International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor (2018): 7.426

Municipal Solid Waste Management in Dehradun City (Uttarakhand): A Review

Naveen Chandra Joshi

Department of Civil Engineering, Uttranchal University Dehradun 248001 Uttarakhand, India

Abstract: ***The major environmental problem in the Dehradun city is improper management of municipal solid waste. The improper management of municipal solid waste cause bad disease and affect the environment and water bodies. The studies told that about 60% of municipal solid waste is disposed in open areas and landfills .the paper present a rivew on management of MSW in the Dehradun city. And it is also given a review of the characteristics, generation, collection and transportation. The study pertaining to MSWM for Dehradun City has been carried out to evaluate the current status and find out the major problem. And all method are critically reviewed and also reviewed their advantage and disadvantage. The study is beneficial for future study's and it is also gives an idea about to research on present MSWM scenario.***

1. Introduction

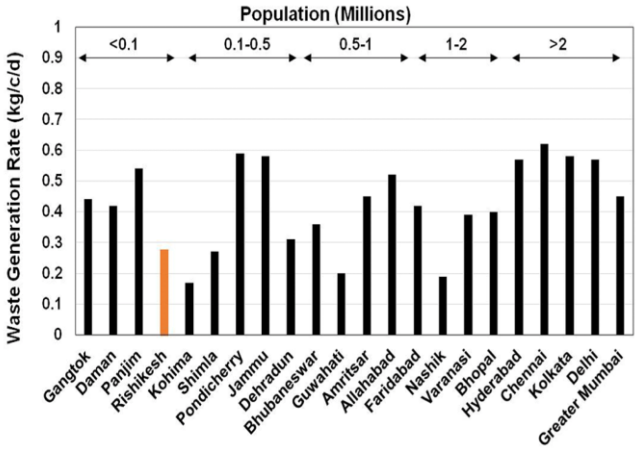
Migration of people for village to city causes high amount of MSW daily in the Dehradun city. It is also affected the generation by the improper disposal and management of MSW. High amount of MSW causes harmful diseases and effect the natural environment and the water bodies .Due to change in lifestyle and advancement in the new technology of the people and increasing population causes high amount of MSW. The improper management of MSW cause acclamation at every nook and corner. The solid waste generally arising from houses hospital hotels are transported by the means of trucks and other vehicle. As we know that The low laying area is used for the disposal of MSW and control operation. In the Dehradun city the solid waste management has been so far ignored and studies over the environmental impact is less. Most of the government and private organization working together to control and manage the MSW System.

Qualitative and Quantitative analysis of MSW

MSW is generally a combination of commercial waste, institutional waste, food waste ,rubbish ,industrial waste, sanitation waste, sweeping waste, construction waste and, demolition waste and it may also contain toxic material like (medicine, electrical item, pesticide) it may also contain some recycle waste like (paint wood glass) etc. The MSW contain large amount of organic and inorganic waste. The MSW generated quantity depends on some factor like stander of living food habit and seasons. The Dehradun city now generate four time more MSW than they did in 2002.Presently about 300 tons of solid waste is generated per day by products of agriculture industrial and other process. In the Dehradun city the urban population rate increases at a very steep rate of about 4% per year including three major city Mussorie, Vikasnagar, Rishikesh

Name of district	Name of town Total population	Municipal solid waste generated kg/day	Total municipal waste generated tpd	treatment
Dehradun	940008	57000	51	dumping

Source Nagar Nigam Dehradun 2002



Generation Rate of MSW for Dehradun City (CPCP 2004) (Fig 1)

Name of district	Name of town Total population	Total municipal waste generated tpd	Treatment
Dehradun	583679	291.84	dumping

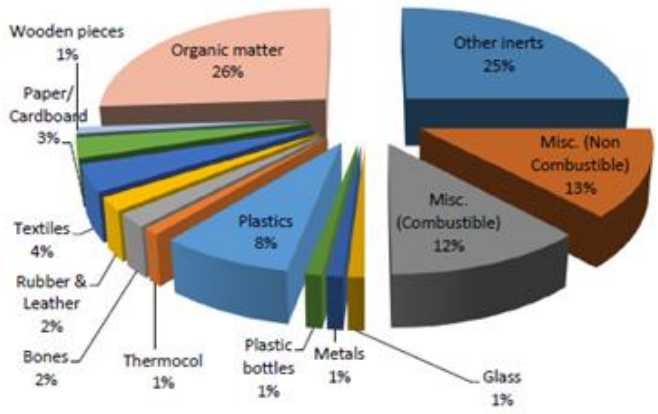
Source junuram (2015)

The studies conduct Dehradun city as showed in figures the existing waste is identifying by its strength and weakness at all levels .the system started through generation of MSW from source to disposal.

MSW Characteristics and Composition

To control the msw I n dehradun city the management system has to be planned the things .the msw is charactrrizied into two char 1,physical char.2,chemicxal chare.

1) Physical Characteristics



Source Junurn (Fig 2)

2) Chemical Characteristics

Chemical Properties		Results of Different Sample					
Sr.	Chemical Test Parameters	1	2	3	4	5	Average
1	pH	5.9	6.5	7.2	7.1	5.7	6.48
2	TVS	20.20%	17	18.3	15.96	19.5	14.1924
3	TS	79.80%	83	81.7	84.04	80.5	66.0076
4	Moisture Content	28.30%	26.2	25	27.6	30	21.8166
5	Organic Carbon	13.50%	10.6	16.5	14.7	10.3	10.447
6	Organic Matter	67.40%	59.5	61.2	53.2	65.2	47.9548
7	Nitrogen	0.87%	0.65	0.72	0.63	0.54	0.50974
8	Potassium	0.65%	0.71	0.63	0.57	0.7	0.5233
9	C/N Ratio	15.50%	16.82	22.9	23.3	19	16.435
10	Phosphors	0.48%	0.56	0.4	0.5	0.65	0.42296
11	Sulphur	0.22%	0.32	0.32	0.26	0.24	0.22844
12	Chloride	0.29%	0.27	0.26	0.3	0.28	0.22258

Source Junurm (Nagar Nigam)

Storage and Collection of MSW

Storage and collection of MSW is the most important phenoman. The soild waste generily arising from (houses, hotels, hospital and other institutional place) is to be storted in bins (waste bins). The bins are used for both type of solid like (decomposable or non decomposabl waste). The storage bins are mainely two types (fixed or movable). The movable bins are comenley used for collection due to its hige durability and properties.The bins are generalley provided at various points along the roads and the streetand also some times they are provided at open areas (like parks).The sweepers are used for sweep the road mannualley they have their own specify area with they work .A sweeper is collect the waste into the wheelbarrow and then transfer the waste into the collection points and bins. In the dehradun city most of the wsate is uncontrolled on the roads and the streets due to improper collection eficency .The collection efficiency of dehradun city less then 60% . the city does not provied collection at most of the points like some villages.In the dehradun city the collection of msw is done by nagar nigam dehradun.

Transfer and Transport of MSW

Transfer of MSW is a very important method to disposed the waste .The vehicle's are used to collect the refuse material and transfer it to the processing or disposal site.different types of vechils are used to transport the waste accordingly to theair collecting frequency .I n the dehradun city1.(There are 48 DP boxes for storage.2. (91 CP boxes). 3. 46 (door to door collection Tata magic). 4. (2highway trucks)(5. (6 DP vehicles)'.6.(2 compactor). After collecting the waste from bins the waste is transfer to the primary site(kargi chowk).after the primary site the huge amount of solid waste transfer to the main treatment plant(sesambada).Dehradun nagar nigam are used their own vehicles for transporting MSW.

MSW Disposal and Treatment

Source Nagar Nigam (Fig 3)

1) Inward solid waste and record : the waste coming from primarey dumping site thourg trucks is weightted at disposal plant.
2) Unloading at tipping floor:after the weighing of waste material the cpompleate waste is unload at tipping floor for the further processing.
3) Processing @75MM trommel:the waste unloaded on the floor is secived throug the 75 mm seive the material greter then 75 mm is used for simply land filling.
4) Refused derived fuel and recyclables segregation:the waste seived through 75 mm trommel is collectted and er used for further process.
5) Fermentation at mechanized aerobic windrows for 28 days: The process of aerobic composting is for all types of organic waste and is also suitable for waste which have high amount of nitrogen. Generally it requires temperature up to 160 degree Fahrenheit to the Bactria with the help of Plant matter such as grass clippings and leaves. Aerobic composting works quickly but requires a high amount of maintenance, as the moisture and temperature need to be monitored closely.
6) Processing @25 mm trammel after 28 days fermentation: after the aerobic composting the waste is sieved through 25 mm trammel to avoid larger particles. If particle size is greater than 25 mm then again if it goes for the refused derived fules.and if less than 25 mm is particle is obtain then it is goes for 4 mm trommel .after this process less than 25 mm and greater than 4 mm particles are shifted for sanitary landfilling.
7) Biological composting cycles: the waste material size less than 4 mm is used for further organic work like the screen off material is used for plantation of trees, soilfelling, and etc. rhe biological material is transported from treatment plant to the required area.

2. Conclusion

The solid waste is a major problems in those days the waste is dumped at every nook and corner due to the improper managenment of local bodies and locality unawerness.the managenemt should conduct the awerness programe with the help of news and other medium .some of NGO's are working on this matter but as a study 60 % of people are unawere .the frequency of dooer to door collection should be improved and also improve the transportation facility throug which the waste is transferred .the collection bins have sufficient capacity to store the waste more then actual .Nager nigam or managenment should maintained the storage facility in such a manner that they do not pollute the environment and also the proper disposal of biodegradable or non biodegradebal waste.the waste treatment process adopting in the dehradun is very old and we need some advanced techineque for treating solid waste.In the new era losts of new techineque are avalible to treat the waste.due to the population explosion 40 to 50% of waste is untreatted and left out at the corner of streat and the roads this will create environmental polution and hazerdious desease .for location of dump sites and execexwaste on roads some of sofware may be used for locating them like (remote sensing ,Gis).

Finalley the study concluded that the lack of resources and suitable planning are the main barriers of MSWM.

References

[1] ShaikhMoiz Ahmed, Hassan Muhammed and AkeSivertun, "Solid Waste Management Planning using GIS and Remote Sensing Technologies Case study Aurangabad City, Bangalore", 2006IEEE
[2] Maher Arebey, M A Hannan1, Hassan Basri, Huda Abdullah, "Solid Waste Monitoring and Management using RFID, GIS and GSM", Proceedings of 2009 IEEE Student Conference on Research and Development (SCOReD 2009), 16-18 Nov. 2009, UPMSerdang, Malaysia, pp no. 37 – 40, 2009 IEEE
[3] Bidyut Kr. Bhattacharya, Swapan Das, "A Holistic Approach for Integrated Solid Waste Management System of Kolkata Municipality Corporation Area", pp no. 1999 – 2003, 2011IEEE
[4] [4] aditya jain ,ranu bagherwal 2017 design and implementation of smart solid waste monitoring and collection system based on internet of things,ieee40222