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Shit Management in India

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Abstract

Sanitation creates a clean, hygienic, and sustainable atmosphere. This article explores sanitation economics. The sanitation economy has lagged behind sociology. Sanitation is economically driven. This article applies economics to sanitation theory and practise. The environment and economic growth are interconnected and complex. Economic growth is causing a natural crisis. Economic analysis of ecological issues, causes, and effects uses economic ideas, tools, and methods. Sanitation economics must be addressed globally and locally.

Keywords: Environment, economic, India, hygiene, sanitation, water

INTRODUCTION

Urine, faeces, washing, cooking, and solid waste from homes, workplaces, schools, hospitals, and other public buildings are all wastes people create. Controlling and managing all these wastes benefits humans and the environment. Waste management is tough in urban areas with limited space.

UNICEF defines sanitation as "interventions that reduce human exposure to diseases by providing a clean environment." Human exposure to faeces has caused many intestinal infections, food and water contamination, and children's deaths in poor and emerging countries. Infected drinking water and poor sanitation kill 1.4 million infants each year. Also, 2.4 billion humans lack sanitation. Furthermore, 564 million Indians openly defecate, compared with 946 million worldwide. Nearly half of India's 1.2 billion people lack toilets due to sanitation issues.

Sanitation Facts

- 2.2 Billion people worldwide lack clean potable water.
- 4.2 Billion people lack safe toilets [1].
- Nearly half of the world's schools lack soap and water hand washing amenities.
- To meet basic needs and reduce public health risks, each person needs 50 litres of water per day.
- 207 Million individuals trekked for more than 30 minutes round trip to obtain better water [2].
- 2 Billion humans worldwide drink faeces-contaminated water [3].
- Furthermore, 297,000 children younger than 5 years old die from diarrhoeal diseases due to bad sanitation, hygiene, or drinking water [4].
- Unsafe water and sanitation kill 20 times more children younger than 5 years old in protracted conflicts than direct fighting [5].
- Every year, unclean births result in 1 million fatalities. Infections kill 26% of neonates and 11% of mothers [6].

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- Hygiene marketing saves money [7].
- 2 billion people worldwide lack hand washing amenities at home [8].
- Water- and sanitation-related diseases cost many nations 5% of GDP in productivity loss [9].
- Access to sanitary facilities would reduce disease by 10% worldwide [10]

In urban areas, basic drinking water costs $1 and saves $3 in medical bills and productivity. Basic cleaning returns $2.5 per $1. In rural areas, $1 spent in basic drinking water returns nearly $7 in medical savings and productivity. Basic rural sanitation saves $5 in medical bills and productivity for every $1 spent [11].

Sanitation improves health and lifespans. Children need it most. Over 800 children under five die daily from avoidable diarrhoea-related diseases due to a lack of water, sanitation, and hygiene. Diarrhoea also makes kids lose their appetites, which can cause malnutrition. One in four children globally is stunted due to poor sanitation. “Irreversible physical and cognitive damage” results.

Climate change, water scarcity, population expansion, demographic changes, and urbanisation are challenges for water supply systems. Half the globe will be water-stressed by 2025. Wastewater reuse for water, nutrients, and energy is becoming essential. Wastewater now irrigates 7% of developing nations’ land. Safe wastewater management increases food output and reduces health risks.

Groundwater and wastewater will increasingly be used for potable and irrigation water. Climate change will increase rainfall variability. The sanitation SDG targets present huge challenges, but they also present great opportunities, which we can begin to realise when we start thinking of sanitation as a service to be delivered and wastewater and faecal sludge as resources to be reused rather than wastes to be disposed of.

This idea underpins the sanitation economy. That is amazing! Safely handled sanitation services create jobs, economic growth, and resource loops.

Public and private service providers range from megautilities like Sabesp in Brazil and Manila water in the Philippines to local businesses like container bases Sanitation in Haiti and sludge emptiers in Uganda.

ECONOMIC WATER

The water issue is economic. Water collection and safety searches cost billions in business opportunities. Women gather water for 785 million people without safe water. They spend hours each day walking to rivers and ponds or standing in line for hours at community water kiosks. Water and sewage shortages cost the world $260 billion annually.

Access to water and sanitation for homes has an impact on household spending as well as the overall economy. Home toilets and safe water can lower a family’s health care costs. Universal water and hygiene would save $18.5 billion in deaths annually. Water and sanitation investments yield $4 in health savings, work gains, and fewer premature deaths.

Home water enables women and their families to earn income. Instead of going for water, they can work sewing, farming, or teaching. They can escape poverty with income from these pursuits.

Economy of Sanitation

The Toilet Board Coalition conducted a Circular Economy Feasibility Study in 2016. Our main concerns were:

- Are waste resources being upcycled into valuable goods?
- Are there scalable business models to supply these goods sustainably?
- Does the system attract big industrial buyers?

Twelve low-income sanitation SMEs and twelve experts from multinational companies, academia, and the "waste" (resource) management value chain participated in the study.

Supporting Toilet Innovators and Sani-preneurs has shown that downstream challenges like transport/collection and treatment are as important as building demand for toilets. For the treatment plants and the many communities without a publicly funded sewage system.

Six key results from the initial Sanitation in the Circular Economy study with low-income entrepreneurs, academics, and multinational companies.

1. Unexploited toilet resources are a key bio cycle component.
2. The circular economy could make sewage self-sustaining and valuable.
3. Three sanitation circular economy chance cycles
4. Corporate supply lines have renewable resources.
5. Future industrial uses are innovative.
6. Low-income countries have leapfrog potential.

WATER AND SANITATION COSTS

Is water and sewage investment profitable? Although it is difficult to quantify the advantages of improving water and sanitation, the best estimates indicate that they substantially outweigh the expenses. According to the UN, investments in water and sanitation save health care costs, disease, and output by $8. on 2004, the WHO discovered that, depending on technology, investing $1 on water, sanitation, and hygiene education would result in health and other benefits of $3 to $34.

The 2006 UN Human Development Report stated that the water and sanitation deficit costs $170 billion, or 2.6% of developing nations' GDP.

Delivering the most affordable, sustainable technology would require an extra $10 billion a year to meet the millennium development goals (MDG) on water and sanitation in sub-Saharan Africa. Universal water and sanitation costs $20 to $30 billion, based on technology.

Modern household water and sanitation services cost seven key components:

- Opportunity costs of diverting raw water from other uses to the home.
- Transporting polluted water to the city.
- Raw water purification for imbibing.
- Urban home distribution of treated water.
- Home effluent collection (sewerage collection).
- Wastewater treatment (sewage treatment).
- Discharging treated wastewater costs or harms others (negative externalities).

ECONOMIC BENEFITS OF BETTER WATER AND SANITATION

Sanitation and water improvements have many business benefits:

Sanitation and hygiene programmes for the public are economical. Nearly half of people living in impoverished countries suffer from one or more water- and sanitation-related illnesses, such as trachoma, which can cause blindness, guinea worm, or diarrhoea. Diarrhoea is twice as common in children from toiletless homes. Water and sanitation access can improve health and reduce the cost of building world health systems. The cost of healthcare would be reduced by $1.7 billion yearly if

everyone had access to basic facilities, including $610 million in sub-Saharan Africa, which makes up 7% of the region's health budget.

Saving time: Individuals without access to water or toilets spend a lot of time each day searching for remote spots to urinate in the open, waiting in lines for public restrooms, or collecting water. Sanitation would give each household 1000 extra hours per year to work, learn, care for children, collaborate, and rest. This time is worth over US$100 billion annually. Rural African households spend 25% of their day fetching water, according to study. Sub-Saharan Africa spends 40 billion labour hours carrying water (TEARFUND 2008 and UN-WATER 2008).

Water infrastructure investments reduce the time women spend carrying water vast distances.

By increasing education returns: To meet MDG school enrolment goals, developing countries are increasing education spending. It will have a bigger impact if some of the money is used to build teacher and student restrooms with separate areas for girls. Worm infections deplete nutrition and calories and cause listlessness and inattention, so healthy kids learn more. Parasitic worms infect two thirds of African students.

Improved water and sanitation could boost productivity in developing nations, raising family incomes and economic growth. Universal water and hygiene would save 15- to 59-year-olds 3.2 billion working days from diarrhoea. Better water sources would save 20 billion working days a year, mostly for women.

Protecting investments in better water supply: Improvements in drinking water quality may be hampered by poor hygiene. Without toilets, water contamination during domestic storage and handling is greatly increased. Contamination of local drinking water sources can necessitate costly investments in faraway sources.

Water is a useful resource. By raising treatment and other costs, water contamination from faeces or other sources hurts transportation, agriculture, fisheries, energy generation, large-scale industrial processes, small-scale industries, and recreation.

In 2006, the tourism industry contributed over US$6,000 billion in economic activity, or 10% of the world's GDP and almost 9% of all jobs. Good sanitation and water supply are essential for a successful tourism sector because health, safety, and aesthetics greatly influence holiday destinations.

Water and Sanitation Economic Analysis Tools

A cost-benefit analysis may produce the following results if it appears viable to value in money all significant economic costs and benefits:

Expenses and benefits as a percentage of household income: All household expenses and benefits will be considered in the household economic analysis. This helps determine whether total economic costs are reasonable or benefits are high enough. Responsible entities can calculate ratios.

By dividing the discounted benefits by the discounted costs, the cost-benefit ratio compares a sanitation or water decision to "doing-nothing."

Internal rate of return: Over the course of the sanitation and water improvement, the internal rate of return calculates the equivalent return on investment in percentage terms, taking into account both monetary cash flows and non-monetary costs and benefits.

The cost-effectiveness ratio is a more detailed measure that contrasts expenses with a single benefit of better water and sanitation, expressed in physical (non-financial) units like better-served residents, improved health, or pollution reduction. Public planning uses this tool.

Water and Hygiene Economics

The water issue is often attributed to politics, not economics, which is partially true. Water and hygiene are about matching demand and supply, providing high-quality water at the right time and place at a price people can afford.

Institutional and control issues complicate this. Some control issues are economic.

Surface water supply's fixed costs cause a cost allocation problem with no technical solution. Water supply requires collective effort to provide and finance due to its high capital intensity, longevity, and economic scale.

Water and hygiene improvements boost the economy.

Sanitation and Water Improvements have many Business Benefits

Hygiene and sanitation are cost-effective public health initiatives. Nearly half of people living in underdeveloped countries suffer from one or more conditions connected to water and sanitation, such as diarrhoea, guinea worm, or trachoma, which can cause blindness. Diarrhoea is twice as common in children from toiletless homes. Water and sanitation access can improve health and reduce the cost of building world health systems The cost of health care would be reduced by $1.7 billion yearly if everyone had access to basic facilities, including $610 million in sub-Saharan Africa, which makes up 7% of the region's health expenditure.

Sanitation and hygiene programmes for the public are economical. Nearly half of people living in underdeveloped countries suffer from one or more conditions connected to water and sanitation, such as diarrhoea, guinea worm, or trachoma, which can cause blindness. Children from families without toilets have diarrhoea twice as often. Access to water and sanitation facilities can boost health and lower the cost of setting up global health systems. The cost of health care would be reduced by $1.7 billion yearly if everyone had access to basic facilities, including $610 million in sub-Saharan Africa, which makes up 7% of the region's health expenditure.

Saving time: People who don't have access to water or toilets spend a lot of time each day searching for isolated spots to urinate in the open or collecting water. Sanitation would give each household 1000 extra hours per year to work, learn, care for children, collaborate, and rest. This time is worth over $100 billion annually.

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Sanitation Economics

Indonesia's Economic Impact of Sanitation study supports that claim. Poor health and sanitation cost Indonesia an estimated US$6.3 billion or 2.3 percent of GDP in 2006.

According to the study, poor sanitation and hygiene result in 50,000 preventable deaths and 120 million bouts of disease each year. Annual economic effect exceeds US$3.3 billion (IDR 29 trillion). Poor sanitation pollutes water, raising household water costs, and reducing fish output in rivers and lakes. Polluted water from bad sanitation costs US$1.5 billion (IDR 13 trillion) annually.

The study estimates that poor sanitation and hygiene cost Indonesia US$6.3 billion (IDR 56 trillion) in 2006, or 2.3% of GDP.

The study estimates the greatest economic losses from health and water supplies. Health services, clean water, and job absenteeism due to poor health are expected to cost people money.

It is predicted that investing in water and sanitation services will improve global GDP by 1.5 percent and return US$4.3 for every dollar invested due to decreased health care costs for individuals and society as well as greater workplace productivity and involvement due to better access to facilities.

Sanitation Economics Initiatives

A 2007 WSP study from East Asia found that poor sanitation and hygiene cost Cambodia, Indonesia, Lao PDR, the Philippines, and Vietnam over US$9.2 billion a year (2005 prices). The Economics of Sanitation Initiative was launched by this study. The ground-breaking study attributed dollar amounts to a country's sanitation costs. The report raised awareness and government action in several nations. WSP created the ESI initiative to fill key gaps in developing country sanitation economic impact evidence. After East Asia, ESI studies were conducted in Africa, South Asia, and Latin America.

East Asia's second phase of ESI examines alternative sanitation interventions' costs and benefits in various settings. The study helps allocate sanitation money more efficiently. Studies were conducted on Yunnan Province, China, Indonesia, the Philippines, Vietnam, and Cambodia.

According to the study, sanitation improvements improve health, dignity, and quality of life. The study also found that environmentally friendly sanitation choices cost more, but households, tourists, and businesses value them. Wastewater management's environmental benefits to downstream communities can boost economic returns.

ESI discovered that sanitation spending returns US$5.5 for every dollar invested in a WHO article titled Global costs and benefits of drinking-water supply and sanitation interventions to attain the MDG objective and universal coverage. The report projected that inadequate water supply and sanitation cost the global economy US$260 billion annually.

Sanitation Economy

Toilet, circular, and smart cleaning economies exist.

Companies across sectors must provide safe sanitation to workers, supply chains, and communities. In the Toilet Economy, toilets improve lives and provide health, hygiene, renewable resources, and information on human health and behaviour. Toilets are now a net benefit to human rights and company value, not an unaffordable cost.

Toilet resources—human excreta—provide new sources of water, energy, nutrients, and more for business activities. New technologies in the Circular Sanitation Economy are creating cheaper, decentralised options to capital-intensive waste management systems. Circular economy cleaning unlocks scarce resources that are vital to future growth.

In the Fourth Industrial Revolution, digital technology and data are upending sectors and creating new firm value. In the Smart Sanitation Economy, sensoring and satellite earth observation provide real-time sanitation system tracking, improving operational efficiency and revealing human health and consumer behaviour.

Business will be disrupted as we transition to a sustainable, sanitation economy development model, which comes with significant risks and opportunities. Iteratively growing digital platforms that are

circular and agile will be tried to create new social and environmental value chains. To avoid losing assets to the sanitation economy, you must act first and fast.

The sanitation economy must be scaled up to attain SDG 6.2's universal sanitation. By developing a healthy market for commodities, services, renewable resource flows, data, and information, sanitation systems will alter industries, cities, communities, and businesses. For business and society, we identified three approaches to scale:

By 2030, cities will be home to 5 billion people, or 60% of the world's population, primarily in Asia and Africa. Everyone must have safe hygiene. Smart public toilets, treatment, and health can help towns achieve sanitation intelligence.

SECTORS

Agriculture and manufacturing hire millions in economies without safe sanitation. Circular sanitation as a model for sustainable and efficient business operations can provide sanitation for millions of people, provide access to scarce resources like water, energy, and nutrients, and address worker health risks and environmental degradation in communities where businesses operate.

STANDARDS

Towns can provide more affordable, quicker sanitation services for expanding populations by adopting new standards for decentralised public and community restrooms. Safe toilet use and water, energy, and nutrient renewal can turn sanitation from cost to value. Sanitation intelligence can improve sanitation access, sanitation system management, and human health and conduct through data standards.

To transform sewage systems from prohibitive public costs to viable and sustainable corporate opportunities, new systems, business, and financial models are required.

Grid Change

Sanitation economy systems models are based on the emerging "new grid" idea that combines the best profitability and service features of traditional sewer systems and decentralised "off-grid" solutions into a lower-cost, more sustainable hybrid model—a network of flows of nutrients, water, energy, data, and finance. Optimizing "new grid systems" requires scaling to at least 1 million people.

New Business/strategic Models

Sanitation businesses are emerging from the sanitation economy. Sanitation business owners generate a variety of revenue sources:

- The toilet economy turns public restrooms into brand-new consumer venues with high-quality, reasonably priced items and services that are packaged to provide several revenue streams.
- Circular sanitation economy revenues include turning sanitation waste into toilet resources that can be up-cycled into water, energy, organic fertilisers, and possibly high-value proteins and other organic chemicals optimised for local markets and regulation. Several types are nearing cost recovery.
- Digitisation, operations monitoring, and user data, customer insights, and health and behaviour data can boost smart sanitation economy revenues.

New Financial Models

The sanitation economy needs new sanitation business model valuation and pricing. Financial models should evaluate new evidence of higher value product and service models. In the near future, blended finance will be required to pay for capital expenses for sanitation economy infrastructure that will free up commercial financing for large-scale revenue-generating models.

The sanitation economy changes company and government sanitation costs from unaffordable to sustainable.

TOILET ECONOMY CIRCULAR SANITATION ECONOMY

Sanitation costs society $250 billion per year, and UN Water estimates a $1 trillion financing gap per year to meet SDG 6 by 2030.

The World Bank is expanding its sanitation work globally by launching a circular economy initiative based on its recent Latin American experiences, which see wastewater as a resource rather than a problem. The research suggests a fundamental paradigm change away from treating wastewater and releasing it into a receiving water body and towards a circular model that encourages reuse, recycling, restoration, and recovery of energy, nutrients, reusable water, and biosolids while reducing water use and consumption. This technique can aid in the financial survival of sanitation systems and services. The technique also helps with greenhouse gas capture, agriculture energy production, and water supply.

Through its "Citywide Inclusive Sanitation" (CWIS) program, the World Bank is rethinking urban sanitation service delivery. The CWIS strategy encourages a range of technical solutions that are flexible and adaptable, customised to the needs of the world's expanding cities, so that sanitation services can develop and evolve alongside them. The Bank urges governments to focus on service supply rather than infrastructure, taking into account financial, institutional, regulatory, and social aspects.

The Indian government implemented disruptive strategies from 2014 to 2019 to increase access to sanitation by including young people, the media, influencers, and corporate social responsibility. This creates a $62 billion sanitation economy market in India, which can create many new jobs, enhance health and the environment, and save households.

Indian towns are going digital. Pune, India's first Smart Sanitation City, shows how all smart cities can use emerging technologies to improve basic infrastructure and reach optimised and aspirational smart sanitation.

Sanitation benefits workers, companies, and the environment. Sanitation workers and their families' health and well-being depend on early community involvement. However, Sanipreneurs and businesses can profit from this.

Developing Countries' Sanitation Economics

Poor hygiene costs money. Sanitation accounts for 92% of the US$38 billion cost of missing the MDG water and sanitation goal. To meet the MDG sanitation goal in developing countries, US$142 billion (US$ 2005) is needed. Sanitation costs US$28 per person. US$14 million per year. This study shows that sanitation is socially and economically beneficial. In non-OECD countries, achieving the sanitation MDG target and achieving universal access to sanitation would generate returns of between US$9.1 and US$11.2 for every US$1 invested.

Sanitation is profitable given present knowledge. SDG cleaning targets save lives and boost economies.

Unimproved hygiene costs money.

Sanitation-related illnesses and lost output cost money. Inadequate or far-flung sanitation facilities result in time and effort losses, lower product quality due to poor water quality, decreased tourist revenue due to high contamination and disease risk, and clean-up costs.

Poor hygiene is costly, according to science. Sanitation accounts for 92% of the US$38 billion cost of missing the MDG water and sanitation goal. A recent Southeast Asian study found that poor sanitation and hygiene cost Cambodia, Indonesia, the Philippines, and Vietnam over US$9.2 billion a year (2005 prices)—2% of their combined GDP. The primary economic implications were, in descending order, those on health, water resources, user preferences (access time cost), and tourism. Everyone is affected by poor sanitation, but especially the poor and the weak (children, women, people with disabilities, and the elderly).

Several studies have estimated the fiscal costs of poor sanitation. In Ghana and Pakistan, environmental risk factors driven by malnutrition have increased child mortality by more than 40%. Malnutrition impairs school achievement and delays labor market entry, doubling the cost to 9% of GDP.

Poor hygiene costs Cambodia US$448 million annually, or US$32 per person. Cambodia lost 7.2% of its GDP in 2005. This was about twice the forestry sector's GDP input or the fishery sector's. Financial losses totalled US$160 million per year, 2.5% of the GDP, or nearly US$12 per person.

Poor sanitation and hygiene cost Indonesia US$6.3 billion, or 2.3% of GDP. Health and water resources had the greatest effect on economic losses. Each year, poor sanitation and hygiene result in 50,000 early deaths and 120 million episodes of disease. Each year, it costs more than US$3.3 billion. Each year, poor hygiene and water pollution cost the US$1.5 billion. Poor sanitation resulted in losses to human welfare of US$1.2 billion (due to the time required to acquire unimproved sanitation), losses to tourism of US$166 million, and environmental losses of US$96 million as a result of the loss of productive land.

Fiscal issues

Water, sanitation, and solid waste control services must be fiscally sustainable. Sanitation and solid waste services must be included in water supply willingness-to-pay studies. Health and hygiene education should be examined in terms of willingness to pay for studies. Developing alternative cost-recovery methods requires more research. If beneficiaries cannot pay, this study should examine alternative sector financing models.

Research Areas

No exhaustive list of research themes and priorities will be supplied. First, how to organise and finance water, sanitation, and solid waste services will be the biggest challenge in the near future, not the "hardware" of water supplies, sanitation, and waste management. How can people create, use, and maintain facilities? How can people be organised, trained, and motivated? How can institutions promote the growth and sustainability of the sector? How to optimise assets and alternative methods for low-income neighbourhoods?

Sanitation requires a well-organized action study. Emphasize community engagement. Action research—disciplined inquiry—helps educational leaders evaluate their practices, programs, and processes. It is a methodical way for teachers to evaluate their work or investigate an issue. An action study is planned, organized, and shareable.

Action research is a participatory methodological approach that combines inquiry and action with direct participation by the investigated subjects. A cycle of reflection, study, and action generates new knowledge and collectively solves problems.

Research Ideas

- This list is incomplete. Topics may vary
- Climate change, hygiene, and so on

- Surface water pollution and drinking water
- Low-cost water filter
- Groundwater poisoning
- Odour issues
- Sanitation odour control
- Sewers and storm water runoff
- Mathematical wastewater planning
- Water as waste paper? Sanitation reforming (toilet)
- Wastewater and faeces affect marine environments
- Toilet revolution in rural China/other country cases
- Sanitation methods and re-use and disposal
- River pollution
- Antimicrobial plant root treatment for household water and wastewater
- Urban sanitation: beyond toilets
- Sewers and wastewater management
- Emergency sanitation options
- Reducing health risks to human waste and sewage workers.
- Health care wash
- Expanding rural sanitation and hygiene
- Market-based sanitation
- Entrepreneurial sanitation
- Sanitation financing and CBA
- Sanitation and smart finance
- Domestic private sector participation for sustainable services
- Poor-inclusive WSS sector reform
- Targeting urban poor and improving small town services
- Adapting water and sanitation service delivery to climate change
- WSS services in fragile states
- Sanitation system
- NGO sanitation
- Solid waste best practices
- Traveller sanitation

CONCLUSION

Hygiene and sanitation affect our bodily, psychological, social, and spiritual health. Numerous methods exist for cleaning up our surroundings. Theory and practise must be the best. Shit management is not an easy job. It requires detailed planning and effective strategies. It is not either a one man affair or a once for all affair. For the health of our bodily, psychological, social, and spiritual selves, proper cleanliness and sanitation are crucial. There are a variety of ways we might maintain order and cleanliness in our environment. We require best practises in both theory and practise.

In this article, we have discussed not only the sanitation issues but also pointed out some of the possible areas for further research. Both rural and urban areas need attention and concentration. The question is not either-or. It has to do with Swachh Bharat.

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