

Key Drivers Influencing Tribal Communities to become Open Defecation Free: Case of Dantewada District, Chhattisgarh in India

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Research Article

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Abstract

The Swachh Bharat Mission has been successful in improving the sanitation condition across the nation in a very short span of time. The key approach adopted by the Government of India (GOI) was primarily Community Led Total Sanitation (CLTS) also termed as Community Approached to Total Sanitation (CATS). This paper attempts to identify the key drivers behind collective behaviour change of the tribal communities in Dantewada district of Chhattisgarh. In the study 102 respondents were selected randomly and interviewed across different open defecation free (ODF) villages through a questionnaire. The data was then analysed through SPSS which reveals that Supportive Environment, Institutional and Social Support, Personal Necessity, Issues with Open Defecation, Enhanced Awareness and Social Enforcement are the key drivers in improving the sanitation condition and making the district open defecation free. The study has practical policy implications which can help the implementing bodies to work for this cause more effectively.

Full Text

Dantewada, also known as South Bastar District, is a small district on the southern tip of the state of Chhattisgarh in India and shares its boundaries with the states of Maharashtra, Telangana and Odisha. The district is home to nearly 0.25 million people, out of which more than 75 percent belong to scheduled tribes, living in and off the forests that they inhabit. Gond is the major tribe with nearly 60 percent population and the remaining ones include Halba, Muriya and Maria tribes. The district comprises of 4 development blocks which cover 124 Gram Panchayats (GPs), the primary units of elected local self government in the rural areas. At the time of the launch of Swachh Bharat Mission Gramin (SBM-G) in October 2014, the sanitation coverage of the district was less than 10 percent, with all 124 GPs remaining to be declared as ODF. To make entire country Open Defecation Free (ODF) within next five years was not an easy task. Approach was the key to success.

The impact and results Community Led Total Sanitation (CLTS) had been showing across the world was the only option to make this happen. The power of collective community action and the quick and effective results of CLTS (Kar, 2005; Kar & Chambers, 2008) had proven that how things change very rapidly. Being a participatory and empowering approach, it engages communities in a manner that stimulates self analysis and collective local action to put an end to open defecation (Kumar & Shukla, 2011). This CLTS intervention supported by UNICEF, sought to combine CLTS tools and techniques with other social mobilization methods ensuring multi-stakeholder engagement at various levels to achieve credible Open Defecation Free (ODF) results with speed and on scale (author; Alhassan & Anyarayor, 2018). The key components of the strategy adopted included the following: capacity building; institutional strengthening; and ODF celebrations. During February 2015, a team of 30 trained CLTS facilitators was constituted to help implement SBM-G in the district. This worked well and by 2016 the coverage reached to 40 percent and very rapidly the entire district of Dantewada was declared ODF on November 1, 2017 in just a matter of 30 months since CLTS inception. However, CLTS that merely providing toilet but does not guarantee in enhanced sanitation, hygiene, and their use. Previously,

attention to sanitation needs high initial standards and offered subsidies as an incentive and it becomes a way of dependence on subsidies. In this context, CLTS draw attention towards the behavioural change and thus ensure real and sustainable improvements. In this awareness is created among community for the implementation of changes from construction of toilets for individual households which leads to open defecation-free villages. Therefore, it could be highlighted that the implementation of CLTS enhances the community's desire for collective change, boost people into action. Thus, encourages mutual social support and appropriate local solutions, as consequences to greater ownership and sustainability.

Jhodiabadam : The first GP to become ODF

In just a matter of two months, the GP with 212 households (HH) became ODF. This GP of Gidam Development Block showed very positive results of CLTS implementation. The effective community triggering sessions and continuous follow-ups brought success. The key player in this achievement was none other than Balram Kashyap who came up as the natural leader, who paved the way for this achievement. The community formally declared itself as ODF on April 16, 2015 followed by a grand ODF celebration on May 5, 2015. This event was organized by the community wherein the district officials, public representatives and people from other GPs were invited. This event was again a motivating factor for other GPs to gear up themselves and work together towards ODF district.

Literature Review

Monney et.al. (2015) have examined the factors which are effecting the slow growth of sanitation coverage, which was as low as 4 percent in past two decades in Ghana. The factors such as current practices of defecation and opportunities and challenges for toilet construction at house-hold as well as institutional level have been analyzed in three rural communities in the Tain district. The results reveal that there are very few house-holds with toilets; most of the people depend on the communal toilets or practice open defecation. Ignorance towards low cost toilet technologies, pre-assumption of toilets to be too expensive to construct and lower level of ownership have been highlighted as the prime barriers towards having toilet at house-hold levels in these communities. The opportunities in such communities to have safe toilet technologies at house-hold level and the best practices are also discussed through the paper (Monney, Baffoe-Kyeremeh, & Amissah-Reynolds, 2015).

Briceno et.al. (2015) have explored two major large scale interventions on sanitation and handwashing in rural Tanzania. The study shows that there was a significant increase in toilet construction which increased to 51 percent from 38.6 percent in just one year and the percentage of open defecation reduced from 23.1 to 11.1 percent. They further suggest that for a large scale program, is important to focus on intermediate outcomes of ownership and sustainable behavior change among the communities (Briceño, Coville, & Martinez, 2015). Good Practices Resource Book (2015) explains the key strategy formulated and adopted by Government of Jharkhand towards creating ODF villages, termed as *Nirmal Grams*, and

further sustaining them through community centred and demand driven approach. The success the pilot project in *Gadri* village had triggered the scaling up of the initiative. The government had pumped in INR 30.46 crores to the Village Water and Sanitation Committees (VWSC) of several panchayats to make them open defecation free through toilet construction at each household.

Mahbub and Mbuya (2015) have analysed the impact of the poor water and sanitation, which is known to be the primary cause for diarrhea, on the growth of the children with respect to Bangladesh (Mahmud & Mbuya, 2015). It shares the hypothesis by Humphrey (2009) which states that the effect of poor water and sanitation on under-nutrition is through tropical or environmental enteropathy (triggered by exposure to human fecal matter) instead of mediating by diarrhea. This hypothesis has created a matter of concern for the Nutrition Enigma in South Asia. There is a high rate of under-nourished children as compared to the income levels in this region and the experts are finding it difficult to figure out the reason behind such anomaly. It serves two objectives; firstly it discusses the probable results of poor WASH conditions and secondly, it advocates possible solutions for the policy makers and other stakeholders to develop multi-sectoral approach to address this grave issue of under-nourishment (Humphrey, 2009).

A report published by The World Bank in 2016, analyses the large scale sanitation project “Total Sanitation and Sanitation Marketing” which was implemented in East Java in Indonesia where there are about 11 percent children affected from diarrhea at any given span of two weeks and yearly 33000 of them die annually succumbing to it. A total of 2100 house-holds from 160 different communities in 8 districts were interviewed before and after the implementation of the project. The findings reveal that there was a 3 percent increase in the toilet construction especially in the non-poor house-holds and there was a reduction of nearly 30 percent in cases of diarrhea in these communities. Improvement in height and weight was also found in non-poor house-holds with no sanitary facilities during baseline study (Bank, 2016).

Hueso and Bell (2013) have explored the Total Sanitation Program (TSP) as a community led, people centered, demand driven, and incentive based programme thought to be ideal for addressing sanitation problems in India, which could not realize the expected outcomes and thus the policy failed to translate into practice. Drawing evidence from two co-ordinated studies from four states, it focuses to understand the dichotomy of the Total Sanitation Program policy and practice, its causes, and the potential of a new sanitation campaign, Nirmal Bharat Abhiyan (Hueso & Bell, 2013).

“Community Led Total Sanitation (CLTS) in East Asia and Pacific: Progress, Lessons and Directions” published jointly by UNICEF, WaterAid, WSP and Plan in 2013, highlights the factors behind the success of CLTS intervention made in these countries due to which the coverage increased significantly on scale and at pace. It further provides recommendations for innovative and customized planning for better and much effective CLTS interventions in these countries. The report finally summarizes the status, learning’s and experiences of the sanitation coverage which increased the number of open defecation free communities in these countries (UNICEF, 2013).

Saxton et.al. (2016) have explored the sanitation model, similar to CLTS, that was designed and implemented by the Technical and Management Support (TMST) and the UK Department for International Development (DFID) have implemented approaches similar to CLTS. This model focuses much on toilet construction which is bit different from the traditional CLTS which emphasizes on behavioral change through triggering communities on emotions like disgust and shame more than just toilet construction. The findings reveal that there is lack of awareness among communities towards the health hazards due to open defecation and fecal-oral transmission of diseases. The report also highlights that though people were aware of the disadvantages of open defecation like hampered dignity of women, conflicts due to defecating on other's land, problems in rainy seasons and harsh weather condition etc., they were least interested in constructing toilets for themselves (Saxton et al., 2016).

Patkar (2016) in "Leave no one behind : equality and non-discrimination in sanitation and hygiene" has summarized experiences from various Asian countries in accordance with the point 6.2 of the Sustainable Development Goals (SDGs) which aims at achieving access to adequate and equitable sanitation and hygiene for all and eliminating open defecation by 2030. The author suggests that in order to achieve these objectives, the process should be inclusive and should not leave any member of the community behind. The community should be kept in primary position and institutions and infrastructure should follow. This would not only help in brining behavioral changes but also sustain the outcomes. The author further emphasizes on the fact that there should be no discrimination on grounds of religion, caste, age, gender, disability, poverty etc. and everyone should be involved to bring about sustainable sanitation outcomes through community led total sanitation (Patkar, 2016).

Gupta et.al. (2016) in "Purity, pollution, and untouchability: challenges affecting the adoption, use, and sustainability of sanitation program in rural India" have analyzed the situation of open defecation and measures taken to improve sanitation in rural India and have found out that the communities have rejected the simple and low cost pit latrines due its emptying process as one of the major aspects for open defecation. The study was done through Sanitation Quality Use Assess and Trends (SQUAT) under which 3235 households across Rajasthan, Uttar Pradesh, Madhya Pradesh, Bihar and Haryana were interviewed. Another qualitative research was carried out with 100 individuals across Haryana, Uttar Pradesh, Gujarat and Nepal parallel to this study. The authors have further suggested ways through which the restrictive social norms can be intervened and positive outcomes can be achieved in the area of rural sanitation (Gupta, Coffey, & Spears, 2016).

Dooley et.al. (2016) have analyzed the impact made through Community Approaches to Total Sanitation towards the improvement of sanitation particularly on eliminating open defecation. The community approaches trigger behavioral change towards sanitation and bring sustainable outcomes as far as sanitation is concerned. Though there are several factors behind slippage and effectiveness but community approaches have shown significant results. This impact of these approaches can be explained and understood through Social Norms Theory (SNT) which will further help the implementers and health workers to address the challenges and improve effectiveness and sustainability. The paper

further suggests that achieving ODF status is not the final goal but a milestone towards reforming social reform towards sanitation and hygiene (Dooley, Maule, & Gnilo, 2016).

Vernon and Bongartz (2016) have analyzed various dimensions for sustainable implementation of community led total sanitation and other components of WASH. Cases and examples across different countries and experiences of various CLTS/CATS implementing organizations and professionals have been studied to understand process, identify bottlenecks and finally figure out sustainable solutions to improve sanitation and eliminate open defecation. They authors further recommend for more work in the areas of Physical Sustainability, CLTS and WASH at scale, Equity, Inclusion and the Marginalized, Access to Finance, Behavior Change and Social Norms for providing better and sustainable sanitation facilities to communities across the world (Vernon & Bongartz, 2016).

Objective

To identify the factors influencing rural communities to become open defecation free (ODF)

Research Methodology

The Study: The study was exploratory in nature and aimed to identify various factors that influence rural households to construct and use toilets and thus end defecating in the open.

The Sample: The sampling technique was non probability cumulative sampling. Questionnaire was randomly distributed to 120 respondents out of which 117 respondents provided valid responses while 3 of them were invalid. The demographic profile of the respondents is shown in Table 1. Apart from demographic variables like age, gender, income, education, information related to sanitation was also included.

Tools for Data Collection: The data was collected through questionnaire distributed among households across different ODF villages in Dantewada district during December 2020. The questionnaire included several scales which were continuous and categorical in nature.

Tools for Data Analysis: Data has been analysed with the help of Factor Analysis and ANNOVA.

Table 1 *Demographic details*

DEMOGRAPHIC DETAILS				
		N	%	95%CI
Gender***				1.16-1.32
	Male	89	76.1%	
	Female	28	23.9%	
Age (years)***				2.34-2.60
	<20	9	7.7%	
	20-40	51	43.6%	
	40-60	50	42.7%	
	>60	7	6.0%	
Caste***				2.90-3.19
	GEN	10	8.5%	
	SC	5	4.3%	
	ST	72	61.5%	
	OBC	30	25.6%	
Disability	Presence	1	0.9%	
	Absent	116	99.1%	
Educational Level***				1.18-1.42
	<10 th standard	91	77.8%	
	10 th -12 th standard	19	16.2%	
	Graduation	5	4.3%	
	Post-graduation	2	1.7%	
	> Post-graduation	-	-	1.07-1.29
Annual Income Level***				
	<25,000	104	88.9%	
	25,000-50,000	9	7.7%	
	50,000-75,000	2	1.7%	
	75,000-1,00,000	-	-	
	>1,00,000	2	1.7%	

TIME POST ODF***			3.23-3.42
<1 Year	-	-	
1-2 Years	4	3.4%	
2-3 Years	71	60.7%	
>3 Years	42	35.9%	
<i>Note: p value***<0.001; CI= Confidence Interval</i>			

DANTEWADA (N=117)

Results And Discussion

The demographic characteristic of surveyed population of Dantewada districts. In this a cluster-randomized trial in rural Dantewada districts conducted, wherein data present that 76.1% of studied participants were male and only 23.9% were female participants. Here, ~ 43% participants were belonging to the 20–40 years' age group and elder population (> 60 years) were only 6%. Classification of cast data revealed that majority of participants were from the schedule tribal (ST) cast (61.5%, N = 72) and least were from the schedule cast (SC, 22%, N = 7.3%). Physically disabled participant was only one. Literacy level of participants was evaluated and found that 77.8% (N = 91) were studied till < 10th standard followed by 16.2% (N = 19) of participants studied up to 10th -12th standard. Post ODF time among studied participants reported, 2–3 years for 60.7% and > 3 years 35.9% (N = 42).

To analyze effectiveness and impact of CLTS implementation, reasons for constructing toilets at home was evaluated (Table 2). Each item was rated on a 5-point scale that ranges from 1 (disagree strongly) to 5 (agree strongly). Around 70% (N = 83) respondents strongly agree with that they felt shame while defecating in open and “Defecating in open is unhygienic” was strongly agreed by 63.2% (N = 74) participants. Wastage of time while going out was not shown much concern and only 61 (52.1%) participants reported strongly agree with it. Children and female gender of the house (mother/wife/daughter) needed toilet at home and shown strong positive willingness in this context with around 17%. While old parents agreed with presence of toilet at home (37.33%, N = 44). CLTS triggering shown positive impact on studied participants and they 60.7% (N = 71) of them realized through CLTS triggering. Studied participants strongly agree with defecation in open have adverse effects of on infants with 38.5%(N = 45). While, pressure from Sarpanch/Pradhan and fear of not getting ration and other govt. facilities upon not constructed toilet were answered by “neutral” response with around 40%. The awareness programs and low cost of toilet were shown “agreed” response by majority of participants. The financial support (N = 48) and material provided by government (N = 39) shown “neutral” response by the highest number of participants. Active involvement of women, children, old person and sick people were “agreed” by the majority of the participants.

Table 2 *Reasons for constructing toilets at home (to analyze effectiveness and impact of CLTS implementation)*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean± SEM
Felt shame while defecating in open	-		4 (3.4%)	30 (25.6%)	83 (70.9%)	4.7±0.05
Defecating in open is unhygienic	-	-	2 (1.7%)	41 (35.0%)	74 (63.2%)	4.6±0.05
Lot of time wasted in going out	-	-	24 (20.5%)	32 (27.4%)	61 (52.1%)	4.3±0.07
Since everybody else was constructing toilet	8 (6.8%)	22 (18.8%)	20 (17.1%)	47 (40.2%)	20 (17.1%)	3.4±0.10
Children wanted toilet at home	7 (6.0%)	4 (3.4%)	43 (36.8%)	43 (36.8%)	20 (17.1%)	3.5±0.09
Mother/wife/daughter wanted toilet at home	-		35 (29.9%)	61 (52.1%)	21 (17.9%)	3.8±0.06
Old parents needed toilet at home	-	-	20 (17.1%)	53 (45.3%)	44 (37.6%)	4.2±0.06
Realization through CLTS triggering	1 (0.9%)	1 (0.9%)	9 (7.7%)	35 (29.9%)	71 (60.7%)	4.5±0.07
Fear of being caught during morning evening vigilance (while defecating in open)	2 (1.7%)	30 (25.6%)	47 (40.2%)	21 (17.9%)	17 (14.5%)	3.2±0.09
Adverse effects of shit on infants	1 (0.9%)	1 (0.9%)	28 (23.9%)	42 (35.9%)	45 (38.5%)	4.1±0.08
Felt disgust during triggering	-	1 (0.9%)	8 (6.8%)	58 (49.6%)	50 (42.7%)	4.3±0.06
Felt shame during triggering		4 (3.4%)	14 (12.0%)	49 (41.9%)	50 (42.7%)	4.2±0.07
To get money from government	22 (18.8%)	46 (39.3%)	44 (37.6%)	2 (1.7%)	3 (2.6%)	2.3±0.08
Pressure from Sarpanch/Pradhan	40	26 (22.2%)	47	2	2	2.1±0.09

	(34.2%)		(40.2%)	(1.7%)	(1.7%)	
Fear of not getting ration and other govt. facilities if not constructed toilet	39 (33.3%)	20 (17.1%)	46 (39.3%)	7 (31%)	5 (4.3%)	2.3±0.10
Effect of CF/PRERAK during visit	1 (0.9%)	3 (2.6%)	12 (10.3%)	68 (58.1%)	33 (28.2%)	4.1±0.07
Effect of senior govt. officers visiting the village and persuading to construct and use toilet	3 (2.6%)	23 (19.7%)	29 (24.8%)	50 (42.7%)	12 (10.3%)	3.3±0.09
Due to awareness programs	1 (0.9%)	8 (6.8%)	43 (36.8%)	51 (43.6%)	14 (12.0%)	3.6±0.07
Influence of local leaders & other influential people	1 (0.9%)	17 (14.5%)	49 (41.9%)	38 (32.5%)	12 (10.3%)	3.4±0.08
Influence of religious leaders	9 (7.7%)	7 (6.0%)	62 (53.0%)	26 (22.2%)	13 (11.1%)	3.2±0.09
Got influenced by natural leaders	1 (0.9%)	4 (3.4%)	45 (38.5%)	48 (41.0%)	19 (16.2%)	3.7±0.07
Low cost of toilet	3 (2.6%)	4 (3.4%)	23 (19.7%)	67 (57.3%)	20 (17.1%)	3.8±0.08
Awareness about simple and easy to construct toilet technology	14 (12.0%)	6 (5.1%)	35 (29.9%)	32 (27.4%)	30 (25.6%)	3.5±0.12
Got support from fellow villagers for toilet construction	3 (2.6%)	6 (5.1%)	48 (41.0%)	47 (40.2%)	13 (11.1%)	3.5±0.08
Financial support from fellow villagers	5 (4.3%)	13 (11.1%)	49 (41.9%)	37 (31.6%)	13 (11.1%)	3.3±0.09
Financial support from government	6 (5.1%)	25 (21.4%)	48 (41.0%)	29 (24.8%)	9 (7.7%)	3.1±0.09
Material provided by government	5 (4.3%)	29 (24.8%)	39 (33.3%)	38 (32.5%)	6 (5.1%)	3.1±0.09
Fear of fine imposed for defecating in open	2 (1.7%)	6 (5.1%)	68 (58.1%)	29 (24.8%)	12 (10.3%)	3.8±0.07
Fear of social boycott	2 (1.7%)	4 (3.4%)	58 (49.6%)	45 (38.5%)	8 (6.8%)	3.5±0.07
Active involvement of women	-	1 (0.9%)	22 (18.8%)	81 (69.2%)	13 (11.1%)	3.9±0.05

Active involvement of children	-	3 (2.6%)	33(28.2%)	69 (59.0%)	12 (10.3%)	3.7±0.06
Active involvement of old persons	-	4 (3.4%)	56 (47.9%)	41 (35.0%)	16 (13.7%)	3.6±0.07
Active involvement of sick/ differently abled	1 (0.9%)	12 (10.3%)	39 (33.3%)	49 (41.9%)	16 (13.7%)	3.6±0.08

Appropriateness of factor analysis: Bartlett test of sphericity

The overall Measure of Sampling Adequacy (MSA) for the set of variables included in the analysis was .679, which exceeds the minimum requirement of 0.50 for overall MSA. Principal component analysis requires that the probability associated with Bartlett's Test of Sphericity be less than the level of significance. The probability associated with the Bartlett test is < 0.001, which satisfies this requirement (Table 3).

Table 3

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean± SEM
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<i>Appropriateness of factor analysis: Bartlett test of sphericity</i>						

For one iteration, above mentioned statements were removed from the further analysis since these have less than 0.05 value (Table 4). These variables were “Realization through CLTS triggering”, “Felt shame during triggering”, “Influence of religious leaders”, “Got influenced by natural leaders”, and “Low cost of toilet”.

Table 4

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.679
Bartlett's Test of Sphericity	Approx. Chi-Square	2201.249
	df	435
	Sig.	.000
<i>Communality requiring variable removal</i>		

Communalities represent the proportion of the variance in the original variables that is accounted for by the factor solution. The factor solution should explain at least half of each original variable's variance, so the communality value for each variable should be 0.50 or higher (Table 5). Highest communalities represented for “Since everybody else was constructing toilet” (0.843), and lowest was observed for “Active involvement of women” (0.506).

Table 5
Evaluating communalities

	Initial	Extraction
Felt shame while defecating in open	1.000	.612
Defecating in open is unhygienic	1.000	.676
Lot of time wasted in going out	1.000	.756
Since everybody else was constructing toilet	1.000	.843
Children wanted toilet at home	1.000	.812
Mother/wife/daughter wanted toilet at home	1.000	.759
Old parents needed toilet at home	1.000	.734
Fear of being caught during morning evening vigilance (while defecating in open)	1.000	.571
Adverse effects of shit on infants	1.000	.669
Felt disgusting during triggering	1.000	.658
Pressure from Sarpanch/Pradhan	1.000	.731
Fear of not getting ration and other govt facilities if not constructed toilet	1.000	.668
Effect of CF/PRERAK during visit	1.000	.508
Effect of senior govt officers visiting the village and persuading to construct and use toilet	1.000	.501
Due to awareness programs	1.000	.556
Influence of local leaders & other influential people	1.000	.530
Awareness about simple and easy to construct toilet technology	1.000	.512
Got support from fellow villagers for toilet construction	1.000	.575
Financial support from fellow villagers	1.000	.809
Financial support from government	1.000	.837
Material provided by government	1.000	.558
Fear of fine imposed for defecating in open	1.000	.595

Communalities represent the proportion of the variance in the original variables that is accounted for by the factor solution. The factor solution should explain at least half of each original variable's variance, so the communality value for each variable should be 0.50 or higher (Table 5). Highest communalities represented for "Since everybody else was constructing toilet" (0.843), and lowest was observed for "Active involvement of women" (0.506).

	Initial	Extraction
Fear of social boycott	1.000	.694
Active involvement of women	1.000	.506
Active involvement of children	1.000	.671
Active involvement of old persons	1.000	.658
Active involvement of sick/ differently abled	1.000	.671
Extraction Method: Principal Component Analysis.		
Communalities represent the proportion of the variance in the original variables that is accounted for by the factor solution. The factor solution should explain at least half of each original variable's variance, so the communality value for each variable should be 0.50 or higher (Table 5). Highest communalities represented for "Since everybody else was constructing toilet" (0.843), and lowest was observed for "Active involvement of women" (0.506).		

Factor analysis or Principal Component Analysis was conducted for the cluster formation with rotation method of Varimax with Kaiser Normalization. Six components matrix was derived which explained 63.56% variance covering 27 variables related to reasons for constructing toilet at home (Table 4). About 22.8% of variance was covered in 1st component, which was explained by Influence of local leaders & other influential people, Material provided by government, Fear of fine imposed for defecating in open, fear of social boycott, Active involvement of women, children, old people and sick/ differently abled. The second component explained by Effect of senior govt officers visiting the village and persuading to construct and use toilet, got support from fellow villagers for toilet construction, financial support from fellow villagers and government, which has 13.37% loading. The 3rd has 8.19% of variance, which include variables like since everybody else was constructing toilet, children and other female gender and old parent wanted toilet at home. A 7.21% of variance was covered in 4th matrix, have four variables namely, Felt shame while defecating in open, Defecating in open is unhygienic, Lot of time wasted in going out, Felt disgust during triggering, shown in Table 6. The 5th component 6.58% of loading and include five variables such as Defecating in open is unhygienic, Adverse effects of shit on infants, Effect of CF/PRERAK during visit, Due to awareness programs and Awareness about simple and easy to construct toilet technology. The 6th component has 5.33% of loading and includes three variables.

Table 6
Variable loadings on components

	Component					
	1	2	3	4	5	6
Felt shame while defecating in open	-.488	.259	.040	.549	-.045	.034
Defecating in open is unhygienic	-.043	-.396	.032	.705	.132	-.046
Lot of time wasted in going out	-.108	-.239	.192	.789	.146	-.081
Since everybody else was constructing toilet	.231	-.094	.829	.293	-.006	.090
Children wanted toilet at home	.177	.005	.877	.036	.005	.101
Mother/wife/daughter wanted toilet at home	.042	.277	.774	.002	.281	.047
Old parents needed toilet at home	-.194	.084	.741	.163	-.227	-.251
Fear of being caught during morning evening vigilance (while defecating in open)	.172	.149	.255	.024	.261	.621
Adverse effects of shit on infants	.235	.216	.009	-.132	.740	.049
Felt disgust during triggering	-.101	-.187	-.126	-.707	.357	-.027
Pressure from sarpanch/pradhan	.005	-.005	-.054	-.109	-.165	.830
Fear of not getting ration and other govt facilities if not constructed toilet	-.164	.138	-.529	.084	.227	.533
Effect of CF/PRERAK during visit	.009	-.053	.055	-.044	.707	-.020
Effect of senior govt officers visiting the village and persuading to construct and use toilet	.208	.537	-.118	-.170	.338	.331
Due to awareness programs	.249	.334	-.022	-.029	.511	.346
Influence of local leaders & other influential people	.558	.277	.034	-.338	.236	.268
Awareness about simple and easy to construct toilet technology	.257	.387	-.172	-.048	.511	-.061
Got support from fellow villagers for toilet construction	.087	.700	.115	-.145	.204	.046
Financial support from fellow villagers	.071	.889	.106	.017	.000	.034
Financial support from government	.311	.852	.020	.004	.011	.117
Material provided by government	.645	.331	-.095	.132	.057	-.051
Fear of fine imposed for defecating in open	.734	.089	.124	-.175	.049	-.024

	Component					
Fear of social boycott	.776	.061	.197	-.201	.094	-.019
Active involvement of women	.575	-.085	.135	.263	.205	-.197
Active involvement of children	.664	.166	.232	.297	-.195	.149
Active involvement of old persons	.763	.033	.035	-.152	.066	.213
Active involvement of sick/ differently abled	.741	.233	-.029	.105	.226	.072
Eigen value	6.85	4.01	2.46	1.97	1.60	1.16
% of the variance	22.85	13.37	8.19	7.21	6.58	5.33
% accumulated variance	22.85	36.22	44.42	51.63	58.22	63.56

The results of the factor analysis show that the following factors have influenced the tribal communities of Dantewada to end open defecation:

1. Supportive Environment: influence of local leaders, provision of fine being imposed for defecating in open, social boycott for defecating in open, involvement of women, children, elderly and differently abled community members are the statements, which have been outcomes of the CLTS implementation, that constitute the supportive environment for ending open defecation.
2. Institutional & Social Support: effect of officials, support in construction of toilets, financial support from fellow community members and government form the second factor.
3. Personal Necessity: the third factor contains the statements associated with the personal necessity like demand for toilet from children, women and elderly members of the family and also effect of toilets being constructed by other community members.
4. Issues with Open Defecation: The statements forming the fourth factor are associated with feeling of shame, open defecation being unhygienic and wastage of time in going out for defecation.
5. Enhanced Awareness: The fifth factor is supported by the statements connected with enhanced awareness on diseases among infants due to open defecation, effect of community facilitators and awareness on simple and cheap toilet technologies.
6. Social Enforcement: Statements based on social enforcement *viz.* fear of getting caught by vigilance committees of the community, pressure from the *Sarpanch* and fear of seizure of free ration in case toilet is not constructed, form the sixth factor.

In this study focus on providing social structure to the population and awareness play a vital role in adaptation of strategies in improvement of population health. The study also guides in for the preparation of policy guidelines by various social and government organizations. Such policies can be implemented for the significant improvement of the health and hygiene conditions in the communities.

In enhancement of awareness among population can be influenced by the applications of technologies which can be widely accepted. They are found in the adoption of digital services, health services, and other technological aspects of e-governance services in making better hygienic condition as a result of enhanced awareness.

Conclusion

The research primarily helps in identifying the factors that have influenced the tribal communities of Dantewada district in ending open defecation and adopt better sanitation practices through construction and usage of toilets at household level. The findings show that supportive environment, institutional and social support, personal necessity, issues with open defecation, enhanced awareness and social enforcement are the factors behind eliminating open defecation in Dantewada district.

Further, these factors also show that there has been strong effect of the CLTS approach which focuses on total sanitation through collective behavioural change of the communities. The tools used in the communication and triggering process have generated demand for toilets from each member of the community and the awareness on better and low-cost toilet technologies have helped the people in constructing the toilets of their choice and locally available resources. The vigilance committee formed by the community itself has been successful in ensuring the toilet usage and that no one goes out for defecation. The results also show that there is also pressure from the *Sarpanch*, who is the elected leader of the community, for constructing and using the toilets.

The results and learning paves way for further research on impact of various triggering tools, training of community facilitators and sustaining the results achieved so far.

References

1. Alhassan, A., & Anyarayer, B. K. (2018). Determinants of adoption of open defecation-free (ODF) innovations: A case study of Nadowli-Kaleo district, Ghana. *Journal of Development and Communication Studies*, 5(2), 54-69. doi: 10.4314/jdcs.v5i2.4
2. Bank, W. (2016). Sanitation Marketing in Lao People's Democratic Republic: World Bank.
3. Briceño, B., Coville, A., & Martinez, S. (2015). Promoting handwashing and sanitation: evidence from a large-scale randomized trial in rural Tanzania. *World Bank Policy Research Working Paper*(7164).
4. Dooley, T., Maule, L., & Gnilo, M. (2016). Using social norms theory to strengthen CATS impact and sustainability. *Sustainable Sanitation for All: Experiences, challenges, and innovations*, 299. doi/book/10.3362/9781780449272
5. Gupta, A., Coffey, D., & Spears, D. (2016). Purity, pollution, and untouchability: challenges affecting the adoption, use, and sustainability of sanitation programmes in rural India. *Sustainable Sanitation for All: Experiences, challenges, and innovations*, 283. doi/pdf/10.3362/9781780449272.017
6. Hueso, A., & Bell, B. (2013). An untold story of policy failure: the Total Sanitation Campaign in India. *Water Policy*, 15(6), 1001-1017. doi.org/10.2166/wp.2013.032

7. Humphrey, J. H. (2009). Child undernutrition, tropical enteropathy, toilets, and handwashing. *The Lancet*, 374(9694), 1032-1035. DOI: 10.1016/S0140-6736(09)60950-8
8. Kar, K. (2005). Practical guide to triggering community-led total sanitation (CLTS).
9. Kar, K., & Chambers, R. (2008). Handbook on community-led total sanitation.
10. Kumar, N., & Shukla, J. (2011). CLTS in the context of a countrywide programme in India: Public good, private good. L Mehta y S (eds.). *Shit Matters. The Potential of Community-Led Total Sanitation. Practical Action Publishing. Rugby*. DOI:10.3362/9781780440347.009
11. Mahmud, I., & Mbuya, N. (2015). *Water, sanitation, hygiene, and nutrition in Bangladesh: can building toilets affect children's growth?*: World Bank publications.
12. Monney, I., Baffoe-Kyeremeh, A., & Amissah-Reynolds, P. K. (2015). Accelerating rural sanitation coverage in Ghana: what are the speed bumps impeding progress? *Journal of Water, Sanitation and Hygiene for Development*, 5(4), 531-543. doi.org/10.1596/978-1-4648-0698-8
13. Patkar, A. (2016). Leave no one behind: equality and non-discrimination in sanitation and hygiene. *Sustainable Sanitation for All*, 267-280. DOI:10.3362/9781780449272.016
14. Saxton, J., Rath, S., Nair, N., Gope, R., Mahapatra, R., Tripathy, P., & Prost, A. (2016). Handwashing, sanitation and family planning practices are the strongest underlying determinants of child stunting in rural indigenous communities of Jharkhand and Odisha, Eastern India: A cross-sectional study. *Maternal & child nutrition*, 12(4), 869-884. doi: 10.1111/mcn.12323
15. UNICEF. (2013). Community-Led Total Sanitation in East Asia and Pacific: Progress, Lessons and Directions. *East Asia and Pacific Regional Office, UNICEF: Bangkok, Thailand*.
16. Vernon, N., & Bongartz, P. (2016). Going beyond open defecation free. *Sustainable Sanitation for All: Experiences, Challenges, and Innovations; Practical Action Publishing: Rugby, UK*, 1-28. doi/book/10.3362/9781780449272