MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 33 Issue 2, December – 2023, Pages: 398-407

EVALUATE EXISTING POLICIES REGARDING LANDFILL MANAGEMENT IN DELHI, HIGHLIGHTING THEIR EFFECTIVENESS, CHALLENGES, AND POTENTIAL IMPROVEMENTS

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Abstract

India's most populous and urbanised metropolis is Delhi. Over the past ten years (1991–2001), the population has grown at an annual rate of 3.85%, over double the national average. A thorough waste management policy for the city of Delhi is now being finalised by the government of Delhi. A sustainable and scientific approach to waste management will be outlined in the policy. In order to carry out the policy's implementation, the government is also putting up a special waste management authority. A group of specialists employed by the authority will assist in developing and executing efficient waste management plans. The administration of Delhi is dedicated to maintaining the city's cleanliness and greenery. We want every citizen to help us turn Delhi into a waste management model city. During the Budget presentation, KailashGahlot, the Finance Minister for the Delhi government, set a lofty goal for emptying all three of the city's dumpsites. He declared on March 22, 2023, that the Okhla dumpsite would be cleansed by December 2023, Bhalswa by March 2024, and Ghazipur by December 2024. Ghazipur, Okhla, and Bhalswa are Delhi's three main disposal sites. Almost 28 million tonnes of legacy trash are being carried by the three dumpsites, which together occupy 200 acres. With six million tonnes of residual trash, the Okhla dumpsite spans approximately 62 acres. By the end of November 2022, authorities from the Municipal Corporation of Delhi (MCD) and media sources stated that approximately 1.5 million tonnes of waste had been processed and evacuated. Subsequently, a private firm was awarded a tender to handle the remaining 4.5 million tonnes of material. As of March 2023, around 700,000 tonnes of extra legacy garbage had been processed and disposed of, leaving about 3.8 million tonnes for the contractor to treat. The current condition of Delhi's municipal landfill management is examined and assessed in this study. The Delhi government's and the Municipal Corporation of Delhi's suggested policies and measures to enhance the current landfill management system are also summarised in the report. This study is focused on landfill management in Delhi, highlighting their effectiveness, challenges, and potential improvements.

Keywords: Population, Urban, Landfill, Policy, Municipal Corporation

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Introduction

Biomining is an eco-friendly method of removing residual garbage that has been buried at landfills for years from materials that resemble fine soil, construction and demolition (C&D) debris, and recyclables like plastic, textiles, rubber, and other solid items. After being sorted and separated, the recyclable materials are directed towards either scientific disposal, recycling, or continued use. Trommels of various sizes, depending on capacities and needs, are typically used in conjunction with other equipment such as compost screens, air density classifiers, and conveyors for the handling and sorting of legacy debris.

The Swachh Bharat Mission 2.0 mandate is highly promising, as the Government of India has committed to significant financial devolutions for the purpose of cleaning up the current dumpsites and enhancing the solid waste management ecosystem in all Indian cities, including Delhi. However, the success of the entire project depends on having a clear plan with deadlines for reaching the desired outcome. The Okhla dumpsite has over 3.8 million tonnes of garbage that needs to be cleaned up. The pace of work indicates that the remediation of the dumpsite will take at least another year. Solid waste production generally increases with economic success and the proportion of the population living in cities (Hoornweg and Laura, 1999). Urban solid waste management in India continues to be one of the urban system's most ignored aspects.

The Okhla dumpsite is located next to a waste-to-energy facility with a processing capacity of 2,000 TPD, but during a site visit, a team from the Centre for Science and Environment in New Delhi noticed that fresh waste is still being disposed of at one side of the site. Because the trucks were bringing in more MSW, puddles of leachate were also seen outside the site's border wall. The overall volume keeps rising due to new waste dumping, rendering MCD's ability to complete the cleanup procedure impossible.

A few unofficial rubbish pickers were also observed at the location separating recyclables from legacy waste. Empty site remediation is a scientific process that involves heavy-duty machinery, equipment, and vehicles for the excavation, treatment, and removal of residual trash. Getting involved in this activity with the rubbish pickers can result in a number of mishaps and work dangers. Long-term environmental sustainability may have an impact on the quality of materials that resemble fine soil. It is not possible to prove that the soil-like material that has been removed from landfills is safe to utilize for building roads because there are no national standards or regulations in place. While filling in low-lying areas and building roads are the best ways to manage a large amount of

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material that resembles fine dirt. Safe utilisation of waste fractions recovered from dumpsite remediation is essential.

Landfill management in India

India, the country with the second-highest population in the world (1.3 billion), is seeing a sharp decline in the amount of resources available to the country. This means that failing to assess the best use of available resources could result in increased waste production and pollution, which would further undermine the economy. It has the potential to not only depress the economy but also harm citizens' health and the environment by releasing toxic emissions. Therefore, in order to address the issue of municipal solid waste, it is critical to continuously monitor the use and recovery of resources.

Sharps, dangerous chemical contaminants, and human and animal waste are all found in municipal solid waste (MSW) in many places. They all make it easier for people to get sick or hurt, especially kids, rag pickers, and waste management workers. Research has indicated that gastrointestinal parasites, worms, and similar species are present in a significant proportion of workers who handle waste and those who reside close to or on disposal sites. Such contamination most likely occurs whenever garbage is handled. While it is true that rodents and vector insects can spread a variety of pathogenic agents, including plague, cholera, typhoid fever, salmonellosis, amoebic and bacillary dysenteries, and various parasitizes, it is frequently challenging to link the consequences of such transmission to a particular population.

The unchecked urbanisation and huge industrialization that India is experiencing are still too much for its towns and cities to handle. We may make the factual claim that India lacks fundamental facilities such as an integrated solid waste management system, a functioning sewage system, and a drainage system. A population shift brought about by urbanisation is the migration of people from rural to urban areas, which influences changes in consumer behaviour, fashion, and lifestyle. The quantity of waste produced in recent years has drastically changed as a result of all these variables. The administration of trash collection, processing, and disposal has become increasingly difficult for the government, local governments, and urban local bodies as a result of this.

The act of just disposing of rubbish outside of cities without taking any hygienic precautions has come to be associated with the landfilling process in India. Although landfills are intended to lessen the amount of toxic waste that people are exposed to, they can have negative effects on people since they expose them directly to issues like soil and groundwater pollution.

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Challenges of Landfill Management in Delhi

Delhi, the national capital region, is one of the world's most populous cities, with about 18 million residents. It follows that garbage management is one of the city's biggest problems. About 9,000 tonnes of rubbish are produced daily in Delhi, according to estimates. The majority of this waste ends up in landfills, which are unsightly and pollute the environment.

A major obstacle to the city's waste management system is its inadequate infrastructure. A large amount of waste is dumped on the streets since there are insufficient trash cans and pickup locations. This not only makes the city appear unclean and messy, but it also poses a health risk.

The majority of people in Delhi live in slums, which presents another difficulty. Because there is frequently nowhere for trash cans or collecting locations, it becomes challenging to gather and properly dispose of waste. The fact that many slum-dwellers rely on scavenging through trash dumps for a living exacerbates the situation and contributes to the pollution issue.

Many Indian cities are located in rural and peri-urban areas, and despite the negative effects of dumpsites in recent years, little research has been done on the health and environmental effects on the locals living near to these places. Even at extremely low levels, pollutants like as dioxins and furans emitted due to low burning can cause a wide range of adverse health impacts. These include heightened risk of diabetes, developmental damage, and impairment of reproduction.

Burning tyres at landfills releases additional chemicals, including butadiene and styrene, which are derivatives of benzene. These substances are allegedly carcinogenic to humans, and one of them has even been connected to leukaemia in people.

High levels of PM10 exposure, respiratory issues, bacterial infections, asthma, increased cardiovascular risk, and other illnesses are among the health issues linked to different emissions from landfills. Given the prevalence of open dumps in India, cockroaches, rats, flies, mosquitoes, and other pests breed there. Certain diseases, such plague, histoplasmosis, malaria, dengue, West Nile fever, and murine typhus, are highly prevalent among the people who live close to the dump site because the organisms that cause them proliferate there. Concerns exist not just about possible health risks but also about the spread of toxins in the food chain of animals and birds, vegetation degradation, offensive odours, landfill settlement, groundwater pollution, air pollution, and global warming.

How to Dispose of Waste?

Waste management has emerged as a critical concern in Delhi due to the city's growing population and development activity. The organisation in charge of trash management in the city is the

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Municipal Corporation of Delhi (MCD). But efficient waste management is still difficult because of a lack of infrastructure and knowledge.

Waste can be disposed of in three primary ways: recycling, incineration, and landfilling. In Delhi, the most popular way to dispose of waste is in a landfill. Simply place the waste in the allocated spot and cover it with soil. Due to the potential for soil and groundwater contamination, this approach is not very effective.

High temperatures are used during incineration to burn rubbish. Although less garbage is produced using this procedure, airborne contaminants may still be released.

Recycling is the most efficient way to manage garbage since it lowers pollution, conserves natural resources, and minimises the amount of waste generated. Recycling can be done in special recycling facilities or at home.

Products for Disposal of Garbage

Are you trying to find products to make getting rid of your trash easier? Go no farther than our website's blog area. Our extensive product line can assist you in controlling waste and maintaining a clean and organised home or workplace. We provide everything you need, from recycling bins to trash bags, to make waste management simple.

Before you begin your product shopping, make sure to check out our blog, which offers a variety of useful ideas and recommendations. In addition to offering a helpful buyer's guide that goes over all the fundamentals of waste management, our experts can assist you in selecting the best products for your needs. Therefore, we can help you regardless of whether you're new to waste management or simply need a refresher.

Waste Generation and Disposal as a 'Public Bad'

Waste production and disposal might be considered public bads. The social cost of trash disposed of at landfills includes the expense of methane emissions into the air and groundwater contamination, whereas waste disposal at the household level solely involves private costs in the form of money paid to the garbage collector. Additional environmental expenses include excessive truck traffic noise and stench (Repetto et al 1992). The population density further exacerbates these environmental effects.

Furthermore, the non-market costs of landfills are augmented by land prices; nevertheless, very few governments impose a rent that accurately reflects these values (Repetto et al 1992). The approximate cost of disposing of one tonne of waste in a Mumbai landfill includes the value of the land that could have been used for other development activities, the actual costs of disposing of MSW, the cost of

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pollution abatement, and the value of recyclables (Yedla and Parikh 2001). But there are more than just direct repercussions. Landfills have been shown in studies to have a negative impact on property prices. According to a meta-analysis of the effects of Pennsylvanian landfills on surrounding communities, landfills that receive 500 tonnes of waste per day depress the value of local residential real estate by 12.9% (Ready 2005).

When garbage collection services are provided for a fixed price, each extra unit of waste produced by a household is free of charge, which encourages waste production. Furthermore, because of a lack of knowledge about the advantages and disadvantages for society, every family makes an arbitrary decision to recycle or dispose of materials based only on convenience.

Current Scenario of Waste Management in Delhi

The Solid Waste Management Rules of 2016 are implemented by five local bodies in Delhi. In Delhi, 11144 tonnes of municipal solid waste are produced daily (TPD) garbage segregation at the source, door-to-door collection, intermediate storage, and transport facilities with GPS for the separated garbage are all part of the comprehensive strategy that the local bodies are putting into action to ensure effective treatment and disposal of municipal solid waste.

The processing of 2000 TPD of municipal solid trash is done at the Bawana Integrated Solid trash Management Facility, which also features an engineered sanitary land fill, a compost plant, and a waste-to-energy plant. The operator of this integrated solid waste management facility is M/s Delhi MSW Solutions Ltd. It is suggested that Tehkhand's South Delhi Municipal Corporation (SDMC) create one Engineered Sanitary Land Fill. East Delhi Municipal Corporation (SDMC) and NTPC are proposing to work together to establish an Integrated Solid Waste Management Facility for 2000 TPD at GhondaGujran.

There are three waste-to-energy plants (WTE plants) in Delhi, Okhla, Ghazipur, and Bawana, with a combined capacity of 5250 TPD. Two new waste-to-energy plants are being proposed: one in the Integrated Waste Complex at GhondaGujran, with a capacity of around 2000 TPD, and another in Tehkhand. The capacity of the two proposed WTEs will expand from 5250 TPD to 8450 TPD by December 2021 upon commissioning.

Household garbage is currently given to the "kabadiwala" (scrap dealer) in the form of old newspapers and empty glass bottles. Nevertheless, there is no separation of the daily garbage produced. The ragpickers located at the dhalao level gather packaging materials and milk packets

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from regular trash in order to recycle them. To arrive at the best answer, it's critical to comprehend the roles that the many players at each step are playing.

Steps can be taken to improve Landfill Management in Delhi

Scientific Waste Management: Planning for waste management must to be grounded in reliable scientific and engineering research. Garbage composition, initial and ongoing operational expenses, transportation distances, and the locations of facilities for processing and disposing of garbage should all be taken into account. Planning for solid waste management requires precise data, which can only be obtained through thorough waste characterization investigations. **Waste Collection:** A number of changes should be taken into consideration in order to improve collection practices, such as more frequent sweeper service, daily waste collection (as opposed to alternate days), the use of mechanised vehicles, better coordination between the timing of waste generation and collection, and greater accessibility for waste collection vehicles. The process of garbage collection and segregation could be streamlined by combining the formal and informal sectors.

Policy Implications

The findings show that, while financial incentives have the biggest effect, even low-cost interventions (like informational campaigns) can affect how families dispose of their waste. In light of this, user fees ought to be designed in a way that encourages segregation. Rather than imposing a flat cost that ignores the habits of waste disposal, families that practise waste segregation ought to pay less than those that do not. Recently, the North Delhi Municipal Corporation (NDMC) suggested basing waste collection costs for homes on property taxes. According to the study's findings, however, a differential rate based on whether or not families separate their garbage will lead to a higher rate of regulation compliance.Policies have placed a strong focus on the idea that the key to addressing the waste issue is source segregation. However, decisions made at each step have an impact on both the previous and subsequent stages. For example, if the household's separated waste is combined with other waste during the garbage collector's collection, this will not only impact the phases after collection but also result in the households not sorting their waste. Therefore, raising awareness among garbage collectors as well as generators is imperative. Additionally, the RWAs can help with information sharing and compliance monitoring.A monitoring system must be implemented to guarantee that the waste generators are informed of the regulations and that the collection system is being followed. Here is where the RWAs can once more be extremely important in keeping an eye on compliance levels and informing the ULBs of any rule violations.

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Conclusion

In Delhi, landfill management is a significant yet frequently disregarded concern. With a population of more than 25 million, the city produces a significant amount of waste daily. This trash can lead to major health and environmental issues if improperly managed.India faces significant environmental difficulties related to the generation of garbage and insufficient waste transportation, collection, treatment, and disposal. The ecology and public health in India are negatively impacted by the current systems' inability to handle the amounts of waste produced by the country's growing urban population. It can also strengthen the workings of the market system by imposing formal employment schemes, since poor management gives rise to a host of other issues. The health component in the impoverished areas needs particular attention. Regular check-ups by the doctors at the closest public hospital can accomplish this.

The impacts of inadequate waste management techniques on the environment and public health are more apparent than ever due to the world's fastest urbanisation and growing population. According to the study, Delhi produces a huge amount of MSW, and the current infrastructure and policies are not up to par.

To promote segregation during collection and reduce the amount of waste going to landfills, it is necessary to implement appropriate mechanisms and incentives. This will increase the use of alternative energy sources. Delhi could easily implement a similar system. The significance of cleanliness and hygiene needs to be made known to the public. Covering the trash cans, for instance, can help lower the risk of numerous illnesses.

The separated garbage needs to be included into the current collecting system through modifications. To make sure that the garbage separated by family’s remains separated until it reaches the processing facility, carts or dhalaos must be equipped with the necessary equipment. Homeowners are also unaware of the facilities put up to treat garbage, such compost plants, according to survey replies.

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