LANDFILLS: AN EMERGING THREAT TO ENVIRONMENT

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Solid waste can be defined as any solid material generated, which is not required and is of no use. With time these wastes may become toxic and hazardous making their disposal a serious threat and concern to the environment and human health. The rapid population growth and uncontrolled urban expansion has resulted in accelerated consumption of resources which has ultimately led to the increased amounts of solid waste which has become cause for degradation of environment.

As per world bank report, an average of 740 grams of solid waste is generated by each person in a single day. Total municipal solid waste generated across the world amounts to approximately 2 billion tons out of which 34% is contributed by high income countries.

Sometimes waste generated vary from person to person, time to time and place to place. So, depending upon the type of waste generated we can go for different management processes like if the waste generated is paper, plastic etc., it can be recycled or reused, if the waste is organic, it can be composted, combustible waste can be incinerated or even energy can be generated from waste. Besides all this, still a major portion is being disposed of in open areas or unmanaged landfills. According to reports 37% of total waste produced globally is dumped in form of landfills and in India, about 91.4% of the collected waste was landfilled.

What is landfill?

A landfill is any form of land area used for dumping and disposal of all form of waste. It can be an open dump without proper management or can be a fully engineered site with necessary measure to protect the environment

This economic and mostly used method of landfilling is widely used in countries like India with an objective to minimise the direct influences of solid waste on land, water, air, animals as well as humans. They can be: Open Dumps or Unsanitary Landfill, Semi-controlled or Monitored landfills, Sanitary landfills.

Landfills are effective but they are still least rational method of waste management. A tremendous amount of waste is being dumped in the form of landfill and as per the current estimation 1240 hectares of land is required as landfill per year. It is estimated that by 2030 the landfill area equal to Bengaluru will be required to dump municipal solid waste. Not only this but continuous odour, air pollution, water pollution etc., due to landfills are serious sanitary problems.

Effects of landfills on environment

Formation and emission of gases and leachate formation are the two-major impacts of landfills. Gases like CO2, methane along with other constituents from landfills are generally formed due to biological decomposition of municipal solid waste. Along with this, Leachate which is the liquid containing hazardous and carcinogenic chemical constituents percolate through deposited waste into the ground water. Leachate sometimes may also contain heavy metals like Copper, Cadmium, Zinc etc.

Due to these two factors, several accidents of fire and explosion in landfill are reported, the gases formed are combustible in nature and have ability to form explosive mixture in air, also oxygen and methane are good factor to sustain a fire. Landfills are also known to damage vegetation at nearby site due to gases released from them. Along with these the unpleasant odour from the landfill is also major problem. The differential composition creates differential settlements that effects the integrity of landfills. The percolation of leachate is the most significant threat to groundwater. Also, landfills are known to contribute in global warming due to emissions of greenhouse gases.

Scenario of Delhi

The whole world is facing issues of landfill sites for waste disposal. Due to enormous amount of waste generated the requirement of landfill sites is increasing day by day. Today it's like a waste beast, growing every day and the national capital Delhi is no exception to it. Shown in fig.

(Image Source: Singh et al., 2019)

Practices to reduce burden on landfills

Solid waste is increasing and is becoming a serious problem. Therefore, proper management and disposal of waste materials is necessary. Good waste management includes many processes, including maintenance, collection, transportation, processing, recycling and disposal. Integrated waste management is always recommended.

Landfills are not considered the best solution for waste management.

Recycling is considered a better option than landfill. Many materials are recyclable, at least to some extent. Certain products can be obtained from materials by recycling materials such as wood, metals such as iron and aluminium, plastic and especially glass.

Waste-to-Energy Conversion (WTE) - Waste can be incinerated to produce energy. This allows unused materials to have a second life by being used to generate more energy that can be used by the community.

However, it is linked to the production of greenhouse gases such as carbon dioxide. Anaerobic digestion is a process by which bacteria and other organisms break down organic waste and produce methane without the need for oxygen and open air. Anaerobic digestion is a relatively new process that is just beginning to gain attention as a waste management and energy production process. Composting is another method that mineralizes organic waste through microbial degradation.

Currently, a lot of research is being done to develop new and advanced techniques for efficient waste management.

One such process is pyrolysis, which utilize high temperature to break down organic waste into smaller products that can be more easily disposed of. Another process, called plasma arc gasification, catalyses organic matter into syn gas and a waste product called slag, which can be used to make materials used for construction.

Thus, management of municipal solid waste is a serious concern, in addition to available approaches for management of landfill, sensitization of people is equally important to reduce the production of solid waste.

GHAZIPURStarted in: 1984Area: 29.6 haDumping rate: 2000 TPDStatus: Dumping continues

BHALSWAStarted in: 1992Area: 26.2 haDumping rate: 2200 TPDStatus: Dumping continuesOKHLAStarted in: 1996Area: 16.9 haDumping rate: 1200 TPDStatus: Dumping continues

References

- The world bank ‘Trends in solid waste management’. Available at: The tundra and the permafrost underlying it might seem a million miles faraway to the majority of us. However, regardless of where we reside, the choices we make on every single day ultimately contribute to climate change and have a significant impact on the world's climate. We can help protect the permafrost on the earth and stop the vicious loop of global warming by lowering our carbon footprint, purchasing energy-efficient products, and supporting climate-friendly organisations, laws, and policies.
- The primary issue with permafrost is that it will continue to melt and release carbon even if human emissions are reduced. Permafrost won't thaw all at once, and the carbon will not be released in one go as a huge puff. Instead, it will slowly leak out over decades or perhaps centuries. According to the IPCC study, the thawing permafrost would have an impact on more than 1,200 communities, 36,000 buildings, and four million people, worldwide. This puts the hard-won Paris climate objectives to keep the increase in global temperatures at well below 1.5C—compared to preindustrial levels under jeopardy from the planet-warming gases leaking from permafrost.
- https://www.researchgate.net/publication/335136652_Landfill-Solution_or_a_Bigger_Problem_to_the_Environment