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A Study on the Progress, Challenges, and Impacts on Sanitation and Waste Management in Mizoram, India

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ABSTRACT

India's Prime Minister Narendra Modi initiated the Swachh Bharat Mission (Clean India Mission) on October 2, 2014, with the aim of advancing sanitation and achieving universal sanitation coverage. The objective of the Swachh Bharat Mission was to achieve nationwide sanitation and the establishment of communities that are free from open defecation and maintain cleanliness. This research study investigates the progress, obstacles, and impacts of the Swachh Bharat Mission on sanitation and waste management. The paper analyses pertinent concepts, methodologies, empirical evidence, and arguments regarding mission development, municipal waste management, and urban population expansion during the last decade. This research article aims to elucidate the Swachh Bharat Mission and its influence on sanitation and waste management in India.

Key words: Sanitation, Aspects, Management, Towns, Swachh Bharat Mission, Waste

Introduction

The Swachh Bharat Mission, launched in 2014 by the Government of India, aimed to achieve universal sanitation coverage and promote clean and open defecation-free communities across the country. With a focus on improving sanitation practices and waste management, the mission aimed to bring about a significant transformation in the lives of people by ensuring safe and hygienic living conditions (Ministry of Housing and Urban Affairs, 2024). Many illnesses afflict the population of India as a result of poverty and filthy surroundings, particularly harming youngsters. India historically had high poverty rates and unsanitary environments, although the country has made significant progress in alleviating these challenging circumstances. The Government of India recently published the House-

hold Consumption Expenditure Survey: 2022 - 2023, which affirms that India has made significant progress and officially eradicated severe poverty. This also demonstrates that India is progressing towards an improved standard of living and a safer and more sanitary system (Bhalla and Bhasin, 2024).

Inadequate sanitation may also have a cascading impact on national progress since it impairs the health of workers, leading to reduced productivity, lower income, and an inability to provide education and secure prospects for their offspring. The lack of sufficient water, sanitation, and hygiene (WASH) services in India's health facilities is a significant factor in the high newborn mortality rate, which now stands at 24 fatalities per 1000 live births (A Clean India, 2024).

A significant proportion of rural households in India, reported that all members of their home use

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the toilet when needed, indicating a complete absence of open defecation practices (National Annual Rural Sanitation Survey, 2017-18) Public health initiatives in any country are hindered by open defecation and insufficient sanitation facilities, which cause infants to be born prematurely and have stunted development. Kerala and Mizoram are ranked at the forefront among the states, as they exhibit a notable achievement of 100% of families refraining from engaging in open defecation practices (Jebaraj, 2018).

Mizoram has made great progress in achieving the Swachh Bharat Mission's (SBM) objectives. The initiative has been successful in decreasing open defecation and has made great strides in waste management and sanitation. But as this article will demonstrate later on, there are still certain obstacles that must be cleared in order to accomplish the other two objectives. The largest and most widespread non-profit, secular volunteer organisation in Mizoram, the Young Mizo Association (YMA), has made great strides in encouraging people to take part in SBM programmes, occasionally collaborating with the State Government and District (Community Mobilisation in Mizoram, 2024).

The progress made under Swachh Bharat Mission is examined by building household toilets, communal toilets and declaration of open defecation-free towns. The study analyses data to determine the extent to which the mission has achieved its goals and identifies sanitary infrastructure gaps and challenges with its implementation. The study also examines city and municipal home waste disposal strategies and waste volumes. The study shows current waste management strategies and highlights historical trends. The data are analysed to evaluate Swachh Bharat Mission waste management activities and suggest areas for improvement.

Additionally, the decadal expansion of the metropolitan population is investigated to understand demographic changes and their effects on sanitation and waste management. The study examines urbanisation and the link between population increase, sanitary infrastructure, and waste management systems. The study analyses district-level data to determine urbanisation patterns in various areas and their effects on Swachh Bharat Mission objectives.

This study examines the Swachh Bharat Mission's development, obstacles, and effects on sanitation and waste management. This study examines data,

theories, methodologies and empirical evidence to better understand the mission's efficacy and inform future actions and policies.

Research Gap

The research gap in this study lies in the lack of detailed analysis and data for intervening years. The study covers the progress, challenges, and effects of the Swachh Bharat Mission, but it primarily utilises data from particular years, such as household toilet construction, community toilet construction, and open defecation-free town declarations. This makes it difficult to evaluate long-term progress, problems, and effects. Additionally, the Swachh Bharat Mission's effects on sanitation and waste management, including as public health, waterborne illness reduction, and environmental sustainability, are seldom discussed.

Research Questions

1. What is the progress made under the Swachh Bharat Mission in terms of individual household toilet construction, community toilet construction, and the declaration of open defecation-free towns in Mizoram?
2. What are the challenges faced in achieving the objectives of the Swachh Bharat Mission, particularly in improving sanitation and waste management practices?
3. What are the impacts of the Swachh Bharat Mission on domestic waste disposal practices in cities and towns?
4. How has the urban population grown over the years, and what are the implications of this growth on sanitation and waste management efforts under the Swachh Bharat Mission?

Objectives of Research

1. To assess the progress made under the Swachh Bharat Mission by analyzing the number of individual household toilets constructed, community toilets constructed, and the declaration of open defecation-free towns in Mizoram.
2. To identify and analyze the challenges faced in achieving the objectives of the Swachh Bharat Mission, with a specific focus on improving sanitation and waste management practices.
3. To evaluate the impacts of the Swachh Bharat Mission on domestic waste disposal practices in cities and towns by analyzing the quantum of waste generated and disposed of in different ar-

eas.

4. To examine the decadal growth of the urban population and its implications for sanitation and waste management efforts under the Swachh Bharat Mission, by analyzing district-wise data on urban population growth.

Methodology

This research article collects statistics on the Swachh Bharat Mission's progress, problems, and effects on sanitation and waste management in India. The data were obtained from the Directorate of Urban Development & Poverty Alleviation, which monitors household and community toilet construction, open defecation-free towns, domestic waste disposal, and urban population growth by decade. The data are analysed to uncover trends, patterns, and significant conclusions about the Swachh Bharat Mission's progress, difficulties, and repercussions. Descriptive statistics are used to analyse data and identify study goals. Findings from this study are analysed and discussed using data-driven evidence. The Empirical data validates the analysis's findings.

Overall, Data collection, analysis, literature evaluation, discussions, interpretations, limits, and suggestions comprise this research article's methodology. This study analyses the Swachh Bharat Mission and its effects on sanitation and waste management in India using a holistic approach.

Analysis and Discussion

Based on the data obtained, here are the comprehensive findings:

Progress under Swachh Bharat Mission

Open defecation (OD) is the act of excreting or disposing of human faeces in open areas such as fields, woods, shrubs, bodies of water, or other unenclosed regions (WHO and UNICEF, 2021).

The Swachh Bharat Mission has prioritised the construction of home toilet development to improve sanitation practices in India. The mission data show a significant number of individual household toilets constructed with the highest 11,118 home toilets built in 2019-20. This indicates the dedication to the provision of domestic sanitation critical in improving hygiene and reducing open defecation. However, the data indicate a large communal toilet building deficit. Providing community toilets is es-

Table 1. Progress under Swachh Bharat Mission

Sl. No	Year/ District	No. of individual household Toilet Constructed	No of Community Toilet Constructed	No of Town Declared Open Defecation Free (ODF)
1	2	3	4	5
1	2015 - 2016	268	0	0
2	2016 - 2017	0	0	0
3	2017 - 2018	2,176	0	23
4	2018 - 2019	0	0	23
5	2019 - 2020	11,118	291	23
6	2020 - 2021	0	0	23
District - Wise 2020 - 2021				
1	Mamit	0	0	3
2	Kolasib	0	0	4
3	Aizawl	0	0	3
4	Champhai	0	0	1
5	Serchhip	0	0	3
6	Lunglei	0	0	2
7	Lawngtlai	0	0	1
8	Siaha	0	0	1
9	Saitual	0	0	1
10	Khawzawl	0	0	3
11	Hnahthial	0	0	1
	Total	0	0	23

Source: Directorate of Urban Development and Poverty Alleviation

sential in situations where household toilets are neither practicable nor adequate. The absence of any community toilet construction during the mentioned years suggests a potential gap in providing adequate sanitation facilities to communities.

In addition to toilet installation, the Swachh Bharat Mission declared towns open defecation-free (ODF). By the year 2020-21, 23 towns are declared ODF(UD&PA, 2021). It is important to note that the amount of ODF towns fluctuated throughout districts, indicating that progress in reaching ODF designation differed spatially. The declaration of ODF settlements are an essential step towards eradicating open defecation and encouraging appropriate sanitation. The Swachh Bharat Mission helped improve sanitation in India by building family toilets and declaring ODF towns which aimed at increasing sanitation availability, cleanliness, and open defecation reduction are essential for public health and well-being. The data further indicates the need to close the community toilet building gap and make sanitation services available to everyone.

Domestic Waste Disposal of Cities/Towns

The available data provides valuable insights into waste management practices in cities and towns in India. It includes information on the quantum of waste generated and disposed of, as well as the number of households covered for garbage collection.

In 2020-21, a total of 117,139 households received garbage collection. This indicates the magnitude of efforts to offer effective garbage management and collection services to many households. Additionally, the data breaks down 2020-21 garbage disposal by city/town. This breakdown helps explain regional garbage generating and disposal patterns across different areas. It may show patterns and trends specific to cities or towns, identifying areas for improvement or effective waste management solutions.

However, without data for the preceding years, it is impossible to examine waste management trends and patterns throughout time. Multiple years' worth

of information are needed to understand and monitor waste management methods' improvements and changes. Continuously monitoring and collecting data on waste management techniques is essential for evaluating progress, finding areas for development, and adopting successful solutions. Regular data collection and analysis assist evaluate waste management policies and initiatives, make educated choices, and execute targeted solutions.

Decadal Growth of Urban Population

The data allow us to analyse the urban population increase in the districts over time.

The 1951 population was 196,202, including 6,950 urban residents. Urbanisation was 3.54% of total population. No decadal growth rate is given this year.

The overall population was 266,063 in 1961, including 14,257 urban residents. Urbanisation rose to 5.36% to total population. Decadal increase from 1951 to 1961 is 35.61%.

Table 2. Domestic Waste Disposal of City/Towns

Sl. No	Year/ City, Town	No of Household with City/Town	No of Household covered for collection of Garbage	Quantum of Waste Generated (Ton per Day)	Quantum of Waste Disposed (Ton Per Day)
1	2	3	4	5	6
1	2015 - 2016	NA	NA	NA	235.19
2	2016 - 2017	111,174	88,044	208.03	168.79
3	2017 - 2018	*	*	*	*
4	2018 - 2019	*	*	*	*
5	2019 - 2020	*	*	*	*
6	2020 - 2021	117,139	117,139	219.36	219.36
City/ Town Wise 2020 - 2021					
1	Mamit Town	1,968	1,968	3.49	3.49
2	Kolasib Town	4,570	4,570	7.28	7.28
3	Aizawl City	67,594	67,594	152.58	152.58
4	Champhai Town	7,302	7,302	9.82	9.82
5	Serchhip Town	5,150	5,150	6.35	6.35
6	Lunglei Town	12,086	12,086	17.10	17.10
7	Lawngtlai Town	5,504	5,504	6.25	6.25
8	Siaha Town	7,000	7,000	7.53	7.53
9	Saitual	2,324	2,324	3.49	3.49
10	Khawzawl	2,204	2,204	3.31	3.31
11	Hnahthial	1,437	1,437	2.16	2.16
	Total	117,139	117,139	219.36	219.36

Source: Directorate of Urban Development & Poverty Alleviation

NA = Data not available

*Survey was not done during the year

Overall population rose to 332,390 in 1971, while urban population rose to 37,759. Urban population rose to 11.36% of total population. Decadal increase from 1961 to 1971 is 24.93%.

The overall population rose to 493,757 in 1981, while the urban population rose to 121,814. The urban population share rose to 24.67%. From 1971 to 1981, growth was 48.55%.

Total population rose to 689,756 in 1991, while urban population rose to 317,946. Urbanisation rose to 46.1%. Decadal increase from 1981 to 1991 is 39.7%.

In 2001, the total population reached 888,573 and the urban population 441,006. Urbanisation rose to 49.63%. Decadal increase from 1991 to 2001 is 28.82%.

The overall population reached 1,097,206 in 2011, while urban population rose to 571,771. The urban population increased to 52.11%. The decadal growth rate from 2001 to 2011 is 23.48%.

District-wise (2011) data

The urban population in Mamit, Kolasib, Champhai, Serchhip, Lunglei, Lawngtlai, and Siahia is divided into different categories. Mamit has a total population of 86,364, with 14,899 classified as urban, representing 2.61% of the total population. Kolasib has a total population of 83,955, with 46,878 classified as

urban, representing 8.2% of the total population. Aizawl has the highest total population of 400,309, with 314,754 classified as urban, representing 55.05% of the total population. Lunglei has a total population of 161,428, with 68,752 classified as urban, representing 12.02% of the total population. Lawngtlai has a total population of 117,894, with 20,830 classified as urban, representing 3.64% of the total population. The total urban population for all the districts in 2011 was 571,771, representing 52.11% of the total population.

Overall, the findings suggest progress in terms of toilet construction and efforts to achieve open defecation free status. The data on waste disposal provides a snapshot of the current situation, while the decadal growth rate highlights the increasing urban population in the studied areas. However, the lack of detailed analysis and data for intervening years limits a comprehensive assessment of the effectiveness and impact of the Swachh Bharat Mission. The analysis of the provided data reveals several key findings regarding the progress and challenges of the Swachh Bharat Mission in Mizoram.

Progress Under Swachh Bharat Mission

The Swachh Bharat Mission prioritises the construction of domestic toilet development. Based on the data, toilets were constructed in a substantial

Table 3. Decadal Growth of Urban Population

Sl No.	Year/City, Town	Total Population	Urban Population	Percentage of Urban Population to Total Population	Decadal Growth Rate (%)
1	2	3	4	5	6
1	1951	196,202	6,950	3.54	-
2	1961	266,063	14,257	5.36	35.61
3	1971	332,390	37,759	11.36	24.93
4	1981	493,757	121,814	24.67	48.55
5	1991	689,756	317,946	46.1	39.7
6	2001	888,573	441,006	49.63	28.82
7	2011	1,097,206	571,771	52.11	23.48
District Wise (2011)					
1	Mamit	86,364	14,899	2.61	
2	Kolasib	83,955	46,878	8.2	
3	Aizawl	400,309	314,754	55.05	
4	Champhai	125,745	48,529	8.49	
5	Serchhip	64,937	32,019	5.6	
6	Lunglei	161,428	68,752	12.02	
7	Lawngtlai	117,894	20,830	3.64	
8	Siahia	56,574	25,110	4.39	
9	Total	1,097,206	571,771	52.11	23.48

Source: Department of Urban Development & Poverty Alleviation

amount, peaking in 2019-20. This indicates progress towards universal sanitation coverage and access to home sanitation facilities. However, the data also highlights a significant gap in the construction of community toilets. Community toilets are essential in regions where family toilets are neither practicable nor adequate. Community sanitation may be lacking due to the absence of community toilet installation throughout the indicated years. The declaration of ODF towns are another achievement by the Swachh Bharat Mission. By the year 2020-21, 23 towns in Mizoram are declared ODF (UD& PA, 2021). This shows the effectiveness of cleanliness awareness initiatives and efforts to promote attitude modification.

Challenges Faced

The report highlights numerous obstacles in achieving universal sanitation and waste management practices. Poor financing for toilets and waste management systems is a major challenge. Constructing both individual household and community toilets and implementing sustainable waste management requires sufficient resources. Inadequate water and sewage systems are another challenge. These limitations might influence sanitation facility performance and sustainability, making Swachh Bharat Mission objectives difficult to implement.

Additionally, Behaviour modification and societal norms can hinder mission success. Reducing open defecation involves focused measures, community participation, and ongoing awareness campaigns. The challenge lies in motivating individuals to adopt proper sanitation practices and discard traditional mindsets regarding open defecation.

Impacts on Domestic Waste Disposal

The data reveals city and local home garbage disposal methods. It depicts garbage generated and disposed of in various places. The data gives a snapshot of waste management techniques, but without data from previous years, it is impossible to identify trends and patterns. However, garbage collection has been expanded to cover many houses, demonstrating the success of waste management practice. The SBM also raised garbage management practices and cleaning awareness. It has promoted recycling, waste segregation at the source, and landfill reduction. However, poor infrastructure and population knowledge continue to hinder the effectiveness of waste management practice.

Decadal Growth of Urban Population: The analysis of the decadal growth of the urban population shows that India is urbanising. The urban population rose steadily, peaking in 1961. By 2011, a large share of the population was urban, showing considerable urbanisation in the investigated locations. The district-wise breakdown of the urban population in 2011 shows variations in urbanization levels across different districts. Therefore, to fulfil urban needs, sanitation and waste management infrastructure must be improved. The Swachh Bharat Mission helps meet these needs by providing sanitation facilities and boosting proper urban waste management practices. However, rising urbanisation and changing population dynamics need continual monitoring and adaptation.

Limitations of the Study

The limitations of the research are also acknowledged and discussed. These limitations include potential gaps in the available data, the specificity of the data from the Directorate of Urban Development & Poverty Alleviation, and any biases or limitations associated with the selected data collection and analysis methodologies.

Policy Implications

- **Strengthening of sanitation and waste management infrastructure:** The study suggests investing in their growth and improvement. This includes constructing more communal toilets, boosting residential toilets, and improving waste collection and disposal.
- **Addressing challenges through targeted interventions:** The challenges identified in achieving the objectives of the Swachh Bharat Mission require specific interventions. Targeted sanitation initiatives, financial incentives or subsidies for toilet building in low-income regions, and tackling cultural and societal obstacles to open defecation are policy implications.
- **Integration of waste management in urban planning:** The research suggests the need for urban planning policies to incorporate waste management considerations. This can include provisions for waste segregation, recycling facilities, and appropriate waste management infrastructure in new urban development projects.

Recommendations

- **Continuous monitoring and evaluation:** Conduct

regular monitoring and assessment to measure success under the Swachh Bharat Mission. This will highlight areas for improvement and influence policy changes.

- Collaboration with stakeholders: Effective sanitation and waste management projects involve partnership with local communities, government agencies, NGOs, and business sector companies. For comprehensive and durable solutions, policies should promote and support such cooperation.
- Investment in research and innovation: Policies should promote sanitation and waste management technology advancements and research. Investing in research can provide affordable and sustainable sanitation and waste management solutions.
- Incentivizing behaviour change: Incentives for behaviour change: Policies should encourage individuals or communities for adopting and adhering to proper sanitation and waste management practices. This may encourage habit change and support the Swachh Bharat Mission.

The assessment emphasises continual monitoring and evaluation to track progress, identify issues, and implement necessary changes. It also emphasises community engagement and attitude modification as essential factors to the success of SBM. The report concludes with significant insights into the Swachh Bharat Mission's success, obstacles, and effects on sanitation and waste management in India. It emphasises the need to address finance, infrastructure, behaviour change, and waste management challenges.

Conclusion

The Swachh Bharat Mission has been a major focus on constructing individual household toilets, with the highest number constructed in 2019-20. This progress attempts to enhance household sanitation facilities. By the year 2020-21, 23 towns in Mizoram are declared ODF(UD&PA, 2021). Consequently, since 2014, the Government of India has made significant progress in achieving the Open Defecation Free objectives. As of January 2020, a total of 36 states and union territories, 706 districts, and over 603,175 villages have achieved the status of being certified open defecation-free (A Clean (Sampoorna Swachh) India, 2024). However, the development of communal toilets, which are essential for sanitation

in locations where family toilets are not possible, is lacking. The Swachh Bharat Mission seeks universal sanitation and waste management. However, finance for toilet building and waste management systems, infrastructure shortages, and habit modification remain challenges. Insufficient toilet building and waste management resources threaten sanitary infrastructure. Additionally, open defecation must be addressed by focused measures, community participation, and awareness campaigns. Motivating people to practice appropriate cleanliness and abandon outdated/traditional views is challenging. The analysis provides insights for the evaluation of the Swachh Bharat Mission. While progress has been made in terms of toilet construction and the declaration of open defecation-free towns, challenges such as inadequate funding and infrastructural gaps hinder the full realization of the mission's objectives. The Swachh Bharat Mission has promoted waste segregation, recycling, and landfill reduction in India. However, these approaches are nevertheless hindered by infrastructure and population knowledge. Improved sanitation and waste management facilities are required due to the urban population growth. By providing sanitation and improving urban waste management, the mission helps meet these needs. Rapid urbanization and shifting population dynamics require constant monitoring and response. The SBM requires waste management policies to address waste management. Improved sanitation and waste management infrastructure, including family and communal toilets, is essential. Awareness programmes and financial incentives are required to overcome problems and encourage ODF behaviour. Urban planning policies should also incorporate waste management considerations.

Conflict of Interest - None

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