

An Overview of Solid Waste Management and its Aspects

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ABSTRACT: *Solid waste management is the major issue in front of the many countries and its different aspects including generation, collection, processing as well as recycle and reuse plays an important role in the favor of human, animal as well as environmental health. Different sectors including industries, transportation and agriculture etc. produce wastes at large scale that has adverse effect on the ecosystem. Different techniques for the management of solid waste has been implemented such as incineration process and composting method etc. The technique is adopted based on the type of the solid waste in order to ensure that it is not damaging ecosystem. In order to overcome such issues, proper management of solid waste can help to minimize its negative impact on the health as well as on environment. By considering the importance of waste management issue, this review paper discussed about the solid waste management and its different aspects. Proper solid waste management implementation will help for the protection of ecosystem equality, public well-being and environmental conservation.*

KEYWORDS: *Disposal, Ecosystem, Environment, Solid waste, Waste Management.*

INTRODUCTION

The management of the solid waste is the main problem in front of the many cities in front of small as well as big cities. As the world's population increases, the demand of the different things such as food, infrastructure and transportation has been also increases exponentially. In order to fulfill the demand of the society, there are various sectors such as agriculture, industries and construction has been growing significantly[1]. In order to fulfill the demand of the food by the growing society increases significantly in recent years. Small scale farming system doesn't have capability to fulfill this demand that is why industrial farming system comes into the picture. Industrial farming utilizes the heavy machines and large farm land in order to increase the yield rate so that food can be produce at large scale. The main issue associated with the industrial agriculture is that it produces solid waste at large scale if consumption of the food not takes place in proper manner. If food is not consumed within the time limit just after harvesting, then there will be heavy wastage to food takes place that create the issue of solid waste management in agricultural sector[2]. Another side of the agriculture is municipal waste that is collected from the houses. First of all it is very important to minimize the solid waste comes from the agriculture waste as well as proper solid waste management technique must be adopted.

On the other hand, there has been waste or leftover hoarded on large scale by different industries that might be hazardous as well as non-hazardous waste. The wastes that come from the different industries can be scrap of metals, scrap of lumber, concrete and weed trees as well grass and the electronic waste also. These wastes have huge adverse effect on our ecosystem that shows negative impact on the wildlife and health of the humans as well as animals. It is very important to manage the solid waste so that its impact on the ecosystem can be minimized. From the last few years, individuals, government authorities as well as industries give the importance to the solid waste management. Different techniques has been tried to implement so that solid waste management can be done properly. This review paper provides an overview of solid waste management and its different aspects. This paper will discuss about the different sources of solid waste and how it can be minimized and how it can be manage properly so that conservation of ecosystem takes place more effectively. This review article provides a good reference to the researchers those are working in the field ecology and more particularly in green technology.

SOLID WASTE MANAGEMENT AND ITS IMPORTANCE

Solid waste management is a technique, by which the accumulated waste from the different sectors (as shown in the Figure 1) is collecting, processing and disposing of wastes that are in solid state that must be superfluous

because it can't be utilize for longer time to serve its perseverance. In some cases, the solid waste management includes the recycling and reuse process rather than disposing it.

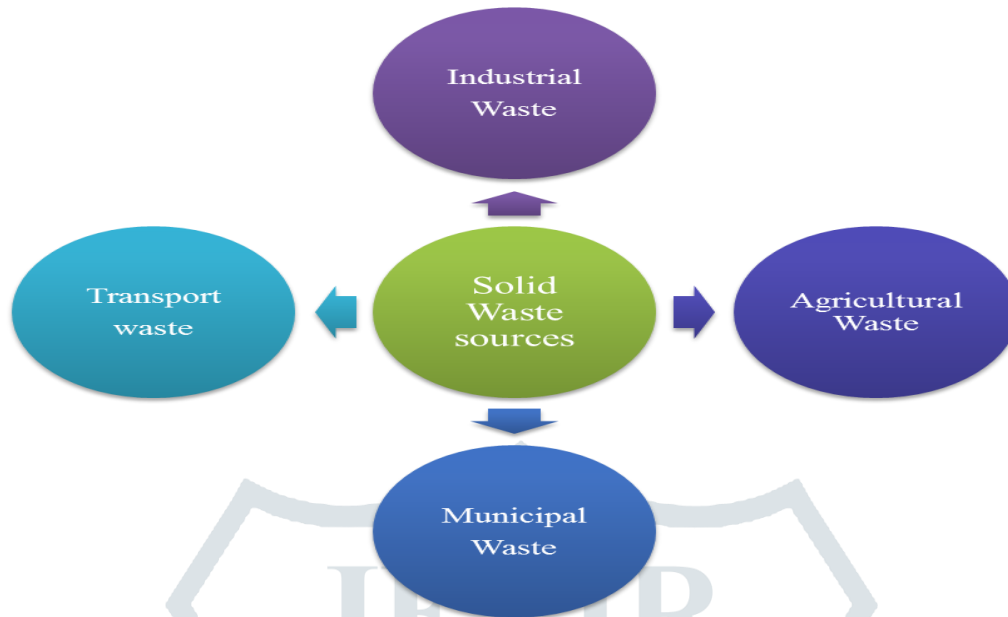


Figure 1: Schematic Illustration of the Different Sources of the Solid Waste

The solid waste generation by the different sectors promotes the development of different techniques of the management of solid waste because the particular solid waste management techniques must be utilized for specific kind waste otherwise it will negatively impacted on the other aspects of the ecosystem. For instance, toxic solid waste cannot be dispose to the sea because it will damage the marine ecosystem. That is why it is important to adopt proper solid waste management technique for specific kind of solid waste. The different solid waste generated by different sectors is listed in the Table 1.

Table 1: List of Sectors for that are Generating Different Sorts of Solid Waste

Sectors	Types of Solid Wastes
Agriculture	Fertilizer tanks, Manure, harvest's leftovers, feeds as well as pesticides etc.
Industries	Useless tires, scrap of metals, useless motor vehicles, electronic waste, septage, useless consumer appliances, concrete etc.
Municipal	Used cans as well bottles, used batteries, clothing, food items and newspaper etc.
Transportation	Garbage, radioactive substances and toxic as well non-toxic elements etc.

There are various factors because of that the solid waste management is necessary. Some of the factors are discussed below:

- Because of rapidly growing population of the world as well as increase in growth of urbanization, solid waste generated at large scale.
- The generation of the solid waste has adverse effect on the human as well animals' health.
- Solid waste has bad effect on the food as well as water quality; it improves the water population that has direct negative impact on marine ecosystem as well as on health.
- It helps to minimize the risk of various diseases and pollution including air and water pollution as well as soil pollution.

- Proper implementation of the management of the solid waste provides the capability to manage the solid waste for minimizing its impact on ecosystem by adopting various processes including collection, separation, processing either disposing or recycling and reusing.
- By adapting the advanced technologies, the management of solid waste can execute more effectively that encourage the eco-friendly nature of it.

SOLID WASTE MANAGEMENT IMPACT ON HEALTH AND ECOLOGY

Solid waste is an important component that promotes various diseases among the public as animals, it also has adverse effect on the ecosystem. Different ecosystems have its own importance in our nature. Ecosystem provides us different necessity things in order to survive such as food, water and fresh air etc[3]. Rapid growth of the population as well as industrialization stimulates the generation of the solid waste from different sectors. The solid waste can be toxic, non-toxic and radioactive substance. Every solid waste must be dispose or recycle and reuse properly otherwise it may encourage the damaging of the environment. Different waste has different elements such as it can be hazardous or nonhazardous due to which each solid waste must be process through proper solid management technique so that its output can be maximized.

Solid waste management can help to improve the health of different ecosystems including forest ecosystem, marine ecosystem, grassland ecosystem and freshwater ecosystem etc. Since every ecosystem has its own importance in the nature that is why it must be conserve through the proper solid waste management systems. The municipal wastes are the major cause of the spread of various diseases in the society. For instance, houseflies are the major cause of the disease transmission. Houseflies sits on the different toxic, non-toxic and other wastes then they come back to houses and sits on the consumable things that are used by the humans. In this way, various diseases caused by bacteria and other means transmitted by houseflies from one place to another place[4]. There are some communicable diseases are can be possibly transmitted by the houseflies, the main diseases are comes from infectious diseases category. More particularly, houseflies are very responsible for the dysentery as well as diarrhoea. The spreadness of these diseases by houseflies is greater at those places where disposal of the solid waste is not proper. Houseflies are greatly attracted by the processed food or food in bad conditions. That is why the promotion of the management of the solid leftover is very significant.

Another disease that are spread due to an inappropriate disposal of the solid waste generally known as non-communicable disease. When the solid waste disposal site are not operated in proper manner then lots of toxic and hazardous substances transfer to the groundwater including chemicals as well as heavy metals etc. These substances increase the chances of water pollution and soil pollution that has as adverse effect on the health of the humans as well as animals and ecological systems. That is why proper management of solid waste includes properly operated disposal sites or places. Another drawback of badly functioned disposal sites is risk of injury. While workers dealing with the solid waste, there are various hazardous things are in the waste that can cause of injury. Proper management of solid waste promotes the proper handling of the wastes at disposal places or sites[1], [5].

SOLID WASTE MANAGEMENT AND ITS ASPECTS

Solid waste management plays a vital role in the conservation of the environment and secure health of the humans as well as animals. It is a technique that promotes proper disposal of the waste so that the adverse effect of hazardous substances on the environment can be minimized. There are various steps involves in the effective management of the solid waste, some of the steps as shown in the Figure 2.

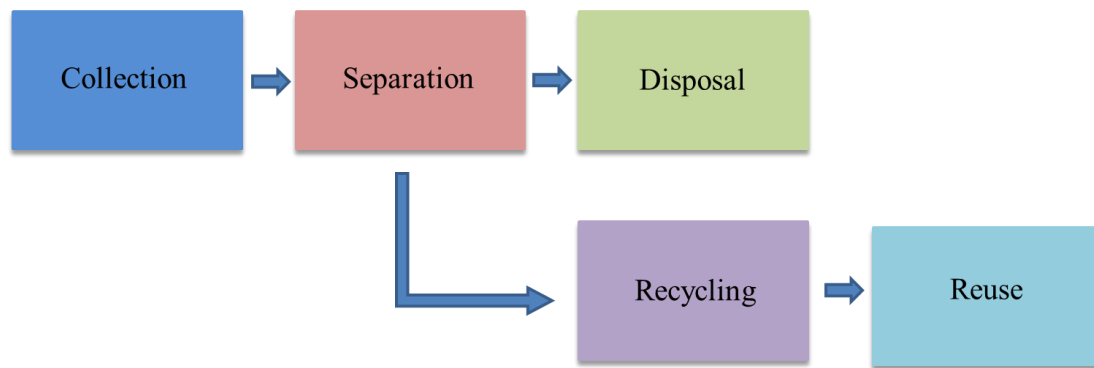


Figure 2: Schematic Representation of the Different Processes in the Solid Waste Management

The process of management of solid waste itself an attention seeking topic because the management of waste totally depends on the various steps involves in the procedure. There are different types of solid wastes comes from different sectors that is why it must be ensure that each waste should be process according to the hazardous level and in which conditions these wastes has been collected. The list of major steps that has been involved in the management of solid waste is listed in the Table 2. Each step has its own advantage in the technique of management of solid waste. Government authorities of various countries now give the proper attention to the solid waste management because of climate change and global warming. Since most of the diseases caused by the low quality of water that is why authorities ensure that no chemicals or hazardous solid substances directly dispose to the ground.

Table 2: List of Process in the Technique of Management of Solid Waste.

SWM Process	Explanations
Collection	This is the primary step of the effective management of the solid waste. The waste comes from the different sectors such as agriculture, construction as well as industries etc. Each waste must be collect in proper manner because different waste has different impact on the ecology and the health. In this regard the collection center of the solid waste can play significant role in that. For instance, municipal waste includes used plastic bottles, cans and food stuff etc. Each waste collectively collected by the municipal corporation vehicle. In each society there are various bins has been established by the municipal corporation that are generally known as collection centers. So that citizens can put their collected waste in the bins followed by the collection of the waste from the bins by the municipal corporation vehicle. This is the general step followed by the collection of municipal waste. Like that other sectors such as agriculture and industries follows almost same collection procedure but in different manner.
Separation	Since wastes are combination of different substances, for instances in municipal waste consist of used bottles, food stuffs, used cans and other things are usually utilized in houses. Since each waste has different substances so that the separation of the each waste must be needed so that each waste can be dispose separately. Like plastic bottles has following different disposal technique as compared to the cans or food stuffs. For the separation of the wastes different mechanisms has been used, in some cases machines has been utilized and in some cases manually has been done by the workers. Separation has

	been done on two bases; first one is based on type of elements like metals or plastic. And the second one is size.
Disposal	Now after the sorting of the different wastes based on size and the type of substance. Disposal of the waste takes place. Each waste disposes in different way because it involves different processes. Like food stuff can dispose in different way as compared to the plastic. Some waste can't be used for further that is why those wastes doesn't have important significant for longer time. In this regard, this type of waste vanishes completely through the proper disposal process. Some wastes are like food stuffs can be utilized further in order to fulfill different objectives. These types of wastes deal in different way. After sorting of these wastes, it goes under the recycling process so that in can consume in different ways for fulfilling the different objectives.
Recycling	Recycling is the process by which used stuffs or substances convert to the different materials or products so that these stuffs can be further used for different purpose. For instance, food stuffs are biodegradable and full of nutrients. These days recycling of the food stuffs takes places on large scale because it can be convert to the biomass or bio fertilizes through proper recycling mechanism. Since, chemical fertilizers have shown adverse effect on the food quality so that bio fertilizers based on the food stuffs plays an important role in the agricultural sector. Like that scrap metal can be recycled in order produce different metal items that can be utilized for different purposes.
reuse	The recycling of the waste now gain significant amount of attention because it offers various benefits such as conservation of the raw materials and reduce the adverse impact on the ecological systems. Recycling is an industry that process different wastes in order to generate the different new items or products according to the need. Reuse of the recycled products reduces the pollution significantly. Various industries also promote recycling and reuse of the products because it involves less need of raw materials as well as capital investment.

TECHNIQUES OF MANAGEMENT AND DISPOSAL OF SOLID WASTE

The disposal of the waste is the final stage in the management of the solid waste. Disposal usually utilized sites of landfill in which solid wastes are directly dumped. These disposal sites are usually operated and maintained by the municipal corporations but these are common in developing countries or low income countries. Developed countries doesn't follow this disposal method, generally they utilize sanitary landfill sites for the disposal of the solid waste in the final stage of the management of the solid waste. The main disposal techniques in the management of the solid wastes are listed in Table 3.

Table 3: List of Disposal Techniques in Effective Management of Solid Waste

Disposal Technique	Characteristics
Dumping into sea	<ul style="list-style-type: none"> Well suited for the locations that are situated at coastal areas Expensive The nature of this techniques in not friendly with environment

	<ul style="list-style-type: none"> • The waste has to carry long way from coastal area for dumping of the waste
Sanitary landfills	<ul style="list-style-type: none"> • This techniques is well known for its inexpensiveness, simple as well as effective • A dig in the ground required for the disposal of the solid waste • Each layer of the waste packed by the mechanical tools and put earth on that. With time the solid waste settle down. • Microorganisms present in waste decompose them that is commonly happens in the composting technique • Limited quantity of the waste can be dispose at a time
Incineration	<ul style="list-style-type: none"> • In this technique burning of the waste utilizes in order to dispose the solid waste • Well suited technique for the combustible waste • High capital investment is needed for operation and maintenance • For incineration, drying chimney has been utilized
Ploughing in fields	<ul style="list-style-type: none"> • Very less utilized for the disposal of the solid waste • Usually, not friendly with the nature or environment
composting	<ul style="list-style-type: none"> • This technique is close enough to the disposal technique of sanitary landfilling • This technique is widely used in the developing countries • It decompose the organic matter present in the waste • There are mainly two types of composting techniques <ul style="list-style-type: none"> ➤ Composting based on open window ➤ Mechanical composting
Salvaging	<ul style="list-style-type: none"> • In this technique, the substances like glass, plastic and paper shall be salvaged following by recycling of the waste and reusing it
Hog feedings	<ul style="list-style-type: none"> • Not usually used in the developing countries like India • The solid waste are place in the different grinders followed by the feeding into the sewers • The residues of solid waste can't be dispose properly by utilizing this technique
Fermentation as well as biological digestion	<ul style="list-style-type: none"> • This technique generally process biological waste in order to convert into compost • Recycling is the major advantage of this technique • Toxic wastes can't be dispose in this technique • The technique is usually based on fermentation that is mostly utilized for the conversion of

	<p>waste products to the useful production by utilizing the activity of microorganisms</p> <ul style="list-style-type: none"> • This technique doesn't require high maintenance cost • Environmental friendly in nature • Less risk of injury
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DISCUSSION

Solid waste accumulation is the one of the major issue in front of the society because it has adverse effect on the health of the humans as well as animals and ecology. Various sectors including construction, industrial agriculture and industries generates solid wastes at large scale. These wastes damage the environment and increase the air pollution, water pollution and soil pollution etc. Among all the wastes coming from different sectors, municipal waste has high priority of dealing with because it has direct impact on the society. Industries are major source of generation of the solid waste because industries work on the large scale. Most of the industries have proper waste management techniques but in order to ensure the proper management of solid waste, techniques must be upgrade every single day. There are various steps involves in the effective management of the solid waste that combines different stages including collection, sorting, disposal, recycling and reuse. These steps are primary objective to follow in solid waste management. Since each waste is the collection of different sizes and different substance that is why sorting of the wastes plays an important role in the solid waste management because based on the further process have been proceed. The effective management of solid waste minimizes the pollution significantly and will promote the conservation of the ecosystem.

CONCLUSION

The management of the solid waste is the primary concern of many countries, more particularly in populated countries such as India and China. Rapid growth of the population increases urbanization and food requirement. High population improves the demand of various things including food, infrastructure and transportation due to which industrialization takes place on large scale in order to fulfill the demand of the society. Since industries produce products at large scale that is why they generate solid wastes on large scale. The management of solid wastes is the major problem because it has adverse impact on the environmental conditions. Air pollution and water pollution is mainly caused by the solid waste. The waste creates many issues related to the health of public and drainage systems etc. In this regard, an effective and efficient management of solid waste is extensively needed. In future it will recommended that, government authorities must take initiatives and make proper guidelines for the management of solid waste so that these effects can be minimized and also individuals as well industries has to take responsibilities to reduce the generation of wastes as less as possible.

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