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Sustainable Sanitation: An Overview

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Abstract

Safe sanitation is one of the foundations of a healthy, comfortable and dignified life. Yet, two billon people around the world lack safe drinking water. Almost half of the population, 3.6 billion people lacks safe sanitation. Despite progress, over half of the world's population, 4.2 billion people, uses sanitation services that leave human waste untreated, threatening human and environmental health. The Oxford Economics report states that in terms of total cost, India suffer the most, with US $ 106.7 billion wiped off the GDP in 2015. Poor sanitation costs India 5.2% of its Gross Domestic Product annually. Sustainable sanitation encompasses of the entire sanitation cycle, which includes user interface, containment and storage, transport, treatment, disposal or reuse. Along with Sustainable sanitation approach promotes human health by breaking the vicious cycle of diseases. This approach considers waste as a resource and minimizes waste which is economically viable and environment friendly approach. Sustainable sanitation can help the nations in achieving the 2030 Agenda for Sustainable Development. This is highly incorporated with major Sustainable Development Goals (SDGs). This paper is theoretical in nature and put a detailed note on sustainable sanitation. Though it is relied on secondary data and data has been collected from various published sources such as periodicals, articles reports and books.

Key words: safe sanitation, sustainable sanitation, human and environmental health, sustainable development, SDG

Introduction

Globally, 884 millions of people do not have access to safe drinking water and 2.5 billion of people are without adequate sanitation facilities. Over 1.7 billion people still do not have basic sanitation services such as private toilets or latrines. Of these 494 million still defecates in the open, for example in street gutters, behind bushes or into open water bodies (WHO 2021). WHO attributes 80% of all diseases and 25% of all deaths in developing countries to polluted water. Poor sanitation reduces human wellbeing, social and economic development due to transmission of diarrheal diseases such as Cholera and Typhoid as well as intestinal worm infection and Polio. Lack of sanitation exacerbates stunting and contributes to the spread of anti microbial resistance. Open defecation perpetuates a vicious cycle of diseases and poverty. The countries where open defecation is wide spread have the highest numbers of death of children aged under 5 years as well as the highest level of malnutrition.

Bruntland commission on sustainable development published its report 'Our Common Future' (1987). This report described sustainable development as, "development that meets the needs of the present without compromising the ability of future generation to meet their own needs." The report demarcated three fundamental pillars i.e., social, economic and environmental of sustainable development. Sustainable Sanitation is a integral part of these pillars. The Johannesburg Conference (2002) implemented MDGs (Millennium Development Goals). MDG ensured environmental sustainability through its targets and launched progress towards developing a set of sustainable development goals (SDGs). SDGs were built upon MDGs and were part of post 2015 development agenda.

The sustainable development summit (2015) took place in Paris. This summit legitimized sustainable development goals for the 2030 agenda for sustainable development. One of the SDGs, SDG 6 is dedicated to water and sanitation and ensures no one left behind. The new 2030 agenda includes water, sanitation and hygiene (WASH) at its core with SDG 6 dedicating a commitment to “Ensure availability and sustainable management of water and sanitation for all.”

Figure 1: Goal 6 interlinks the three dimensions of sustainable development

Source: Sustainable Development Report, 2021.

Access to clean water, sanitation and hygiene are human right as well as fundamental to human health. The resolution of the UN General Assembly and the human right council in 2010 brought the breakthrough for the recognition of the right to sanitation. Therefore, World Health Assembly (2011) recalled the general assembly resolutions and urged states to ensure that national health strategies support the progressive realization of the human right to water and sanitation "that entitles everyone, without discrimination to water and sanitation that is sufficient, safe, acceptable, physically accessible and affordable for personal and domestic uses." In 2015, the right to water and sanitation referred as one combined human right that is "the human right to safe drinking water and sanitation."

The 2019 novel corona virus (COVID-19) outbreak has highlighted the importance of water sanitation and hygiene (WASH). The pandemic reinforced that poor sanitation puts everyone at risk. Recognition of the sanitation crisis has prompted the United Nations to declare 2008, 'The International year of Sanitation. World Water Day (22 March) and World Toiler Day (19 November) also established to promote action on water and sanitation through public awareness activities, conferences and activities.

What is Sanitation?

'Sanitation' means different things to different people, but its definition has to include 'the safe management of human excreta', usually by means of a toilet that confines feces until they are composted and safe, or enables them to be flushed away into a sewer. In its fullest sense, as understood for the International Year of Sanitation, sanitation also includes environmental cleanliness, hand washing, garbage removal and

wastewater disposal. The concept of sanitation as 'clean living, free from contact with excreta and other disease carrying- agents', now being promoted around the globe. (IYS, 2008)

Sustainable sanitation is an immediate approach to promoting human health, conserving natural resources and making environment more viable. It reduces the harmful impact and economic cost of traditional sanitation systems. These harmful impacts include degradation of environment, water and soil pollution and depletion of natural resources as well. ." Sustainable sanitation addresses these issues with efficient and environmental friendly practices and technology. Sustainable sanitation system considers the entire "sanitation value chain" from the experience of the user, excreta and waste water collection methods, transportation or conveyance of waste, treatment and reuse. Socially acceptability, economic viability and environment friendly nature of sustainable sanitation keeps its sustainability intact.

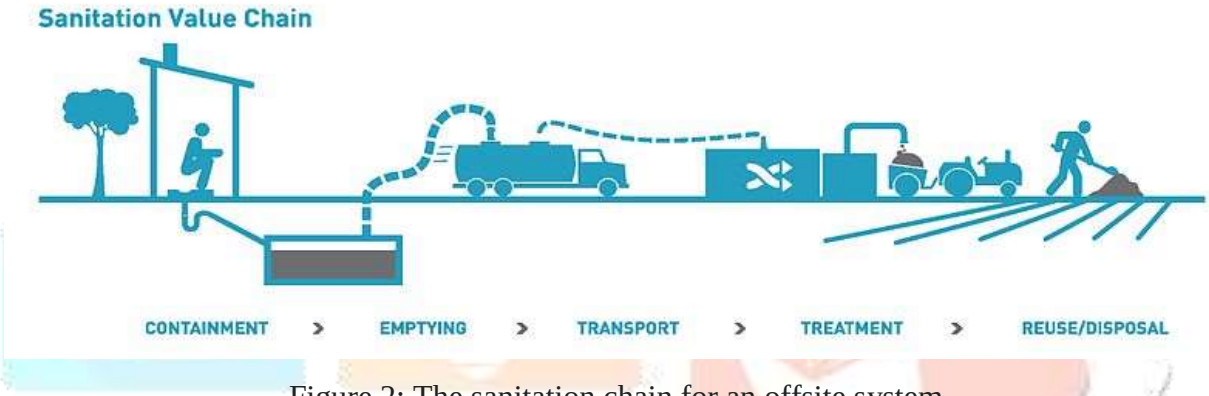


Figure 2: The sanitation chain for an offsite system.

Source: https://www.flickr.com/photos/gtzecosan/22340106212/in/dateposted-public/

This is prerequisite to observe some basic principles when planning and executing a sanitation system. The members of 'The Water Supply and Sanitation Collaborative Council' endorsed a set of principles during its 5th Global Forum in 2000. This set is called "Bellagio Principles of Sustainable Sanitation", which must be seen as the underpinning basis for a new approach.

- Human dignity, quality of life and environmental security at household level should be at the center of any sanitation approach.
- In line with good governance principles, decision making should involve participation of all stakeholders, especially the consumers and providers of services.
- Waste should be considered as a resource and its management should be holistic and form part of integrated water resources, nutrient flow and waste management processes.
- The domain in which environmental sanitation problems are resolved should br kept to the minimum practicable size (household, neighbourhood, community, town,district, catchment).

Need of Sustainable Sanitation

The large number of people around the world who still do not have access to adequate water, sanitation, drainage and solid waste disposal services provides sufficient evidence that conventional approaches to sanitation are unable to make a significant dent in the service backlog which still exists. Sustainable sanitation is a system which covers the gap of traditional sanitation system. Sustainable sanitation considers sanitation holistically. Poor sanitation is directly connected to all major global concerns, including growing inequality, the loss of natural resources, environmental degradation and climate change. Sustainable sanitation is prerequisute for societal advancement and economic prosperity and viable environment as well.

Sanitation is vital for human health, child development, and social and economic progress. The prime objective of sanitation is to protect and promote human health. It is also fundamental for the fullfilment of childrights and the achievement of good physical, mental and social well being.

Table1: Human Diseases and Their Transmission

No	Disease	Pathogens	Mode of transmission	Symptoms
1	Cholera	Vibrio cholera – bacteria	Food contaminated with faecal matter	Vomiting and Diarrhoea
2	Typhoid	Salmonella typhi – Bacteria	Salmonella typhi –SBacteria	Salmonella typhi Bacteria
3	Bacillary Dysentery	Bacterium Shigella	Faeces of an infected person contaminates food	Dysentery
4	E-Coli Diarrhea	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

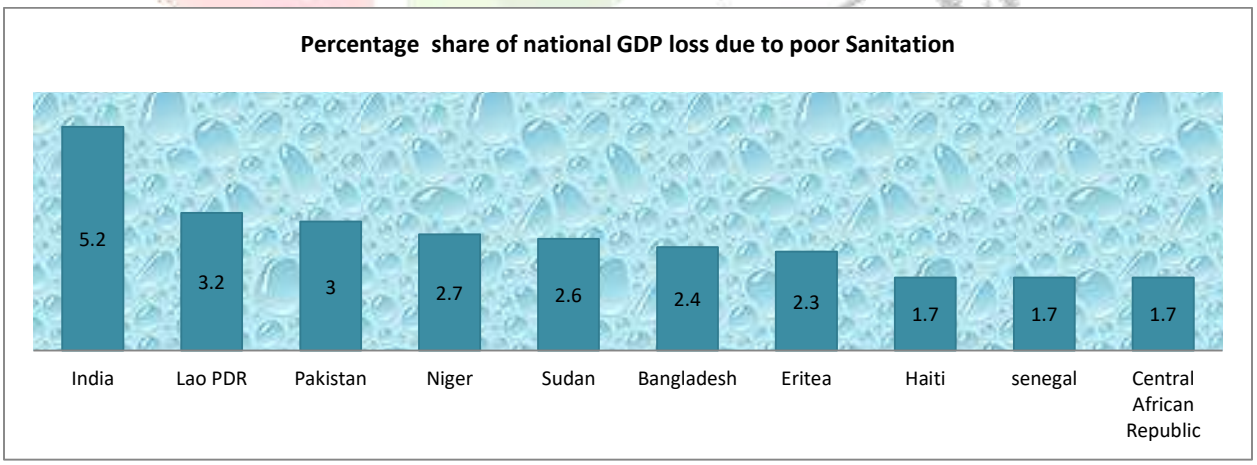
Source:www.colfinder.net/materials/Communicable_Diseases/CD_Unit_11.odtcited 01.04.2015

Sustainable sanitation breaks this vicious cycle of diseases and promotes healthy life. A WHO study states that in 2022, 57% of the global population (4.6 billion people) used a safely managed sanitation service. Over 1.5 billion people still do not have basic sanitation services, such as private toilets or latrines. Of these, 419 million still defecate in the open, for example in street gutters, behind bushes or into open bodies of water. According to the WHO/UNICEF Joint Monitoring Programme on Water Supply and Sanitation, 3.4 billion people do not have safely managed sanitation impacting their health, dignity and development, and contributing to some 1.4 million preventable deaths annually.

Sanitation generates economic benefits

A 2012 WHO study found that economic losses from poor sanitation and inadequate water supply would be equivlant to 1.3 perecent of global gross domestic product. Poor sanitation increase health expenditures. It also enhance the poverty cycle due to out of pocket expenditure. Sustainable sanitation approach can quantify the loss of the benefits and savings.

Figure1:Percentage share of national GDP loss due to poor sanitation



Data source: Lixil group corporation, water aid and Oxford economics (September 2016). The true cost of poor sanitation.

Sanitation keeps the environment clean

The UN World Water development report states that 26% of the world's population (roughly 1 in 4 people) do not have access to safe drinking water and 46% lack access to basic sanitation. A staggering 78% of sewage generated in india remains untreated and usually disposed off in rivers, lakes, contaminating 90% of all surface water. Toilets often confused with sanitation. Although toilets are only repositeries to receive waste. When waste is flushed, it flows through a piped drain,which could be either connected to a sewage treatment plant or not as well. But sustainable sanitation includes changed hygienic behaviors, maintenance, emptying, treatment and disposal or reuse of accumulated faecal matter. The Indian government report 'From ODF to ODF Plus Rural Sanitation Strategy 2019-2020' states that India has still thousands of toilets with single pits or septic tanks that require desludging from time to time. To ensure sustainability , all purposes, including agriculture, farm forestry,toilet flushing and industrial uses. The nutrient content of treated water act as a fertilizer ,when used as irrigation in agriculture. Industries can use treated water as cooling water,making concrete, soil compaction and dust control.

Figure3: **Benefits of Sustainable sanitation**

Source: compsed by the researcher

Sanitation ensures gender privacy and dignity

Sanitation also reduces fear and animal attacks (snake bite, dog bite, insect bites and attacks by wild animals). It negatively impact women psycology to defecate in open. Women go out for defecation or to relieve themselves usually in the early morning or late evening. It is of great concern that factors such as sexual harassment, patriarchal system, and absence of privacy, poverty, cultural traditions, suspicion at home and humiliation in public are causing major impact on women's mental health. Thus it can be said that access to toilets is a key determinant contributing to all over health of women. Sustainable sanitation promotes school attendance of girls by the provision of separate sanitation facilities.

Sustainable sanitation is achieveable

As conventional sanitation systems to resource management have some serious drawbacks. Sustainable sanitation focuses at overcoming these shortcomings. Centralised water based sewage mixes different wastewater streams. It includes street runoff,industrial flow and domestic grey water.This gets difficult for any treatment plant to handle this even after high techonological establishment. The amount of harmful substances such asheavy metals, chemicals and posionous gases makes it also unable to reuse.. Alongwith previous approaches of sanitation uses a laege amount of water for flushing toilrt. Water is the most scarce resource. The Human Development Report 2006 states, "the scarcity at the heart of the global water crisis is rooted in power, poverty and inequality, not in physical availability." Sustainable sanitation covers this gaps.

Challenges and Suggestions

Certain key challenges affects the sustainable sanitation system inversely. Behavioral change and social acceptance is prime. Climate change is a reality of the hour. Furthermore, the voices of vulnerable people, households, and communities who are at the forefront of experiencing climate change impacts on sanitation should be focused on.. Alongwith sustainablility factor capacity buiding, community participation, market development shold be taken into consideration.

Conclusion

The 2030 Agenda for Sustainable Development provides important thrust for more integrated planning and development of sustainable sanitation. Sustainable sanitation can assist the nations in achieving SDGs. Sustainable sanitation is a simple approach which considers waste as a resource. Sustainable sanitation that allows for resource recovery has the potential to contribute to circular economy and green cities, sustainable food chains, renewable energy, and new business models for private sector involvement. Sharing of experiences and thoughts on addressing climate change impacts on sanitation at a local level are critical to evolving the sanitation sector.

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