

Environmental Sanitation

“Reflections from Practice”

A Module for Community Health Practitioners

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With the Team

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sochara
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LIST OF ABBREVIATIONS

No.	Abbreviation	Expansion
1	CLTS	Community Led Total Sanitation
2	SLWM	Solid and Liquid Waste Management
3	SOCHARA	Society for Community Health Awareness, Research and Action
4	CHC	Community Health Cell
5	MDG	Millennium Development Goal
6	CPHE	Center for Public Health and Equity
7	APL	Above Poverty Line (family)
8	BPL	Below Poverty Line
9	Eco-San	Ecological Sanitation
10	SHG	Self Help Group
11	CBO's	Community Based Organisation
12	NGO's	Non Government Organisation
13	CSR	Corporate Social Responsibility
14	CHLP	Community Health Learning Programme

“Community Health is a process of enabling people, to exercise collectively their responsibility, to their own health and to demand health as their right.”

Axioms of Community Health-1,

Community Health In Search of Alternate Processes, CHC, SOCHARA 1987, 2011

FOREWORD

Dr. Thelma Narayan, Director SOCHARA, SOPHEA

Environmental sanitation and public health have been closely inter-related since long. Provision of safe water supply and sanitation are part of the most basic first generation public health interventions.(1) This central issue was highlighted by the Bhole Committee Report 1946, and by the second and third five year plans of India (2). WHO in 1952 estimated that 50 million people in India were affected every year by water borne diseases and 2 million died annually from this cause (2)

Half a century later, as a member of the Karnataka Task Force on Health and Family Welfare (1999-2001) we reviewed the health situation in the state. It was estimated then that 50% of infant deaths were attributed to waterborne diseases, and an estimated 1.5 million under five deaths occurred in India due to water related diseases.(1) 10% of the total disease burden in developing country situations is estimated to be accounted for by poor quality and inadequate quantity of water. (1)

Water washed diseases are scabies and trachoma. **Water based diseases** include schistosomiasis and dracunculiasis (guinea worm disease). **Water related diseases** are malaria, filariasis and dengue fever. **Water borne diseases** through faecal contamination include diarrhoea, dysentery, cholera, typhoid Hepatitis A, amoebiasis, giardiasis, helminthic infestation/intestinal worms, campylobacter etc.

Thus water and sanitation related adverse health impacts are clearly a public health priority. However, are they? Public health planning and implementation through a variety of public sector programs since the National Water Supply and Sanitation Program of 1954 have not captured the popular imagination.

The formation of Village Health and Sanitation Committees (VHSCs) by the National Rural Health Mission created an operational mechanism for decentralized Community Action for Health (CAH) with availability of untied funds. The SOCHARA experience with CAH in Tamilnadu in 450 Village *Panchayats* in six districts covering around 4000 villages and hamlets found that VHSCs often prioritized the cleaning of public water supplies. The community health approach to sanitation by Prahlad of SOCHARA in Karnataka with communities in parts of 8 districts elicited a very positive response.

This work needs to be taken further and scaled up. This report captures the learning from our experience. Participatory action research may add insights. The next 10 years are important for the completion of these first generation public health reforms with an across the community approach.

References:

1. Task Force on Health and Family Welfare, Government of Karnataka, Final Report – “Karnataka – Towards Equity, Quality, Integrity in Health”, Government of Karnataka, April 2001.
2. Kawata K, Environmental Sanitation in India, Lucknow Publishing House, 1967.

PART - A

PERSPECTIVES ON SANITATION AND HEALTH



Source : Jatha for sustainability at Edhalli Village Kolar Dist. 2012

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“The Community Health Approach involves the increasing of the individual, family and community autonomy over health and over the organisations, the means, the opportunities, the knowledge and the supportive structures that make health possible”.

Axioms of Community Health-2,

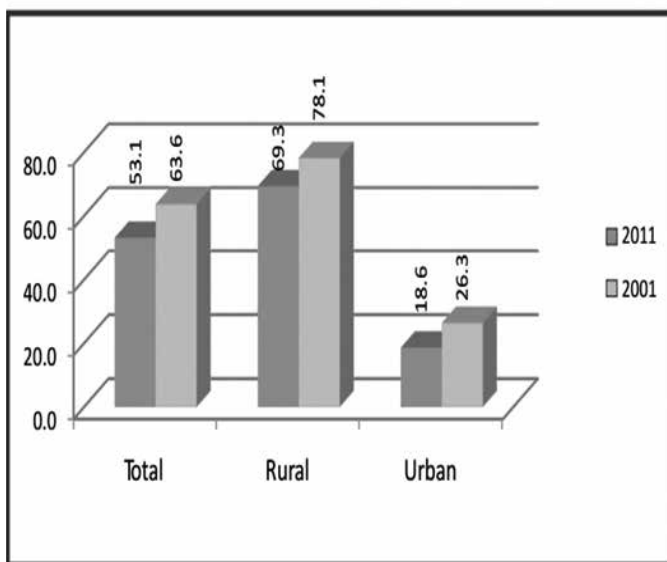
Community Health In Search of Alternate Processes, CHC, SOCHARA 1987, 2011

CHAPTER 1 : INTRODUCTION

Water, sanitation and waste management are important driving forces for community health in India. A clean environment, open defecation free areas, personal hygiene practices among the individuals, proper solid and liquid waste management, and availability of adequate safe drinking water determine the health of individuals as well as the community. About 88 % of child deaths are estimated to be related to diarrhoeal diseases (PFC - Progress for Children - 5) and according to the World Health Report, 2005, CHERG (Child Health Epidemiology Reference Group, 17% of child mortality was due to diarrhoea. Major public health challenges like diarrhoea, cholera, malaria and dengue, polio, Hepatitis A and E, amoebic dysentery and other diseases are also caused due to unsafe drinking water and poor sanitation. Over 1 billion people or 15% of the world's total population practice open defecation (1). In India 68.84% of the population lives in rural areas (2). According to the Census of India 2011, 71.59% of rural individual households in Karnataka do not have toilet facilities and are dependent on the use of open spaces for defecation (3)(2). The government of India along with several international organisations, civil society organisations, elected representatives, policy makers and *Panchayati Raj* Institutions have facilitated several programmes since 1986 to improve Sanitation and the living conditions of rural populations but the implementation and achievement is not up to the mark (2).

We live in a time of rapid change and progress in science and technology with changes in housing structures, lifestyle, food habits, clothing, education, but one of the major challenges that still remains is tackling the problem of open defecation.

PERCENTAGE OF HOUSEHOLDS HAVING NO LATRINE
INDIA, 2001-2011



Source: - censusindia.gov.in, 2011

Figure 1 : Percentage of Household Having no Latrine

Table 1 : Social Change in Human Being

No.	Time	Food	Clothing	Education	Housing	Transportation	Relationships	Open defecation
1	Stone age	Raw food	Leaves, animal skin etc	Informal	Caves, tree trunks etc.	Bare foot walking, using animals	No relationship	Yes
2	Modern age	Cooked food	Clothes	Schools, colleges etc	Proper structure with brick,stone etc	Motor vehicles	Marriage, parental relationship etc	Yes

In a developing country like India, the diseases related to unsafe drinking water and sanitation in rural areas still have considerable community and public health significance and have impacted socio-economic development. Awareness regarding the value of a clean environment, organic farming, nutrient value of faeces and urine, reduction in waterborne diseases through improved sanitation practices and economic development through job creation for masons in their own villages will lead to sustained socio-economic growth.

Factors which influence sustainable growth in the of the community are:

1. Migration (Masons):- Human migration is the movement of individuals and families from one place to another in search of employment, food, shelter and better living conditions. Members in certain occupations like masons, semi-skilled masons, laborers, painters, plumbing workers, carpenters and others migrate from one place to another. Migration may be temporary or a permanent arrangement in search of jobs and better wages depending on the individual’s interest. Providing employment and better living conditions for such individuals in their own villages may reduce migration.



Figure 2 : Sanitation and its Inter-linkages

There are a number of economic activities related to sanitation which can result in the economic growth of the local community, thus possibly reducing migration. These include: the construction of toilets, vermi-compost bins and compost bins, installation of proper liquid waste management system, development of production centers for

cement rings for toilet pits and dustbins; producing bricks and other construction work related to sanitation will provide jobs for local masons, construction workers, laborers, painters, tile producers and installers.

- 2. Organic farming through urine and faeces:** Farming, with the use of natural fertilizers, has been practiced by our ancestors for thousands of years. The developments after the 18th century have led to use of chemical fertilizers and pesticides along with hybrid crop varieties and genetically modified crops, which have now become common agricultural practice. Usage of chemical fertilizer and pesticide results in decreased crop production, loss of soil fertility, water contamination due to chemicals, death of surface drinking water sources due to eutrophication, ground water contamination from chemicals and loss of indigenous type of crop varieties all of which lead to environmental degradation. All these factors at global level have diverted the interest of individuals, scientists, researchers and practitioners to shift from chemical fertilizers to organic fertilizers. Human faeces and urine have high levels of NPK (Nitrogen, Phosphorus and Potassium). Proper management of faeces and urine through composting and other scientific techniques will have multiple economic benefits and also reduce unsafe management practices. Human waste can be used in producing compost, Biogas (using cow dung and human waste) and can also be used as liquid fertilizer by using proper dilution techniques.
- 3. Health cost:** Sustainable environmental sanitation practices, safe drinking water supplies and proper waste management systems result in reducing money spent on ill health caused due to poor access to sanitation.
- 4. Clean Environment:** The environment comprises of both living and non-living organisms. Our environment is becoming increasingly polluted due to various reasons. An important cause for environmental contamination is poor sanitation facilities. Ensuring a proper solid and liquid waste management system and ensuring a 100% open defecation free status results in a sustained clean environment.
- 5. Girl child and sanitation:** Parents are often not inclined to send the girl child to school if there is no toilet. The girl child faces several social and health (personal hygiene) related issues particularly at home and in school when they do not have access to a toilet and go out for defecation/urinating. Millennium Development Goal (MDG) 2 speaks about achieving universal primary education. To achieve MDG 2, both private and government schools should ensure that every girl child comes to school by providing safe sanitation facilities.

Table 2: Socio-economic impact caused by absence or lack of access to toilet facility

	Generation of hazard	Exposure to hazard/Consequences	Economic and health impacts
No toilet	Defecating in open areas	Dog bite, deaths due to snake bite, attack from wild animals	Ill health, man power loss, wage loss and economic impact on families
	Surface water pollution	Water contamination with Faecal matter	Ill health and investment on disease control
	Ground water contamination	Ground water contamination Faecal matter	Ill health and investment on disease control
	Soil pollution	Loss of nutrient value (faeces are highly pathogenic when they are not treated properly)	Degradation of soil resources
	No toilets in schools	Less girl child attendance in schools because of lack of privacy	No gender empowerment, loss of human resources
	Faeces and urine as waste.	Loss of NPK (Nitrogen, Phosphorus and Potassium) value	Investment for purchasing fertilizers, compost etc.

Water

Water covers 71% of the earth surface. Of this 96.5% is found in the oceans and seas, which are not suitable for drinking purposes, 1.7% as ground water, and 1.7 % as glaciers and ice caps of the Antarctica. Around 2.5 % of the earth water is fresh water and the remaining sources are not suitable for drinking purposes.

The main processes involved in the water cycle (or hydrological cycle) are evaporation, condensation and precipitation. Evaporation is a step in the water cycle where water from rivers, ponds, oceans, plants and animals evaporates under the influence of sunlight and condenses in the atmosphere as clouds, and later precipitates as rain. The runoff water after the rain collects into surface water bodies like oceans, rivers, ponds, and absorption by soil results in the ground water being recharged.

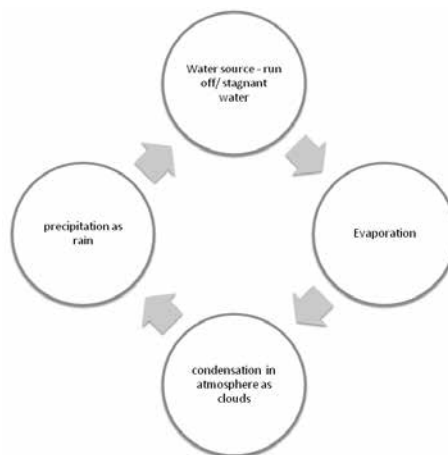


Figure 3 : Hydrological Cycle in the atmosphere

Surface water bodies and ground water bodies are polluted due to various anthropogenic and natural activities that are the main sources of viruses and bacteria that cause water born and water related diseases.

According to Census 2011, 53.1% of households in rural India do not have a toilet facility and are dependent on open spaces for defecation. Open defecation is linked to contamination of water sources and soil.

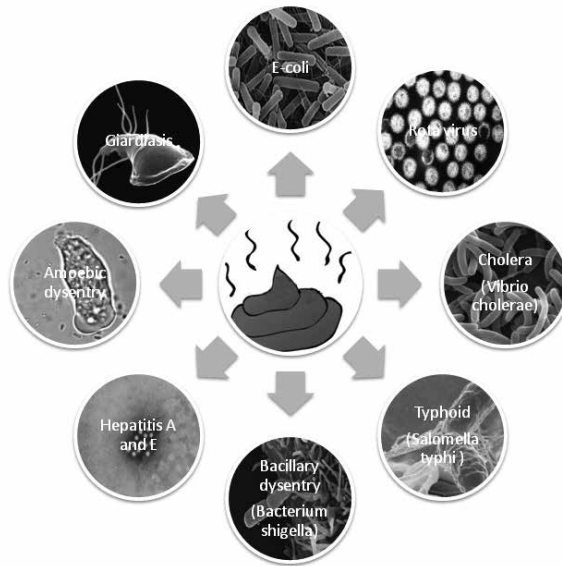


Figure 4 : Disease caused due to lack of proper drinking water and poor sanitation

Table 3 : Diseases caused due to Faecal oral transmission

No.	Diseases	Pathogens	Mode of transmission	Symptoms
1	Cholera	Vibrio cholera - bacteria	Food contaminated with faecal matter	Vomiting and Diarrhoea
2	Typhoid	Salmonella typhi - Bacteria	Faeces of a infected person contaminates food and water	Typhoid fever
3	Bacillary dysentery	Bacterium Shigella	Faeces of an infected person contaminates food	Dysentery
4	E-Coli diarrhoea	E- coli bacterium	Contaminated water	Diarrhoea
5	Hepatitis A and E	Virus	Contaminated food, water, direct contact with infected animals and persons, transmission from blood and others	Fever, jaundice, headache, vomiting, nausea etc
6	Rota virus	Virus	Contact with the infected person and others	Diarrhoea
7	Amoebic dysentery	Protozoa	Faecal oral through contaminated hands	Dysentery

8	Giardiasis	Giardia lamblia	Through contaminated food and water	loss of appetite, diarrhoea, blood in urine, loose or watery stool, stomach cramps, upset stomach, vomiting excessive gas, and burping
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Source :- www.colfinder.net/materials/Communicable_Diseases/CD_Unit_11.odt cited 01.04.2015

Child Health and Sanitation

Children represent the future, and so ensuring their healthy growth and development should be a prime concern. Children are more susceptible to diseases caused due to unsafe drinking water and poor sanitation. Diarrhoeal diseases are one of the leading causes for child deaths. Most the diarrhoeal diseases are caused by Faecal- oral transmission. Proper hand washing, child faeces disposal, personal hygiene practices, child friendly toilets, awareness creation among mothers on good sanitation practices result in improved child health.

Table 4: Leading causes of death in children under 5 in the world - 2011*

Cause of Death in under 5 children globally		
Cause	% Total	
	1-59 Months	Total (0-4 Years)
All causes	57	100
Pneumonia	13	17
Prematurity	2	17
Birth asphyxia	1	11
DIARRHOEA	9	9
Malaria	7	7

Source :- <http://www.who.int/mediacentre/factsheets/fs178/en/> dated :- 15.04.2014

CHAPTER 2: HISTORY OF SANITATION

Open defecation has been practiced since the beginning of time by all creatures. Individuals use agricultural fields, wastelands, banks of lakes/ rivers, forestlands and open waste places to defecate. Defecation sites are usually far from human settlements. Over the years due the influence of factors like modernisation, changed cultural behavior, changes in social life and education, have developed technologies for sanitation ranging from using dry toilets to flush toilets and ecological sanitation.

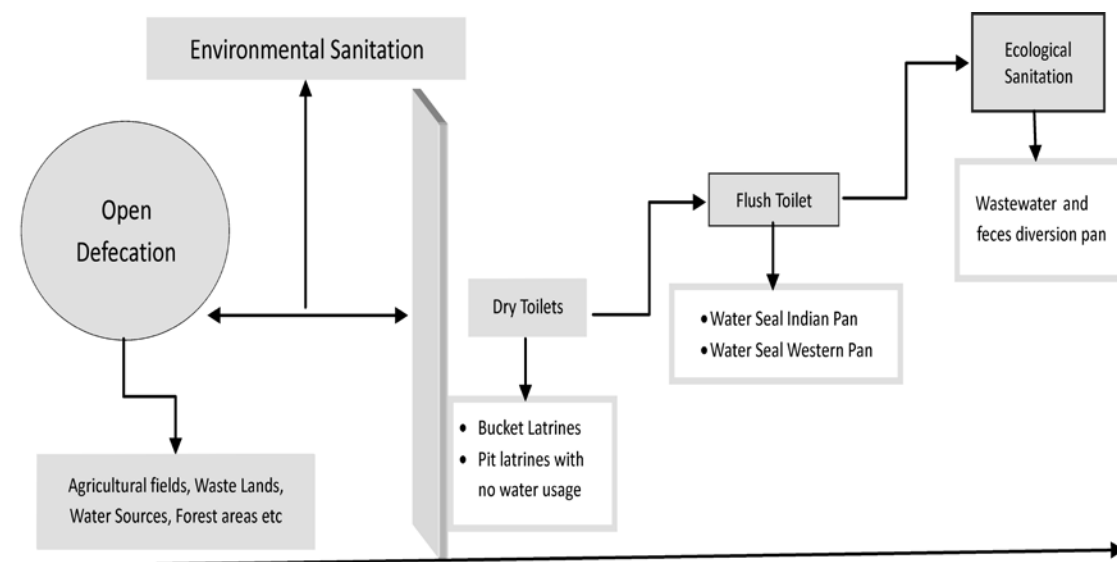


Figure 5 : Sanitation and evolution of toilet system has its own history starting from open defecation to improved ecological sanitation system.

Dry Latrines :- Dry toilets are different from water sealed toilets. In this type of a toilet, a seat with a hole is directly connected to a pit. In some communities buckets were used for collecting faeces and were cleaned by persons belonging to lower castes.

Flush toilets/ Water sealed latrines:- Legislations such as prohibition on manual scavenging and construction of dry latrine gave space for the use of a new technology called flush toilet or water sealed latrines; where-in a connection from the water sealed toilet pan to “Under Ground Drainage (UGD)” and septic tanks came into existence.

Ecological Sanitation: - Ecological sanitation technology incorporates the principles of recycling faeces, urine and wastewater which are collected separately, treated and used as compost and fertilizer for agricultural crops.

Evolution of a toilet system has its own history. Some landmarks are as listed below

Table 5 : Historical Evolution of Toilets and of toilet systems

BC 2500	In Mohenjodaro, there existed a highly developed drainage system where waste water from each house flowed into the main drain.
BC 1000	In the Bahrein Island in the Persian Gulf, a flush type toilet was discovered.
AD 69	Vespasianus (Otto Empire) for the first time levied a Tax on Toilets.
1214 AD	Construction for the first time of public toilets, manned by scavengers, in Europe.
1596 AD	JD Harrington invents W.C.(water closet)
1668 AD	Edict issued by Police Commissioner Paris, for construction of Toilets in all houses.
1728 AD	Architect J.F. Brondel argues that attached toilet is ideal.
1739 AD	First separate toilet for men and women appear at a ball in Paris.
1824 AD	First Public Toilet in Paris
1859 AD	Toilet of Queen Victoria is decorated with gold.
1883 AD	First Ceramic Toilet by Thomas Turiferd for Queen Victoria.
1889 AD	Sewage treatment for the first time in the world
1959 AD	All surface toilets abandoned (Paris).

Source :- <http://www.sulabhtoiletmuseum.org/old/pg02.htm> cited :- 01.08.2014

Examples from Indian History - Nahagaraha fort – Jaipur- Rajasthan

Rajasthan in India is famous for its Royal Heritage mainly that of the Rajputs. Some of the examples we can quote from the History of Sanitation in India is Nahagarah Fort in Jaipur, Rajasthan. This fort was built by Maharaja Sawai Jai Singh II in 1734 AD (4). The fort follows the Indo-European architecture style. Systematic toilet facilities, water lifting facility and toilet with wash water facility are found in the fort.

Table 6 : Indian History of Toilets

Built In:	1734 AD
Built By:	Maharaja Sawai Jai Singh II
Renovated By:	Sawai Ram Singh in 1868



Toilet with Ventilation -
Nahagarah fort



Toilet Pan



Toilet Pan with water facility

Environmental Sanitation: Efforts from the Government

As a part of efforts by the Government of India, international organisations, elected representatives, policy makers and others, several projects were started to improve rural sanitation and drinking water systems. Under these projects components like school sanitation, *anganwadi* sanitation, incentive/subsidy for toilet construction, communication programmes, waste management, personal hygiene programmes were introduced. Though some progress as been made, the achievement of the programmes have not been up to the mark.

Some of the programmes started for improving environmental sanitation are as follows.

Table 7: Public Sector Sanitation Programmes in India

NAME OF PROGRAMME	PERIOD
Central Rural Sanitation Programme (CRSP)	1985-86 to 1994-95
Nirmal Grama Yojana	1995 to 2004
Swachha Grama	2000 - 2005
Sector Reform Projects (16 Districts in INDIA)	1999 to 2004
IRWS&SP - Danida (10 districts) Integrated Rural Water Supply and Sanitation Programme	Pilot 1991-1996 Phase I - 1997 to 2002 Phase II ongoing from 2002
IRWS&SP - Netherlands	Concluded
KRWS&SP - WB assisted	Phase I - 1993 to 2001 Phase II - Jal Nirmal Project ongoing from 2002 to 2005
Unicef - SSHE	1999 to 2002
Total Sanitation Campaign (TSC)	2005-2012
Nirmal Bharath Abhiyan (NBA)	2012
Swachha Bharat Abhiyan	2014

Apart from governmental programmes, committees instituted by the government have also recommended the improvement of sanitation conditions in rural areas. These are as listed below.

1) Bhore Committee - Report of Health Survey and Development Committee

The Government of India in 1943 appointed a Health Survey and Development Committee committee under the chairperson of Sir Joseph Bhore to make a broad survey of the present situation in India with regards to health conditions and to make recommendations for future development. The Bhore committee made a series of recommendations and also found out existing practices for disposal of the night soil using buckets in some of the municipal cities of India. The report also clearly mentioned that the disposal of night soil was handled by the Health Department and in some cities responsibility was also shouldered by the Engineering Department (5).

Box - 1

“Composting has been tried of recent years in some towns -considerable progress has been made with this disposal, particularly in Madras” – Here the rural sanitation unit is attached to Public Health department where septic tank latrines have been built for individuals houses, with a cheap type of concrete seat with water seal. – Bhore Committee report, 1948

Box - 2

“The first town to have a underground sewage disposal system was Calcutta, it has been introduced as far back as 1870”-

Bhore Committee report, 1948

2) Report of “The Health and Survey and Planning Committee” – (August 1959 to October 1961)

Box No. 1 and 2 What the Bhore Committee said

The Ministry of Health, Government of India set up a committee in 1959 to access the developmental activity undertaken following the Bhore Committee recommendations. The committee was constituted under the chairmanship of Dr.A.Lakshmanswami Mudaliar. There afterwards with series of meetings the committee decided and formed a Sub Committee of “Public Health including Environmental Hygiene” (6)

Box- 3

“Occupational Health Including Industrial Health”

“Over and above the general provision for health protection which the worker can share with the other members of the population. Special measures should be taken to counteract the adverse effects associated with occupations”

Report of “The Health and Survey and Planning Committee” 1961

3) Final Report of the Task force on Health and Family Welfare – April 2001

On 21st December 1999 under the leadership of Chief Minister Mr.S.M. Krishna a Task force on “Health and Family Welfare” was set up under the Chairmanship of Dr.Sudarshan. The taskforce constituted subgroups on various issues and conducted several consultations, visits and meetings with the experts. Individuals and organisation and submitted the final set of recommendations (23) for improving water and sanitation facility as shown in box.

Box - 4

Recommendations from the Karnataka Task Force on improving Water and Sanitation

- “Reduce water borne diseases through
 - Setting standards for drinking water quality
 - Periodic testing for contamination of drinking water
 - Periodic water purifications –eg:- Chlorination of water
 - Mapping of water resources at *Gram Panchayat* level
 - Collaborations with Health professional, *Panchayats* and other Local bodies.
 - Introducing Health Promotion activities concerning water and sanitation
- Improve sanitation by
 - Introducing schemes for schools, *Anganwadi* and Individual toilet
 - Maintenance of draining system at the local level
 - Introducing Solid and Liquid waste management and popularising composting, vermin composting etc.
- Develop Health Promotion, advocacy and social mobilization.”

Based on the reports from the various committees, studies from the researchers and for achieving “Millennium Development Goals” Government of India Started Several Projects for Achieving Sanitation progress in Country. Under Sanitation Projects focus on School toilets, *Anganwadi* toilets, gender empowerment, managing waste, construction of toilets with demand driven approach and ensuring personal hygiene practices were made mandatory .

CHAPTER 3: MILLENNIUM DEVELOPMENT GOALS (MDG) AND SANITATION

In the year 2000, representatives from 189 countries gathered together and committed to develop global partnership to reduce extreme poverty, achieving universal primary education, promoting gender equality and empowering women, reducing child mortality, ensuring environmental sustainability, improving maternal health and combat HIV /AIDS, Malaria and others by setting a series of time bound targets with the deadline of 2015 (7).

Table 8 : Targets for Millennium Development Goals

Goals	Targets
Eradicate extreme poverty and hunger	Target 1. Halve, between 1990 and 2015, the proportion of people whose income is less than \$1 a day Target 2. Halve between 1990 and 2015 the proportion of people who suffers from hunger
Achieve Universal primary education	Target 3. Ensure that by 2015 children’s everywhere boys and girls alike will be able to complete full course of primary education
Promote gender equality and empower	Target 4. Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015
Reduce child mortality	Target 5. Reduce by two-thirds between 1990-2015, the under 5 mortality rate
Improve maternal health	Target 6. Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio
Combat HIV/AIDS malaria and other diseases	Target 7. Have halted by 2015 and begun to reverse the spread of HIV/AIDS Target 8. Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases
Ensure Environmental Sustainability	Target 9. Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources Target 10. Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation Target 11. Have achieved by 2020 a significant improvement in the lives of at least 100 million slum dwellers

<p>Develop a global partnership for achievement</p>	<p>Target 12. Develop further an open, rule-based, predictable, nondiscriminatory trading and financial system (includes a commitment to good governance, development, and poverty reduction? Both nationally and internationally)</p> <p>Target 13. Address the special needs of the Least Developed Countries (includes tariff- and quota-free access for Least Developed Countries? exports, enhanced program of debt relief for heavily indebted poor countries [HIPCs] and cancellation of official bilateral debt, and more generous official development assistance for countries committed to poverty reduction)</p> <p>Target 14. Address the special needs of landlocked developing countries and small island developing states (through the Program of Action for the Sustainable Development of Small Island Developing States and 22nd General Assembly provisions)</p> <p>Target 15. Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term</p> <p>Some of the indicators listed below are monitored separately for the least developed countries, Africa, landlocked developing countries, and small island developing states</p> <p>Target 16. In cooperation with developing countries, develop and implement strategies for decent and productive work for youth</p> <p>Target 17. In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries</p> <p>Target 18. In cooperation with the private sector, make available the benefits of new technologies, especially information and communications technologic</p>
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Source :- cited :- 28.04.2014 Sanitation linked to Millennium Development Goals (MDG)

Clean environment, proper drinking water facility, privacy to girl child, sustained sanitation practices are one of the key indicator for attaining “Millennium Development Goals”. The linkage between achieving MDG goals and sanitation activities are shown in the table.

Table 9 : Sanitation and achieving the Millennium Development Goals (MDG)

Sanitation related Activity	Results	Achieving MDG goals
Potable drinking water supply, proper waste management and 100% open defecation free villages	Less expenditure on health and improved economy	Eradicate extreme poverty and hunger :- MDG 1
Improved toilet facility with separate toilet units for girls and boys	Privacy and dignity of all children especially girl child	Achieve universal primary education :- MDG 2
Improved toilet facility at individual house hold level	Privacy and dignity and awareness on personal hygiene practices especially women	Promote gender equality and empower women :- MDG 3
Open defecation free villages with proper drinking water supply and clean village	Reduction in diarrhoea and other water and sanitation related diseases	Reduce child mortality :-MDG 4
Open defecation free villages and improved drinking water supply and awareness on personal hygiene food sanitation and nutrition	Reduced anemia and malnutrition results In healthy mother	Improve maternal health :- MDG 5
Clean environment, personal hygiene practices and improved food hygiene practices	Creates healthy environment and awareness	Combat HIV AIDS, malaria and other diseases :-MDG 6
Achieving 100% open defecation free status and proper solid and liquid waste management	Clean and healthy environment	Ensure environmental sustainability :- MDG 7
Networking	Civil Society, NGO's, CBO's, <i>Panchayati raj</i> institution's, Research institutions	A Global Partnership for engagement :- MDG 8

Clean environment and environmental sanitation are directly linked with the Millennium Development Goals. The focus on improving components of environmental sanitation in rural and urban areas can result in achieving MDG goals.

CHAPTER 4 : ENVIRONMENTAL SANITATION WITH A GENDER PERSPECTIVE

According to the World Health Organisation the term gender is described as “*socially constructed roles, behaviors, activities, and attributes that a given society considers appropriate for men and women(8)*”. Gender equality with respect to need for sanitation facilities for women and girl child is a major concern. Women are made responsible for most of the household activities like cooking, fetching water, caring of children and the elderly in households. They also have child bearing and child rearing roles. But women are denied access to a toilet facility , which affects them in several ways. A serious issue linked with lack of access to toilets is the psychological stress associated with it. Fear, harassment, lack of privacy and dignity of the women in community are commonly experienced stress factors. Many girls drop out from the school because of not having toilets in schools or not having separate toilets for boys and girls.

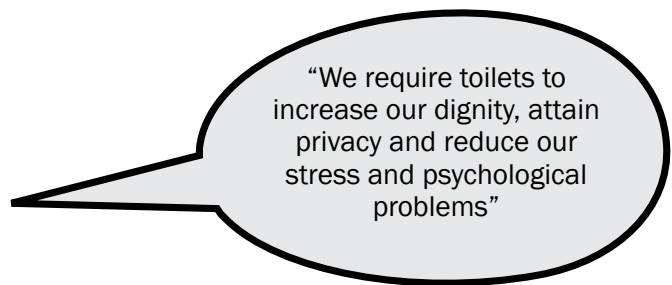


Figure 6 : Women speak out

Defecating in the open creates a huge negative impact on the psychology of women. Women go out for defecation or to relieve themselves usually in the early morning or late evening. They face major stress during open defecation this is closely associated with the time when they have to go out for defecation. Some of the common problems associated with the women not having access to toilets are as follows (21):

1. **Privacy and Dignity** :- Privacy and dignity of women are affected when they defecate in the open spaces like road side , waste land etc.
2. **Fear** :- Fear is the most common impact on women when they go for open defecation. Fear is associated with men who throw stones, take photographs, follows them when they go for defecation and other activities which enhances the fear of individual.
3. **Animal attacks** :- Snake bite, dog bite, insect bites and attacks by wild animals are a major threat during defecation.

A recent study by a SOCHARA fellow highlighted that poor access to sanitation facilities is a determinant of mental health of women (see box for conclusion)

Box 5

Poor access to Sanitation and Women’s Mental Health

“access to toilets is a practical issue that is linked to health and affects mainly the women in terms of mental health. Many of them expressed that it is a serious issue of concern. It is of great concern that factors such as sexual harassment, patriarchal system, absence of privacy, poverty, cultural traditions, suspicion at home and humiliation in public are causing major impact on women’s mental health.

The problems are so deep and personal that the women are unable to share about them; as a result they are silently suffering from psychological stress. This in turn leads to fear, reduced sleep, reduced intake of food, lower self confidence, distress, confused state of mind and constant worry about the future. The feeling of being worthless and suicidal tendencies was also pointed out. All these are characteristics that can lead to mental illness.

We can conclude that absence of access to toilets is a key determinant contributing to poor mental health of women.”(21)

Community Health

“increases individual, family and community autonomy over health and over the organisations, means, opportunities, knowledge and supportive structures that make health possible”

- Community Health Cell, 1987

PART - B
UNDERSTANDING OF SANITATION &
ITS INTERLINKAGES



Source : Mason training at Edehalli village, Mulabagilu taluk Kolar dist. 2013

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“The Community Health Approach includes an attempt to integrate health with development activities including education, agricultural extension and income generation programmes, An attempt to orient existing medical programmes towards preventive, promotive and rehabilitative actions”.

Axioms of Community Health-3,

Community Health In Search of Alternate Processes, CHC, SOCHARA 1987, 2011

CHAPTER 5 : DETERMINANTS OF SANITATION

Many factors affect the health of communities and individuals. Factors like living and environmental conditions, pollution, water contamination, climate change and global warming are some factors which are affecting health of an individual. To a large extent factors like social determinants, economic determinants, political interference and policy changes, cultural aspects within the community and ecological factors greatly influence the sanitation situation of individuals and that of the community .

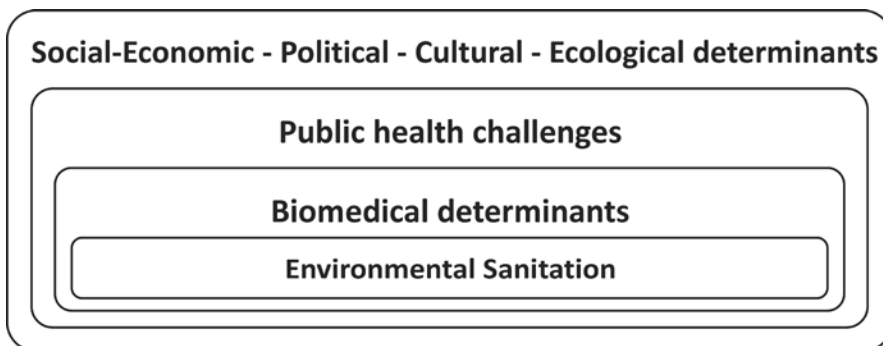


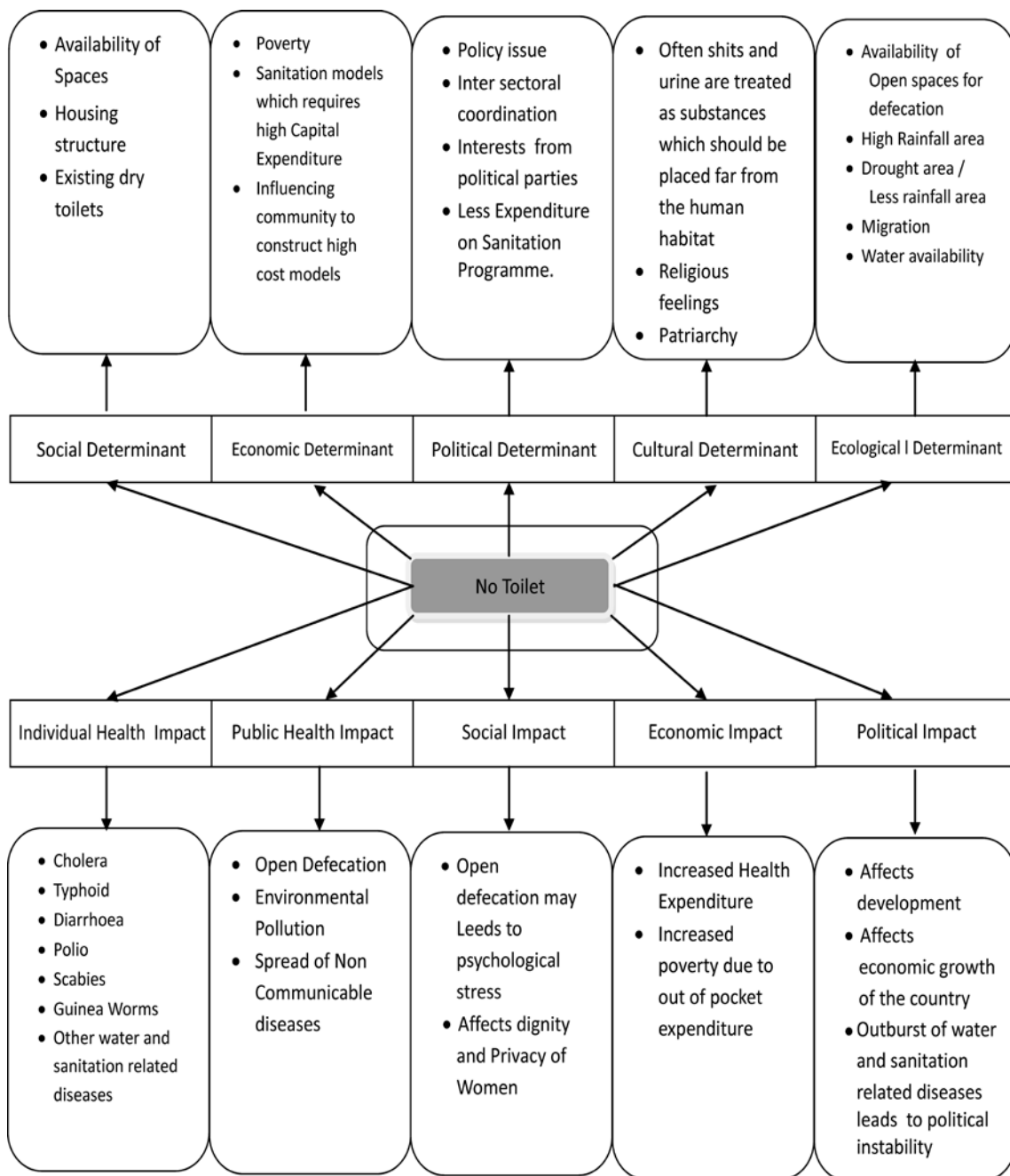
Figure 7 : Determinants of Environmental Sanitation

Due to improper sanitation facility, communities and individuals are greatly affected by diseases (biomedical challenges) like cholera, polio, malaria etc which are associated with public health challenges such as child mortality, and are further associated with Social, Economic, Political, Cultural and Ecological challenges such as poverty, gender discrimination and caste. Women and children are more susceptible to the health problems related to sanitation.

The main cause for the open defecation is not having a toilet or not using it. Many other factors are associated with the practice of open defecation and some of them are as listed below.

- Cultural thoughts and behaviour
- Mind-set of the individuals
- Lack of proper awareness on the health impact of faeces
- Education
- Interest of elected representatives
- Lack of coordination between Panchayati Raj system and other departments.

Table 10 : Social-Economic-Political-Cultural-Ecological Analysis of Lack of Access to Toilets



Impact of not having toilets

Several impacts can be observed due to lack of toilets in rural areas, which affect individuals, community and environment. Some of them are as listed below.

Health Impacts

Human faeces contains viruses, bacteria, protozoa and other microbes which causes serious illness like diarrhoea, cholera, typhoid and other water borne diseases. When individuals defecate in the open the chances of drinking water contamination is very high. The faeces in open areas can facilitate transmission of diseases through various sources. It may be through drinking water, agricultural field, flies, animals, and food. Where women and children are more susceptible to the diseases. According to a UN fact sheet *“Open defecation is one of the main cause of diarrhoea, which results in death of more than 750,000 children under age 5 every year (1).*

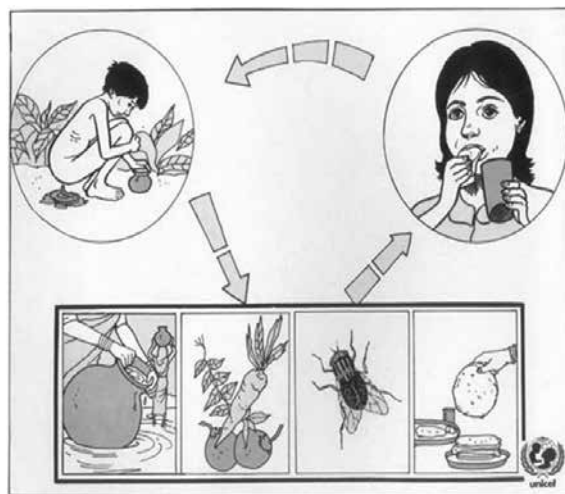


Figure 8: Feco-Oral Transmission

Public Health Challenge

The major concerns of not having toilets are public health challenges like open defecation and environmental pollution, which affects the larger population. Water and soil are contaminated by the faeces in open spaces, which contains highly pathogenic microbes affects public health.

Social Impact

Not having toilets in individual household affects the dignity and privacy of women. The time for going out for defecation for women is in the early morning hours or late night hours. There is fear



Figure 9 : Lack of Privacy

Source :- <http://sanitationupdates.files.wordpress.com/2013/12/maryada-mp-campaign-fig.jpg> Cited :- 07.08.2014

and the privacy and dignity of women is affected.

Economic Impact

Episodes of diarrhoea are associated with costs to access healthcare, and also due to loss of daily wages when an individual or family member is affected. As the poorest communities are most affected by diarrhoea, such episodes further increase their financial insecurity.

Box: 6. Health Expenditure and Sanitation

1. Doing nothing is costly. Every \$1 spent on sanitation brings a \$5.50 return by keeping people healthy and productive.
2. The global economic gains from investing in sanitation and water are estimated at \$260 billion per year.
3. Poor sanitation, on the other hand, costs countries between 0.5 and 7.2 per cent of their GDP:
 - \$448 million/7.2 per cent of GDP in Cambodia
 - \$53.8 billion/6.4 per cent of GDP in India
 - \$ 6.3 billion/2.3 per cent of GDP in Indonesia
 - \$17.5 million/2.0 per cent of GDP in Liberia
 - \$4.2 billion/6.3 per cent of GDP in Pakistan
 - \$3 billion/1.3 per cent of GDP in Nigeria

Source :- www.sanitationdrive2015.org/resources-2/fast-facts cited :- 07.08.2014 Political impact

The lack of workforce and children dying because of improper sanitation facility also affects development of the community, since most of the earnings are invested towards treatment of ill health. This results in the poor economic growth of the country, affects developmental activity and increases political pressure at the global level.

CHAPTER 6 : DISASTERS AND SANITATION

Disasters are caused mainly due to natural and man made causes. Disasters cause serious health hazards to individuals as well as to community members. During a disaster the climate and weather condition in the area change and the change of conditions directly affects the water and sanitation situation and favors the growth of harmful microbes and vectors.

“A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources” (9)

NATURAL DISASTERS

Natural disasters can lead to serious public health consequences such as injuries and deaths. Some of the natural disasters which directly affect the water and sanitation situation of communities are listed below.

Drought :- Drought is a natural calamity which is directly affects to water availability, crop production and weather condition of the particular area. Drought is generally caused due to less/no rainfall during the rainy season. Drought in a particular area

favors the growth of harmful bacteria and viruses in available drinking water sources and due to scarcity of the drinking water people drink the water contaminated by microbes and get affected by water borne diseases.

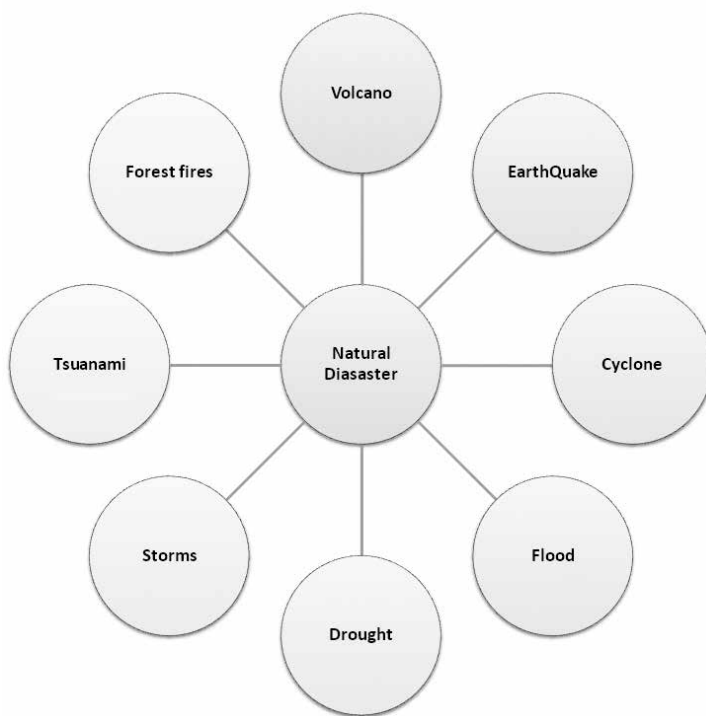


Figure 10 : Natural Disaster

Volcano :- Volcanoes occurs in the mountain region where hot lava, ashes and gases pushes out from the earth crust. Volcanoes disturb the natural system which destroys the human habitat at a larger level affecting housing, sanitation system, drinking water supply, climate, crops and also leads to death of animals, plants and occasionally humans also. The ashes and gases which escape from the volcano affect the health of individuals, in the form of respiratory disorders. Substances emerging from the volcanic eruption contaminate nearby drinking water sources which in turn affects the health of the community.

Storms and Cyclones :- Storms followed by heavy rainfall, cyclones, lightning cause serious health hazards. Storms generally affect human habitations, housing structures and contamination of drinking water sources like open well, pond, and stream. This has happened for instance after the Orissa cyclone.

Tsunami :- Tsunamis are caused due to earthquakes beneath the sea floor resulting in formation of huge sea waves, which usually affect the community/habitat residing near the sea shore. Water contamination is one of the major public health problem occurs after a Tsunami, which results in waterborne diseases and water logging results in vector borne diseases. We have experienced this after the tsunami that occurred in the Tamilnadu coast in 2004.

Forest fires :- These are common natural or man made disasters which occurs in the forest during the summer seasons where the rainfall is less and when dry leaves and other waste gets sparks causes the forest fires. Forest fires not only affect flora and fauna in the forest but can also affects nearby communities.

Floods :- Floods are caused due to heavy rainfall and other conditions such as dam water mismanagement, rise in sea level resulting in public health hazards. After floods the drinking water usually gets contaminated with Faecal matter and the remains of dead animals which inturn results in waterborne diseases.

Earthquakes :- Earthquakes are caused due to seismic waves which are formed in the earth crust. Earthquakes destroy human habitat or communities causing death of the individuals in the community and also pollution of the environment.

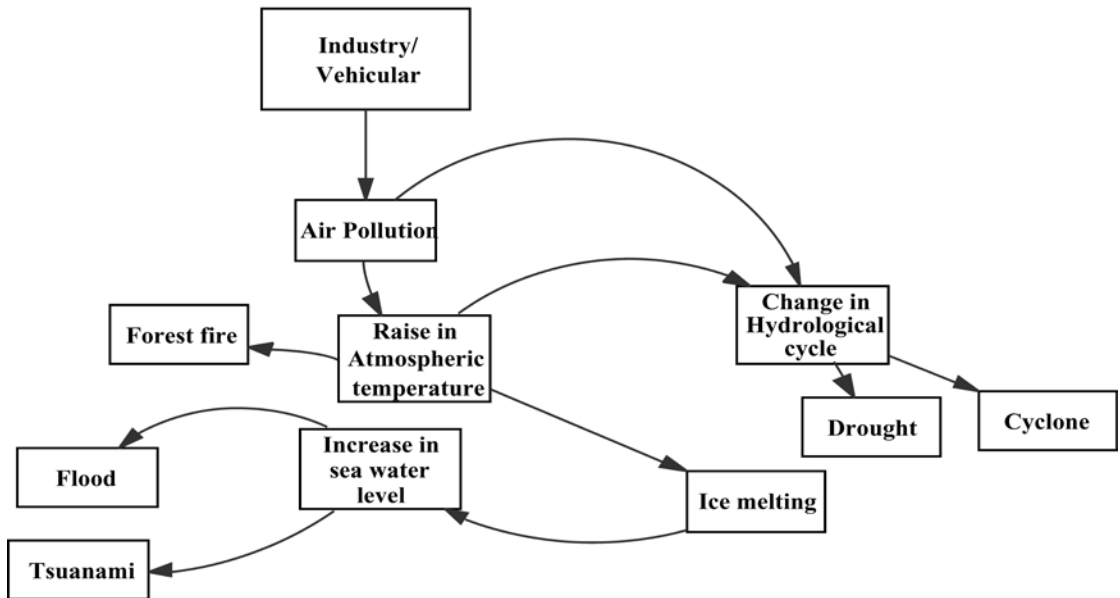


Figure 11 : Man Made Disasters – A Causal Loop Diagram

Manmade disasters usually occur from pollution of the environment due to anthropogenic causes. One of the examples we can take is the rising of sea level, which is caused by rising temperature in the atmosphere. Industries and vehicles are the main cause for air pollution which increases the atmospheric temperature. Increase in temperature results in disturbance within the hydrological cycle and causes melting of polar icecaps resulting in a rise in sea level.

Manmade disasters also includes wars, conflicts, and displacement of communities due to developmental projects – dams, mines, and those leading to deforestation. Sanitation is a major challenge in all these situations apart from shelter, food, water supplies and security.

“It is health that is real wealth and not pieces of gold and silver.”

- Mahatma Gandhi

CHAPTER 7 : APPROPRIATE TECHNOLOGY FOR SANITATION

To ensure better sanitation practices, every individual person in rural and urban areas should have access to a toilet and should use it. Toilets could be constructed using locally available materials depending on the financial affordability of the individual. Several factors determine the type of toilet design to be constructed, such as soil condition, availability of local materials, water logging, water scarcity, availability of space, individuals' for the construction of toilets amongst others. To achieve sustained use of toilets each individual should be involved in the process to develop a sense of ownership with responsibility, and toilets should be constructed using appropriate technology.

Economic revolution as a sustainable pattern :- Appropriate technology and economical conditions of the community are directly linked. Construction of toilets using affordable locally available material, training local masons and involving individuals from the houses are the pathways for the construction of low cost toilets and ensuring sustainability. Appropriate technology also develops a sense of ownership among the communities.

Community cultural revolution :- Culture within the community involves attitude, behaviour, values, and assumptions (10) shared within the community. Appropriate technology involves self-reliance, construction of toilet using locally available material (11) which changes the thought and behaviour of the community results in community cultural revolution.

Criteria for using appropriate technology for low cost toilet construction (11).

Depending on the community interest, water availability, local geographical situation and other climatic conditions the prerequisites for the construction of low cost toilet technologies are:

1. Construction with limited financial resources.
2. Constructing using locally available materials
3. Training local masons for the construction with low cost technologies which helps in local employment generation.
4. Involving members from the community for the construction of toilet to develop a sense of ownership.
5. Using technologies which are affordable, acceptable and easily available to the community needs.

During the construction of toilets we should keep the following points in the mind.

The toilet model should:

- Not contaminate nearby drinking water source (distance of 10-15 meters should be maintained between drinking water source and toilet pit);
- Not easily accessible to flies, animals etc.
- Not promote manual scavenging.
- Not pollute environment.
- Be constructed using locally available materials.
- Protect privacy and dignity of women.
- Not affect cultural habits of the community (except where this needs to change).
- Be in a closed system.
- Not adversely affect economic status of the community.
- Resist the natural conditions like heat, rain and to some extent should resist disasters.
- Be user friendly for persons with physical disability and mental illness and also for children.

Mason training modules for 3 days

Mason is the word used for the specific occupation within construction work with knowledge and skills in planning, design, laying of cement/other materials. They can play an important role in making a village open defecation free. The objective of the mason training for the construction of toilets is to teach skilled/semi skilled masons for the construction of low cost toilet models using appropriate technology. There are many technological options for the construction of low cost toilet models depending on the local environmental conditions. The activities under mason training can be modified.

Table 11 : Module used for Training of local Masons

Day :- 1	Day :- 2	Day :- 3
Theory	Pit and Basement Construction	Super Structure Construction
<ul style="list-style-type: none"> • Site selection • Model selection depending on the geographical conditions • Discussion on ground water contamination by Faecal matter • Discussion on low cost toilet models which were constructed in other villages 	<ul style="list-style-type: none"> • 1-2 toilet pit with basement are constructed as a part of mason training . • Construction takes place with the help of beneficiary also to sense the ownership • Training masons for constructing basement using stone, bricks and cement • Training on placing pan and p-trap. 	<ul style="list-style-type: none"> • Teaching masons on constructing super structure using locally available material like stone, rings, used round shaped water tanks and others

Toilet Pit Construction : - Toilet pits are constructed in the form of a honey comb structure where the pit acts like a soak pit which absorbs moisture content in the faeces and allows solid material to get composted in the pit. Usually a twin pit system is implemented during the construction. This type of model allows faeces to get composted inside the pit after it get filled up, mean while another pit can be used to connect with the pan. After a few months, the faeces gets composted and can be used as organic manure in agricultural fields. Construction of pit also varies depending on the individual financial status. Most of the times we train the masons to construct pit in a round structure, to withstand the pressure created from the top, when the pits are covered. Some of the pit models and there description are as given bellow.

Toilet pit construction using Stones

Table 12 : Requirements

Sl. No.	Materials required	Description
1	Stones	130-140
2	Measurement	3.5 X 3.5 ft
3	Labour	2 Labour for 2 days
4	Pit	Should be in round shape



Figure 12 : Toilet Pit constructed using stone

(Source : SOCHARA Mason Training Photographs-2012)

This type or model of a low cost toilet was constructed using locally available stone. The construction does not require brick, cement or masonry work. Constructing this type of toilets requires two workers, stone and a 3.5 x 3.5 ft space.

Advantages

- Gaps between the stones absorbs water and only dry faecal matter is left inside and the time required for the pit to fill up may be up to 6 years for a family of 5 members

- When the pit gets filled after 6-8 months the manure which comes from the pit can be used as compost for agricultural fields.
- This type pit model doesn't require cement, sand, curing period or a skilled Mason.
- No manual scavenging required during the cleaning of pits.
- No vent pipe is required because pits are constructed with a honey comb structure.

Limitations

- Not suitable in water logged areas
- If proper distance is not maintained between pit and drinking water source like bore well and open well the chances of contamination are very high.
- Cannot construct these pits in rocky areas and in areas with high water table

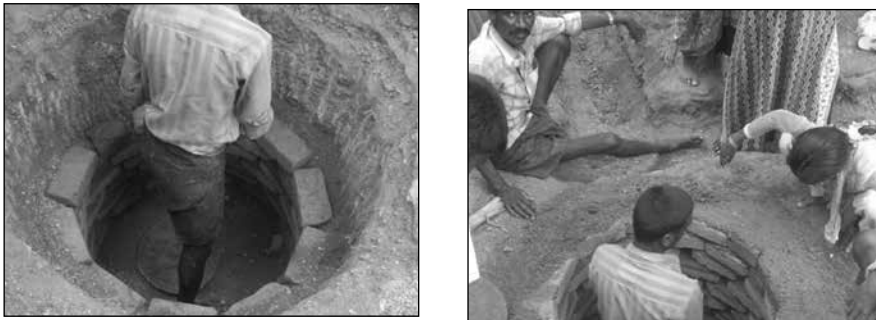


Figure 13 : Toilet Pits constructed using bricks

(Source : SOCHARA Mason Training Photographs-2012)

This type of pit models were constructed depending on the interest of the individuals. Bricks are cheaper in some areas and little bit costlier in other areas depending on the availability.

Table 13 : Material requirements for Pit Toilets

Sl. No.	Materials required	Description
1	Bricks	120-130
2	Cement	18 kg
3	Sand	In the ration 1 : 5 (for 1 kg cement 5 kg Sand is required)
4	Labour	1
5	Semi skilled mason	1
6	Measurement	3.5 X3.5 ft

Advantages

- Semi skilled mason can be trained to construct a toilet pit;
- No vent pipe is required;
- No manual scavenging;
- Faecal matter after pit gets filled up can be used for compost after some time.

Limitations

- Not suitable in water logged and rocky areas;
- Requires adequate distance from drinking water source to be maintained;
- Gap should be maintained in between the bricks, in such a way that the moisture content in the faeces should be soaked into the earth, otherwise the pit may fill up quickly.



Figure 14 : Toilet Pit Construction using rings

(Source : SOCHARA Mason Training Photo graphs-2012)

The pits are constructed using readymade cement rings. To maintain gap, holes are made at certain distance during production of the cement rings or gap can be maintained in between the rings while placing one above the other.

Table 14 : Requirements for Pit Toilets with Rings

Sl. No.	Materials required	Quantification
1	Cement rings	3 - 4 rings depending on the size
2	Pit	3.5 X3.5 ft
3	Labour	2
4	Assistant labour	1

Advantages

- Easy to place;
- No mason is required while placing a ring in the pit;
- No vent pipe is required;
- No manual scavenging.

Limitations

- Chances of breakage during the transportation and placing rings;
- May cost more than a toilet brick and stone ring;
- Not useful in water logged areas.

Models for Super Structure of Toilets

Super structures can also be constructed using locally available materials like stone, bricks, bamboo, cement rings of bigger size and other material to maintain the cost effectiveness and sustainability of low-cost toilet models. Some of the low cost super structure models can be constructed as shown below



Figure 15: Models for Superstructure of Toilets

CHAPTER 8 : ECOLOGICAL SANITATION

Eco – san is usually described as a sanitation model where urine, faeces and wash water is collected, treated and used as compost in the agricultural fields. Culturally we have different assumptions about human waste and we were not aware of the nutrient value of urine, faeces, wash water, and human waste is dumped away from the human habitation. Even though the toilets are constructed and are being used, human waste is disposed either in water sources or in wastelands. Eco-san principle views human waste as an opportunity to produce organic manure and fertilizer. The design of the Eco-san toilets is made in such a way that the urine is collected separately in a chamber (plastic can), two pits are designed for the faeces collection, and for wash water separate soakage pits are made at the ground level.

Even though regular toilet models (Water Seal Model) are being constructed to improve the sanitation conditions of people living in urban and rural areas there are some technical issues associated with the construction of such toilets. If these issues are not addressed properly, the toilet construction may become problematic to people.

Problems in the existing situation regarding sanitation practices

The common defecation practice in India is by using leach pit type of toilets. The technology of these types of toilet may be feasible and acceptable in some conditions but not in all conditions. Some of the problems regarding the existing situation regarding sanitation practices are as listed below

- May promote manual scavenging during the disposal of human waste
- Leach pits are not suitable in the water logged areas
- Nutrient value of the faeces and urine gets lost
- Proper distance from drinking water source to leach pit should be maintained otherwise drinking water may get contaminated by faeces
- In areas with water scarcity eg in north Karnataka and desert regions Eco- San toilets are more suitable than pit model toilet, since less water is needed during usage
- Cleaning of pit (human waste disposal) requires machines or has to be done manually, so it may not be cost effective.

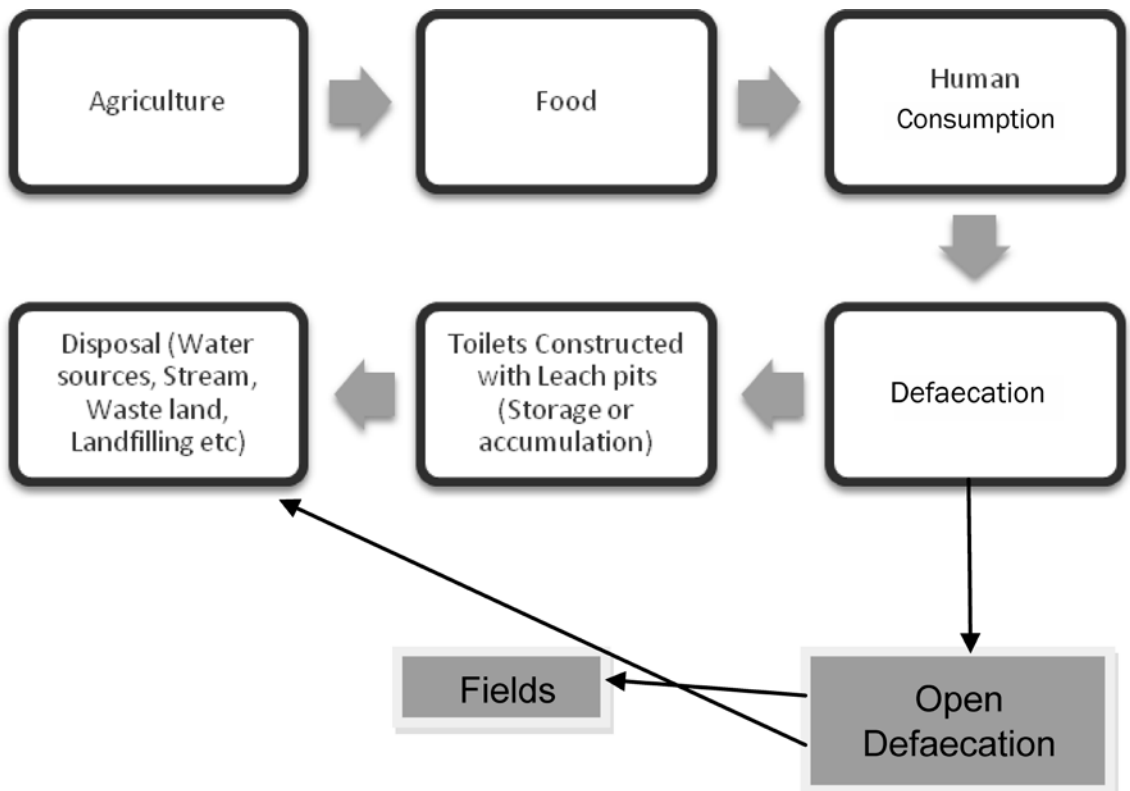


Figure 16 : Conventional method of disposal of human waste

Current methods of disposal of human wastes are not based on the principle of recycling. We ingest food from food crops and other consumable products and then we defecate either in toilets (constructed like a leach pit) or defecate in open spaces; in either case faeces is untreated and disposed of in water bodies and open spaces. Here the linkage between consumption (food) and disposal (human waste) are not linked and nutrient value is lost.

Eco-Sanitation principle

Ecological sanitation is based on principle of recycling where the pit and pan of the Eco-san toilets are designed in such a way that highly pathogenic human waste like urine, faeces and waste water are collected, treated and recycled than used as a manure and fertilizer for the crops.

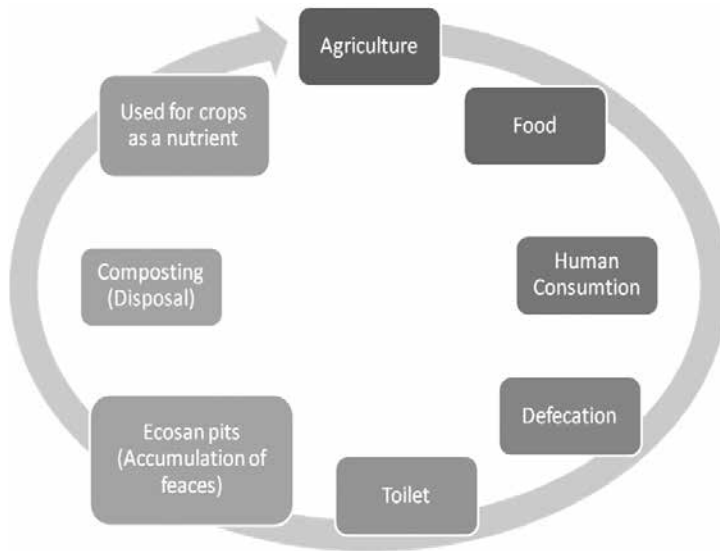


Figure 17 : Principle of Eco-Sanitation

Table 15 : Nutrient value in Human Waste

	Nitrogen	Phosphorus	Potassium
Urine	11.0	1.0	2.0
Faeces	1.5	0.5	1.5
Total	12.5	1.5	3.5

Gram per Person per day (1 kg of urine and 150g of faeces including moisture)

Source: - http://www.nku.edu/~longa/haiti/kids/faeces_value.html cited :- 08.08.2014

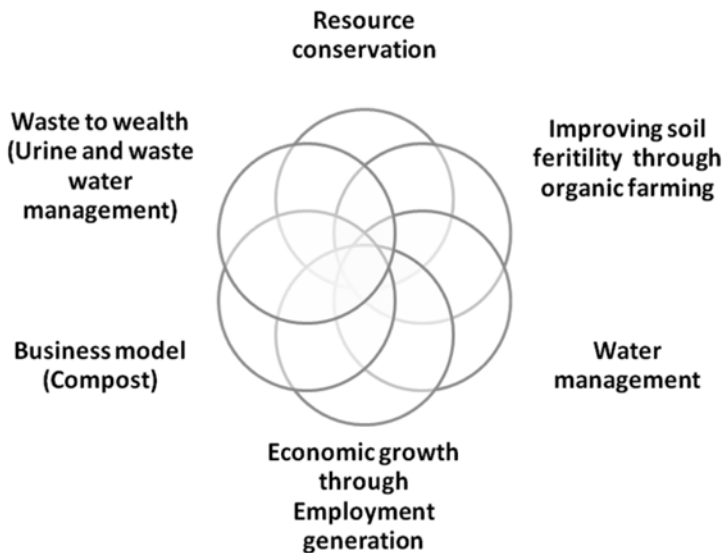


Figure 18 : Sustainable approach of eco-sanitation

Eco-sanitation as a sustainable approach

Eco-Sanitation technology is a sustainable approach for development of humankind. Apart from maintaining a clean environment eco-san technology can be developed into a business model and generate employment.

Resource Conservation and Waste to Wealth:- Eco-san technology helps to conserve resources by reducing water usage (flushing), converting human waste into fertilizer and manure which are rich in NPK value, and also reduces pollution of water and soil.

Business model / employment generation: - Human urine has a high nutrient value and faeces are rich in manure content. When faeces and urine are treated properly, the pathogenic content can be removed and the product can be used safely for growing crops as a organic fertilizer, which enhances the nutrient value of the soil. Urine can be made into fertilizer powder after treating it and this can be made available to the public for gardening / farming. Faeces can be made into manure and sold to farmers, which develops the business model.

“The Community Health Approach essentially a democratic, decentralized, participatory, people-building and people empowering activity. Recognises that this new value system must pervade the interaction between the community and the ‘health action’ initiators as well as within the team of ‘health action’ initiators themselves”. **Axioms of Community Health-4,**

Community Health In Search of Alternate Processes, CHC, SOCHARA 1987, 2011

CHAPTER 9 : FLUOROSIS AND HEALTH

Fluorine is one the elements that exists in nature. Fluorine exists in association with other elements as fluorides naturally in the environment. Excessive use and accumulation of fluoride in the human body affects health of the individuals causing dental fluorosis and skeletal fluorosis.

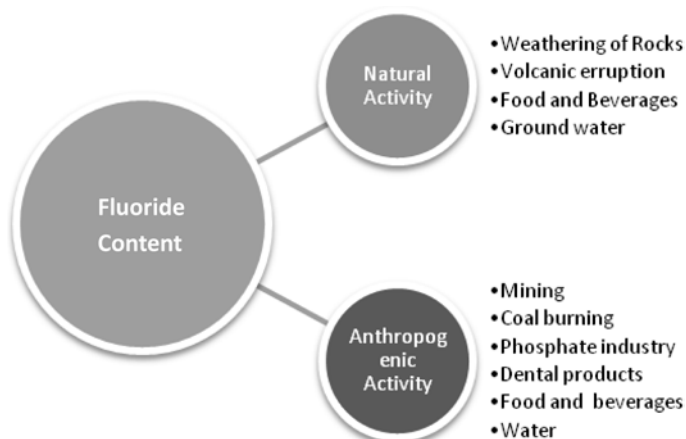


Figure 19 : Source of fluoride

Fluoride exposure and distribution on Environment

Fluoride distribution in the environment is determined by natural as well as anthropogenic (man-made) causes. The distribution of fluoride in nature is due to weathering of rocks, volcanic eruption, low concentration in vegetables and fruits, and in ground water. It is found in atmosphere due to volcanic eruptions and industrial emission (phosphate, and coal mining Industry). Fluoride is also used in the production of some dental products which are used to reduce tooth decay. Fluoride concentration may vary from one source to another source. Concentrations beyond certain permissible limit may cause serious health problems. Several international and national organisation have set permissible limits (see Table 16) for fluoride exposure.

Table: 16. Permissible limits for fluoride

Name of the Organisation	Permissible limit in drinking water (Mg/l)
Bureau of Indian Standards (BIS)	0.6 -1.2
Indian Council of Medical research (ICMR)	1.0
World Health Organisation (WHO)	1.5

Source :- http://www.nih.ernet.in/rbis/india_information/fluoride.htm cited :- 09.07.2014

Effect on human health

Several studies have shown that exposure to fluoride may cause serious health hazards to the community and fluoride exposure may be short term or it may be long term. Volcanic eruption, burning of coal and others result short term exposure to fluorides. Many study have stated that the main cause for the long term exposure to fluoride is drinking water sources. The World Health Organisation has indicated impacts of varying levels of fluoride (see Table 17).

Table 17: Health Impacts of Fluoride levels in drinking water

Level in water	Effects
0.8–1.2 mg/l	Prevention of tooth decay, strengthening of skeleton
Above 1.5 mg/l	Fluorosis: pitting of tooth enamel and deposits in bones
Above 10 mg/l	Crippling skeletal fluorosis

Source: - http://www.who.int/water_sanitation_health/naturalhazards/en/index2.html cited :- 09.07.2014

Dental Fluorosis

Dental fluorosis is caused by excessive exposure to fluorides during the phase of tooth growth. The effects of fluoride on individuals are determined by several factors like age of the children, nutrition absorption capacity of the children, fluoride contamination in drinking water, food and others sources in their habitat and also bone growth(12). Children in the age group of 1-4 years are highly affected by excessive intake of fluoride through drinking water, food, beverages and other sources. Children are no longer are at risk after 8 years of age. Stains and spots on teeth, which develop during fluorosis, are permanent and can darken over a time (12).

Skeletal Fluorosis

Skeletal fluorosis is a disease, which directly affects the bone due to excessive fluoride intake through drinking water and other sources. Symptoms are mainly associated with bone structure. Excessive intake of fluoride results in less elasticity and hardens bone structure which in turn results in fractures. Joint pains, nausea, weakened bone structure, reduced appetite characterise early stages of skeletal fluorosis and these in turn results in bone fractures (12).

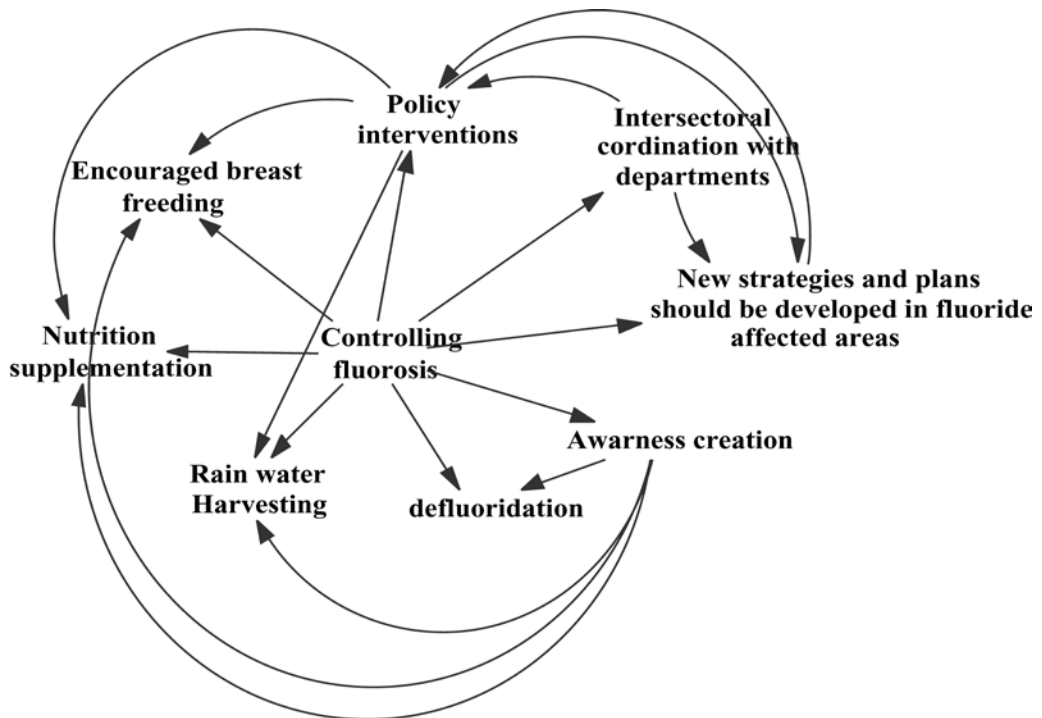


Figure 20 : Controlling Fluorosis as part of access to safe water

Community Health approach for controlling fluorosis

Many communities in rural/ urban areas are dependent on ground water sources for drinking purposes. In some areas the fluoride content in ground water is very high. Controlling fluorosis has become a great concern over the past few decades in affected areas. Fluorosis control requires policy level interventions which should have community health approach. Some of the activities like encouraging breast feeding of children through awareness creation, rainwater harvesting and usage of rainwater, preparation of separate plans for nutritional supplementation of children in affected areas, coordination with water supply, nutrition, rural development, women and child welfare, and health departments as a common goal for controlling fluorosis.

CHAPTER 10 : OCCUPATIONAL HEALTH AND SAFETY OF SANITATION AND ALLIED WORKERS

The health, safety and welfare of workers at their work place is a fundamental human right. According to WHO Occupational Health and Safety is defined as “*all aspects of Health and Safety in the work place and has a strong focus on primary prevention of hazards*” (13). The occupational health and safety of sanitation related workers has not received the attention that it requires. These sanitation workers are largely in the unorganised sector. They also belong to socially disadvantaged groups.

A major concern in occupational health is the exposure to risks and hazards such as stress, physical exposure, work place, nature of work, technology used in work place among others. The primary care aspects at the work place are never a priority or concern. Four major areas of focus while taking measures in response to individuals facing health hazards (13) are:

- Identification of Hazards :- Physical hazards, chemical hazards or other types of hazards
- Assessing the problem associated with the hazards
- Controlling hazards through safety equipment, preliminary treatment for the affected individuals and providing safety equipment for workers.
- The measures taken should be reported properly to the concerned authority.

Occupational Health Safety of Sanitation related workers

Safety of sanitation related workers has been given inadequate importance in public and community health. Sanitation related workers face serious health hazards particularly physical and chemical hazards. They also face several issues like gender discrimination in the work place, wages problem, absence of safety equipment, no proper regulation at the policy level and serious threat due to chemicals.

Assessing the work place for occupational health safety : Assessing the work place should be a primary concern for ensuring the occupational health and safety of the workers. Six basic tools (13) that must be considered while assessing the work place are mentioned below:

1. Management System : work places should have proper environmental sanitation management systems. The environmental sanitation management system should assess the environmental and health impact of the activity, institute a monitoring committee for ensuring health safety, display safety guidelines at the work place and ensure restricted entry for high risk areas.
2. Trainings : Proper training should be given to workers on health and safety measures and gender issues at the work place.
3. Place of work for sanitation workers :- Place of work should be kept clean, should ensure privacy and dignity of women workers, frequent breaks should be given during work hours and monitoring committee should regularly assess the hazards related to the work place.
4. Ensuring basic amenities : Basic amenities like proper drinking water facilities, toilets for men and women and personal hygiene practices at work place.
5. Safety equipment : Workers must be trained in use of and given safety equipment like, hand gloves, face masks and boots.
6. Emergency tools : Emergency tools like proper communication and transportation system during emergency, and access to a primary health care system, should be in place .

Occupational health hazards of the construction worker (for toilet construction eg masons).

Occupational health deals with the health and safety of a worker in their work place. Construction work requires changing locations and physical involvement and is more susceptible to the occupational hazards. construction workers are exposed to include physical hazards like exposure to dust and particulate matters, extreme temperature, electric shocks, noise, extended work days due to deadlines and exposure to various chemicals during painting and other work. Some of the common health issues related to occupational workers are pain or injury, respiratory problems, allergies, bronchitis, stress and wounds.

CHAPTER 11 : SOLID AND LIQUID WASTE MANAGEMENT

India has diverse geophysical conditions with majority of the population living in rural areas. The United Nations Joint Monitoring Programme (JMP) estimates globally 2.6 billion people don't have to access sanitation and 80 % of them live in the rural areas. Lack of appropriate sanitation and improper solid and liquid waste management practices resulted in vector borne diseases like cholera, malaria, typhoid, polio, malaria etc. Modernisation, urbanisation and scientific technologies resulted in advantages to mankind and also resulted in pollution of environment through various sources. One of the major problems is improper solid and liquid waste management. Rural areas also produce huge amount of waste that are not handled properly. Disposal of this waste in an unscientific manner results in pollution of water sources.

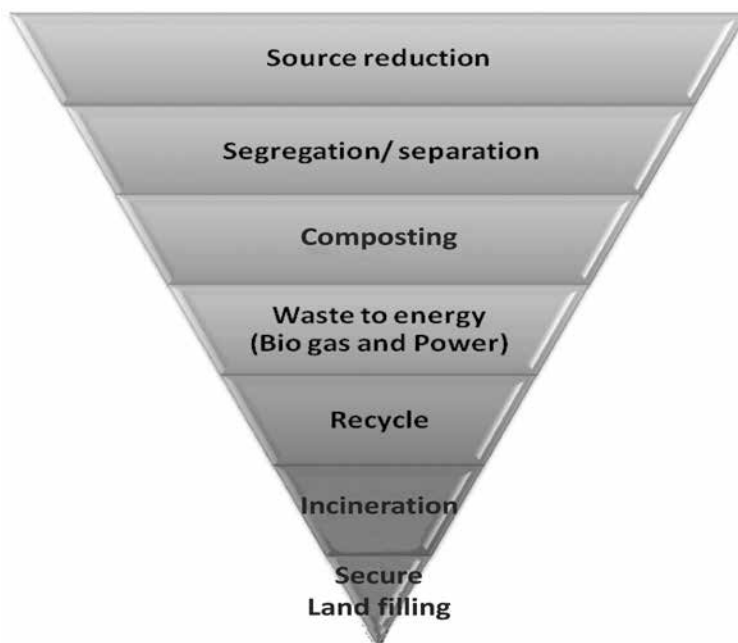


Figure 21 : Preferable option for managing waste

As per UNICEF estimation on an average 0.4 to 0.45 kg of waste is generated per individual in rural areas and most of the wastes are managed by dumping or burning. The current disposal methods through unscientific dumping and incineration results in serious impact on air, land and water pollution.

Types of waste

In general there are two types of wastes based on the physical properties they are categorised into solid and liquid waste.

Solid waste

Any wastes other than human excreta, urine and wastewater are called as solid waste. On the basis of biodegradability solid waste are further classified into biodegradable and non biodegradable waste and non-biodegradable are further classified into recyclable and non-recyclable waste. Solid waste from the rural areas generally includes waste from individual household, commercial/ market waste, agricultural waste, Bio Medical waste and industrial waste.

Liquid waste

Used water which is left out from various purposes called as liquid waste. Liquid waste in general categorised into grey water and black water. Wastewater generated from the toilets are called as Black water which contains mixture of faeces and urine contains harmful pathogens should be treated separately. The grey water which is generated from kitchen, bathroom and other sources should not be mixed with black water.

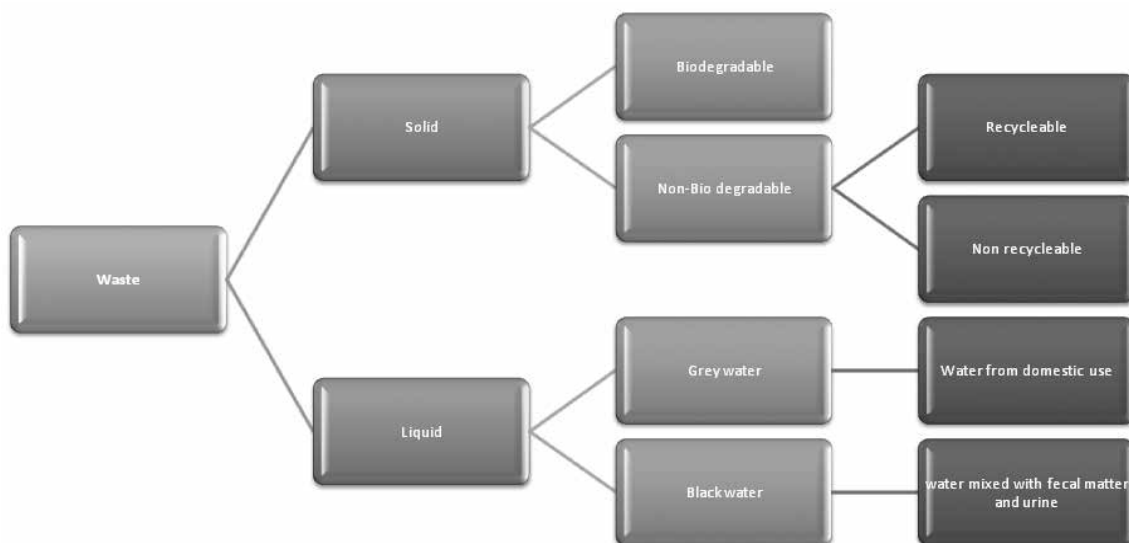


Figure 22 : Solid and Liquid Waste

Management of Waste

The preferable option for the management waste is at individual level rather than at the community level. Community health approach and involving community, NGO's, CBO's and rural/urban development institution are essential during management of waste. Various strategies can be used for management of waste. To attain sustainability following process can be used for the waste management process.

1. Networking / Partnership

Networking is an important component for sustaining developmental activity. Involving community, *Gram Panchayats*, urban waste management board, local SHG, youth groups, CBO's schools and anganwadis during planning implementation and monitoring of the waste management process in the community results in ownership within the community and helps to take the process forward in a sustained manner.

2. Collecting preliminary information

Information on number of households, population, commercial areas, market, existing disposal/management system, details of vacant places nearby, quantum of waste generated per day should be collected may be through rapid survey or may be conducting series of meeting with the community as well as the local bodies for proper planning.

3. Capacity building

Capacity building for stakeholders at various level starting from state at village level is required. Capacity building process will include class room sessions, exposure visits, sharing success stories through resource persons and demonstration.

4. Planning through Community participation

The information collected should be analysed with the participants as well as the community. The preferable low cost technical option can be shared with the community and based on the discussion "Solid and Liquid waste management" plan can be prepared.

5. Resource mobilisation

Grants available with certain finance commission both in central and state government, CSR projects, funding agency, International Organisation etc can be used to take up "Waste Management Process" .

6. Implementation

The implementation of the project under waste management can be through local gram panchayat/ SHG/ Youth group/ ward committees/ Panchayati Raj system and NGO's can implement the project where the income from the process can be utilised for sustaining the activity .

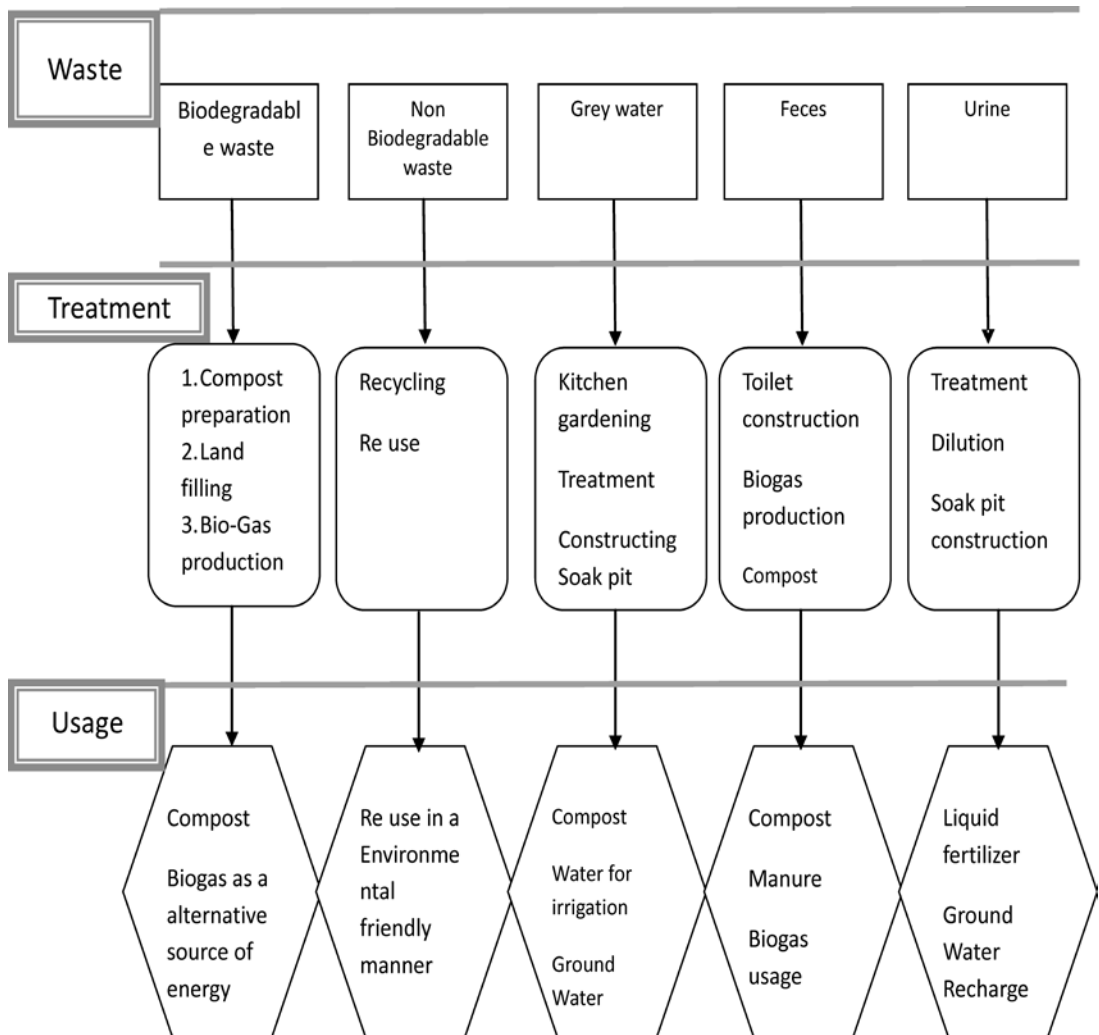


Figure 23 : Waste Treatment and Usage

CHAPTER 12 : TOILET WITH BIOGAS PLANT

Biogas is produced by decomposition of waste in an anaerobic condition (absence of air) using waste material such as cow dung, human waste, kitchen waste, agro waste and plant residue. Biogas is an effective fuel and contains methane, carbon dioxide, hydrogen sulphide and hydrogen components. Some Northern Karnataka districts like Belgaum and Hubli-Dharwad have toilet pits connected to biogas plants

Table 18 : Components of Biogas

Compounds	% of compounds in Biogas
Methane	55-75
Carbon dioxide	30-45
Nitrogen	0-5
Amonia	0-0.05
Hydrogen sulphide	0-0.05

Source :- <http://www.biomassenergy.gr/en/articles/technology/biogas/102-xhmikh-systasi-bioaeriou-biogas-typical-components> cited :- 18.08.2014

Biogas formation

The formation of Biogas occurs through three stages:

- **Hydrolysis** :- This is the process through which contents in organic matter like carbohydrate, proteins and lipids undergo a decomposition process.
- **Acidosis** :- The process where the decomposed material get converted into acetic acid from the waste in an anaerobic condition which is suitable for methane gas production.
- **Methanation** :- Methane producing bacteria converts the waste material into methane gas, carbon dioxide and slurry, where the gas moves out of the pipe connected to digester and slurry moves out of the inlet.

Benefits of Connecting Biogas with toilet

Biogas plant connected with toilet have multiple benefits . The main concept used in construction of toilet with biogas is converting waste into wealth. The waste (Toilet and Kitchen waste) generated in the community can easily connected to the biogas plant and gas produced after then decomposition process can be used for domestic uses and slurry left out can be used as a manure.

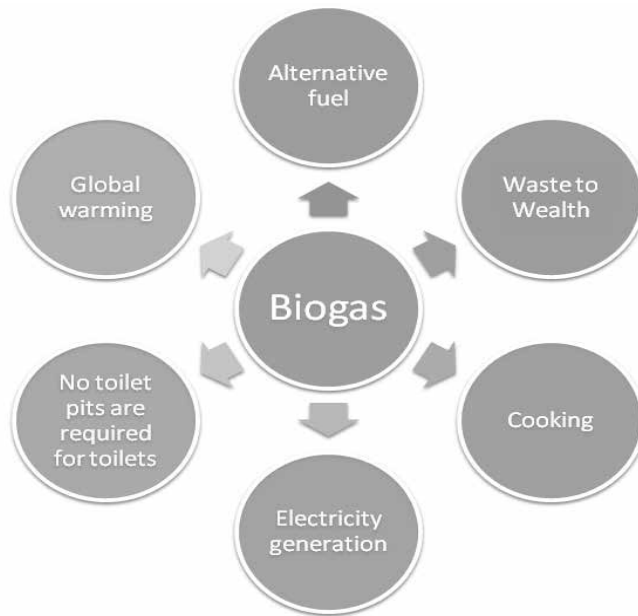


Figure 24 : Usage of Biogas

Waste to Wealth: - Waste generated by the toilets (faeces and urine) and cow dung waste with kitchen bio-degradable waste produces good volume of biogas and slurry left out during the process can be used as manure for the agricultural fields.

- **Cooking:** - Biogas is used for cooking purposes. 2 cubic meter capacity of digester is sufficient producing bio gas for 4 people in the family.
- **Electricity generation:** - Bio gas can be used for generating electricity through turbines.
- **Fuel:** - Biogas can also be used to run vehicle in liquid form combined with diesel and can act as a alternative sources of fuel.
- No requirement of toilet pit where outlet from the toilet are directly connected to Biogas plant

The rise in atmospheric temperature over many decades has become a serious concern. One of the causes for the global warming is the increase in the greenhouse gases like water vapour, methane, carbon dioxide and other gases. Cow dung when not treated and kept in open spaces produces methane gas which is one of the green house gases contributing to global warming. In biogas production process decomposition occurs in a closed container and the methane gas produced is used as a fuel for cooking and other purposes. So methane gas if used in a proper and productive way can be prevented from escaping into the atmosphere.

PART - C

BUILDING THEORY FROM PRACTICE



Source :- Madhya Pradesh community health fellowship, June 2012



Source :- Mason Training at Narabandi Village, Raichur Dist. Date - 30-03-2011

CHAPTER 13 : AN OVERVIEW OF SOCHARA'S INVOLVEMENT IN ENVIRONMENTAL SANITATION

In 1984 four co-initiators from CHC- Community Health Cell, Bangalore went on a challenging journey across India to get a deeper understanding of “Community Health”. Subsequently after a three year study-reflection-action experiment process in 1987 the team members got down to writing the reflections and published a book titled “**Community Health – In Search of Alternative Processes**” (17). This Study – reflection – action resulted in the formation of a registered Society called the “**Society for Community Health Awareness, Research and Action (SOCHARA)**“. The website www.sochara.org provides an update of work being undertaken in various dimensions of community health including environmental health.

SOCHARA aims to improve the health of the community by adopting a community health approach to public health problems. Among its activities the SOCHARA team focuses on sanitation activities in rural areas of Karnataka since the past five years. The goal is to “Improve the Health of Women and Children” through improved sanitation practices by empowering communities, members of *Panchayat Raj* institutions and organisations. The focus is also on involving civil society and academics in sanitation. The goals of SOCHARA is to bring:

- The ‘Community’ back into comprehensive primary health care;
- The ‘Public’ back into public health; and
- The ‘People’ back into the health policy discourse.

.....In order to achieve “**HEALTH FOR ALL**”.

SOCHARA, Sanitation and a Community Health Approach

SOCHARA work in environmental sanitation started since the late 1990s with a study on “*Health status of tea plantation workers with special reference to their occupation*” by Ravi Narayan and Ramchandran (1982) which was followed by series of recommendations in different reports including the Final Report of the Karnataka Task Force on Health and Family Welfare –April 2001 by Dr. Sudarshan, Dr.Thelma Narayan and others (23). As a part of supporting the ‘Right to Health’ activities, work on environmental sanitation as a determinant of health became an integral part of SOCHARA post tsunami in 2004-05, in the Community Action for Health initiative through Village Health Sanitation and Nutrition Committes and in an intense way with a fulltime anchor person in the past five years.

Community Action on Sanitation

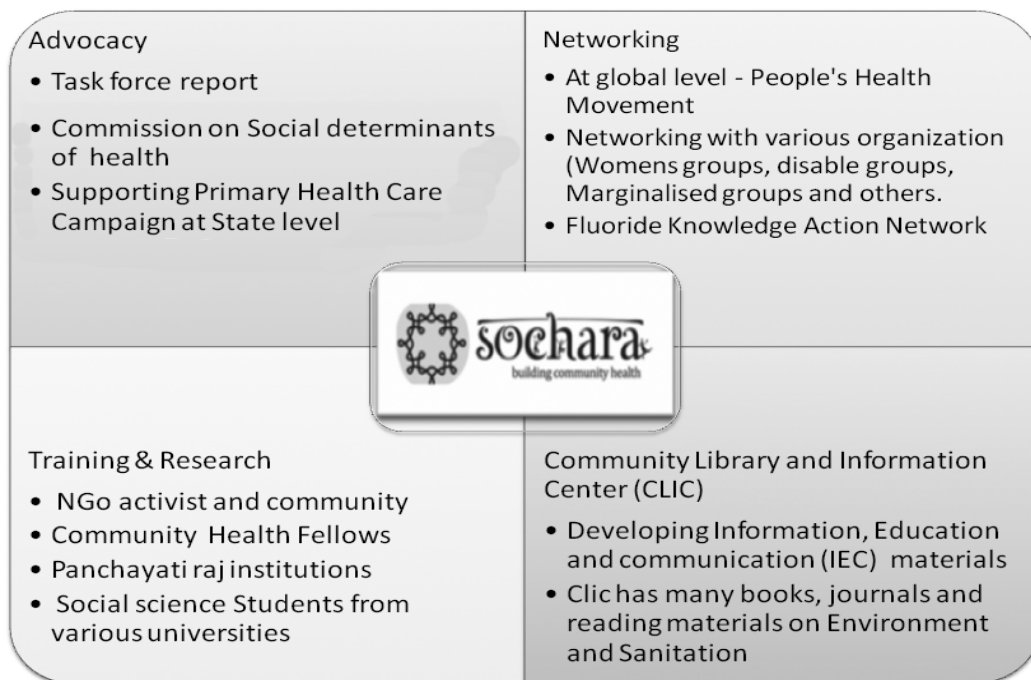


Figure 25 : Components of community health approach to Sanitation

Theory and Practice or Praxis is an integral part of the SOCHARA activity. Work on Environmental Sanitation has included a range of actions:

Community Action process and one of the determinant of Health . Community Health Practice/ Action is an integral part of SOCHARA. Using “Community Led Total Sanitation” as a base several process have been planned and implemented. The process includes 3 major steps:

- Pre-triggering process
- Triggering process
- Post triggering process

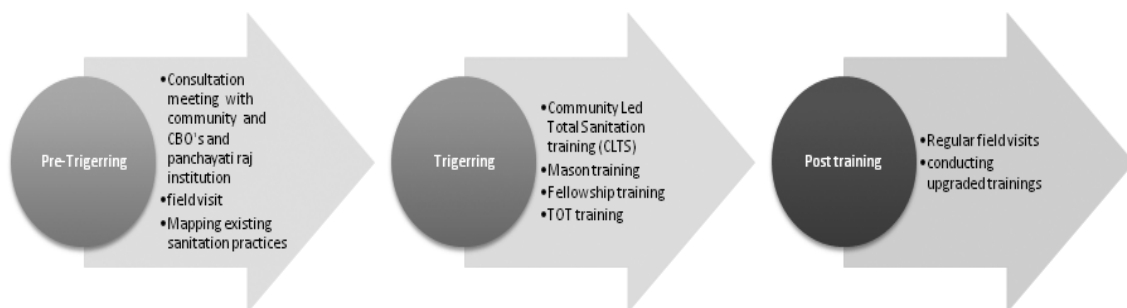


Figure 26 : The Social Process for Community Led Total Sanitation

Pre-triggering process

The pre-triggering process is an important phase before starting training. This process involves conducting meeting with the community, civil society organisations, meeting local Panchayati Raj institutions. Discussion with the local leaders, mapping existing sanitation practices and others. The main objective of the triggering process is to evolve strategy for achieving open defecation status.

Triggering Process

Community Led Total Sanitation Method

Community Led Total Sanitation (CLTS) is an effective successful training method in achieving Open defecation free status. The term CLTS was coined by Mr.Kamal Kar who was working in some villages of Bangladesh and India (14). CLTS method is a collective action for achieving open defecation free status within the community. Certain triggering tools were used during the training for motivating community to build toilets, and creating awareness (14). The triggering tools used in the CLTS method are as follows (15)

- Rapport building
- Defecation area transect
- Water and Shit
- Discussing social issues related to sanitation
- Cost of illness

Rapport Building

Some of the common barriers found between the trainers and the community are culture, appearance, language , building a trust with the people, community interests and others. The topics which the trainer want to discuss may not be of interest to the community. To overcome all these factors the trainer should build good rapport that includes mutual respect, willingness to listen to their problems, an honest attempt to understand feelings of the individuals, should respect their culture, values and beliefs, analyse the situation and willingness to learn. By understanding these things community can feel comfort o that trainers can gain their confidence. By having a good rapport with the community a trainer can move to next level of triggering.

Defecation area transect walk

Defecation area transect walk is an effective method of triggering communities to identify the major existing sanitation problems in their area and to identify the faecal-oral method of transmission of water related diseases (15). They learn the local practices for disposing of waste, locate area of defecation and then visit constructed toilet models that may be available nearby. The transect walk by the community accompanied by the trainer/visitor to areas where defecation takes place is one of the most important triggering tools, wherein the community starts thinking about the sanitation situation in the village and get motivated to change their habits.

Understanding faecal contamination of water

A glass of clean drinking water can be brought and offered to someone from the community asking if they could drink it. If he/she says yes then ask the entire community if they would agree to drink the clean water. Then the trainer plucks (hair) and touches a lump of shit and dips it into the water and again the trainer offers the water to the individual who is standing next to trainer to drink. Immediately individuals refuse to take a drink. Then we initiate a discussion with the community by asking questions Such as : How many hairy legs do flies have? Are there possibilities in the village locality where flies can sit on shit and then also sit on food? Do we realize how we are ingesting food and water contaminated with shit. After this ask the community to calculate amount of shit produced which can be ingested by the flies and individuals every day. Also help them to realise that they are ingesting others shit also during their food intake.

Social issues and sanitation

Case studies like rapes, murder, snake bites, dog bites, wild animal attacks, problems faced by Women and adolescents when they go for defecating out side were also discussed. The discussion on social issues is one of the effective tool were community members realise the actual problems faced by person with disability, elderly people, adolescents and others when they go for defecating outside.

Cost of Illness

According to the World Health organisation diarrhoea, cholera, dysentery, typhoid and hepatitis A are the major diseases caused by improper water and sanitation (16). During this triggering activity the trainer initiates the discussion on the average

amount of money spent on treatment of water and sanitation related diseases. The group then reflects on how the practice of open defecation affects their health and how the investment on ill health makes a family poorer.

Learning facilitation in sanitation through community health fellowship & learning programmes

SOCHARA has since 2002-03 been running the Community Health Learning Programme (CHLP) in Bangalore- Karnataka. Since 2009 it offered a “Community Health Fellowship Programme” in Bhopal MP. The programme has a diverse group of fellows including researchers, activists, community leaders, public health professionals, social science students and others who are committed to working on health. Training of these young professionals on environmental sanitation has been an integral part of the fellowship programme. The modules used in the teaching on sanitation are as follows

Table 19 : Teaching Modules on Sanitation and Health at SOCHARA

Module	Subject	Description
1	Introduction to Sanitation	History of sanitation
		Sanitation programmes in India
		Community Health and Sanitation
		Appropriate technologies on sanitation
		Social, Economical, Political, Cultural and ecological analysis of sanitation
2	Ecological Sanitation	Problems with existing sanitation practices
		Concept of eco-sanitation
		Eco-sanitation principle
		Technological option on eco-sanitation
3	Millennium Development Goals & Linkage with Sanitation	MDG and Sanitation
4	Solid and Liquid Waste Management	Introduction to waste
		Low cost waste management technologies
		Bio-medical waste management technologies, low cost management technique and legal aspects

Ref: Unpublished documents at SOCHARA

Table 20 : No. of interns from the Community Health Learning Programme trained- 2011

Year	No. of Interns	Module
2011	7	Module - 1

Table 21 : No. of full time Community Health Interns trained on Environmental Sanitation

No. of interns	Batch No	Module
10	7	Module -1 & 2
10	9	Module - 1, 2 & 3
10	10	Module- 1, 2 & 3
20	11	Module - 1, 2 & 3

Table 22 : Number of flexi interns trained on Environmental Sanitation (2011-14)

Year	No. of interns	Module
2011-14	12	Module- 1 & 2

Table 23 : University Students oriented to Environmental Sanitation

No	University	No. trained	Module
1	Christ University	4	Module - 1 & 2
2	Bangalore University	7	Module - 1 & 2
3	Bangalore Medical College	2	Module - 1 & 2
4	K.L.E University, Belgaum	1	Module - 1 & 2

Table 24 : Interns and their work on Sanitation during fellowship

No	Name of the Intern	Batch	Topics covered under Research Study
1	Dr.Mohammed Manzoor Akheel	Flexi intern	“Sanitation Activities at a village under SOCHARA working area”- Budihal Village, Karanataka
2	Mr.Bheemraj	9	“Hospital Waste management”- Anekal Taluk, Karnataka
3	Mr.Ganesh	10	“Mental Health and Sanitation”- Hospet Taluk, Karnataka
4	Mr.Pravesh	9	Reason for open defecation - Madyapradesh
5	Mr. Amarendra	11	Community Culture and sanitation - Uttar pradesh

Table 25 : Trainings organized by interns during the fellowship in the community

No.	Name of the intern	Trainings conducted	District	Villages
1	Ms.Manjula	Community Led Total Sanitation	Raichur	Potnal & Kota village
2	Mr.Mallikarjun	Community Led Total Sanitation	Bagalkot	Budihalla village

Table 26 : Alumni who continue work on Environmental Sanitation

No.	Name	District	Organisation
1	K.B.Oblesh	Tumkur	Thamate
2	Smt.Manjula	Raichur	Navajeevana Mahila Okkuta
3	Mr.Mallikarjun	Hospet	Punyakote foundation
4	Mr.Hanumanthappa	Davangere	
5	Mr.Karibasappa	Haveri	Nirman

Table 27 : Trainings attended by Interns in the field

No.	Name of the community health intern/ fellow	Training Subject	Field visit area where trainings were conducted	District
1	Mr.Suraj Sarvode	Mason training	Davadabetta village	Tumkur
2	Ms.Changeithem Lhouvvm	Community Led Total Sanitation	Aralere village	Kolar
3	Ms.Nandris Marwein		Aralere village	Kolar
4	Mr.Mallikarjun		Budihalla village	Bagalkot
5	Mr.Hanumanthappa			
6	Ms.Shivamma			
7	Ms.Manjula		Potnal and Kota village	Raichur
8	Dr.Uzair		Maski village	
9	Dr.Suman		Maski village	
10	Mr.Akiv		Narbandi village	
11	Dr. Mohammed Manzoor Akheel		Budihalla village 2 nd level training	Bagalkot

Ref. for all the above – SOCHARA Annual Reports Summary of Axioms on “Sustainable sanitation – SOCHARA initiative” derived from the “Community Health – In Search of Alternative Processes” (18)

Community Health Axioms Adapted to Sanitation



Figure 27 : Towards Sustainable Sanitation

Table 28 : SOCHARA activities in relation to the Millennium Development Goals

“The Community Health Approach includes building equity and empowering community beyond social conflicts. Axioms of Community Health-5,

Community Health In Search of Alternate Processes, CHC, SOCHARA 1987, 2011

Millennium Development Goals	SOCHARA Activities
Eradicate extreme poverty and hunger	Focus on Health as a Right and Responsibility; Addressing the social determinants of health
Achieve universal primary education	Working on school sanitation and personal hygiene practices
Promote gender equality and empower women	Training women's groups and enhancing their knowledge on various aspects of community and public health which empowers women.
Reduce child mortality	Trainings, working on child rights, nutrition and sanitation
Improve maternal health	Womens health empowerment training programmes, supporting right to health activities at district level
Combat HIV AIDS, malaria and other diseases	Working on improving sanitation and personal hygiene practices to reduce risk of diseases
Ensure environmental sustainability	Through regular follow up, upgraded training for resource groups and regular field work
A global partnership for engagement	Networking with civil society Organisations, NGO's, CBO's, Panchayati Raj institutions etc

Ref: SOCHARA Annual Reports; website www.sochara.org

“Equity, ecologically - sustainable development and peace are at the heart of our vision of a better world - a world in which a healthy life for all is a reality; a world that respects, appreciates and celebrates all life and diversity; a world that enables the flowering of people’s talents and abilities to enrich each other; a world in which people’s voices guide the decision that shape our lives.

There are more than enough resources to achieve this vision”

Source: *The People’s Charter for Health - The People’s Health Movement, December 2000*

“Improvement of health is likely to come, in the future as in the past, from modification of the conditions which lead to diseases, rather than from intervention into the mechanisms of disease after it has occurred ”.

Thomas Mckeown, 1976

PART - D

SUSTAINABLE SANITATION



Source :- Mason Training at Budihal Village, Badami Taluk, Karnakata, June 2010

“The Community Health Approach includes Promoting and enhancing the sense of community”

- Axioms of Community Health-6,

“The Community Health Approach includes confronting the biomedical model with new attitudes, skills and approaches”

- Axioms of Community Health-7,

“The Community Health Approach includes confronting the existing super structure of medical / health care to be more people and community oriented”

- Axioms of Community Health-8,

“The Community Health Approach includes a New Vision of health care and not a professional package of actions”

- Axioms of Community Health-9,

“The Community Health Approach includes an effort to build a system in which health for all become a reality”

- Axioms of Community Health-10,

Community Health In Search of Alternate Processes, CHC, SOCHARA 1987, 2011

CHAPTER 14 : SUSTAINABLE SANITATION

The idea of sustainable development, with the specific inclusion of sanitation, has not been given much importance in development projects. A focus on sustainable development enables communities to lead a healthy life and results in utilisation of fewer resources. The concept of sustainable development can be achieved when the public system, as well as communities and individuals start acting with a sense of urgency on issues related to open defecation, waste management, personal hygiene practices, school and *anganwadi* sanitation and other environmental issues.

“Sustainable development is the development that meets the needs of present generation without compromising on the ability of future generations to meet their own needs” – Dr. Brundtland, Rio Conference, 1992

Approaches to sustainable development

Approaches to sustainable development include various issues like community action for health, inter-sectoral coordination between systems, social, economic, political, cultural, ecological and environmental challenges (17) within the community and society. Approaches for sustainable development could consider the following issues:



Figure 28 : Components of Sustainable Sanitation

- Universal access to toilets (no focus on APL or BPL families);
- Toilets should be constructed using locally available materials;
- There should be coordination between the departments of health, rural development, water supply and others for a common cause;
- Long term strategies should be prepared to achieve “*Sanitation for ALL*”.
- The benefits from the government for construction of toilets should be universally distributed among all social groups.
- The *Panchayati Raj* system should be easily accessible and accountable to the community.

Process for Sustainable Development

Sustaining practices for environmental sanitation in Rural Environments require a continuous process. The process and effort required includes (17, Page No. 44-48):

1. **Awareness creation**

Awareness creation within the community, individuals and *Panchayati Raj* system (local government) is a vital component to ensure sustainability.

2. **Human Resource development**

Creating human resources at the local level helps the development process with the community. Training SHG’s, CBO’s, youth groups, elected representatives creates a mass of human resources which in turn acts as a resource group and creates a platform for sustainable process.

3. **Attaining ‘Rights and Responsibilities’**

The United Nations General Assembly on 28 July 2010 recognised the human right to water and sanitation and also acknowledged that “*Clean Drinking Water and Sanitation are essential to the realisation of all human rights*” (18). Sanitation facilities and their usage is determined by various factors. “**Having a toilet is a right of an individual and using toilet is a responsibility**”.

4. **Networking**

Networking is important to attain sustainability of a process. Networking with local institutions, NGO’s, CBO’s and other community ensures sustained activity of sanitation processes in their areas.

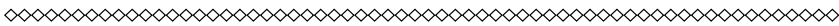
5. **Inter - sectoral coordination**

Inter- sectoral coordination at policy and at implementation levels is crucial. Various departments, international organisations, NGO’s, CSR departments from private

companies, CBO's, funding agencies are working for rural development. Coordination and understanding between departments, projects and organisations are necessary for the process of development.

6. **Attaining Equity in Action**

Equitable distribution is a basic principle of sustainable development. Several projects on sanitation address the issue of Equity within the community, but the reality is totally different, persons with disability, single women in the community, Below poverty line families are struggling to attain Equity in the society. Special provisions for women, BPL families and persons with disability are important in any development process (17,19).



Community health is “a preventive, promotive and rehabilitative orientation to health action”

- Community Health Cell, 1987

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