

## A RESEARCH STUDY ON WASTE SEGREGATION WITH AUTOMATIC HAND SANITIZER DISPENSER SYSTEM

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### ABSTRACT

Segregation at the source is the key in solid waste management, especially when we have limited economical resources. We divide solid waste into three categories Wet, Dry and hazardous waste. According to solid waste management rule, 2016 it is responsibility of generators to segregate waste into these three categories. Lack of awareness, loosely implementation of laws and various other reasons are obstacles in achieving appropriate results. After segregation we can choose Reduce, Reuse and Recycle for appropriate solid wastes. Solid waste management should be sustainable ecologically as well as economically. In a developing country like India it's very important to have a cast effective solid management plan. We have to deal with poverty, population growth and high urbanization rate combines with ineffective and under-funded solid waste management technique.

**KEYWORDS:** Segregation, Solid Waste Management

Solid waste management in developing countries is looked as major challenge to civil bodies. At a time when the national capital is dealing with increasing load of solid waste and struggling with its scientific disposal, we have to rethink the segregation methods of solid waste. There are five municipal corporations (comprising over 280 wards) are there in the city, according to Delhi pollution control committee (DPCC) these 280 wards generate approximately 14,000 tonnes per day (TPD) of solid waste in Delhi. We mainly use landfilling and burning as a tool for disposal of solid wastes. There are three landfilling sites are there in the city Bhalswa, Okhla and Ghazipur. Height of these landfilling sites are increasing dangerously. As load on these sites are increasing day by day and bearing capacity of these sites are decreasing with time, we have to find a way forward. Ministry of Environment, Forest and Climate Change Government of India has notified The Solid Waste Management Rules 2016, in supersession to the Municipal Solid Waste (Management and Handling) Rules 2000. The new rules generally relate to Municipal Solids Waste. A new category of Domestic Hazardous Solid wastes has also been established. The new rules have also made a provision of segregation at source, before this provision most of the segregation were done at destination. Solid Waste can be segregated into the different streams like Biodegradable waste (it includes organic waste, e.g. kitchen wastes, fruits, flowers, leaves from the trees, paper etc.). Basic reason for segregation of solid waste is that we need different treatment for different solid wastes. As Landfill sites in Delhi had exceeded their capacity way back in 2008 and most of these sites is being contaminating soil, groundwater

and air quality in and around their surroundings. In an important judgment NGT (national green tribunal) told that (Order of the National Green Tribunal in the matter of Almitra H. Patel & Anr. Vs. Union of India & Others dated 11/09/2017 regarding municipal solid waste management in Delhi.) The Municipal Corporation shall, at its own cost after taking all help from other stakeholders including NCT Delhi, start the work of segregation, compaction and bioremediation of the municipal solid waste. In another order in March 2019 NGT said that civic body should notify at least three wards or zones as model wards where complete compliance with solid waste management rules is expected. NGT also said that the "model wards" are required to be compliant within six months while the remaining wards or zones have to be made "fully compliant in respect of environmental norms within one year". The three municipal corporations have taken different approaches to pursuance of these orders. All three, however, are focusing on ensuring source segregation of waste at the household and commercial level in their attempt to fully comply with municipal solid waste management by-laws.

### LITERATURE REVIEW

#### Municipal Solid Waste Regulations and Schemes in India

The Environment Protection Act enacted in 1986 gave power to the central government to regulate all forms of waste and to tackle specific problems that may be present in any region of India. Under the Act, the central government has the power to take measures to protect and

improve environment. In particular, such measures include preparation of manuals, codes or guides relating to prevention, control or abatement of pollution.

The 74th Amendment act (1992), endowed the municipalities with such powers and authority as may be necessary to carry responsibility conferred on them including the responsibility of public health, sanitation and solid waste management under this act.

The Municipal Solid Waste (Management and Handling) Rules (SWM Rules), 2000, highlighted that it is the responsibility of the generator of waste to ensure delivery of waste in accordance with the collection and segregation system notified by the municipal authority. In order to encourage this, the municipal authorities shall undertake a phased programme to ensure community participation in waste segregation. The Rules also specified that landfilling will be permitted only for non-usable, non biodegradable and non-recyclable inert waste (MoEF,

2000). In 2006, the National Environment Policy (NEP) identified municipal waste as a major cause of soil pollution. It recognized the need for strengthening the capacity of local bodies for segregation, recycling and reuse of municipal solid waste to efficiently deal with the problem. The policy emphasized the importance of substituting biodegradable and recyclable materials for non

biodegradable materials. It called for and developing and implementing strategies for the recycle, reuse, and final environmentally benign disposal of non-biodegradable waste through promotion of relevant technologies and use of incentive based instruments (MoEF, 2006). National Mission for Sustainable Habitat subcommittee report emphasized the need for community participation in waste management activities by the ULBs along with segregated storage at source for effective recycling (MoUD, 2014). The Clean India Mission, 2014 (Swachh Bharat Mission) guidelines advise ULBs to distribute two dustbins to promote segregation at source. Further in this direction, for promoting and scaling up production of compost, the central government in 2016 introduced a policy for providing market development assistance of Rs. 1500 (about 23 USD) per tonne of city compost for scaling up production and consumption of the product.

The SWM Rules 2016 which replaced MSW Rules 2000 are the latest regulation to efficiently handle municipal solid

waste. The major provision under the new rules is that they mandate the waste generator to segregate the waste into biodegradable and non-biodegradable waste before it is collected, thus, shifting the onus of segregation onto the household. (MoEF, 2016). Further to the new rules, the National Green Tribunal (NGT) in its judgment on December 22, 2016, has directed every State and Union Territory to implement and enforce the MSW Rules 2016 in all respects and without any further delay. The Supreme Court told last year, while hearing a case initiated by it to curb dengue deaths in the city, told that “the problem of solid waste management in Delhi will certainly require the active cooperation and assistance of the residents considering the fact that their position is very critical, its problem of the people and actively solved by them”. The epic court then ordered setting up of an expert panel to go “in-depth into all aspects of solid waste management”. The committee, which submitted its report to the epic court in January this year, stated that three of the Urban Local Bodies East Delhi Municipal Corporation, South Delhi Municipal Corporation and North Delhi Municipal Corporation had “negligible” segregation at source. The committee said that segregation of municipal solid waste involved major behavioral changes both in the public and within the ULBs. It suggested that all Residents’ Welfare Associations registered under the Societies Registration Act, cooperative societies registered with the Registrar of Cooperative Societies/Delhi Development Authority and with government bodies be considered for the purpose of engagement with the ULBs. To speed up the implementation, the ULBs have advised that they would make use of social media to reward good practices and success stories in segregation. Integrated Solid Waste Management (ISWM) proposes a waste management hierarchy with the aim to reduce the amount of waste being disposed, while maximizing resource conservation and resource efficiency. The ISWM hierarchy ranks waste management operations according to their environmental, economic, and energy impacts. Source reduction or waste prevention, which includes reuse, is considered the best approach; followed by recycling; and composting of organic matter of waste, resulting in recovery of material. The components of waste that cannot be reused or recycled can be processed for energy recovery. The remaining option is the disposal of waste in sanitary landfill sites, which is the least preferred option. Based on this management hierarchy and local conditions, an appropriate system and technology

should be selected in the Municipal Solid Waste Management (MSWM) plan (according to DPCC).

## METHODOLOGY

Implementation of law can be achieved if residents and authorities work in tandem, compatibility among all the stakeholders is must for better results. The Solid Waste Management Rules, 2016, states that it is the responsibility of producers or generators to segregate waste into three

categories wet, dry and hazardous waste. Only after segregation they can hand over the segregated waste to authorized waste collectors or local bodies. Wet waste is biodegradable; dry waste includes plastic, paper, metal, wood among others; and domestic hazardous waste includes napkins, empty containers of cleaning agents, mosquito repellents, etc. This was reiterated in Delhi's Solid Waste Management By-Laws notified in January 2018. However, a majority of Delhi is yet to implement segregation of waste at source, be it households, hotels, restaurants or other waste generators.

**Table 1: Target for segregation at source**

Name of urban local body	% of segregation as on date	% of segregation aimed at	Date by which to be achieved
New delhi municipal council	70	100	31/3/2019
Delhi cantonment board	50	90	31/5/2019
East DMC	Negligible	80	31/3/2020
South DMC	Negligible	80	30/9/2021
North DMC	Negligible	80	30/9/2021

Name of urban local body	Waste per day (MT)	(MT) waste processed at waste to energy plant	(MT) waste processed in compost plants	Waste being processed in decentralized plants/parks	Waste going to landfill sites (average MT)
SDMC	3600	1800	200	-	1600
North DMC	4000	1300	700	-	2,000 at bhalsa, 400 at narela
EDMC	2500	1500	-	-	1800
New delhi municipal corporation	350	300	30	20	-
Delhi cantonment board	62	28.83	2	6.5	24.67

Now when segregation at the source (generators households) is being becoming ground reality in upcoming years all the stakeholders (ULB, corporate and people) of can adopt different measures for segregated waste.

## COMPOSTING

Wet waste can be used for composting at both household as well as corporate level. Compost results in a phcal breakdown of organic matter layered with small amounts of soil by a process known as aerobic disintegration. Structure of the matter is broken down by bacteria and fungi of decay until it is part of the soil mass. Composting fulfills three R's of solid waste management (Reduce, Recycle and Reuse). Composting is not only ecological but it's also economical in nature. At a very lowercapital investment we can start composting at individual level. Currently, about 550 houses have started doing home composting by installing home composters, which cost ₹500 and are easily operable. This year, the NDMC has targeted 3,000 houses. (According to Supreme Court committee report janaury 2019). Composting is not only helpful for solid waste management but it also promote and support organic forming.

## RECYCLING

If we segregate solid waste at source then we can recycle the solid waste very efficiently. In the case of dry waste we can adopt proper recycling methods and waste become useable. Recycling is the recovery and reuse of materials from wastes. Delhi needs a decentralized and individual centric approach to recycle the solid waste. If we achieve segregation of waste at source then we can adopt different measures for segregated wastes.

## CONCLUSION

The study provides an insight into the behavioural aspect of effective waste disposal in a developing country, plagued with weak institutions. It tackles the question of effectively processing waste in fast growing urban cities in e developing countries, taking the particular case of Delhi. Considering that organic waste amounts for as much as 40–60% and recyclables amount to 17.5% of total household waste, mixing the two, renders both unusable. In India, the household disposes off waste in a mixed manner only, the study uses interventions to bring about a change in the present system of garbage disposal—waste segregation.

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