

Approaches for Recycling and Managing Waste

Dr. Vishal Soni, Dr. Monika Gupta, Rajnish Shukla

Dept. of Management

Chandigarh Business School of Administration, Chandigarh Group of Colleges, Chandigarh
cgcpapers@gmail.com

Article Info

Volume 82

Page Number: 2526 - 2530

Publication Issue:

January-February 2020

Article History

Article Received: 14 March 2019

Revised: 27 May 2019

Accepted: 16 October 2019

Publication: 18 January 2020

Abstract

Abstract: With increase in population number and urbanization, trash amount is also gathering at a great pace. Increase in technology, industries, and solid trash from municipals generate large amount of trash/ wastes. Though all sorts of trash are hazardous, waste from urban areas also addressed as "solid waste" is a trash that can be controlled without creating any pollution or damage to different species. This paper includes a thorough overview of the approaches for recycling and managing waste along with the researches performed on adverse effect of trashes on environment.

Keywords: *pollution, solid waste, waste compost*

I. INTRODUCTION

Management of trash is a matter of immense importance. "Solid waste" is generated due to many factors such as human actions, lifestyle patterns etc. Waste control is a matter of concern not only for reducing pollution and diseases but also for recovering valuable resources from the same. Waste management may include liquid, solid, gases or radionuclides substances, that are managed by various prospects and expertise[1]. Usually, every waste management involves a common procedure i.e. assembling waste, carting, initial treatment, organizing and finally reducing or lessening residues. Different types of trashes are collected in different way.

Practising managing waste is different for different nations such as cities and village areas. Similarly resident and industries also practice different management protocols[2]. In residents and institutions trash is managed by local government. Similarly in commercial & production units trash is managed by one who produces it.

Recycling & regulation of trash is been practiced mostly all over the world thereby managing waste both in surroundings and households[3]. Modern system of managing waste have considered recycling practice as an important parameter in managing waste thereby cleaning the surrounding by separating the trash materials.

The major objectives of trash management involves[4]:

1. Reducing aggregate trash by recycling of declined.
2. Re-introducing certain groups of materials as raw materials at secondary level or as carriers.
3. Re-introducing natural trash into biological cycle.
4. Reducing waste disposed on landfills upto to best level.
5. Development of naïve technologies to manage waste upto desired level.

Apart from this following waste hierarchy, i.e. "3Rs" – "reduce, reuse & recycle" so as to

properly manage trash and provide a clean & green environment[5].

II. METHODS OF TRASH MANAGEMENT PRACTICE

Categorization & allocation of discrete trashes to respective classes is not so easy by using traditional methods. Some naive methodology and techniques are needed to be proposed and manufactured by researchers. Table 1 shows methods of trash management procedures[6].

Table 1: Trash management procedures

Waste stream	Waste disposal methods
Combustible wastes	Roaster incineration
	Fluid bed incineration
	Pyrolysis-incineration
	Pyrolysis-gasification
	Separation-composting-incineration
	(Wet and dry) separation-digesting-incineration
	Separation-digesting-pyrolysis
	Separation-digesting-gasification
	Separation-digesting-incineration in a cement plant
Non-combustible wastes	Selective separation-incineration
Partially combustible waste streams	Landfill
	Pyrolysis and co-incineration in a coal power plant
	Pyrolysis and co-incineration in a powdered coal power plant
	Incineration in a fluid bed furnace
	Gasification
	Feedstock Recycling
Organic wastes	Composting
	Anaerobic Digestion

III. HIERIARCHY OF TRASH MANAGEMENT

The major concept of managing the trash is reducing the trash and then reusing it. By reducing the aggregate trash generated, a reduction in source trash may be achieved which will further can be reused thereby preventing them from entering main waste stream. The trash is collected once it gets generate. Recovering any material for trashes in the course of recycling followed by composting is considered to be convenient way of managing wastes. Due to improper facilities such as technology & economic problems of recycling, designing of product and inadequate trash separation sources, most of solid trashes are compost into landfills.

IV. SUBSTANCES RECOVERY FROM TRASH

Recycling

From generations reduce & reuse of trashes has been the most convenient methods of managing trashes. Recycling requires different lines of waste collection. Just because of limitations in differentiating sources, trash gets collected in mixed way that is addressed as “municipal solid waste (MSW)”[7]. Separation of mixed trash is very difficult. Usually manual separation is done which includes paper, glass, metals and plastics as these materials are recyclable. It is very hectic and time consuming to segregate such substances from solid trash and moreover sometimes it is not done properly thereby, problems arises in recycling and decomposing such waste. But these trashes are required to be combusted so as to prevent landfilling and at the same time generate energy.

Organic Composting

Organic composting is as important as inorganic trashes recycling. The compost of organic material obtained may be used for “organic 4066 Trends in Biosciences 10 (21), 2017 fertilizer” for farming.

These organic compost can be used as macro nutrients rich in N, P, and K. Apart from this, these can also serve as important micro-nutrients[8].

The compost generated from aerobic trashcomposting is already contaminated mainly by heavy metals. This type of contamination can be hazardous to health of public and surroundings which also restricts farming. Therefore, mixed trash composting is not a suitable method for sustainable trash management. India is usually preferred country for composting mixed trash comprising organic & inorganic substances as 93% of municipal solid trash is landfilled without any kind of alternative. Figure 2 is a pictorial representation of organic composting.

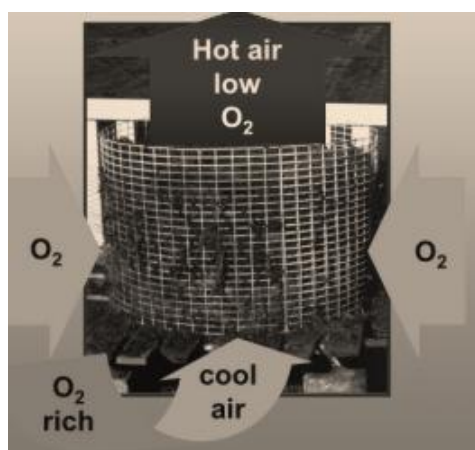


Figure 2: Organic composting

Energy Repossession

Energy repossession is process of repossessing energy that is in the form of chemical from municipal solid waste. Chemical energy saved in trashes serve as the input energy used in manufacturing such materials.

Biomethanation

“Anaerobic digestion” is defined as breakdown of organic substances i.e. food remains, manure, sludge etc. by micro-organisms without requiring oxygen. In reference to paper, anaerobic digestion or biomethanation refers to treatment of organic waste so as to repossess energy in the way of biogas and compost in residual liquid form[9]. The methane and CO₂ produced from biogas may be used as potent fuel or may be used for generating electricity. Moreover, the residual liquid slurry may also be used as organic fertilizer. Figure 3 is a pictorial representation of anaerobic digester.



Figure 3: Anaerobic digester

Landfilling

“United Nations Environmental Program (UNEP)” addresses landfilling as manageable disposal of trashes on land in a suitable way so that the contact b/w trashes & surroundings is reduced in a significant way thereby, concentrating trashes in predefined space/area[10]. Landfill is developed to extract trashes from the natural surroundings and leaving them innocuous via “biological”, “chemical” & “physical” processes.

A/c to researchers, the last option in hierarchy of trash management is landfilling. Of all the sanitary landfilling is the most commonly practiced solid trash management. Since, for landfilling there is a scarcity of area and moreover it also leads to increase in costs therefore, trash utilization is a potent alternative in contrast to disposal. Figure 4 is a pictorial representation of landfill.

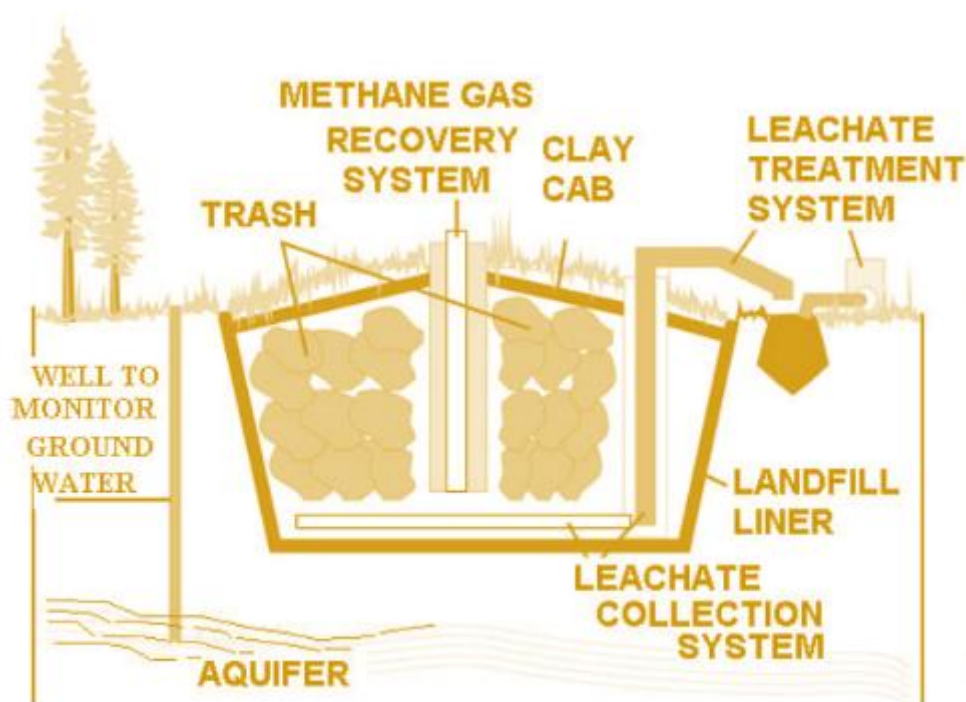


Figure 4: Landfill

V. PROBLEMS TO PUBLIC

The present level of solid trash management in metropolitan areas is very threatening to health of society. The smoke & bio-aerosols generated due to burning of trash are inhaled by people which may lead to severe health problems. Also, the release of air-borne insects can also lead to certain infections[11]. Toxic materials within trashes are the major cause of respiratory & skin problems, irritation within eyes and reduced life span. The percentage of carbon and hazardous elements like lead, chromium etc. leads to life

threatening diseases upon consumption with water.

Compost from composting of trash is usually infected with heavy metals such as zinc, copper, lead, nickel etc. Therefore, by utilizing such composts for farming on field can contaminate the field soil with contaminated heavy metals.

Also, the street animals, insects and pests also eat wastes and spread diseases to public. The mosquitoes too breed upon sewers and drainage systems that is clogged by trashes.

CONCLUSION

This paper conclude that, trash management is a matter of concern to prevent the public health from hazardous diseases and creating a clean & green environment.

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