

“Review On Technological Solution For Rural Sanitation Structure A Case Study Of Village.”

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Abstract - population living in pastoral area. Since independence, there's a growth of population and presently stands at 125 Cr. The sanitation wasn't at each given any precedence of the living. Whereas health, husbandry and industrialization entered precedences in 5 time plan by government of India. On completion of 3 times of Swacch Bharat charge, Ministry of Drinking Water and Sanitation (MoDWS) organized SWACCHATHON1.0 a Swacch Bharat hackathon which was blazoned on 1st August 2017. Environment sustainability is directly linked to sanitation (subburaman). Public health conditions relate by Sanitation which are a mortal excreta disposal and acceptable treatment of clean drinking water and sewage. Sanitation is abecedarian for sustainable development, laying a critical work in promoting mortal health, good and livelihood guarding echo system from declination. (sarah dickin, 2017).

Key Words: sanitation, groundwater, surface water, air, soil, and environment.

1. INTRODUCTION

Sanitation is a broad term which includes safe disposal of human wastes, waste water management, solid wastes management, water supply, control of vectors of diseases, domestic and personal hygiene, food, housing, etc. Sanitation and environmental sanitation have the convergence in many aspects, environmental sanitation is largely viewed as “the control of all those factors in man’s physical terrain, health, easing poverty, , enhancing quality of life and raising productivity- which are all essential for sustainable development”(WHO 1992).

Fiche et al. (1983) gave a rough guide to the relative importance of different aspects of sanitation as follows: Excreta disposal- 25; Excreta treatment- 15; Personal and domestic cleanliness-18; Water quality- 11; Water availability-18; Drainage and silage disposal-6 and

Food hygiene - 17 points. Sanitary household toilet is the most important aspect of sanitation. Besides, restoration of

dignity, privacy, safety and social status, sanitation has strong bearings on child mortality, maternal health, water quality, primary education, gender equity, reduction of

hunger and food security, environmental sustainability, global partnerships and ultimately poverty alleviation &

Improvement of overall quality of life. Open defecation is still in practice in numerous pastoral areas performing in serious social, health, profitable and environmental problems. Openly left mortal waste helps in percentage and transmission of pathogens, which carry diseases and infections. The problem is most acute for children, women and youthful girls. Children, especially those under 5 are most prone to diarrhea and occasionally indeed lose their lives. Loss of number of school days is another problem in times of illness. In case of women, lack of sanitation installation frequently forces them to circumscribe themselves by reducing and controlling their diet, which leads to nutritive and health impacts. Women, especially adolescent girls, face advanced pitfalls sexual assault due to lack of ménage toilets. Impacts of good sanitation:

Good sanitation has the following impacts on individuals and on community:

- Improves health
- Decrease in morbidity and mortality
- Improves man-days
- Improves productivity
- Poverty alleviation
- Improves water quality
- Minimizes prevalence of drop-out in school particularly girl students

It is an accepted fact that poor pays directly an laterally more due to bad sanitation. Utmost diurnal stipend base lose out in case of illness due to bad sanitation. Further, other members of the family who look after the sick member also lose their diurnal earning or training (in the case of children). In most of the rural areas health facility is rarely available forcing people to take the advice of private doctor or quacks who charge very high leading to more economic loss. Open defecation has been a deep-confirmed age old socially inherited behavior in rural India.

Provision of acceptable sanitation content in rural India has been a major challenge due to its miscellaneous socio-profitable conditions. Hence, even with advent of technology in rural India, substantive proportion of the rural poor still prefer to purchase a “mobile phone”, rather than on investing for sanitary toilets, since sanitation is neither a felt need nor open defecation is a artistic taboo. The most important challenge for effective implementation of sanitation program in rural areas is that most rural population being poorly informed or not overtly

Conscious of the linkage between sanitation and health. Due to inadequate knowledge and lack of, awareness they mostly believe that good or bad health lies due to reasons other than improved or bad sanitation. Another important barrier for sanitation is that there is no concept of

Community health and hygiene in pastoral areas. Wherever, there is awareness, it is limited only to personal sanitation and hygiene, not at community level. Effect of sanitation can be gauged only when facility and practices are adopted at community level. Best option for improved sanitation is by construction and proper use of a latrine by the household, which is owned and maintained for its own use and benefit. Such individual toilets can be built through various technological options to suit the household’s affordability.

1.1 TOTAL SANITATION CAMPAIGN AND ITS KEY PROVISIONS

Sin 1986, the Rural Development Department initiated India’s first public program me on pastoral sanitation, the Central Rural Sanitation Program me (CRSP). The CRSP interpreted sanitation as construction of menage toilets, and concentrated on the creation of pour-flush toilets through Tackle subventions to induce demand. The crucial issue of motivating geste change to end open defecation and use of toilets wasn’t addressed. As a result the programme in the force driven mode had limited intervention in perfecting pastoral sanitation content. As a result there was only just 1 percent annually growth of sanitation content throughout the 1990s.

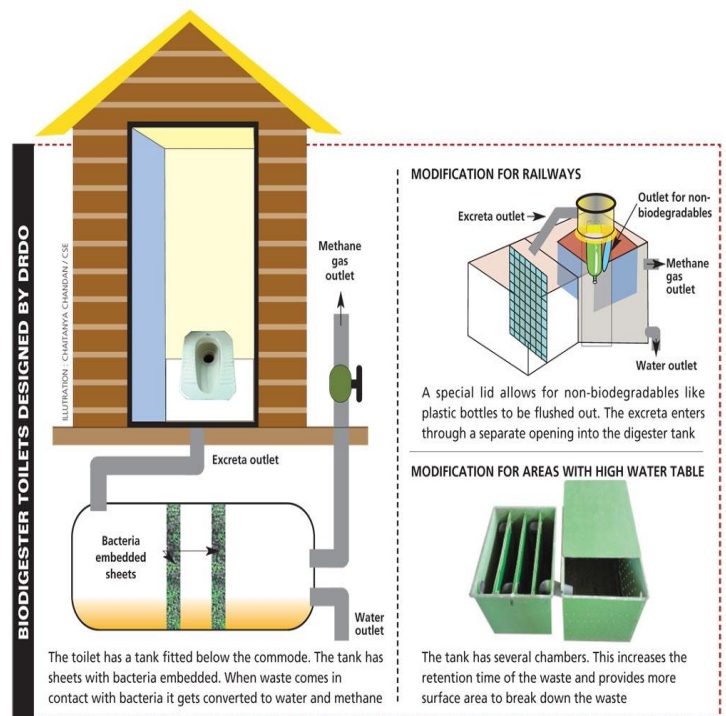
In light of the fairly limited intervention of the CRSP in perfecting the pastoral sanitation content, the Government of India restructured the programme, leading to the launch of the Total Sanitation Campaign (TSC) in the year 1999. Total Sanitation Campaign (TSC) is a

Flagship scheme of the Government of India administered by the Ministry of Drinking Water and Sanitation. TSC supports vill communities to end open defecation in their areas and achieve total sanitation, to ameliorate social quality, sequestration and insure aseptic and healthy living terrain. Creation of demand for sanitation from people through Behavior Change Communication (BCC) and supporting them with information on a menu of

technological options to construct and use safe sanitation installation is high ideal of the TSC. Under the TSC, fiscal support in the form of an incitement is given to homes living Below the Poverty Line (BPL) for construction and use of toilets. However, the main focus of the program is to create sustainable awareness and behavior change among the people, through capacity building and motivation to build individual household latrines (IHHLs) to own and maintain. The key challenge in achieving total sanitation in villages is to provide sustainable technology affordable even for poor families in different geographical conditions and also bring about a change in the knowledge, stations and age-old practices of the villagers towards open defecation. To end this state, furnishing easy access to a restroom and motivating people to use them

2. BIO DIGESTOR TOILETS:

Bio-digester toilets are constructed to convert human waste into gases and manure. The zero-waste bio digester technology uses psychotropic bacterial like Clostridium and Methanosarcina (these microbes can live in cold or hot climate and feed on waste to survive) to break down human into usable water and gas.



2.1 NUTRIENT CONTENT:

Human faces considered a valuable nutrient source in no. of countries. Annual amount of toilet waste is about 520 kg per person. This amount includes altogether 7.5 kg. of nitrogen, phosphorus, and potassium, and some micronutrient in the form of useful plants. If the

nutrients in the faces of one person were used for grain cultivation, it would enable the production of the annual amount of grain consumed by one person. Composting and separating toilets have enabled the reclamation of human excreta and the use of the nutrients contained in it as fertilizer and soil conditioner. In Sweden organic farmers have interest in using liquid manure like urine reason of the content of macronutrients and the low heavy metal content.

If the circulation of human faces between the urban and rural areas will increase, it must be insured that the quality and fertility of soils are not negatively affected in the long term perspective. This means in the practice that there is a need for research on efficiency and environmental impacts of this organic fertilizer.

Nutrients such as nitrogen, phosphorous and potassium play an important role in the growth of plants. In general, nitrogen and potassium make up about 80 percent of the total mineral nutrients in plants; phosphorous, sulphur, calcium and magnesium together constitute 19 percent, while all the micronutrients together constitute less than 1 percent. Nitrogen is responsible for the dark green colour of stem and leaves, vigorous growth, branching / tillering, leaf production, size enlargement, and yield formation. Phosphorous is used for growth, cell division, seed and fruit development. Resistance of plants to disease increase by Potassium also creates winter hardiness and drought resistance. It also increases grain plumpness and growth of fruit and root vegetables.

Nutrients present in soils are consumed by crops to produce food and other products for the benefit of human beings and animals. Crop products are often consumed far away from the production sites, some times thousands of kilometres away in another country

2.2. PROBLEM IDENTIFICATION

As per MoDWS report there are lots of villages are facing sanitation problems. Because of the geographical conditions the numbers of gutters are less in some of the villages. There are so many poor villages which are facing the problems like poor maintenance, and diversion of toilet wastewater to plants designed for domestic waste. Due to lack of awareness and backward mentality people practice open defecation. It causes lots of serious health issues. Due to lack of information people don't know the importance of degradation of fecal matter. Improper planning causes illiteracy about sanitation structures and its cleaning.

2.3 USE OF SEWAGE SLUDGE

In the Nordic countries between 30 to 48% of sludge is used in agriculture. Rich in organic matter and nutrients, mostly nitrogen and phosphorus, stabilized sludge is used as a fertilizer and soil conditioner in agriculture. Sludge is rather

poor in other macro-nutrients, although lime-stabilized sludge contains significant amounts of calcium and magnesium. About a half of the micro-nutrients, copper, zinc, and manganese, are usable for plants. The fertilizing value of sludge is weakened by the fact that its nutrient balance does not correspond to the nutrient needs of plants; sludge is poor in nitrogen and rich in phosphorus. The amount of nitrogen in sludge will increase in the future, if the removal of nitrogen from wastewater becomes more efficient. The fertilizing effect of the nitrogen contained in the sludge is slow but long-lasting, and the same applies to phosphorus, which takes years to be released into the soil to be used by plants. Organic matter usually constitutes 50-60% of the dry matter of mechanically dried sludge, which is why the use of sludge in agriculture increases the amount of organic substances in cultivated land. Above all, sludge is most beneficial in mineral soils. An increase in organic matter in the soil improves the structure and water economy of the soil and stimulates microbe activity. It improves the structure and water economy of the soil and stimulates microbe activity. It also effectively binds various harmful substances, such as heavy metals, preventing their action on the soil.

3. ANALYSIS

3.1 THE HOUSEHOLD SURVEY:

SR.NO.	FACILITIES	NO.OF FAMILIES
1	TOILET	
	1. PRIVATE	29
	2. COMMUNITY	0
2	3. OPEN DEFECATION	48
	DRAINAGE LINKED HOUSE	
	1. COVERED	00
3	2. OPEN	77
	3. NONE	00
	WASTE COLLECTION SYSTEM	
4	1. DOOR STEP	00
	2. COMMON POINT	00
	3. NO COLLECTION SYSTEM	77
5	COMPOST PIT	
	1. INDIVIDUAL	00
	2. GROUP	00
6	3. NONE	77
	TYPE OF HOUSE	
	1. KUTCHA	72
	2. SEMI PUCCA	05

We created a survey form it includes annual income, gov. schemes, home type, privet toilets, or no toilets etc. After the completion of survey it gives lots of information and using this data we analyze the problems of that village.

4. LINKAGES BETWEEN SANITATION, HEALTH AND TOILETS

before eating meals, and after defecation. Sanitation has a direct impacts on health. Lack of awareness of the linkages between sanitation and health, and health and productivity makes it difficult to effectively implement most sanitation programmes in rural India. Often, they believe poor health and poor productivity is borne of factors other than sanitation. The SBM (G) programme highlights social and health benefits of sanitation leading to demand driven approach, making it successful in rural area.

1) Human waste and disease transmission.

Human excreta contains a full spectrum of pathogens that transfer from diseased to healthy individuals through several direct and indirect routes, causing infections and superimposed infections. In rural areas it is estimated that about 80% diseases are water borne diseases—directly or indirectly linked with human waste. Infections enters human body through fluids, fingers, flies, food, and fields

2) Pathogen in human excreta

There are several bacterial pathogens in human waste. Some common bacterial and helminth pathogens are described below

Table 1 Bacterial Pathogens in Human Excreta

Bacteria	Diseases	Reservoir
<i>Escherichia coli</i>	Diarrhoea	Human
<i>Salmonella typhi</i>	Typhoid fever	Human
<i>S. paratyphi</i>	Paratyphoid fever	Human
<i>Other salmonellae</i>	Food poisoning other salmoellioses	Human
<i>Shigella spp,</i>	Bacillary dysentery	Human
<i>Vibrio cholera</i>	Cholera	Human
<i>Other vibriions</i>	Diarrhoea	Human

Table 2: Helminth pathogens in human excreta

Helminths	Common name	Diseases	Transmissi on
<i>Ancylostoma duodenale</i>	Hookworm	Hookworm	Human-soil-human
<i>Ascaris lumbricoides</i>	Roundworm	Ascariasis	Human-Human-soil
<i>Taenia saginata</i>	Beef worm	Taeniasis	Human-Cow-Human
<i>T. solium</i>	Pork Tapeworm	Taeniasis	Human-Pigs Human
<i>Trichuris trichura</i>	Whipworm	Trichuriasis	Human-Soil-Human

4. CONCLUSIONS

Village is having less sanitation facilities and having less number of toilets. Village is facing sanitation problem due to geographical conditions, poor maintenance, due to lack of awareness and backward mentality of people. By monitoring the usage of toilet, it is seen that those people having toilet facility are not using toilets regularly and also maintenance is poor. It is observed that human excreta contain nitrogen, phosphorus, and potassium and these gases have wide applications in various field like agricultural etc.

5. REFERENCES

1. **Avvannava S.M. & Mani M.,** (2008), "A conceptual model of people's approach to sanitation", Science of the Total Environment vol.no.390 page no.1-12.
2. **Booklet of Asian Development Bank,** (2016), "Water for All Series 18: India's sanitation solutions for All: How to make it happen smart Sanitation Solutions", Booklet published at 4th World Water Forum held at Mexico.
3. **Chi-Chung T., Brill E.D.,Pfeffer J.T.**(1987), "Comprehensive Model Of Activated Sludge Wastewater Treatment System", Journal of Environmental engineering,vol.113,no.5,ASCE,ISSN 0733-9372/87/0005-0952/\$01.00.paper no.21841.113(5):page no.952-969.
4. **Chi-Chung T., Brill E.D.,Pfeffer J.T.**(1987), "Optimization Techniques for Se c"ondary Wastewater Treatment System", Journal of Environmental Engineering,vol.113,no.5,ASCE,ISSN 0733-9372/87/.paper no.21840.113(5):page no .935-951.

5. **Crocker J., Saywell D., Bartram J.** (2017), "*Sustainability of Community –Led Total sanitation Outcomes :Evidences from Ethiopia And Ghana, Elsevier*" International Journal of Hygiene and Environmental Health, page no.551-557
6. Environmental & Urbanization (2003), "*Water sanitation and drainage: ensuring better provision with limited resources*" environmental & urbanization, page no.03-10.
7. **Harada H.** (2012), "*Urine-Diverting system for securing sanitation in Disaster and Emergency Situation, Leadership and Management in Engineering*" 12(4): page no 309-314.
8. **Huang X.**, (2016), "*Electrochemical disinfection of toilet wastewater using wastewater electrolysis cell*", Water Research 92(2016) page no.164-172.
9. **Kaminsky J. & Javernick A.**, (2014) , "*Theorizing the internal social sustainability of sanitation organization*" ,ASCE,vol.no.141(2).
10. **Kavita Wankhade** (2015). "*Urban Sanitation in India: Key shift in the national policy frame*", International Institute for Environment and Development, page no.555-5.
11. **Mark Sanders MEng (Hons)** (2018), "*Sustainable Sanitation: fertilizer from human waste*", Waste and Resources Management vol.no.168, page no.144-151.
12. **Reilly K., Elizabeth L.** (2014), "*The toilet tripod; Understanding successful sanitation in rural India,*" Elsevier-Health &Place 2943-51.
13. **Sahoo K.C., Hulland K.R.S.,Caruso B.A.,swalin R.,Freeman M.C.,Panigrahi P., Dreibelbis R.**,(2015), "*Sanitation related psychological stress:A grounded theory study of women across the life-course in Odisha, India*", Social science & medicine, vol.no.139,page no 80-89.