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An Empirical Study On The Impact Of Swachh Bharat Abhyian On Rural Sanitation In Tamilnadu With Special Reference To Sivagangai District

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ABSTRACT

Swachh Bharat mission is very necessary to run continuously in India until it achieves its goal. It is very essential for the people in India to really get the feeling of physical, mental, social and intellectual well being. It is to make living status advance in India in real means which can be started by bringing all over cleanliness. The Swachh Bharat Mission of urban areas aims to cover almost 1.04 crore households in order to provide them 2.6 lakhs of public toilets, 2.5 lakhs of community toilets together with the solid wastes management in every town. Gramin Swachh Bharat Mission is a mission implementing cleanliness programmes in the rural areas. Earlier the Nirmal Bharat Abhiyan (also called Total Sanitation Campaign, TSC) was established by the Government of India in 1999 to make rural areas clean however, now it has been restructured into the Swachh Bharat Mission (Gramin). This campaign is aimed to make rural areas free of open defecation till 2019 for which the cost has been estimated is one lakh thirty four thousand crore rupees for constructing approximately 11 crore 11 lakh toilets in the country. There is a big plan of converting waste into bio-fertilizer and useful energy forms. This mission involves the participation of Gram Panchayat, Panchayat Samiti and Zila Parishad.

Keywords: Impact, Abhiyan, Society

I. INTRODUCTION

The Swachh Bharat missionwas initiated by ourPrime Minister Sri Narendra Modiwith a view to create Clean India. Launched on October 2ndin 2014, Swachh Bharat Mission advised every Indian citizen to take up responsibility in keeping the country clean. The PM stated that a clean India would be the best tribute to give to the Father of our Nation on his 150th birth anniversary and that everyone should contribute their part in doing away with litter and waste by the year 2019. He asked everyone to devote a hundred hours every year, two hours a week, towards cleanliness. With regards to his own words, the PM proceeded with the mission by taking a broom and cleaning a part of the city by himself. He also nominated public figures and personalities from various walks of life to carry forward this mantle. This act of engaging in cleaning up homes, work places, villages and cities collectively would bring in a drastic reduction in littering of waste and pollution. The Prime Minister's advice and initiative should not be taken up with deaf ears but should be accepted with a change in the collective mentality of the public as well as the government officials at all levels. Proper sanitation and systems should be in place to dispose waste and maintain cleanliness. Anti-litter campaigns should be held to create awareness among the general public and motivate them to take up the broom. Stringent enforcement of the law is also a necessity to maintain this attitude and sanitation. Funds should be collected and allocated to provide proper sewage systems, public toilets and garbage disposals across the country. Urban areas are the most severely affected from improper wastage disposals, so a collective education to citizens can ensure that their cities are kept clean. The Swachh Bharat Mission is a huge movement that if taken forward can bring about a massive change in both the country's outlook as well the citizen's attitude.

II. LAUNCHING OF TOTAL SANITATION CAMPAIGN (TSC)

The Total Sanitation Campaign (TSC) is a full-fledged rural sanitation programme is the first of its kind. The results of sector reforms pilot projects and lessons and inputs from other countries as also various international development agencies have also taken had been into consideration when designing this programme. A few important elements have been added in this programme for better and concrete results. They are: the existing Total Sanitation Programme should include safe disposal of night soil, rainwater, domestic liquid and solid waste. It should not be restricted to construction of latrines only. Awareness of sanitation standards and health impact of unsanitary conditions continues to be low. Rural sanitation should be promoted as a total package consisting of safe handling of drinking water, personal hygiene and village

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sanitation safe disposal of human excreta including child excreta, solid waste management and scientific disposal of wastewater, domestic sanitation and food hygiene.

III. TOTAL SANITATION CAMPAIGN IN TAMIL NADU

A Total Sanitation Campaign designed to suit district specific requirements. TSC were implemented in phases with some start-up funds made available for preliminary IEC work. The Total Sanitation Campaign envisages a synergistic interaction between the Government machinery, active NGO participation, intensive IEC, the provision of an alternative delivery system and more flexible, demand oriented construction norms. The following norms are being adopted for financing the different components of TSC. Pattern of Subsidy for Household Latrines Subsidy shall be available for the simplest and least expensive (Yet sustainable) latrines and for the purpose of this scheme a duly completed household sanitary latrine shall comprise only of "Basic Low Cost Unit" (BLCU) without the super structure. The maximum subsidy allowed is Rs. 500 per unit and the States/UTs wishing to adopt a single flat rate of subsidy will be free.

The Rural Sanitation programme was launched in 1986 with the objective of improving the quality of life of the rural people and to provide privacy and dignity to the women. The programme was restructured and introduced during April 1999. As per the revision, fifty per cent allocation for Total Sanitation Campaign (TSC) in select districts and the balance for the 'allocation based programme'. Subsidy was provided to construct household latrine viz. Basic Low Cost Unit (BLCU) without the super structure. In general, the performance of financial achievements was satisfactory, but the district wise performance was found to vary among the districts. So far, they created 60,785 individual household latrines, 142 school latrines, 48 health centers for women and 13 Rural Health Dispensaries. The implementing authorities faced various difficulties in execution of the programme, particularly household latrine. The subsidy for household latrine Rs.500 is not enough to construct a toilet. The officials struggled to identify the beneficiaries, hence they could provide the subsidy to the people who were constructed / constructing the toilets. If this practice continues, the benefits could not trickle down to the target groups. On the other hand, the people could not contribute and construct the toilet for their use. According to them, the toilets are not needed immediately. To make the environment neat and clean, the policy has to be amended suitably and introduce the same. Besides, awareness has to be created among the people, to make the programme as success.

It is to be noted that the State Government has allotted Rs.2,500 (including additional amount provided by the State Government) and the Central Government has provided Rs.3,200. Assistance from Mahatma Gandhi national Rural Employment Generation Scheme (MGNREGS) is Rs. 4,500 and the beneficiaries has also contributed Rs.900. Thus, the total amount Rs. 11,100 has been spent towards the construction of Individual Household Toilets (IHHT)

The Total Sanitation Campaign in Tamil Nadu has been ineffective and inadequate due to 'large-scale mismanagement of funds and non-adherence to the implementation mechanism. In Tamil Nadu, an audit conducted in March 2014 has revealed that 46.29 lakh houses did not have toilets. Funds reportedly did not reach District Rural Development Agencies on time and, therefore, the village panchayats, resulting in 46.29 lakh households going without toilets.

It is also said that the scheme had a total fund of Rs. 4,247.11 crore between 2009 and 2014 but only spent Rs. 785.71 crore. The cash books were also not maintained properly and there were irregularities.

IV. THE TOTAL SANITATION CAMPAIGN IN SIVAGANGAI DISTRICT

The Total Sanitation Campaign (TSC) renamed currently as Nirmal Bharat Abhiyan (NBA) of Government of India is a major programme for rural sanitation. Tamil Nadu was the leader and pioneer in the field of sanitation until 2006. Subsequently, TSC became a target-oriented programme, and hence it lost its momentum. Though toilets were constructed in **Sivagangai District**, they became not functional due to various reasons. Inappropriate selection of toilet models, lack of superstructure, water scarcity, lack of technical support in case of failures are the main reasons for poor performance. Lack of sustained Information, Education and Communication (IEC) programmes has left thousands of toilets being unused. The Integrated Women Sanitary Complexes constructed in all village panchayats were defunct due to poor maintenance. Toilets were provided to schools and Anganwadis under the Total Sanitation Campaign in Sivagangi district.

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The State has have given a new thrust to the Sanitation front towards declaring Tamil Nadu as an 'Open Defecation Free State', by strengthening institutional arrangements for implementation, ensuring availability of funds, provision of infrastructure and also through sustained IEC campaigns. All the Integrated Women Sanitary Complexes in rural areas in Sivagangai district have been renovated and efforts are on to ensure continuous usage and maintenance through the Habitation level user groups. 'Clean Village Campaign' for promotion of clean environment and sanitation in rural areas has been reintroduced. Effective disposal of solid and liquid wastes, ban on use of plastics with due emphasis on water conservation and rain water harvesting structures will be part of the campaign.

The inadequacy of proper sanitation facilities in many of our cities and towns, and lack of proper maintenance of public and community toilets contributes to the continuation of the practice of open defecation. A policy for achieving Open Defecation Free (ODF) Status in the urban areas by 2015 is being formulated that will ensure provision of sanitation facilities through Under Ground Sewerage Scheme (UGSS), increased public conveniences to ensure that the health of the rural population in the state is protected and at the same time, pollution of land and water resources in the State is mitigated.

V. NEED FOR THE STUDY

As India moves into the next millennium it has many things to be proud of. With a landmass of 3.29 million square kilometers and a population of just over a billion India has enormous natural resources, it also has the second largest pool of technical and scientific personnel in the world and is one of the fastest growing economies in the developing world in terms of its Gross Domestic Product (GDP) growth. In the five decades since independence, India has witnessed a significant achievement in many of the Millennium Development Goals like reduction of extreme hunger and poverty by increasing self-sufficiency in food grains, increased life expectancy, sustainable management of its natural resources, rapid expansion in the urban, energy and industrial sectors, improved child and maternal health, increased universal primary and higher education, advancement in the field of science and technology, increased access to sanitation and water facilities, increased participation of women in social and political arena and above all a multicultural and religious vibrant social democracy. However, India is still far behind other developing nations in terms of achievement in some of the very basic social and economic development indicators especially in the rural areas where majority of our population lives. In India 65 per cent of its rural areas are without sanitation facilities and large parts of rural areas face acute water shortage. Some areas are completely deprived of education facilities particularly secondary and higher education and drop out of children from schools particularly girls is very high. Infant and Maternal Mortality rates are very high, and around 0.6 -0.7 million children people majority from the backward castes are involved in manual scavenging. Due to lack of awareness and traditional beliefs, open defecation is very common. Participation of poor and marginalized communities in the local governance and informed decision making is also lacking specially in tribal and remote areas. In this context, this study assumes a greater significance.

VI. IMPACT OF SWACHH BHARAT ABHIYAN

Swachchhta Abhiyan has really a great impact on Indian society. People are taking an initiative to clean the village, society, colony, city, railway platforms, etc. A series of awareness campaigns by the district administration, state govt., and central govt. made the people conscious about the hazards of pollution. Swachh Bharat Mission is trying to plug financial loss on health matter and help to ease the burden on existing health care facilities which will help to boost our Indian economy. Swachh Bharat Mission is going to boost our tourism. Definitely the tourists will increase because tourists are getting better surrounding than before.With the increase in tourism our income will rise. But we have a mass of people who are still not aware. People of villages especially those who are not well educated spit pan, gutkha, tobacco on roads and public places. They eat some stuff in bus, train and throw wrappers on road, not in dustbin. Some people have not changed their habits. To make Swachchhta Abhiyan successful we need more campaigning to create awareness.

VII. OBJECTIVES

1. To assess the impact of Swachh Bharat Abhiyan on males, females, children and senior citizens.
2. To examine the linkage factors between open defecation and educational status

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3. Impact and adoption of Swachh Bharat Abhiyan practices at household, community, society, schools and institutional level.

VIII. METHODOLOGY

This study was conducted in Sivagangai district of Tamil nadu. There are 12 Panchayat Unions in Sivagangai District. Out of which Three Blocks i.e Kalayarkoil, Tirupathur and Kallal have been selected purposively. In the next stage, two village Panchayat from each of the selected Panchayat Union have been selected on random basis. From Kalaiyarkoil Union, Ammanpatti, Kadaneri were selected randomly. From Tiruppattur Panchayat union, two village Panchayat , Ranasingapuram and Kandavaryanpatti were selected at random. From Kallal Union, two villages Koothalur, Keela Pattamangalam were selected randomly.

At the end, randomly selected seventy (40) households from each of these selected villages have been taken into consideration. Thus, size of the sample constitutes 240. Dependent and independent variables were selected in this study such as age, sex, education, caste, religion, occupation, income, family type, sustainable, impact, society, adoption, awareness, sanitation, hygiene, knowledge, practices, disease, cause, Community etc. The statistical tools were used as percentage, rank and correlation coefficient.

IX. DATA ANALYSIS AND INTERPRETATION

Having Toilet Facility with Linkages of Educational Status of the Respondents

Sl.No.	Toilet Facility	No. of Sample Respondents and Their Educational Status							
		IL	UPL	UMS	US	HSL	D/D	PGL	Total
1.	Yes	4 (1.66)	15 (6.25)	27 (11.25)	44 (18.33)	32 (13.33)	53 (22.08)	28 (11.66)	**203 (84.58)**
2.	No	4 (1.66)	9 (3.75)	7 (2.91)	10 (4.16)	7 (2.91)	-	-	**37 (15.41)**
	Total	**8 (3.33)**	**24 (10.00)**	**34 (14.16)**	**54 (22.50)**	**39 (16.25)**	**53 (22.08)**	**28 (11.66)**	**240 (100.00)**

Source: Primary Data

Figures in Brackets are Percentage Value

IL = Illiterate, UPL = Upto Primary Level, UMS = UptoMittle School, US = Upto Secondary, HSL = Higher Secondary Level, D/D = Degree/ Diploma Level, PGL = PG Level

Analysis of Chi – Square Test

Test	Calculated value	d.f	Table value	Result
Pearson chi square	43.18	1	3.84	Rejected

As the calculated value of chi-square is greater than that able value at 5 per cent level of significant, It disproves the null hypothesis. Therefore, there is a close association between having toilet facility and education status of sample households

X. IMPACT OF SANITATION ON HEALTH

It is needless to emphasize that sanitation affects not only health of individuals, but also productivity and hence, national income of the country. It is in this context an attempt is made to examine the impact of sanitation on health status of sample households in Sivagangai district. From the analysis of Chi – square, association is observed between some variables such as drainage system and annual income, toilet facility and annual income, open defecation and water availability, plinth area and having toilet facility. Hence, in order to examine the impact of sanitation on health, multiple regression analysis has been employed to identify the critical factors of sanitation. Linear, semi-log and double log models were tried by including the identified explanatory variables, considering stepwise regression. Based on the value of adjusted R2 and statistical significance of the partial regression coefficients, the best equation is selected.

Linear Regression Model

The regression model selected for the present study is….

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HEX = β0 + β1FS + β2AI + β3PA + β4D1+ β5D2 + β6D3 + U

Where HEX is the health expenditure of sample households and is known as explained variable

FS is the family size of sample household;

AI is the annual income of sample household;

PA is the plinth area of the house of sample household;

WA is the water availability of the sample household;

DS is the availability of drainage system for the sample household;

TF is the availability of toilet facility for the household;

β0 is the constant term and is known as intercept term

β1, β2, β3, β4, β5, β6 are constants implying the partial regression coefficients and can be estimated with the help of principle of least squares, and U is the stochastic term

Measurement of variables
The variables used in the specified model are measured as follows.

Dependent variable
Health Expenditure (HEX)

Health expenditure is the dependent or explained variable and is measured as total expenditure of the sample household by considering the annual health expenditure incurred on all family members. It is measured in Indian Rupees.

Independent Variables

a. Family Size (FS)

Family size indicates the number of family members living in the sample household. The coefficient of the variable is expected to be positive, as there exists a positive relationship between family size and the health expenditure. Thus, $\beta 1 > 0$.

b. Annual Income (AI)

It is the total income earned by all family members living in the sample households during the study period 2008 - 09. It is measured in Indian Rupees. The coefficient of annual income is expected to be either positive or negative. It is because households with higher income may spend more money on expensive medical care and treatment, hence positive sign is expected. On the other hand, households with low income may not respond to the medical problems immediately so that they may be forced to spend more money on account of delayed medical attention, hence negative sign is expected. Thus, $\beta 2 > 0$ or $\beta 2 < 0$.

c. **Plinth Area (PA)**

It is defined as the net carpet area of the dwelling unit in which the sample household is living. It is measured in Square Yards. The coefficient of plinth area variable is expected to be negative. It is because; lower the plinth area, greater will be the chance for ill health of household members on account of poor ventilation, shortage of fresh air and oxygen resulting in more health expenditure. Thus, $\beta 3 < 0$.

d. Water Availability (D1)

Water is an essential commodity which is used for cooking food, cleaning utensils, washing clothes, bathing and cleaning floor of the house. Lack of sufficient water will lead to poor sanitary and hygiene conditions resulting in sickness of family members. As a result, health expenditure of households may be affected by the availability of water. Hence, in the present study, Water availability in the present study is measured by the dummy variable D1 such that, D1 = 1, if adequate water is available and other wise D1 = 0. Further, the coefficient of D1 is expected to be negative as there exists inverse relationship between availability of water and health expenditure. Thus, $\beta 4 < 0$.

e. Drainage System (D2)

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Availability of internal drainage system to drain out waste water is an important requirement to any household, so as to maintain good sanitary and hygiene conditions by preventing water logging & mosquito breeding inside the premises. Thus, availability of drainage system has its own impact on health expenditure. Accordingly availability is measured by the dummy variable D2 such that D2 = 1 if drainage facility is available, otherwise D2 = 0. Further, the coefficient of D2is expected to be negative as there exists inverse relationship between availability of drainage facility and health expenditure. Thus, $\beta 5$

f. Toilet Facility (D3)

Availability of toilet at home plays a crucial role in reducing the health expenditure of households. It is because in the absence of toilet facility at home, one has to go for open defecation where one is exposed to dangerous pathogens causing sickness such as diarrhea, dysentery due to tape worms, jaundice, polio, hepatitis, cholera, typhoid and viral fevers etc. Hence, availability of toilet facility at home is measured by the dummy variable D3 such that, D3 = 1 if toilet facility is available, otherwise D3 = 0. Further, the coefficient of D3 is expected to be negative as there exists inverse relationship between availability of toilet facility and health expenditure. Thus, $\beta 6 < 0$.

The estimated equation is given by

HEX = 2.315 + 0.15 FS –0.162 AI –0.587 PA –0.378 D1– 0.32 D2– 0 .25 D3 (0.315) (0.178) (2.618)* (9.023)* (6.135)* (0.516) (4.207)* Adjusted R2 = 0.63 F – Value = 16.641

As pointed out, when health expenditure (in Rupees) is regressed on family size, annual income, plinth area, water availability, existence of drainage system and availability of toilet facility. The selected equation is found to be a reasonably good fit as the explanatory variables included in the model provides explanation to the extent of 63 per cent. Further, except the coefficients of the variables with respect to family size (FS) and drainage system (D2) all other coefficients of the variables including annual incomes(AI), Plinth area (PA), Water availability(D1 and toilet facility(D3) are found to be statistically significant at 1 per cent level. Moreover, the coefficients of all variables are observed to have the expected signs.

The analysis implies that annual income, plinth area of house, availability of water and toilet facilities are the important factors affecting health expenditure. Hence, efforts should be initiated by the local body of Vasadi village to focus on the critical factors affecting health of households. Thus, steps should be initiated to push up the annual incomes of households by effectively implementing the income generating programmes. Further, the local body of Vasadi village should seek the help of state government in providing pucca houses under Indira Avas Yojana (IAV) and other schemes with improved size of houses i.e., plinth area. It is because; more than 70 per cent of households in Vasadi village are observed to have pucca (reasonably good) houses, which at present have less living space to accommodate a toilet. Moreover, as availability of water is found to be a significant variable affecting health expenditure, the local body should take responsibility of supplying adequate water through providing community bore wells, stand posts / street taps. Further, as availability of toilet facility is also found to be a significant variable affecting health expenditure of sample households, efforts should be initiated to provide sufficient subsidy for construction of toilets, Community Sanitation Complexes (CSCs), free distribution of toilet kits to the villagers. Thus it may be concluded that reduction in health expenditure is only possible through better sanitary conditions in the select villages in Sivagangai District.

The regression analysis revealed that annual income, plinth area of house, availability of water and toilet facilities are the important factors affecting health expenditure. Hence, efforts should be initiated by the local body of selected villages to focus on the critical factors affecting health of households.

XI. FINDINGS

- Out of 240 respondents, 76 (31.66 per cent) respondents are between the age group of 40-50, 63 (26.25 per cent) respondents belong to 30-40 age group, 43 (17.91 per cent) are 20-30, 32 (13.33 per cent) are 50-60, 20 (8.33 per cent) are 60-70 and 6 (2.50 per cent) of the respondents are above 70 age group respectively. It is evident that, over 182 (75.83 per cent) respondents are in the potential and active age group between 20-50.

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- Regarding the marital status is concerned, 204 (85 per cent) respondents are married, 10 (4.16 per cent) are unmarried and 26 (10.83 per cent) are widow among the sample respondents.
- It is found that, the education level in the study area has improved. 8 per cent of the respondents are illiterates and nearly 27 per cent of the respondents are below 8th standard of education. Others i.e 205 respondents are having medium and higher education status.
- The findings once again strongly support our contention that Households with better sanitation facilities have higher income levels.
- Out of 240 sample respondents, 203 (84.58 per cent) houses are having toilet facility at home and 37 (15.41 per cent) houses are not having toilets
- The people living in villages should avoid open defecation, because it affects the health also it is shame and low dignity for women in villages
- There are 40 panchayats in Tiruppathur block with 43 Sanitary Complexes (40 Integrated Women Sanitary Complexes (IWSC) and 3 Integrated Men Sanitary Complexes (IMSC)) . As per the Government records all the IWSC are functioning and 1 out of three IMSC is non-functioning. But the research survey result shows that 7 out of 40 IWSC are non-functioning.
- Total utilization on sanitary complexes (Women) in Kalaiyar Koil during the year 2009-10, has been a year of highest utilization with Rs. 25,800,000 followed by Kallal block (Rs. 26,400,000), Thiruppathur block Rs. 24,000,000 witnessed lowest utilization for the construction of integrated Women Sanitary Complexes.
- The regression analysis revealed that annual income, plinth area of house, availability of water and toilet facilities are the important factors affecting health expenditure. Hence, efforts should be initiated by the local body of selected villages to focus on the critical factors affecting health of households.
- Majority of the respondents are washing hands with only water after defecation, which is also unhealthy. It is essential that they have to wash their hands with soap water after defecation.
- It is observed that the Rural Sanitary Programmes have provided benefits to common people to construct family and community latrines and toilets. Still, many of the people in villages are not aware about the prime purposes of construction of latrines and toilets.

XII. RECOMMENDATIONS

- ✓ A chapter on sanitation practices should be included in school curriculum from the first standard itself. In each school and college, a team of students called the 'Swachhta Senani' may be formed to spread awareness about sanitation and cleanliness
- ✓ A dedicated Mission for the Swachh Bharat Abhiyaan may be set up both at National and State Level for coordination, guidance, support and monitoring of the programme
- ✓ Swachh Bharat Grading/Rating may be done for all Gram Panchayats, Municipalities, Blocks, Districts and States every year to promote competition among them
- ✓ Assign one day each monthand one week each year (culminating with 2nd October) for the activities of the SBA and to reward best performing Gram Panchayat, Block, ULB, District and State as per the ratings. This programme may include Prime Minister and Chief Ministers to give the awards.
- ✓ Simply construction of toilets at households is not sufficient under Rural Sanitary Programmes, but it is essential to increase the awareness of people to use the toilets and avoid the open defecation
- ✓ The local body should take more initiative in providing pucca houses with toilets under Indira Avas Yojana and other schemes
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- ✓ Sivagangai District is one of the economically backward districts, the government has to encourage the girls to get higher educated and surely well educated girls will avoid open defecation.

XIII. CONCLUSION

A pollution free clean India would be the best tribute to the nation. Swachh Bharat Abhiyan is a cleanliness mass movement organized by the government of India and takes into action by the honorable Prime Minister Mr.Narender Modi. This is the most valuable expedition which everyone must be aware of for the bright future of India. This campaign is a political free mission that immensely focuses on the welfare of the country. The primary aim of this prestigious campaign is to motivate people to make India pristine clean. Teachers, students, and common people are participating in this "Swachh Bharat Abhiyan" with big hits and fire. The main aim of cleanliness campaign is to disseminate the mission as an awareness program globally. This program involves the construction of bathrooms in public areas, promoting sanitation awareness in rural areas, cleaning streets, bringing behavioral changes to people, and converting India an ideal country before the world. Agreeing to this campaign nine people would first invited to the program and continue the chain likewise, this way there would be a huge chain of people who can involve in this campaign and make it a success. By the completion of the cleanliness program, it would indirectly draw the attention of business investors in India and also tourist's attraction would be more from all over the world. This would afford a more serious outcome economic growth of India. On that point are various brand ambassadors are nominated by the PrimeMinister to this event to induce it a successful campaign. This mission facilitates the participation of private sectors towards cleanliness program. Swacch Bharat Mission is also becoming popular in all states to have clean nation. In this regard all the people must use the toilets. In addition to that, human excreta can be converted into bio-gas and this will pave the way for the paradigm shift towards more utilization of renewable energy instead of utilising the Liquefied Petroleum Gas (LP G). utilization of bio-gas from human excreta will definitely transform the India into energy independence nation as Abdul Kalam had predicted. Hence, utilization of bio-gas from human excreta must become an order of the day to have better sanitary environment around the Globe.

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