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Evaluating Solid Waste Management in Nagaland: Is it Getting Better or Worse?

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Abstract:
The rapid rise of urban population in the state of Nagaland coupled with improving standards of living has inevitably led to an increased consumption of resource. This in turn has led to the corresponding amount of waste generation. This paper has analysed the 69th and 76th Rounds of National Sample Survey (NSS) to understand if there is any significant improvement in solid waste management in Nagaland during the period of two NSS rounds that was held in 2012 and 2018. It also analysed the present status of solid waste management in Nagaland under Swachh Bharat Mission as per the most recent data available in the website of Ministry of Housing and Urban Affairs, Government of India. Results of the analysis shows that the improvement in the arrangement of garbage collection over six years, from 2012 to 2018, was less than 2%, which is abysmally low. The data also shows that there is deficiency in almost all aspect of solid waste management in Nagaland. The study highlights serious flaws in the current waste management practices even though the government has now implemented the second phase of Swachh Bharat Mission.

Keywords: Solid Waste Management, Nagaland, Swachh Bharat Mission, National Sample Survey

Introduction

Human activities produce various types of waste, and the ways in which we handle, store, collect, and dispose the waste can have detrimental consequences for both environmental sustainability and public health. The waste materials can be categorized into three main types: solid waste, liquid waste, and gaseous waste. According to Solid Waste Management Rules (2016), 3(46), "solid waste means and includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non-residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture and dairy waste, treated biomedical waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radio- active waste generated in the area under the local authorities". Thus, Solid Waste Management may be defined as "the discipline associated with the control of generation, storage, collection, transfer and transport, processing, and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics, and other environmental considerations, and that is also responsive to public attitudes" (Tchobanaglous et al., p.7. 1993).

The amount of waste generation owing to rapid urbanization has emerged as a daunting challenge for urban local bodies in Nagaland. There is inadequate waste collection, transport, treatment and disposal. The waste management system in Nagaland is overwhelmed by the ever-increasing volume of waste generated causing major threat both to the environment and public health.

Methodology of the Study

This study has analysed the two rounds of National Sample Survey (NSS). The National Sample Survey Office (NSSO) conducted a nation-wide survey on "Drinking Water, Sanitation, Hygiene and Housing Condition" in its 69th round during July to December 2012. The same subject was carried out by National Statistical Office (NSO) in its NSS 76th Round during July to December 2018. A total of 864 households (528 rural and 336 urban) were surveyed in the 69th round during the year 2012 in Nagaland. In the 76th round, a total of 1620 households (552 rural and 1068 urban) were surveyed in 2018 in Nagaland (Directorate of Economics & Statistics, Government of Nagaland, 2019; 2023). The present study also analysed the current status of solid waste management in Nagaland under Swachh Bharat Mission as per the most recent data available in the website of Ministry of Housing and Urban Affairs, Government of India.

Urbanization and Solid Waste Generation

The global population is heading towards an urban future. By 2020, the global population reached 7.8 billion, with the majority living in urban areas. It is further projected that urbanization will continue to increase, growing from 56% in 2021 to 68% by 2050 (United Nations Human Settlements Programme, 2022). India is one of the major contributors to this urban explosion owing to its large demographic size and robust economic growth over the past decade. In 2011, the urban population reached 377.1 million, making up 31.16% of the total population (Sadashivam & Tabassu, 2016). Further, it is estimated that by 2036, India's urban population will reach 600 million people, constituting 40% of the country's total population (Kouamé, 2024).

The state of Nagaland has also been experiencing rapid urbanization since its inception as a state. The number of towns has increased exponentially from a single town in 1951 with less than 2% urban population to 19 statutory towns and 6 census towns with 28.86% urban population by 2011 (Census, 2011). The Table below shows the growth of urban population in Nagaland from 1901-2011.

Table 1: Growth of Urban Population in Nagaland

Census Year	Urban Population in Nagaland (in Percentage)
1901	3.04
1911	1.62
1921	1.75
1931	1.54
1941	1.84
1951	1.93
1961	5.18
1971	9.95
1981	15.51
1991	17.21
2001	17.22
2011	28.86

Source: Census of India

The urban population of Nagaland as on 2011 is 28.86%. The cities with most urban population are Dimap

ur, Kohima and Mokokchung. Urban population comprised 51.95% in Dimapur, 45.6% in Kohima, and 28.81% in Mokokchung. Further, the urban population is expected to have increased considerably since the last census of 2011. In order to accommodate this ever-increasing urbanization, there is a need to explore sustainable ways of improving the quality of life. However, one of the major consequences of urbanization is a rise in solid waste generation.

In India, according to the latest available Annual Report of Central Pollution Control Board, the total quantity of solid waste generated in the country in the year 2021–2022 is 1,70,339 Tonnes Per Day (TPD) and the average per capita waste generation in the country is 123.45 gms/ day (CPCB 2022). Here, Nagaland is estimated to generate about 362.95 TPD of solid waste (NPCB, 2022). Nagaland has 39 ULBs responsible for implementation of the Solid Waste Management Rules, 2016. However, the unplanned process of urbanisation coupled with ever increasing generation of solid waste has become one of the major problem for both the authorities as well as urban dwellers.

Results and Discussion

The National Sample Survey Office (NSSO) conducted a nation-wide survey on "Drinking water, Sanitation, Hygiene and Housing Condition" in its 69th and 76th Rounds in 2012 and 2018 respectively. In order to understand sanitation status, Garbage collection system was assessed as it is one of the important factors in micro-environment. Here, garbage collection arrangement means the arrangement which usually exists to carry the refuse and waste of households to a final dumping place away from the residential areas (Directorate of Economics & Statistics, Government of Nagaland, 2019).

Table 2: National Sample Survey 69th Round (2012) on Garbage collection in Nagaland

Sl. No.	Type of agency removing garbage to the final dumping spot	Rural	Urban	Combined
1.	Panchayat/municipality/corporation	16	412	114
2.	By resident/group of residents	219	273	232
3.	Others	195	66	163
4.	No arrangement	570	249	490
5.	All	1000	1000	1000

Source: Directorate of Economics & Statistics, GoN (2019), NSS 69th Round 2012.

The above data (Table 2) from the 69th Round of the National Sample Survey (NSS) conducted in 2012 shows the status of the arrangements for garbage removal in rural and urban areas of Nagaland per 1000 distribution of households by type of agency collecting garbage of the households. During 2012, 43% of rural household had some arrangement for garbage collection as against to 75.1% of urban households. In rural areas, only about 1.6% of households relied on Panchayat/Municipality/Corporation for garbage removal, while in contrast, urban areas saw a more prominent role for anchayat/Municipality/Corporation, serving 41.2% of households. In rural areas, about 21.9% of households took it upon themselves to dispose of garbage, with residents or groups of residents transporting it to the final dumping site, whereas in urban areas, this figure was slightly higher, with 27.3% of households relying on residents' efforts for garbage removal. A very large proportion of 57% of rural households and 24.9 % of urban households reported that there was no garbage collection arrangement. It presented a gloomy picture with 49% of households having no arrangement for garbage removal in Nagaland.

Table 3: National Sample Survey 76th Round (2018) on Garbage Collection in Nagaland

Sl. No.	Types of agency for collection of garbage of the household.	Rural	Urban	Combined
1.	Panchayat/municipality/corporation	10.9	67.1	28.8
2.	Resident/group of residents	11.8	12.4	12.0
3.	Others	5.4	2.9	4.6
4.	Not known to the household	8.1	5.3	7.2
5.	No agency for collection of household garbage	63.9	12.4	47.5
6.	All	100.0	100.0	100.0

Source: Directorate of Economics & Statistics, GoN (2023) NSS 69th Round 2018

The above table presents NSS 76th round data of percentage distribution of households living in a house by type of agency made arrangement for collection of garbage of the household. The data reveals a stark contrast in household garbage collection arrangements between rural and urban areas. In urban areas, approximately 67% of households had some arrangements in place for their waste to be collected by their panchayat, municipality, or corporation whereas in rural areas, that percentage was only 10.9%. In rural areas, a staggering 63.9% of households lack any formal waste management services, while in urban areas, it stands at 12.4%. The total percentage of household in Nagaland with no agency for garbage collection stood at about 47.5% in 2018.

Table 4: Percentage of Household with no Arrangement for Garbage Collection

Year	Rural	Urban	Total
NSSO 69th Round (2012)	57	24.9	49%
NSSO 76th Round (2018)	63.9	12.4	47.5%

Source: Directorate of Economics & Statistics, GoN, NSS 69th and 76th Rounds.

The table above illustrates a comparison between NSS 69th Round (2012) and NSS 76th Round (2018). It is evident that there is a major deficiency in waste management services, especially in rural areas where there is a is lack of formal or informal service for garbage collection. The improvement over six years, from 2012 to 2018, was less than 2%, which is abysmally low. Notably, during this time the government intensified the nationwide focus towards building a "clean India" in 2014 with the launch of flagship programme called "Swachh Bharat Abhiyan". However, empirical evidence shows that the Swachh Bharat Mission did not bring about a significant change in waste collection and disposal in Nagaland during the initial four years of the mission.

In the NSS 76th round, information on whether the household received any benefit from government scheme for sanitation was also collected in which 16.9% of household reported to have received sanitation facility. Here, none of the household received benefit from the schemes like Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and Smart City Mission. On the other contrary, under Swachh Bharat Mission 26.5% of household were reported to have received benefit in the last three years prior to 2018. However, satiation schemes in India has traditionally been focused on drinking water and open

defecation whereas the area of solid waste management has been neglected. This is also reflected in the survey as 74.5% of household had access to septic tank latrine in the NSS 69th Round (2012) whereas in its 76th Round (2018) the figure rose to 90.4%. Whereas in the case of solid waste management, the data suggest no significant improvement. In fact, we have seen from the above table (Table 4) that the service was deteriorating. Thus, it is clear that the benefit of Swachh Bharat Mission was only open defecation between the two NSS rounds. Solid waste management was not given importance although one of the objectives of Swachh Bharat Mission (Phase 1) was Solid Waste Management. It may be noted that sanitation encompasses not only liquid waste management but solid waste management too. We cannot expect improved sanitation of the state by only focusing on open defecation. While Nagaland achieved Open Defecation Free (ODF) status in 2018 becoming the 22nd state in the country to be ODF, there is a need to focus on solid waste management. In general, the first phase of Swachh Bharat Mission 2014-2019 failed to bring much result in terms of solid waste management in Nagaland.

The second phase that has started from 1st October 2021 as Swachh Bharat Mission (Urban) 2.0, is committed to make all cities 'Garbage Free'. The vision of SBM 2.0 is scientific Municipal Solid Waste Management in cities to ensure segregation of waste at source, process waste in segregated fractions, recover resources and recycle to the maximum extent and minimize landfilling to 20% or less (MHUA, 2021). It has now been four years into the second phase, yet Nagaland is still underperforming in many aspects as shown in the recent updates in government website (Table: 5).

Table 5: Status of Solid Waste Management in Nagaland

State	Total ULB	Total number of wards	Wards with 100% Door to Door Collection	Processing %
Nagaland	39	420	217	1%

Source: https://sbmurban.org/swachh-bharat-mission-progess Accessed on 10 June 2025

According to the latest data available in the website of Ministry of Housing and Urban Affairs, Government of India as on 10th June 2025, there are total no of 96,193 wards in India out of which 94,100 (98%) wards has 100% Door to Door Collection, 87,059 (90%) Wards with 100% Source Segregation and 1,29,283.52 (TPD) is Processed out of 1,59,222.02 (TPD) Generated. Here, we can see that Nagaland is significantly lagging behind in waste management system because only 217 of Nagaland's 420 wards have 100% door-to-door collection (Table 5). This corresponds to one of the lowest processing rates in the region, at just about 1%. By contrast, other states particularly in Nort East such as Tripura and Manipur have significantly higher processing rates of 99% and 59%, respectively.

Table 6: State Wise Status-Dumpsite

North East States	Total no. of Dumpsite	Legacy Waste Qty (In Lakh Tonne)	Remediated Waste Qty (In Lakh Tonne)	Waste to be Remediated (In Lakh Tonne)	Area (In Acre)	Area Reclaimed (In Acre)	Area to be Reclaimed (In Acre)
Arunachal Pradesh	9	0.36	0.22	0.14	49.33	40.00	9.33

Assam	25	25.33	12.68	12.64	119.70	23.93	95.74
Manipur	5	1.60	1.02	0.58	10.96	5.00	5.96
Meghalaya	6	4.00	1.50	2.50	7.81	1.60	6.21
Mizoram	2	7.84	7.84	0.00	3.00	3.00	0.00
Nagaland	12	8.10	0.00	8.10	51.52	0.00	51.52
Sikkim	2	2.54	1.88	0.66	20.52	0.00	20.52
Tripura	14	3.75	3.75	0.00	21.63	21.63	0.00

Source: https://sbmurban.org/swachh-bharat-mission-progess Accessed on 10 June 2025

The above table shows state wise status on dumpsite (Table 6). When it comes to the status of dumpsites and legacy waste management in various states of Northeast India, Nagaland has total of 12 dumpsites with 8.10 lakh tonnes of Legacy Waste. The Remediated Waste Quantity is 0% while Waste to be Remediated is 8.10 lakh tonnes or 100%. Thus, in Nagaland, no legacy waste has yet undergone remediation. The entire 8.10 lakh tonnes of waste remain to be treated. On the other hand, states like Mizoram and Tripura have fully remediated their legacy waste. Assam have made great progress in waste remediation, with 12.68 lakh tonnes remediated. Further, Nagaland has a massive dumpsite area of 51.52 acres that has yet to be reclaimed. According to the data, this is the second-highest among the Northeastern states, right behind Assam.

The unplanned process of urbanisation and the massive generation of waste has become a big burden to the municipalities. It may also be pointed out that the repercussion of mismanagement of waste is not only visible in urban areas but in the rural areas too. Before the rise of the consumerist culture, most waste generated in the villages were biodegradable but with improved transport and communication, most of the fast moving consumer goods (FMCGs) are easily available for consumption even in the remote villages. Thus, the kind of waste that rural areas generate are also becoming similar to urban waste which contains large non-biodegradable waste. Our roads and rivers are filled with massive amount of garbage. The Doyang River which is the largest river in Nagaland and is lifeline to many populations has become a dumping ground for solid waste. Each year with the onset of monsoon season from June to July, solid waste especially plastic waste is carried downstream from many places causing havoc to the environment and also impacting local economy as many people are dependent on the river for their livelihood. Improper management of waste at the point of generation becomes hazardous for other locations. In fact, Nagaland is still practicing transfer of waste and not management of waste because the waste is being carried to dumpsite without treatment. Such transfer of waste only creates more problems both for the Municipalities and the locality where waste is being transferred or dumped. Waste transfer system practiced by the Mokokchung Municipal Council (MMC) can be taken as an example here. Previously Mokokchung Municipal Council dumping site was located at Tsumendang, Ungma village, Mokokchung but with complaint from the residents, the dumping site was shifted to the present site in the outskirt of Mokokchung village. However, it has also drawn complaint as the dumping site is surrounded by rivers, streams and forest causing severe environmental effect. While the landowners have asked for the relocation of the dumping site, the MMC is still yet to find a permanent dumping site. However, this is not an isolated issue in Nagaland. The same issue has also been raised by the residents of Sunrise colony, Dimapur. The residents of the colony filed a petition in 2022 to National Green Tribunal (NGT). As a result, the NGT laid down comprehensive plan for overhauling Dimapur solid waste management

practices. However, the DMC has not been able to follow the directives till now. On the other hand, in Kohima, the sole scientific solid waste management plant in Nagaland still remains non-functional.

Conclusion and Suggestions

All the available data points towards serious flaws in the Nagaland waste management coupled with rapid urbanization. These could be risks to the environment and public health since the state does not have the infrastructure or system in place to manage and process the garbage that is produced. With inadequate source segregation, low waste processing rates, and low door-to-door collection rate, Nagaland's waste management performance is falling behind. To increase environmental sustainability and public health, the state must improve its waste management procedures and infrastructure.

There is also lack of accurate data on solid waste status which is usually not systematic or flawed. There are differences in the information provided by various agencies regarding the generation, processing, and disposal of solid waste. An ineffective waste management system results from the lack of systematic and regular data collection regarding the quantity and composition of waste or the overall status of waste management. Precise information of waste is necessary to create infrastructure investments and support the municipality to plan effectively. Therefore**,** a proper system should be set up to record and monitor all information or data on Municipal Solid Waste Management.

Although waste composition varies substantially depending on the region, income levels and consumption, organic matter is the largest component of waste composition in India with about 40-60% (Ministry of Housing and Urban Affairs, Government of India, 2021). Thus, segregation of municipal waste will enable different materials to be recycled and the biodegradable component to be treated appropriately. Composting enhances the qualities of soil, minimizes environmental pollution, and lessens reliance on chemical fertilizers. Thus, this method should be encouraged.

There is generally a lack of responsibility among communities towards waste management. Most people believe it is the responsibility of municipalities to collect, sort, and transfer waste for disposal in landfills. There is a need to cultivate community awareness and change the attitude of people towards waste as this is fundamental for formulating proper plans for Solid Waste Management. On the part of citizen, they should be willing to pay for better services and cooperate with the municipalities. The behaviour and practices of the community have a significant impact on the delivery of efficient Municipal Solid Waste Management services. Citizens should also be aware of rules and regulation of solid waste management and the services that their ULBs should provide them.

There is also a need to have a resilient and robust organizations for controlling waste management if management of solid waste is to improve in Nagaland. The involvement of informal sectors, private stakeholders, NGOs, Self-Help Groups and involvement of all the concerned departments can make Solid Waste Management a success. A clear regulation and enforcement is a must to improve the management system and to drive for innovation. Until these fundamental requirements are met, Nagaland will continue to suffer from poor waste management and the associated impacts on public health and the environment.

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