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## **Solid Waste Disposal: A Comparative Analysis of Waste Disposal Practices and Waste Awareness at the Town and Village Level**

Neizhanuo Golmei\*, Moameren Pongen\*\*

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#### **About the authors**

\*Assistant Professor,  
Deptt. of Political Science,  
Nagaland University.  
Email: neizhanuo@  
nagalanduniversity.ac.in

\*\*Research Scholar,  
Department of Political  
Science, Nagaland  
University.

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### **Abstract**

*There is a low level of awareness in regard to disposal of solid waste in the context of Nagaland. The practice that is followed is not 'waste management' but 'shifting of waste' from the habitable areas to the distant parts of the town or village. Such practices are therefore, not only short term solutions but hazardous to the environment. Hence, there is an urgent need to sensitize people and spread awareness on limiting waste at the individual level. Taking case studies from Mokokchung District – The Local Ward Authorities, Mokokchung Town Area and Two projects- Greensight Project and Plastic Free Project,*

*Mopungchuket, the paper is an attempt to examine the various mechanisms through which these bodies have been able to spread social awareness on managing waste at the ward and village level. It provides an interesting study of the various strategies and methods that are being implemented not only to control- 'waste generation' - but also to create 'waste conscious' - individuals. Such initiatives have not only contributed towards sensible waste disposal practices but have also generated social transformation through collective action. The paper is thus, an attempt at bringing to the forefront the good practices of waste disposal through local initiative.*

## **Introduction**

**S**olid waste management has become a massive challenge for urban local bodies throughout the country especially with increasing urbanization, changing lifestyles and consumption patterns. In India, the level of urbanisation as a whole has increased from 25.7 percent in 1991 to 27.82 percent in 2001 and to 31.14 percent in 2011(GOI, Handbook on Urban Statistics, 2019). Of the country's total population of 1,210.19 million, 377.11 million or 31.16 percent is said to be living in urban areas (Census, 2011). This urban population generates 62 million tonnes of municipal solid waste per annum, out of which only 43 million tonnes (MT) of the waste is collected, 11.9 MT is treated and 31 MT is dumped in landfill sites (Lahiry, 2019). Of the total waste generated, more than half ends up in the landfill sites. Even though the amount of waste generated has increased over the years, the practice of waste management has remained relatively unchanged. Municipal authorities collect waste and transport it to dumping sites, where waste is openly burned. Such a system is thus inefficient and has a negative impact on public health, the environment and the economy (Kumar et al., 2017).

Though waste management has been considered a challenge mainly for the urban areas, rural areas are also becoming increasingly burdened with waste due to improved connectivity, communication and lifestyle changes. In both the urban and rural areas, waste generated is heterogeneous in nature – comprising of food waste, plastics, metals, electrical items, rubber, textiles, e-waste etc. The heterogeneity of the waste makes sorting and utilization of waste a huge task and therefore most of the waste finds its way in open drains, streams or vacant plots. Disposal of garbage solid waste and of untreated effluent into nearby drains by people is also due to the lack of public awareness on the consequences of waste on health and the environment. Another reason is the lack of financial incentives to stop them from such

practices (Abdel-Shafy and Mansour, 2018). Any design for management of waste depends on how waste is segregated and on the level of public awareness and active participation from the public.

In view of the various arguments stated above, there is an urgent need for a systematic approach to deal with waste both in the urban and rural areas. In Nagaland, while the urban bodies have landfill sites to dump waste, there are no dumping sites or proper system for collection of waste at present in the rural areas. People in the rural areas have their own ways to deal with waste. Nagaland had enacted the Nagaland Integrated Waste Management Policy in 2019 covering all the urban and rural areas of the state with the intention to enable the community to reduce, reuse and recycle waste. Of the 19 urban local bodies in the state, only the capital city Kohima has the scientific solid waste treatment plan. Waste management in the state is therefore still lacking due to the lack of proper regulatory mechanism. Hence, the present study is aimed at analyzing the various mechanisms and methods of waste disposal in the town and village area in Mokokchung, one of the urban district of Nagaland.

## **Study Area and Methodology**

Mokokchung is a town and a municipality in the district of Mokokchung, Nagaland. It is bounded by the state of Assam to its north, Wokha, Tuensang, Zunheboto to its west, east and south respectively. It lies between 93.530 E and 94.530 E longitude and 25.560 N latitude. The area of the district is 1615 sq. km with a total population of 1, 94,622, of which 101,092 are males and 93,530 females with 138,897 constituting the rural population (GOI, NABARD, 2016-17). The Mokokchung Metropolitan Area consists of the continuous settlement from Alichen in the south, through Mokokchung Town upto Amenyong and Khensa in the northwest; and from Mokokchung Town through Fazl Ali College

up to DEF colony in the north east (GOI, Ministry of MSME). However, the process of sub urbanization in the recent years has led to the mushrooming of satellite towns like Yimyu and Marepkong leading to the extension of urban settlement outside the historical boundary of Mokokchung Town. These urban extensions are now wards under the Mokokchung Municipal Council.

Mokokchung Municipal Council (MMC) is one of the three Municipal Councils in the state of Nagaland. Mokokchung town is divided into 18 wards which are: Kumlong, Aongza, Penli, Majakong, Salangtem, Sangtemla, Yimyu, Alempang, Sungkomen, Kichutip, Tongdentsuyong, Artang, Arkong, Dilong, Alongmen, Marepkong, Lijabalijen, and Mongsenbai. Of the 18 wards, Kumlong, Sangtemla, Alempang and Yimyu are regarded as the largest among the wards (GOI, Ministry of MSME). As per 2019 Municipal records, Mokokchung Town generates about 40 metric tons of waste in a day of which 31 metric tons of wastes are collected everyday by the Municipality. The major source of solid waste which is about 50% are from the households, followed by 20% from commercial establishments, 20% from municipal services (street cleaning, landscaping) and 10% from various institutions (office, banks, college, schools etc.). For the purpose of collecting waste, the Municipalities have provided around 50 dustbins/collection points at various locations within the town area.

Mopungchuket village on the other hand is located 18 kms away from Mokokchung town and is one of the oldest and biggest Ao village. It is a popular destination for rural tourism and has been formally declared as a 'rural tourism village' by the government of Nagaland in the year 2007. It has also been labeled as the 'best kept' and 'cleanest' village in Nagaland. The village has a total population of about 2965 persons consisting of 350-400 households. The village is divided into three khels: Pongen Khel, Anungsa Khel and Mongsen Khel.

For the purpose of evaluating the system of waste management in both the urban and rural area, both primary and secondary data were used. In Mokokchung town area, interviews were conducted using an open ended questionnaire with MMC officials, staff, Local Ward Authorities (LWAs), and residents of some wards. In Mopungchuket village, in-depth interviews were conducted with members of the Greensight Project and Plastic Free Project. In addition, secondary data from government documents, journals, magazines and newspapers were also referred.

### **Methods for Collection and Disposal of Waste**

Collection, removal and disposal of solid waste is one of the most important function of the Municipalities (Government of Nagaland, 2001). As per the Act, the municipalities are to ensure surface cleaning of all the streets in the Municipal areas, remove deposits of rubbish, trade refuse, carcasses of dead animals, excrementitious and polluted matter, special wastes, hazardous wastes and other solid waste from hospitals and waste generated by bulk producers. The MMC therefore, carries the responsibility for the daily collection, removal and disposal of filth and polluted materials from the Municipal areas.

While the MMC has the overall responsibility for the collection and disposal of waste, they are assisted by the LWAs. The LWAs works in close coordination with the MMC- however, they are independent in terms of their structure and functioning. They do not receive any kind of monetary benefits from the MMC or from any other source. The nature of the service is voluntary and is aimed at looking after the welfare and well-being of their respective wards. They are selected through nomination by the residents of the wards for a period of five years. The total membership however, varies from ward to ward depending on the size and the number of households in a ward. The LWAs usually consists of one chairman, one secretary, one



treasurer and other executive members. These LWAs enjoys power and has independent functioning only within their own respective wards. They look after the day to day activities of the ward, maintain sanitation and cleanliness, organize social works, impose fines on violation of ward rules, issue certificates like residential proof or verification etc.

Of the 18 wards in the Mokokochung Town Area, there are two different systems of waste collection and disposal. 12 wards are directly under the management of the MMC while 6 wards are under the direct supervision of the LWAs. The MMC has provided dumping pits/dustbins in the 12 wards under its management. Residents of these wards throw their waste in these pits which are then collected and manually loaded onto the trucks and transported to the dumping site everyday (Fig.1). Since there are only three trucks assigned to the 12 wards, most of the times, these trucks are overloaded and not covered properly while transporting the waste to the dumping site, sometimes leading to spilling of waste in the streets/roads. In the case of the 6 wards instead of the dumpster trucks, the wards were given pick-up trucks by the MMC under the Swachh Bharat Mission since the roads within the 6 wards were small and difficult for the dumpster truck to maneuver. However, the collection and disposal of waste is taken care of by the ward authorities themselves. In these 6 wards, there are various pickup points identified for waste collection and therefore, the residents instead of dumping the waste at the dumping pits, collect their waste and load them onto the pickup trucks at the collection points. Residents in these colonies are thus comparatively more careful at waste segregation since they are directly involved in the collection of waste.

In comparison to the 12 wards, the LWAs in the 6 wards also have more freedom in the area of waste collection/disposal because of the decentralization of authority by the MMC to

these wards. The LWAs are in charge of managing the overall administration of the wards which includes maintaining the pickup trucks, hiring drivers and waste collectors. While residents from the MMC wards do not pay any kind of sanitation fee, certain wards managed by the LWAs collect a nominal amount from the residents which are then used towards payment of salary of the sanitation workers and maintenance of the pickup trucks. Such an arrangement in waste management has also received positive feedback from the district administration because of its efficacy.



Fig.1: Picture of MMC dumping pit (Sangtemla Ward) and MMC dumping truck.

In the case of Mopungchuket Village, there was initially no system for collection and disposal of waste. The common practice which was followed was the disposal of waste in various dumping sites within the village which were usually near the streams. Every household was responsible for their own waste. However, such practice has been discontinued since 2017 with the implementation of projects like Greensight Project and Plastic Free Project. Waste is no longer dumped in dumping sites within the village but households collect their waste and bring it to the pickup points identified by the volunteers which are then taken to the MMC dumping site.

## **Local Initiatives for Creating ‘Waste Awareness’**

One of the major problems in regard to waste management is the mindless dumping of waste by the people be it in the town or in the village. There is also no segregation of waste from the source itself, making collection of waste a huge task for the waste collectors. According to the MMC staff, people in the town have a habit of dumping everything and anything in the dumping pit, be it carcasses of dead animals, plastics, piles of mud, tree branches, broken glass, bottles etc. making collection of waste a difficult and dangerous task for the waste collectors. Along with such practices, people also have the habit of dumping waste in the drains which would become a menace during rainy seasons. In order to deal with these issues, various ward authorities came up with their own guidelines for managing waste in their own level. For example, in Sangtemla Ward, the ward authority gave a standing order to all its residents not to dump any waste in the drains. Along with this order, they also covered the drains with bamboo mesh to prevent residents from dumping solid waste into the drains and assigned few individuals to maintain the bamboo mesh and to ensure compliance of the order (Fig. 2).



Fig.2: Picture of bamboo mesh in Sangtemla Ward.

In the 6 wards which are not under the MMC, the ward authorities maintain a strict vigil on maintaining sanitation within their respective wards through decentralization of responsibilities. In these wards, two or more persons are selected to monitor and maintain cleanliness within their respective areas. For example, in Aongza ward, there are 14 clusters and in each cluster two residents are selected to monitor and maintain cleanliness and sanitation in their respective clusters. Their work usually includes initiating various beautification projects like planting trees, flowers etc. repairing public toilets, checking rearing of pigs within the residential areas and organizing social work whenever required. Various initiatives have also been taken by the MMC like conducting seminars/workshops on waste management with the students, ward authorities and NGO's, carrying out tree plantation, converting garbage dumping sites into flower garden and beautification of commercial places with green plants etc.

In regard to Mopungchuket village, the youths have played a major role in creating 'waste awareness' among the residents in the village. One of the important initiatives under the Greensight Project as well as the Plastic Free project has been to encourage segregation of waste at the source itself. The youths along with the Village Council passed a resolution in 2019 which made it mandatory for all households to maintain a compost pit. Such resolutions ensured that all residents become mindful of their waste and learn to sort various kinds of waste, especially biodegradable waste from non-biodegradable waste. Along with this, they have also banned all kinds of single use plastic- be it plastic bags, multilayered packages and plastic bottles from the village (Fig. 3).



Fig.3: Example of local initiatives for managing waste (Mopungchuket Village).

Through the Greensight and Plastic Free Projects, the youths have not only contributed to enlarging the green space in the village but they have also managed to create waste conscious individuals in the village. This became possible through the various activities that were initiated gradually at their local level. The Mopungchuket Student Union (Mopungchuket Ait Laishir Telungjem, MALT) initiated ‘The Greensight Project’ on 26<sup>th</sup> July 2016 with the aim of not only building a greener society but also to preserve the rich biodiversity in the state. The project period was to be for 5 years finally culminating in 2021. Under this project, youths in the village started a plantation drive in the village with the aim to plant 100 trees in one year. While this initiative was already in place, the Youth Ministry of Mopungchuket Baptist Church initiated another project- ‘Plastic Free Project’ to mark the celebration of the 100 years of Youth Ministry (1917-2017) (“Mopungchuket inches towards,” 2019). In 2017, the first year of the project, the team focused on street cleaning and making indigenous basket for collecting waste. The volunteers made 100 indigenous bamboo baskets and placed it at different locations around the village for collecting waste.

After this initial start, the team in collaboration with the Village Council organized a seminar on waste management as a means to sensitize and to spread awareness about waste. The team then started a practice of collecting the textile and plastic waste from the villagers and dumping it in the MMC dumping site once a year. Gradually the project team along with the support of the youths managed to initiate a systematic process of collection and disposal of waste by making use of the pick-up truck which was given to the Village Council by the Public Health Engineering Department (PHED) during a seminar organized under the Swachh Bharat Mission. Some of the other notable initiatives has been the conversion of the dumping sites in the village into clean spaces, use of paper cups, water dispenser during festivals, village gatherings, conducting sensitization talks with students in the primary and high school in the village, engaging and creating 'waste awareness' through social work with the students at Impur Mission Centre and the setting up of a resource recovery room which is at present a temporary room in the VDB building where they have collected clean plastic bags, multilayered plastic and also polythene bags for recycling. Such initiatives have not only created 'waste conscious' residents but their efforts have also led to greater sensitization and awareness on the importance of managing waste.

### **Challenges to Waste Management**

While various initiatives have been initiated at the local level to ensure management of waste, the problem of waste still remains because waste is not managed but shifted from one point to another. In the case of Mokokchung town, instead of recycling or segregating waste, the waste collected is directly taken to the dumping site located in Sabangkabamenchen under Mokokchung Village, which is about 13 kilometers away from the main town (Fig. 4). Even in the case of Mopungchuket village, though segregation is practiced to some extent, chunk



of the waste ends up in the same MMC dumping site. Such practices do not serve the purpose in the long run because waste keeps shifting from one site to another. For example, the MMC dumping site was previously located in Tsukjongkong near Ungma Village but because of the various complains from the villagers regarding environmental and health hazard, the MMC had to shift the dumping location.



Fig. 4: MMC dumping site in Sabangkabamenchen, Mokokchung Village.

While the Nagaland Municipal Act, 2001 has clearly laid out that the Municipality may provide for the purpose of receiving, storing, treating, processing and disposing solid waste or converting solid wastes into compost, re-cycling, such provisions are hardly in place under the Mokokchung Municipal Council which makes waste management more difficult. Another issue is the absence of rag pickers. Rag pickers play a vital role in the segregation of waste. Though plastic is the biggest menace in the town areas, there are very few rag pickers who can collect the plastic. This is largely because there is no market for waste in the district or in the state. The nearest available market is in the neighbouring state of Assam, however, transporting waste through trucks is an expensive affair because of the multiple tax that are levied at different points.

There is an urgent need for the municipalities to invest in purchasing proper machineries for collecting waste. Most of

the trucks which are used by the MMC are not equipped with proper machineries for collecting waste. The MMC also needs to be equipped with sufficient manpower to ensure smooth functioning of the waste disposal system. At present there are only 11 labourers, 3 drivers and only 3 vehicles for collection and disposal of waste from the 12 wards making the task a huge burden for the staff. There is also a need to upscale the workplace hygiene through equipments and waste handling gears like helmets, boots, gloves, masks etc. to reduce the risk of contracting diseases or injury.

## **Conclusion**

While the various initiatives that has been undertaken both at the town and the village level have in some ways contributed to creating 'waste awareness' among the people, the present system at both levels are unsatisfactory mainly because waste is not managed but merely shifted from one place to another. In order to combat the problem with waste, the future course of action should be aimed at reducing waste at the household level. Instead of focusing on distribution of dustbins/construction of dumping pit, the various authorities/bodies should lay more emphasis on cutting down waste through segregation and by investing in building recycling units at the town and village level. There is also a pressing need for the government to invest and support various NGO's, individuals who are involved in creating alternative solution to plastic products. Solution to the dealing with waste can happen only when we build waste conscious individuals. Children should be taught how to differentiate and manage various kinds of waste at an early learning stage.



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