them or being molested²¹.

²¹ Among 44 women who practice OD, as many as 11 women have said someone tried to molest them. One in four women experienced such a serious safety issue.

Table 7-59 : Difficulties faced while going to open defecation

Difficulties	Male	Female	Total
Bitten by snake, scorpion, dog, etc.	41	27	68
Hurting yourself or fallen	35	16	51
Teased by someone	4	6	10
Someone attempted to molest you	3	11	14
Molested by someone	0	2	2
Time wasting	2	1	3
Difficulties to find places for defecation	1	0	1
See human wastes here and there	0	1	1
Feel shamed	2	1	3
No difficulties	10	8	18

b. Reasons for constructing IHHL

As already stated, reasons for constructing IHHL were asked to 283 households who own IHHL under KAP Survey. The option “privacy and security for female members (220)” was selected by most respondents and the other options “pregnancy of female members (115)” follows. The sum of those answers relating to women, i.e. “privacy and security for female members (220)”, “pregnancy of female members (115)” and “children become physically mature (103)” made up 56 % of all answers (783).

Table 7-60 : Reasons for constructing IHHL

Reasons for constructing IHHL (multiple answers)	Urban	Semi-urban	Rural	Total
Program was offering subsidy	1	2	49	52
Someone told me that I had to	6	4	8	18
Had enough money to build	12	11	14	37
For sick/ old relatives	46	37	73	156
For privacy and safety of female members	63	61	96	220
Pregnancy of female household members	35	28	52	115
Children become physically mature	28	30	45	103
Social pressure	5	1	5	11
Construction of new house	10	15	6	31
Neighbor got one	0	0	0	0
Event (wedding/ funeral/ new year)	12	0	11	23
Had visitors from other villages	4	4	9	17

c. Decision makers of IHHL construction

Under KAP Survey, questions “Has your household ever thought about or discussed building a latrine for your family?” and “Who in your household would make the final decision to build a latrine?” were asked to 62 community toilet users and 102 people who practice open defecation.

The results show that three fourths of 164 households have thought about it. The final decision maker would be household heads in most cases of Rajasthan and Uttar Pradesh, while in Tamil Nadu, either household heads or all household members would be decision makers. On the contrary, there are few cases that wife was answered as the decision maker. Although women have great needs for IHHL, they are unable to decide to construct it. Under such a situation, the understanding of male household members, especially household head, would be essential for realization of latrine construction.

Table 7-61 : Consideration of IHHL construction

Consideration of IHHL construction (Present practice)	Rajasthan (OD)	Uttar Pradesh (OD)	Tamil Nadu (OD) (PT)	Total (n)	(%)
Have considered	22	29	30 41	122	74.4%
Have not considered	10	6	5 21	42	25.6%
Total	32	35	35 62	164	100.0%

Table 7-62 : Decision makers of IHHL construction

Decision makers (Present practice)	Rajasthan		Uttar Pradesh		Tamil Nadu		
	(OD)	(%)	(OD)	(%)	(OD)	(PT)	(%)
Household head	22	68.8%	28	80.0%	17	26	44.3%
Household head and his wife	2	6.3%	6	17.1%	0	3	3.1%
Wife	2	6.3%	0	0.0%	7	9	16.5%
All household members	6	18.8%	1	2.9%	11	24	36.1%
Total	32	100.0%	35	100.0%	35	62	100.0%

d. Realization of women’s development needs at GP level

In this section, how women’s development needs are raised and consolidated at GP level is analyzed based on field investigation and literature reviews²².

²² In this section, discussion is limited to the rural situation since 1) findings from the field survey are substantial

The figure below shows the flow of NBA. The starting point is to raise development needs at Gram Sabha and to be recognized as a consensus there to apply NBA.

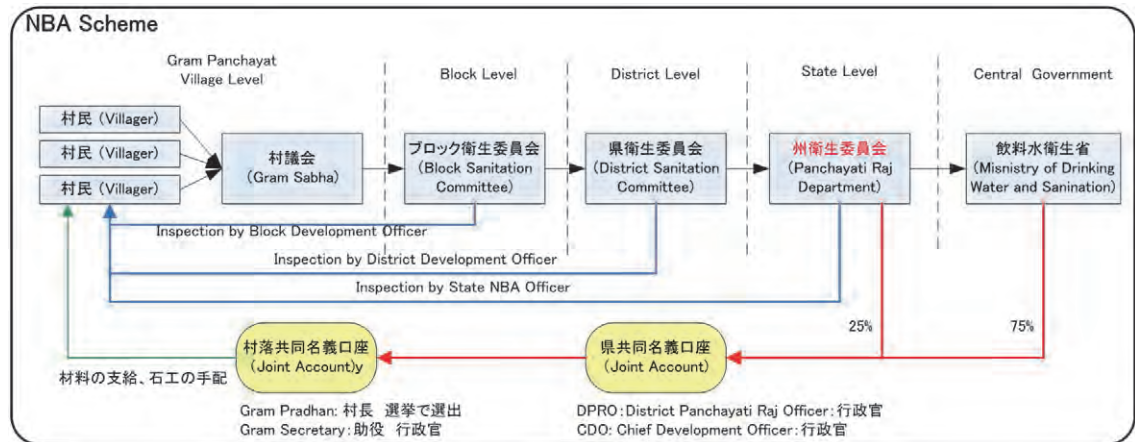


Figure 7-4 : Flow of NBA

The 73rd and 74th constitutional amendments in 1992 stipulate local democracy in order for further decentralization. From the view point of sanitation and gender, it is noteworthy that one-third of the seats in local bodies, in this case Gram Panchayat, are reserved for women. By these amendments, women's representation and influence are expected to be increased, and therefore their development needs will be realized through local political channels. However, the reality at ground level differs, and there are many cases reported that husbands in place of elected wives work as GP members. Also, in general, participation of female villagers in gram sabha is said to be as low as before.

In order to prioritize development needs regarding sanitation and latrine construction that are highly demanded by women, it is imperative to raise those issues at Gram Sabha by themselves through active participation in local democracy and then apply for the related national and state activities formally.

thanks to rich experiences of NBA and also 2) open defecation rate is higher in rural areas.

7.7 Main Findings

Throughout both the First Work in India (from 22nd Sep. to 1st Dec. 2014) and the Second Work in India (from 1st Nov. to 6th Dec. 2014), the team conducted both the qualitative study and the quantitative study through KAP survey as detailed in the previous section. In this section, the key findings which are logically deduced from numerous field findings are summarized below as a review of the field study. They are indeed essential to formulate the future cooperation plan of JICA.

7.7.1 Importance of Comprehensive Approach

The major challenge for eradication of open defecation is considered that **public health benefits are not perceived by people**. This finding is supported by the results of KAP survey, too. The figure below showing the perceived disadvantages of open defecation indicates few respondents consider open defecation as creating environmental and sanitation problems.

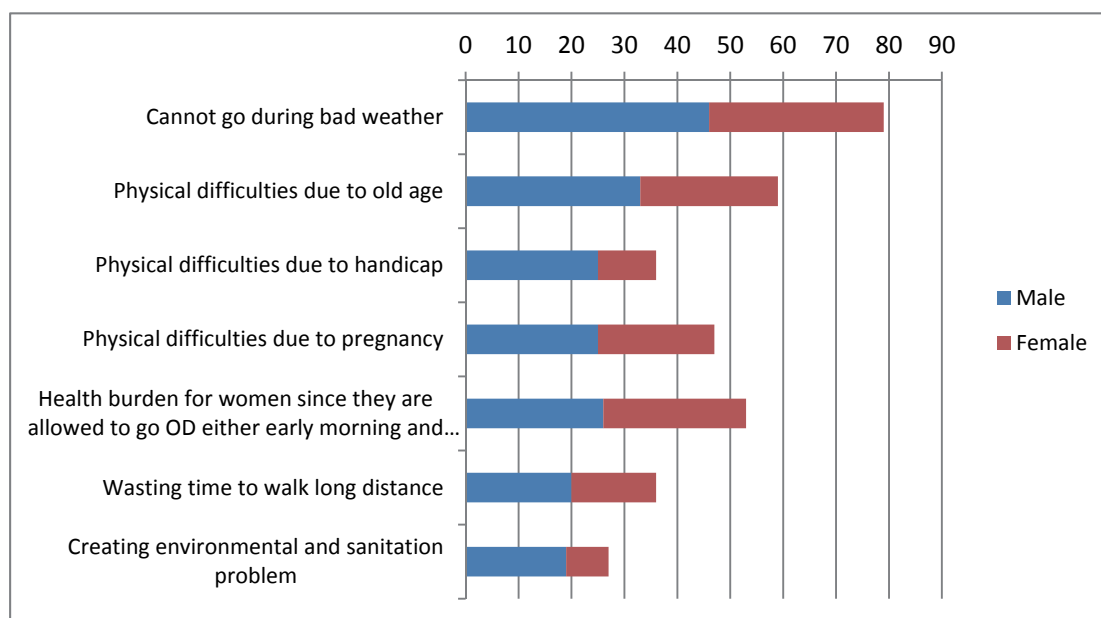


Figure 7-5 : Disadvantages of open defecation

The same tendency is observed from the answers to the question asking advantages of owning a latrine, too. While comfort and convenience are perceived as major advantages, “improved hygiene, health and cleanliness” is considered as secondary benefits as shown below. Only 120 (42%) out of 283 households who owns IHHL and 93 (55%) out of 168 households who do not own IHHL answered “improved hygiene, health and cleanliness” as advantages. The public health benefits, the fundamental benefits of IHHL, are not well realized by people.

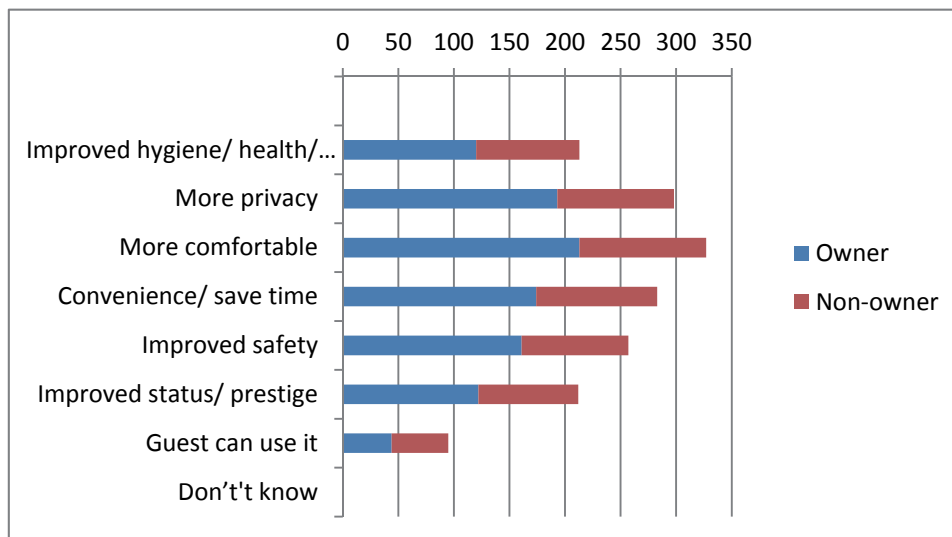


Figure 7-6 : Advantages of owning a latrine

To analyze the reason why the fundamentally important “public health benefits” are not well recognized, it is important to understand the fact that local communities either located in urban or located in rural areas have faced many sanitation problems other than construction and use of IHHLs. In fact, the team has often observed no proper drainage, blackish stagnant water here and there, heaps of uncovered wastes, etc.



Cookware soaked in blackish wastewater. No drainage around. (Ramhi GP in Varanasi District/ Visited on 21 Nov. 2014)



Common water facility in the slum. The surroundings were entirely wet due to the lack of proper drainage (the slum in Jaipur City/ Visited in 13 Nov. 2014)

Relating to the entire sanitation problems, the respondents are asked about issues needing urgent improvement²³, and the answers are summarized in the table below.

Table 7-63 : Issues needed urgent improvement

	Urban				Semi-urban				Rural				Total
	Rajasthan	Uttar Pradesh	Tamil Nadu	Sub-total	Rajasthan	Uttar Pradesh	Tamil Nadu	Sub-total	Rajasthan	Uttar Pradesh	Tamil Nadu	Sub-total	
Drinking water	188	62	80	330	157	38	15	210	226	294	84	604	1144
Access road and transportation	56	17	70	143	109	67	61	237	129	100	126	355	735
Drainage	112	45	148	305	145	113	95	353	110	250	198	558	1216
Latrine facilities	110	3	188	301	67	84	83	234	29	188	144	361	896
Waste collection services	134	79	71	284	114	61	48	223	109	146	128	383	890
Education facilities	56	43	34	133	23	3	16	42	41	57	13	111	286
Health facilities	26	44	96	166	19	1	14	34	33	16	61	110	310
Electricity/ cooking fuel	24	25	69	118	38	23	15	76	27	132	17	176	370
Employment opportunities	48	115	67	230	50	46	41	137	46	150	50	246	613
Overall function of local governments	26	17	77	120	13	14	62	89	0	17	79	96	305

(Note) Respondents give points five to one, while five indicates most urgently needed improvement.

²³ The actual question is “Which of the following do you think need urgent improvement? Rank top five items.”

People hope for urgent improvement in drainage and waste collection, too, in addition to drinking water. Under such conditions, construction of IHHL alone cannot actualize public health and sanitation improvement in the area. This, non-realization of public health benefits, attributes greatly to the problem of lack of urgency with regards to desire to install a latrine.

Under the SBM, the government plans to support not only construction of IHHL but also improvement of wastewater treatment and solid waste management in each community. It is highly advisable for JICA to formulate new support programs in line with the SBM by considering the importance of comprehensive approach.

7.7.2 Realization of Gender Needs

a. Intra-household gender inequality

As already detailed, women have faced serious privacy and security problems while using public/community toilets or practicing open defecation. In order to avoid such problems, needs for IHHL are especially high among women. Demand is generated among women first, and therefore they can be called **demand generators**. In fact, under KAP survey, the mostly cited reasons for constructing IHHLs are “for privacy and safety of female members”, “pregnancy of female household members”, etc.

At the same time, women as a member of community-based organization such as Self-Help Groups (SHGs) often play a role of **social mobilizers** or motivators to motivate people to construct and use IHHLs. In addition, in most cases, women clean IHHLs once IHHLs are constructed. Women are also **O&M operators**.

As a part of KAP survey, latrine owners were asked who was the final decision maker(s) who decided to construct the IHHL. The result shows that mostly household head (husband) is known as the final decision maker. Although women are demand generators, social mobilizers and O&M operators, their voices within households are not so well heard within households. This shows the distinct gender inequality exists in decision making processes within households, and it is important for male members to understand the needs of their female counterparts in the short-term. In the long-term, it is important to decrease such gender inequality by women’s empowerment through, for example, capacity development of SHGs and other women’s groups, and ultimately to actualize women’s demands for improved sanitation.

b. Intra-community gender inequality

In addition to intra-household gender inequality, gender inequality within a community is another hindrance for realization of women’s sanitation needs. As stated previously, for applying NBA, the starting point is to raise development needs at Gram Sabha and to be recognized as a priority there. The same process is going to be taken under SBM, too.

Although thanks to the constitutional amendments in 1992, one-third of the seats in local bodies are reserved for women, their influence at local level is still limited, and their participation in Gram Sabha remains low. It is concluded that the intra-community gender inequality has not been substantially improved yet. Women themselves shall change their thinking from reservation to participation, and they shall raise their voices collectively as well as formally through active participation in development activities of local bodies.

At the same time, the JICA support program shall include activities which contribute to reduce

gender inequality both at the household level and at the community level.

7.7.3 Applicability of Japanese Technology

The following is analysis of the applicability of various Japanese technologies for sanitary equipment and facilities in India.

a. Toilet

The unit bath which contains bath, toilet and washbowl was started to manufacture in 1960's in Japan because it is easy to assemble on site and necessary space is limited. Such unit baths are prefabricated systems whereby the main sections such as walls, ceiling, floor and equipment are manufactured in a factory and they are transported and assembled on site.



Unit Bath

These sections are made of water proof materials and suitable to use in wet conditions. Materials which are difficult to get dirty and equipment shape which are easy to wash are also introduced.

These unit baths have the potential to be adopted at high class condominiums or apartments which space should be utilized efficiently. Local manufacturing might make such unit baths competitive in terms of price in future.

Public toilets were manly constructed in parks, railway stations, on roadsides and/or in commercial areas.

Previously, operation and maintenance was the problem and it was difficult to keep clean.

In Japan, there is no permanent controller since it is free to use and periodical cleaning operation is conducted.



Japanese Public Toilet

There are male and female toilets separately and further, there are separate toilets for disabled persons. New type of materials for toilet or urinal, which is stain resistant and easy to clean are developed and used. Automatic cleansing systems are developed in order to save maintenance cost.

There is standard design of public toilet in India as well. Therefore, it is difficult to export Japanese design as it is. But there are chances to donate Japanese public toilets including the above technologies in order to promote progressive Japanese sanitary equipment and facilities.

b. Toilet Seat

In Japan, western style flush toilets are popular now.

And warm water cleaning toilet seat which is known as a 'washlet' and goes on top of a western style toilet is very popular as well. Origin was developed in USA for medical use but Japanese sanitary equipment manufacturer improve and added many additional functions such as cleansing, drying, deodorizing, automatic cover, health control and so on.



"Washlet"

Same as the pan, it has a smooth surface and is stain resistance.

Indian people have a habit to use water after defecation, therefore there is a possibility for the "washlet" function to be popular in future. High end users might be a target for this toilet seat at this moment but in future, there might be a big market according to the growth of the economy. Local manufacturing is the key factor for price to be competitive.

c. On-site Treatment

During Japan's rapid economic growth of the 1960s, nationwide water pollution caused serious social problems. The delay in construction of sewerage systems and the untreated gray water from households accounted for this problem.

Japanese *johkasou* system was developed where sewerage system is not connected in order to treat both night soil and grey water from households simultaneously in order to maintain sanitary living standards and appropriate quality of water bodies in public spaces.

At beginning, only night soil was treated but later, both night soil and grey water were treated by *johkasou*. Population served by sewerage system is around 77% and population served by *johkasou* is around 8.9 % as of 2013 in Japan.

In India, sewerage system is applying to big cities and construction of STP and pipe line is now progressing. But it takes time and money to serve the system to all the population in urban areas. There are several types of approved on site treatment systems such as septic tanks and two pit latrines. At this moment, these on site treatment systems applied to only night soil and grey water is discharged without treatment.

Japanese JOHKASO system can treat night soil and grey water at the same time, therefore, there will be advantages over the existing on-site treatment systems in India. Price is rather expensive at this moment, but manufacturing in India can reduce manufacturing cost and upon certain demand, further price down will be expected.

7.7.4 Administrative capacity of local bodies

As stated before, the comprehensive approach is imperative to improve sanitation in order to actualize the public health benefits. In India, rural local bodies and urban local bodies that are stipulated in the 73rd and 74th constitutional amendments in 1992 are in charge of such sanitation activities. In urban local bodies, there are three levels depending on population size, namely Municipal Corporation, Municipal Council and Nagar Panchayat, and those three kinds of local bodies do not overlap in terms of jurisdictional areas. On the other hand, as to rural local bodies, three tiers, namely Gram Panchayat (GP), the smallest administrative unit, that consists of a few indigenous villages, Block Panchayat that consist of a few GP, and District Panchayat which

consist of a few Block Panchayat. These rural local bodies are often called Panchayat Raj Institutions (PRIs).

In every urban and rural local body, elected members run local governments. To support them administratively, as seen below, each urban local body is equipped with administrative entity similar to Japanese municipal office, and this administrative body implements development activities including sanitation improvements in their jurisdiction. On the other hand, the administrative works at three levels of rural local bodies are carried out by field functionaries dispatched by the department of rural development in the State Government²⁴.

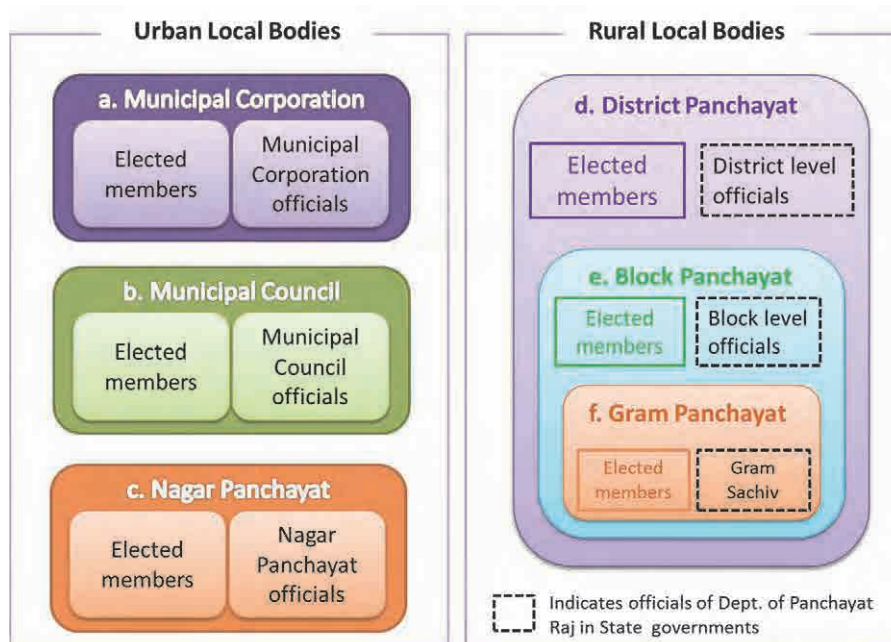


Figure 7-7 : System of Local Governments

During the field studies, the study team have interviewed officials and elected members of the following organizations.

Table 7-64 : List of urban and rural local bodies visited

Urban	Rural
Rajasthan	
<ul style="list-style-type: none"> Municipal Corporation of Jaipur (a) 	<ul style="list-style-type: none"> Zilla Parishad (District level office) of Jaipur District (d) Block development office of Dudu Block in Jaipur District (e)
Uttar Pradesh	
<ul style="list-style-type: none"> Municipal Corporation of Varanasi (a) Ram Nagar Palika (c) 	<ul style="list-style-type: none"> Divisional Panchayat Raj Office District Panchyat Raj Office of Varanasi District (d) Ramana GP in Varanasi District (f) Jayapura GP in Varanasi District (f)

²⁴ They are called Department of Panchayat Raj in many states.

Tamil Nadu	
<ul style="list-style-type: none"> • Commissionerate of Municipal Administration • Tiruchirappali City Municipal Corporation (a) • Musiri Town Panchayat (c) 	<ul style="list-style-type: none"> • Directorate of Rural Development and Panchayat Raj • District Rural Development and panchayat Raj Agency of Tiruchirappali District (d) • Manikandam GP in Tiruchirappali District (f)

(Note) (a)~(f) of this table correlates with (a)~(f) of the above figure.

The remarkable difference of administrative capacities between rural local bodies and urban local bodies is worth noting here. As stated, each urban local body is equipped with administrative entity similar to Japanese municipal office, and this administrative entity implements development activities including sanitation improvements in their jurisdiction. For example, Ram Nagar Palika in Varanasi District is the smallest among urban local bodies, but now it comes under the regional sewerage treatment development plan; it has a certain number of its own sanitation staff. Likewise, the organizational structure of most urban local bodies, even the smallest one, is firmly set, and they have faced no urgent organizational difficulties.

On the other hand, the administrative works at rural local bodies are carried out by field functionaries of the department in the State Government, and these functionaries mainly implement both national and state rural development programs. For example, from the interview with the officer in Block Development Office in Dudu Block in Jaipur District, it became apparent that only five Junior Technical Assistants and one Junior Assistant, who are temporary staff, look after development activities of 56 GPs under Dudu Block. The present system works as long as the field functionaries focus on duplicating the centrally-decided and designed development activities. However, when the urbanized pockets in GPs have faced serious sanitation problems similar to the ones urban local bodies have faced, the current system of rural local bodies are not able to solve them. The organizational structure of rural local body at even block and district level is not designed to tackle such urbanized problems. Census calls those areas with rapid urbanization under the jurisdiction of GPs “Census Towns”. In short, the sanitation problems of Census Towns are acute.

The issues of urbanized pockets in GPs are highlighted by the District Development Officer at Varanasi District Panchayat Raj Office as well as the Senior Water and Sanitation Specialist of World Bank. However, no effective intervention has been made so far.

It is recommendable to focus on urbanized pockets like Census Towns where needs are high but no effective intervention has been made. Also it is necessary to study further on the organizational structures of rural local bodies as a part of the detailed project planning study.

8 Future Cooperation Projects

In this chapter, the cooperation strategies for future projects are summarized, and then several project plans are proposed based in line with such strategies.

8.1 Cooperation Strategies

a. Cooperation in line with the National Programmes of India

The central government has supported the construction of IHHLs in rural areas since CRSP started in 1896. The same efforts continued under TSC started in 1999 and NBA started in 2012, and such series of national programmes contributed to improvement in rural sanitation to a certain extent. The new government elected in May 2014 just started new programme, Swacch Bharat Mission (SBM) and tries to improve the sanitation situation nationwide. NBA targeting rural areas, UIDSSMT targeting urban areas and other related projects are all integrated into SBM, and the SBM was launched massively in October 2014.

SBM consisting of both SMB (Gramin) and SBM (Urban) is the first national sanitation intervention covers both rural and urban parts of India. The major components of SBM are i) provision of IHHL incentives, ii) school and anganwadi toilets, iii) community sanitary complexes (CSC), iv) solid and liquid waste management, v) IEC for people's behavior change, vi) capacity development of officers in charge. For urban areas, public toilets are included instead of school toilets. The wide range of components reflects the comprehensive approach of SBM, and it is recommendable to formulate cooperation plan in line with SBM, the national programme of India.

b. Comprehensive approach for sanitation problems

Local communities, located either in urban or in rural areas, have faced many sanitation problems other than construction and use of IHHLs. In fact, the team has often observed no proper drainage, blackish stagnant water here and there, heaps of uncovered wastes, etc. Under such conditions, construction of IHHL and eradication of open defecation alone cannot actualize public health and sanitation improvements in such areas. As stated above, under the SBM, the government plans to support not only construction of IHHL but also improvement of wastewater treatment and solid waste management in each community. It is highly advisable for JICA to formulate new support programmes by considering the importance of comprehensive approach.

c. Collaboration and coordination among various stakeholders

Comprehensive intervention cannot be made by a single agency or a single program, but through cooperation and collaboration among different agencies and programmes. In rural areas, rural local bodies along with field functionaries of state governments who play a vital role in rural development need to collaborate with field officers such as ASHA and anganwadi workers who have been introduced by other national programs, local NGOs and community-based organizations like SHGs to make the interventions effective and comprehensive. Likewise, in urban areas, it is essential to collaborate and coordinate among urban local bodies, departments of state governments, slum development boards responsible for development activities of low income settlements and slums, local NGOs and community-based organizations. It is indeed imperative to pay special attention to the collaboration and coordination among various

stakeholders in order to make proposed interventions workable and comprehensive.

d. Gender consideration

Through the field studies, it became clear that the women play vital and multiple roles for the improvement of community sanitation as demand generators, as social mobilizers and as O&M operators. In fact, expectations from SBM and other donor projects towards women are tremendous. At the same time, it is revealed that there are two kinds of gender inequalities which hinder realization of women's sanitation needs, namely intra-household gender inequality and intra-village gender inequality. By considering the importance of gender perspectives in the Indian context, the JICA's cooperation plans shall include activities which contribute to reduce gender inequality both at the household level and at the community level.

e. Japanese Technology of Toilet Equipment and Systems

Japanese sanitation equipment has special functions such as strain resistance function, saving water consumption and so on. Particularly, warm water cleansing toilet seat known as washlet is famous and it is reported recently that many tourist come to Japan and purchase as souvenirs.

Some Japanese sanitation equipment suppliers have invested in India and are starting to manufacture in India for considering future big market. High end users will be targeted at first, but later, market volume is expected to be increased.

Johkasou is Japanese technology that aerobic treatment is added after anaerobic treatment; as a result, quality of effluent is high. *Johkasou* can treat both night soil and grey water simultaneously; this technology has an advantage over existing on site treatment systems in India. Its high price is currently holding back its potential for growth in India, however its price can be expected to become lower if it is manufactured in India. More market volume can be expected to further reduce the cost.

Japanese private companies are currently willing to invest in India and Japanese Government cooperation project will supply basic information regarding toilet related issues. Feasibility study on construction and operation of public toilets is proposed to formulate a future cooperation project.

f. Cooperation plan targeting Census Towns

As reiterated, the administrative works at rural local bodies are carried out by field functionaries of the department in the State Government, and these functionaries mainly implement national and state rural development programmes. This system works when the field functionaries implement the centrally-designed development activities, and indeed they will definitely contribute in eradicating open defecation through implementation of SBM.

The serious problem lies with the urbanized pockets in GPs like Census Towns, since although they have faced serious sanitation problems similar to the ones urban local bodies have faced, rural local bodies are not capable of tackling such urbanized problems. Moreover no effective interventions by the national and state governments and donor agencies have been made so far. It is recommendable for JICA to focus on urbanized pockets like Census Towns where needs are high but no effective intervention has been made. Also JICA shall highlight the comparatively advantageous features of Japanese cooperation with dedicated technology transfer in this regard.

8.2 Future Cooperation Projects

Future cooperation projects will be proposed as follows.

Future Cooperation Project	ODA scheme	Remarks
a. Integrated Sanitation Improvement Project along with Indian Policy "SBM"		<ul style="list-style-type: none"> ▪ Comply with Indian policy ▪ Integrated sanitation improvement
a.1 Rural Sanitation Improvement Project	Yen Loan	
a.2 Urban Sanitation Improvement Project	Yen Loan	
b. Women's Demand Responsive Project for Rural Sanitation	Technical Cooperation Project	<ul style="list-style-type: none"> ▪ Gender consideration
c. Feasibility Study on Public Toilets using Japanese Technology	Feasibility Study	<ul style="list-style-type: none"> ▪ Japanese technology on toilets
d. Integrated Sanitation Improvement Project in Census Towns	Technical Cooperation Project	<ul style="list-style-type: none"> ▪ Support urbanized villages ▪ Capacity development of local government staff
e. Kyoto-Varanasi 'Partner City' Related Cooperation Projects	Cooperation between local bodies	<ul style="list-style-type: none"> ▪ Partner City agreement between Kyoto and Varanasi in 2014.

Lending yen loans is explored first, and then the possibility of technical cooperation projects within the same state is considered. This approach, providing different types of support with the same objectives, is called program approach, and in this case learning from the technical cooperation projects is expected to be shared widely with the yen loans implemented in the same state.

For loan programs, loans are often requested from individual states and then counterpart agency would be the relevant departments of the state governments. However, since JICA has already implemented Ganga Action Plan Project, the proposed project **a.2** in the above table shall be a part of the next phase of Ganga Action Plan project which would include the construction of a sewerage treatment plant as originally planned but also other components listed in a.2. As a related project, **b** is proposed in the same area, Varanasi in Uttar Pradesh.

As stated above, currently Varanasi in Uttar Pradesh is only listed as a candidate project site. Once concrete discussions regarding yen loans to any specific state are intensified, it is advisable to start considering to also form a simultaneous technical cooperation project.

a. Integrated Sanitation Improvement Project along with Indian Policy "SBM"

a.1 Rural Sanitation Improvement Project

ODA Scheme	Japanese Yen Loan
Target Area	<p>Target area shall be selected from the states except following 9 states where World Bank is scheduled to implement projects.</p> <p>Further clarification with MODWS is required.</p> <ul style="list-style-type: none"> <li style="width: 50%;">*West Bengal <li style="width: 50%;">*Odisha <li style="width: 50%;">*Chattisgarh <li style="width: 50%;">*Madya Pradesh <li style="width: 50%;">*Rajasthan <li style="width: 50%;">*Maharashtra

	*Gujarat *Andra Pradesh	*Tamil Nadu
Counterparts	Ministry of Drinking Water and Sanitation (Rural) Ministry of Human Resource Development (Department of School Education) (School Toilet) Ministry of Women and Child Development (Angawadi Toilet) State Governments	
Project Duration	Until 2019 Indian Government has set a target to eliminate Open Defecation (OD) by 2019.	
Project Outline	Under the target of eliminating OD by 2019, Indian Government, both national and state, will finance following components under the policy of "SBM" Budget for 5 years projects are huge and part of them will be financed by foreign aid including Japanese Yen Loan. <ol style="list-style-type: none"> 1. Provision of Individual Household Latrines (IHHL) Incentives. 2. School Toilets and Angawadi Toilets. 3. Community Sanitary Complexes (CSC) 4. Solid and Liquid Waste Management 5. IEC for People's Behavior Change 6. Capacity Development for Officers in charge of Rural Sanitation. 	
Input	Amount of Yes Loan will be decided upon discussion with Indian Government. According to the 12th 5 year plan, an outlay of Rs. 37159 crore has been made for rural sanitation.	
Gender Consideration	<ol style="list-style-type: none"> 1. Women are demand creators of sanitation facilities, facilitators of people's behavior change and play an important role in maintenance of facilities. Therefore, the project will be designed for women to be involved from beginning at planning stage up to maintenance stage. 2. Location and design of sanitation facilities shall be carefully examined with gender considerations. 	
Remarks	<ul style="list-style-type: none"> ➤ According to interview survey to relevant government officers, priority of construction of individual household latrines is becoming low and more attention will be paid for people's behavior changes. ➤ More financial demand for improvement of solid and liquid waste management. 	

a.2 Urban Sanitation Improvement Project

ODA Scheme	Japanese Yen Loan
Target Area	There is no specific target urban area at this moment.
Counter Part	Ministry of Urban Development (Urban) Ministry of Human Resource Development (Department of School Education) (School Toilet) Ministry of Women and Child Development (Angawadi Toilet) Municipal Corporation in Selected State(s).
Project Duration	Until 2019 Indian Government has set a target to eliminate Open Defecation (OD)

	by 2019.
Project Outline	<p>Under the target of eliminating OD, converting unsanitary toilets to pour flush toilets and 100% collection and treatment of solid wastes by 2019, Indian Government, both national and state, will finance following components under the policy of "SBM"</p> <p>Budget for 5 year projects are huge and part of them will be financed by foreign aid including Japanese Yen loans.</p> <ol style="list-style-type: none"> 1. Provision of Individual Household Latrines (IHHL) Incentives 2. Community Toilets 3. Public Toilets 4. Solid Waste Management 5. IEC and Public Awareness 6. Capacity Building of Government Officers for design, implementation and operation system. 7. Development of business environment for private companies to invest on sanitation facilities.
Loan Amount	<p>Amount of Yen Loan will be decided upon discussion with Indian Government.</p> <p>According to MOUD, the total cost for mission is Rs. 62009 crore.</p>
Gender Consideration	<ol style="list-style-type: none"> 1. Women are demand creators of sanitation facilities, facilitators of people's behavior change and play an important role in maintenance of facilities. Therefore, the project will be designed for women to be involved from beginning at planning stage up to maintenance stage. 2. Location and design of sanitation facilities shall be carefully examined with gender considerations.
Remarks	<ul style="list-style-type: none"> ➤ According to new SBM, construction of public toilet will be done by 100% private funding. ➤ Funding demand for solid waste management is high but funding from central government is 20% of overall cost. ➤ Incentives for individual household toilets include conversion of insanitary toilets and pit latrines to sanitary toilets.

b. Women's Demand Responsive Project for Rural Sanitation (Technical Cooperation Project)

ODA Scheme	Technical Cooperation
Target Area	Varanasi Division of seven districts including Varanasi District in UP
Counterparts	<p>Along with the Deputy Director of Dept. of Panchayati Raj, UP, who oversees the entire Varanasi Division, the following officers are expected targets for capacity building.</p> <ul style="list-style-type: none"> • 500 Block Development Officers (BDO) • 1,500 sanitation workers • 1,000 elected GP members
Project Duration	For two to three years
Project Outline	<p>The field survey revealed that women's needs for improved sanitation is considerably high, and also women's groups play essential role to motivate people to use latrines continuously. In addition, primarily women are responsible for cleaning of latrines. Thus, as for Individual Household Latrines (IHHL), women are demand generators in the first</p>

	<p>place; also they are motivators of O&M as well.</p> <p>In addition, it became widely known that continuous IEC activities are imperative for successful behavioral changes from the experiences of Nirmal Bharat Abhiyan (NBA), the nation-wide program supporting IHHL construction. Through enhancing the capability of government officers as well as village women, the proposed project aims to improve village sanitation and empower village women; thus the project contributes to eradication of open defecation (OD), which is pursued under Swachh Bharat Mission (SBM) of the current government.</p> <p>Phase 1 : Implementation of Pilot Projects</p> <ol style="list-style-type: none"> 1. Preparation of OD maps, which indicates updated OD status, in seven districts under Varanasi Division, 2. Selection of pilot project sites based on OD maps, 3. Capabilities' improvement of government officers including BDOs, 4. Capacity development of villagers, which shall include support for women's political participation in order to adequately reflect women's developmental needs in local political and developmental activities, 5. Implementation of participatory monitoring and evaluation 6. Formulation of divisional policy on capabilities improvement of government officers, and 7. Formulation of divisional policy on IEC activities. <p>Phase 2 : From pilot projects to State Polices</p> <ol style="list-style-type: none"> 1. Support in formulation of state policy on capabilities improvement of government officers, (Note: Currently relevant government officers are supposed to be trained at MODWS-designated Key Resource Centres (KRC). However the training at these KRCs is said to be insufficient both in terms of quantity and quality. Thus, the future cooperation shall consider including a long-term substantial support of human resources development for the target state, i.e. establishment and institutionalization of "centre for environment and sanitation", which is similar to "Environmental Center Approach" in the South East Asian countries.) 2. Support in formulation of state policy on IEC activities (Note: As for this component, activities shall be carried out in line with Sanitation and Hygiene Advocacy and Communication Strategy Framework prepared jointly by MODWS and UNICEF. Also collaboration with UNICEF shall be positively considered.)
Loan Amount	<p>Japanese experts (3) + local consultants</p> <ol style="list-style-type: none"> 1. Team leader (sanitation policy/ public health) 2. Expert on sanitation facility and engineering 3. Expert on community development and IEC
Gender Consideration	<p>As the project name indicates, the entire activities shall be responsive to women's needs. Since women's political participation is dispensable to actualization of women's developmental needs in these days, the project activities shall encompass interventions to enhance women's political participation.</p>
Remarks	<p>The Project focused on eradication of OD through IHHL construction. However, depending on local needs, it shall include any activities which come under SBM.</p>

c. Feasibility Study on Public Toilets using Japanese Technology; Future Applicability of Public Private Partnership

Sub Component	Nil
ODA Scheme	Project Formulation Study (Feasibility Study on Future PPP)
Target Area	Decision will be made upon discussions with relevant authorities. One of the candidate sites is a potential UNESCO world heritage site (currently on tentative list) or a national park in Varanasi District in Uttar Pradesh.
Counter Part	Ministry of Urban Development Ministry of Environment and Forest Ministry of Tourism Archaeological Survey of India under Ministry of Culture
Project Duration	1 to 2 years
Project Outline	<p>Indian Government has made policy on providing public toilets by utilizing private funding.</p> <p>Japanese sanitary equipment is valued as high quality. Function of economical water consumption, automatic rinsing, toilet seats with bidet functions and so on are the examples. Furthermore Japanese on-site treatment system <i>johkasou</i> has high capacity and it is effective for conservation of surrounding water quality. But such sanitary equipment, facilities are expensive compared to those available in India.</p> <p>Therefore public toilets will be constructed, operated and maintained by the funds from Japanese sanitary equipment companies with consideration of CSR.</p> <p>This study will provide necessary information to the Japanese companies in order to participate in construction, operation and maintenance of public toilets.</p> <p>Following items will be studied.</p> <ol style="list-style-type: none"> 1. Baseline survey of existing condition of public toilets located in a potential UNESCO world heritage site, national park and so on. 2. Basic plan for public toilets construction 3. Basic plan for operation and maintenance of public toilets 4. Conducting pilot projects 5. Feasibility study on operation and maintenance of public toilets through a PPP scheme. 6. Dissemination of study results.
Input	<p>Japanese Experts and Local Consultants</p> <ol style="list-style-type: none"> 1. Team Leader 2. Plan and Design of Sanitary Facilities 3. Tourism Development 4. Public Relations 5. Pilot Project.
Gender Consideration	<ol style="list-style-type: none"> 1. Gender Consideration for location and design of public toilets 2. Gender consideration for operation and maintenance of public toilet 3. Cooperation with regional police in order to secure security surrounding public toilet area.
Remarks	➤ There is possibility for Indian people to accept toilet seats with bidet functions since there is a custom to use water for cleaning after using

	<p>the toilet.</p> <ul style="list-style-type: none"> ➤ There is a possibility to accept Japanese <i>johkasou</i> system where groundwater table is high and/or it is an ecologically sensitive area. ➤ Indian company 'SINTEX' has started manufacturing Japanese <i>johkasou</i> in India.
--	--

d. Integrated Sanitation Improvement Project in Census Towns

ODA scheme	Yen Loan
Target area	There is no specific target state for this project. Select one or several census towns in the same state.
Counterparts	Ministry of Drinking Water and Sanitation State Government District, Block, Gram Panchayat,
Project Duration	2 to 3 years
Project Outline	<p>The serious problem lies with the urbanized pockets in GPs like census towns, since although they have faced serious sanitation problems similar to the ones urban local bodies have faced, rural local bodies are not capable of tackling such urbanized problems. Moreover no effective interventions by the national and state governments and donor agencies have been made so far. It is recommendable for JICA to focus on urbanized pockets like census towns where needs are high but no effective intervention has been made. Also JICA shall highlight the comparatively advantageous feature of Japanese cooperation with dedicated technology transfer in this regard.</p> <ol style="list-style-type: none"> 1. Baseline survey for sanitation condition. 2. Selection of target area and study improvement area. 3. Formulate sanitation improvement plan. 4. Selection of Priority Project and Feasibility Study. 5. Design of Pilot Project 6. Investigation of financial source such as MGNREGA 7. Implementation of Pilot Projects 8. Feed back of the PP results to improvement plan. 9. Dissemination plan for other census towns
Input	<p>Japanese Expert and Local Consultant</p> <ol style="list-style-type: none"> 1. Team Leader 2. Solid Waste Management 3. Drainage plan and design 4. Sanitation Facilities Plan and design 5. Community development
Gender Consideration	<ol style="list-style-type: none"> 1. Gender consideration for toilet construction 2. Cooperation with local police for safety of public toilet
Remarks	<ul style="list-style-type: none"> ➤ Number of census towns increased to three times from 2001 to 2011 and needs for improvement of sanitation conditions in census towns has increased. ➤ No foreign aid has reached census towns to improve sanitation conditions.

e. Kyoto-Varanasi 'Partner City' Related Cooperation Projects

Kyoto-Varanasi 'Partner City' agreement was signed between the Kyoto City Mayor and the Indian Ambassador to Japan on 30th August 2014. According to the agreement, sanitation, tourism and disaster prevention are the issues for cooperation. Following projects will be proposed for future cooperation between the two local governments.

e.1 Varanasi Riverfront Area Resilience Enhancement Project

ODA Scheme	Cooperation Project between Japanese and Indian local governments
Target Area	Varanasi City riverfront Ghats area
Counterparts	Ministry of Urban Development Kyoto-Varanasi Steering Committee Varanasi City Corporation Baranas Hindu University
Project Duration	1 year
Project Outline	<ul style="list-style-type: none"> ➤ Study and evaluate resilience of the target area in terms of physical, social, economic, institutional aspects in case of natural disasters such as floods ➤ Study and evaluate safety of aged buildings in densely populated areas ➤ Formulate basic plan for disaster prevention. ➤ Conduct pilot projects
Gender Consideration	Support organizing local women's group to collaborate with the project to enhance sustainability and empowerment
Remarks	Consideration of capacity and demand of counterparts

e.2 Kyoto-Varanasi 'Partner City' Related Tourism Promotion Project

ODA Scheme	Cooperation Project between Japanese and Indian local governments
Target Area	Varanasi City in front of Ghats area
Counter Part	Ministry of Tourism Kyoto-Varanasi Steering Committee Varanasi City Corporation Baranas Hindu University
Project Duration	2 years
Project Outline	<ul style="list-style-type: none"> ➤ Base line survey for tourism resources such as cultural assets, public entertainment, special products ➤ Survey and assessment of facilities, number of tourists, accessibilities and tourist movements ➤ Develop 'tourism information center' through development of tourism information kiosks, website, signage and others. ➤ Technical cooperation for operation of tourism information center and capacity development for the staff of the center.
Gender Consideration	<ol style="list-style-type: none"> 1. Safety of female tourists and visitors shall be specially considered. 2. Support organizing local women's group to collaborate with the project to enhance sustainability and empowerment.
Remarks	Take special consideration in supporting Varanasi's attempt to become a UNESCO world heritage site (currently on tentative list) to meet the selection criteria.