



The concept of waste and waste management in India

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Abstract

India is now the world 3rd largest garbage generator. Now a day waste is becoming more complex as a variety of materials are discarded as waste together. The present paper seeks to examine these vital questions with a view to providing answers from previous studies. It was found that, waste is primarily subjective in meaning as a substance can only be regarded as a waste when the owner labels it as such. This is particularly true because one individual may regard a substance as a waste, while another may view the same substance as a resource. Nevertheless, it was argued that there is a need to clearly define what constitute wastes as this form the basis for regulation. Improper waste disposal methods such as dumping in open and gutter, burning were more practiced readily in comparison to environmentally friendly methods like composting for kitchen waste.

Keywords: Composting, environment, waste, wastes classification

Introduction

Most human activities generate waste, despite that, the production of wastes remain a major source of concern as it has always been since prehistoric period. In recent times, the rate and quantity of waste generation have been on the increase. As the volume of wastes increases, so also does the variety of the waste increases. Indhira *et al*^[1] conducted a study on Awareness and attitudes of people perception towards to household solid waste disposal. The type of household solid waste disposal items were food items, vegetables, dry leaves, plastics, garden waste, batteries, electronic goods, clothes, rubbers and glasses. Waste can be divided into 3 types, i.e. municipal waste, commercial and industrial waste, construction or demolition waste. Kitchen waste forms a significant constituent of municipal waste. It can be biodegradable like food waste, green waste, vegetable peels, paper or nonbiodegradable like glass, bottles, cans, metals, certain plastics etc. The biodegradable waste decomposes easily while the non-biodegradable contents can be of serious concern as they stay for long in the environment and hard to decompose. Unlike the prehistoric period where wastes were merely a source of nuisance that needed to be disposed of. Proper management was not a major issue as the population was small and a vast amount of land was available to the population at that time. In those days, the environment easily absorbed the volume of waste produced without any form of degradation. With human progress, an increasing amount of waste is produced, resulting in waste disposal using up land, as well as contributing to global warming and having negative environmental impacts^[2-4].

A substantial increase in volume of wastes generation began with time by time when people began to move from rural areas to cities because of industrial revolution. This migration of people to cities led to population explosion that in turn led to a surge in the volume and variety in composition of wastes generated in cities. The large population of people in cities and communities gave rise to indiscriminate littering and open dumps. These dumps in turn formed breeding grounds for rats and other vermin, posing significant risks to public health. An important question in modern day wastes management is – what

exactly is a waste? Waste is the useless by product of human activities which physically contains the same substance that are available in the useful product. Although, waste is an essential product of human activities, it is also the result of inefficient production processes whose continuous generation is a loss of vital resources.

A substance regarded as a waste to one individual, may be a resource to another. Therefore, a material can only be regarded as a waste. Despite this subjective nature of wastes, it is important to describe clearly, what constitutes a waste because. This is because the classification of a material as a waste will form the foundation for the regulations required to safeguard the populace and the environment where the wastes are being processed or disposed of.

Statement of the Problem

Although it is generally agreed that wastes management services are essential services that must be provided in every society, nonetheless very little is known on what exactly constitute a waste. Knowing that the concept of waste is highly subjective as one man's wastes is a resource to another. Hence, it is important to have a clear guide as to what could be classed as waste. The present research therefore examines the concept of wastes and wastes management with a view to determining what waste is, how they are classified and managed.

Methodology

This type of research approach is employed when a substantial amount of work has been done on a research topic and when the intention of the study is to answer specific questions based on previous works.

Classification and Types of Waste

Waste arises in many different forms and its characterisation can be expressed in several forms. Some common characteristics used in the classification of waste includes the physical states, physical properties, reusable potentials, biodegradable potentials, source of production and the degree of environmental impact. Waste can be classified broadly into three main types according to their

physical states; these are liquid, solid and gaseous waste. Although several classifications exist in different countries. The most used classifications are illustrated below.

- Physical state Solid waste Liquid waste Gaseous waste
- Source Household/Domestic waste Industrial waste
- Agricultural waste Commercial waste Demolition and construction waste Mining waste Environmental impact Hazardous waste Non-hazardous waste

Due to the limited scope of the research study, liquid wastes, which can be disposed of via sewer networks or lost to ground water, and hazardous wastes, which require tighter environmental controls, because of their potential to cause environmental harm, are excluded. Only solid waste will be discussed in detail, excluding hazardous solid waste.

Solid waste as the waste produced by human activities that are in a solid or semisolid form and are thrown away as useless products. That solid wastes are a broad group of wastes produced because of various activities such as agricultural activities, landscaping activities and other processes including domestic and commercial processes. Solid wastes are distinctly different from wastewater and gaseous waste emissions. Solid wastes are any wastes that people would normally consider fit for land disposal. Solid waste includes municipal waste, some biomedical waste, electronic waste and some hazardous waste. Solid waste could be putrescible and non-putrescible. Solid wastes are waste materials from municipal, industrial and agricultural activities.

1. Some Common Sources/Types of Solid Waste

Since solid waste consist of several types of waste, it is important to briefly examine the various forms and types of solid waste.

1.1 Municipal Solid Waste (MSW)

Municipal solid waste (MSW) is an important waste stream and one of the most studied. MSW has several implications. Waste stream that people often come in contact with, their collection, treatment and disposal is considered as an important service. Municipal solid waste as the waste collected by which include refuse from household, non-hazardous solids from industrial, commercial, institutional and non-pathogenic hospital waste. Municipal solid waste (MSW) as waste produced from household and commercial premises. They added that municipal solid waste is only a small fraction of the total solid waste arisings. MSW can have a negatively impact on the well-being of the public and the environment if not properly managed.

The compositions of municipal solid include materials such as soil, garden and food waste, wood, paper, ashes, plastics, textiles and rubber. Municipal solid wastes are a collection of wastes that are mainly from household and commercial sources. MSW mainly consist of food and garden waste, textiles, paper or cardboard, plastics, glass and metals. Due to the composition of MSW, the waste could easily be used for energy recovery or the production of fuel. Unlike other waste streams that are more homogeneous with a good percentage of each material, the composition of municipal solid waste is diverse and are generally prone to changes from city to city and country to country.

1.2 Construction Waste

Solid waste from the construction industry one of the main waste streams in our country. Huge waste produced by the construction industry adds to the cost of construction projects, mainly due to the strict control of landfills. Most construction waste are produced from design/detailing errors, design changes, packaging waste, unused scrap materials among others. Similarly, A good percentage of construction waste produced, includes plastics, metal, wood and stones mainly from demolition and re construction activities.

1.3 Industrial Waste

Industrial wastes as waste produced because of the processing of raw materials for the production of new products. That could be in factories, mines or even mills. Different types of wastes produced by the industries; they added that some of the wastes are toxic while others are non-toxic.

1.4 Agricultural Solid Waste

Generally, Agricultural solid wastes are many and are beyond the scope of this study. However, agricultural wastes are wastes arising from activities such as the rearing of livestock, sowing of plants and from milk production. Agricultural waste materials include animal manure, various crop residues and silage effluent. Agricultural wastes are mostly reusable in the energy and industrial sector. Inappropriate management of agricultural waste may lead to environmental hazard for example, high application of manure on land could pollute surface and ground water.

1.5 Commercial Waste

Commercial waste is an important waste stream especially considering the vast amount of solid waste generated from this sector. Commercial solid wastes are solid or semi-solid wastes produced as a result of activities in stores, restaurants, markets, offices, hotels, motels, print shops, service stations, auto repair shops. Commercial waste is often discussed or grouped under municipal solid waste. However, Williams (2005) noted that, in most cases information on the breakdown of wastes into domestic and commercial are not readily available. Generally, the most common waste produced by the commercial sector include, consumer electronics, batteries, tires, white goods, paper, cardboard, metal, plastics, food waste, wood, glass. A breakdown of the different sources of commercial waste reveals that several thousand tonnes of waste are generated from various commercial activities yearly as illustrated below.

Traditional/open Markets: Open market trading is a popular practice for general buying and selling of goods. The items sold in these markets include textile, household goods, foodstuffs, herbal medicines, pharmaceuticals, electrical goods, building materials, stationaries among others. Although these markets attract growths to the local economy, the inadequate management of waste in these markets means that they contribute to environmental degradation. A study conducted in India (Rajeshwari *et al.*, 2001) ^[5] revealed that waste from these markets is usually very rich in organic matter. However, Rajeshwari and others reported that, these organic materials are often

dumped indiscriminately. Most of the solid wastes produced in these traditional markets are food waste.

Hotels and restaurants: The hotel industry can negatively impact on the environment due to the large volume of solid waste they produce. Most hotel operators are not environmentally conscious; that most of the hotels do not reuse their waste. Hence, they contribute to environmental degradation because of the huge volume of solid waste they generate daily. Some of them have the lack of interest to reuse waste in the hotel industry is as a result of the cost associated with the purchase of recycling materials. Lack of information on the impact of solid waste generated by hotels on the environment added to the lack of interest to reduce solid waste by the hotels. The average a hotel will produce more solid waste than a household. The characteristics and the volume of waste produced in a hotel would depend on the number of rooms available in the hotel and their involvement in events hosting.

A typical hotel will produce waste from various sources such as Kitchen and restaurants, rooms, offices, laundry and gardens. The typical waste composition will include food waste, plastics, paper, paints, used batteries, garden waste among others. The waste materials included plastic toiletries, unused soap, slippers and newspapers.

Retail waste

The retail sector covers various commercial activities from the sales of vehicles to household items in or outside stores. Most wastes produced from the sector are non-metallic with composition ranging from packaging materials to animal and vegetable waste. Generally, the type of materials sold influences the type of waste produced. Materials such as fruits, baked products, seafood, packaging materials and other frozen products make up a large amount of waste from grocery stores.

Waste Management

Human interactions with the environment (human activities) have always resulted in waste production. Waste production and management was not a major issue until people began living together in communities. Population and purchasing power of people increases worldwide, more goods are produced to meet increasing demand, thereby leading to the production of more waste. These continuous flows of waste resulting from human activities, overburdened the environment.

Proper planning and control are required in order to prevent the negative impact of waste on the environment. Proper organisation of solid waste management has become an essential task needed to safeguard the environment. The provision of an efficient solid waste management system is now as important as other essential amenities such as electricity, airports, and highways, due to the increasing volume of waste. The continuous disposal of waste to landfill is unsustainable. The processing of waste is a necessary step needed to safeguard public health.

Waste management as a process by which wastes are gathered, transported and processed before disposal of any remaining residues. Solid waste management as the effective supervision and handling, keeping, collection, conveying, treatment and disposal of waste in a manner that safeguard the environment and the public. Some waste

management methods are often preferred than others. For instance, reuse, recycling, composting and energy generation from incineration are often preferred to landfills. However, even some of the preferred management methods, often produce some hazardous materials such as incineration residues. Landfilling is the destination of most waste produced from waste treatment and processing facilities. Strange, added that, other technologies merely serve the purpose of volume reduction or treatment before final disposal.

There are different forms of approach to waste management. Wastes streams with different characteristics may require different management approach. For instance, industrial waste might contain more hazardous materials than municipal waste streams. Hence, the management of these two waste streams might differ. Wastes generated must be gathered and stored by the generator in a place. The municipal authorities or their agents collect the waste from the point of storage, for transportation to processing or disposal sites. The study added that, in some instances, the waste generators separate the waste into various materials from where they are collected for recycling by the recycling industries.

Conclusion and Recommendation

It is agreed that wastes is a direct result of human interaction and activities. Nevertheless, there seems to be several opinions as to what constitute a waste. Wastes are materials whose owners no longer have a need for. Therefore, it is obvious that wastes is indeed subjective in meaning, as the term is open to several interpretations and also influenced by personal opinion. Nevertheless, it is important to provide a definition or at least a guide for the purposes of policies and legislations. This is evident from the fact that, it is the knowledge of what specifically constitute a waste and the categories of wastes that determines how wastes are dealt with or managed.

Waste management involves a process whereby wastes are collected, transported and disposed of in the best possible way of limiting or eliminating the harmful effect of wastes. This aspect of environmental management is as important as other public amenities or infrastructures without which the life of contemporary man would be extremely difficult. This is because studies have shown a direct link between air, water and land pollution and diseases such as lung cancer, heart disease, cholera and hepatitis. Since factors such as population increase and the coming together of people to form communities lead to increase waste generation. Efforts should be directed towards making projections far ahead to ensure that new and existing settlements are adequately planned so as to accommodate possible increase in the volume of waste generation in future. Effectively planning will prevent indiscriminate disposal and other harmful practices so as to prevent the build-up of open dumps and breeding ground for rats and other vermin which poses health risk.

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