

TO STUDY TECHNIQUE USED FOR RESTORATION OF LANDFILL SITE IN MULUND, MUMBAI

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Abstract - Landfills are seminatural terrestrial ecosystems reconstructed on lands with a history of waste disposal. The most important point source of environmental pollution is generated by the municipal waste landfill. This paper is about finding different ways to reuse/recycle the municipal solid waste landfill site. The restoration of landfill in general includes land clearing, soil and water conservation, provision of irrigation facilities etc. This research is conducted reviewing the literature, case studies, collecting data from site visits and site analysis. The outcome of study will help in how to restore after use of closed landfill. Thus, restoration of landfill through this management serve a better form of soil by reducing pollution of land and better positive effect on climate change.

Key words: Climate Change, Landfill, Municipal Waste, Pollution, Restoration.

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I. INTRODUCTION

A Landfill site is a site for the disposal of waste materials. Landfill is the oldest and most common form of waste disposal. In every city there are municipal waste landfills. These closed landfills need to be restored to minimize their potential adverse impacts on the environment and to render them safe for beneficial.

Landfills are regulated under RCRA (Resource Conservation and Recovery Act) Subtitle D (solid waste) and Subtitle C (hazardous waste) or under the Toxic Substances Control Act (TSCA). Subtitle D focuses on state and local governments as the primary planning, regulating and implementing entities for the management of nonhazardous solid waste, such as household garbage and nonhazardous industrial solid waste. Subtitle D landfills include the following:

- Municipal Solid Waste Landfills (MSWLFs)
- Bioreactor Landfills
- Hazardous Waste Landfills
- Industrial Waste Landfill
- Construction and Demolition (C&D) Debris Landfill
- Coal Combustion Residual (CCR) landfill

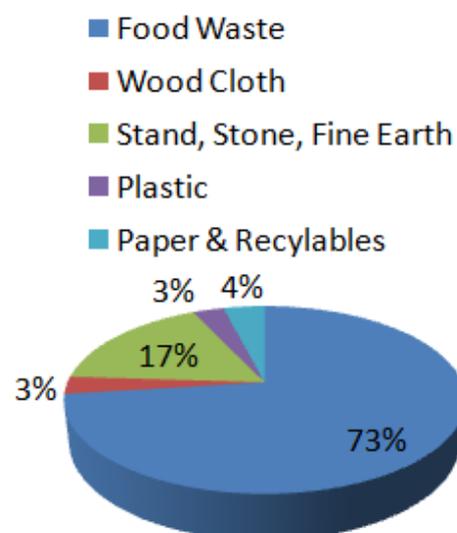
In Mumbai City Deonar, Kanjurmarg, Mulund and Gorai landfills are present. The landfill at Deonar and Mulund was permanently closed after it got filled to its maximum capacity. According to the Bombay high court, the BMC (Brihanmumbai Municipal Corporation)

cannot dump fresh waste on those landfills.

II. MULUND LANDFILL

Mulund landfill is located in the Mulund East in Suburban Mumbai. The site area is 32 Hectare. Over 7,000 metric tonne waste being generated in the city. On Mulund landfill everyday 1500 tonnes waste is generated. The type of waste is Municipal solid waste and Debris. The waste is collected from Northern Mumbai. In February 2016, the Bombay High Court had ordered the BMC to close down the Mulund and Deonar dumping grounds after observing they had reached their saturation points.

➤ DAILY TRASH OF MUMBAI 7000 PLUS TONS



➤ WHAT WILL HAPPEN TO LANDFILL AFTER CLOSING?

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After closing landfill the first thing is Biomining. With the help of

Biomining process will clear the land.

- Rs. 558 cr plan devised by BMC to reclaim it. 7000 tonne heap, accumulated over years, to be broken through Biomining. On Mulund landfill the biomining process is applying.
- After biomining the next process is improve the soil fertility by using different methods..
- After all this methods we can use the landill as a Natural Park for public.

- It is widely used for the extraction of gold from ores this process involves exposing the ore to bacterial oxidation which degrades (breakdown) the insoluble pyrite and arsenic components as it is a precious metal only removal of interfering metal sulfides from ore. Actually bio oxidation leaves metal in solid phase and solution is discarded.

III. WHAT IS BIOMINING?

Biomining can be defined as the extraction of minerals from ores by using micro-organisms. The micro-organisms actually facilitate the extraction of metals from sulfide/iron containing ores. Metals solubilization process is involved in biomining and it is a combination of microbiology and chemistry.

Methods of Biomining

- Bio leaching
- Bio oxidation
- Common metals

BIO LEACHING

- It is a classic method of bio mining. In this method low grade ore is dumped into a heap called leach pile and then soaked with weak sulfuric acid wash. Then acid react with the ores sulfide matrix and encourages the growth of bacterial strain which start to degrade ore and releases minerals/metal in fluid form.

BIO OXIDATION

COMMON METALS

Metals for which this technique is employed included copper, nickel, zinc, uranium, gold and silver.

MICROBES

Most common microbes which are used for bio mining :

- Thiobacillus
- Leptosprillum

IV. METHODS FOR IMPROVING SOIL FERTILITY

Soil fertility and sustainable agriculture practitioners know that the majority soils today need their health and vitality rebuilt. In times past, nature built healthy, vital soils and there's value in copying nature in rebuilding soil health. There are many interventions. Cultivation, Grazing, Composting, Conservation Green manuring, Soil testing, Soil remineralization, Fertilizer priorities, Fossil humates and Visual soil assessment all play a task in establishing self regenerative, self-sufficient, fertile soils.

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The biological activities at the idea of self regenerative soil fertility occur at the surfaces of soil particles where minerals inherit contact with air, water and heat. It's at these surfaces that biological activities provide organic process and silicon release.

CULTIVATION

In nature, soil organisms cultivate the soil from the littlest protozoa, arthropods, nematodes, mites and collembolans to beetle grubs, ants, earthworms and even larger burrowing animals. Plants and their fungal symbiotes spread rocks and soil particles apart by growing into pores, cracks and crevasses. They secrete substances that etch the surfaces of rocks and soil particles and feed micro-organisms that release minerals. At some point, animals will consume the plant roots and open up passages where air and water are absorbed by the soil. Earthworms, grind soil particles up in their digestion processes. They also recycle plant matter as manures, building soil fertility and feeding further growth. This softens the soil and builds crumb structure, tilth and retention of moisture and nutrients, while allowing air, water and root penetration.

Mechanical cultivation softens the soil and prepares a clean seedbed for planting. For the foremost part, cultivation destroys soil life and is very digestive and oxidation. within the age of machinery and power equipment with excessive cultivation and monocropping because the norm, this provides more and faster nutrient release because it collapses the soil biology. an excessive amount of cultivation

burns up organic matter, impoverishes soil life, breaks down soil structure and releases nutrients that then could also be lost.

GRAZING

High density cell grazing is particularly effective. In this technique, large numbers of livestock graze and trample small blocks for a few hours and then are moved on, not to return until plants have regrown. Based on what a pasture needs rather than on a calendar, this could be two weeks, two months or more than a year.

With high-density cell grazing the impact is minimal and what is not grazed is trampled so the more sought-after plants that get grazed hard have a chance at regrowth. Soil animals recycle what is trampled, feeding it back to the regrowth.

COMPOSTING

Composting is more than a simple process of digestion and decay. Nature breaks down every kind of organic material into simple carbohydrates amino acids, but in many cases these would oxidize and leach if there weren't ways of storing and conserving them in easy-to-use forms. Bees gather nectar, digest it, concentrate it and store it in their honeycomb. As with bees, the organisms that gather and complex these nutrients have access to them when needed and these microorganisms are mainly the actinomycetes and mycorrhizal fungi that form close relationship with plants to the benefit of both.

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VOLATILIZATION AND LEACHING

A criticism identified by organic farm research is volatilization and leaching from raw animal or plant wastes. These losses can be pollutants in the atmosphere, in waterways or in the water table. Biodynamic management of plant and animal wastes before application on soils involves composting of solid wastes and fermentation of liquids, like effluents, with the herbal preparations. All materials got to be weakened into stable humus or stable liquid brews before use. Proper application of the complete range of biodynamic preparations ties up loose nutrients and minimizes run-off or leaching. Rank manures smells are a sure sign of nitrogen loss and are also an invitation for weeds, pests and diseases. This is neither a plus for soil fertility nor a plus for the environment. Wherever animal wastes collect or nitrogenous materials break down, soil or rock powders can be scattered and CPP or Soil Activator sprayed to minimize losses and keep smells in check.

SOIL TESTING

Before bringing in manures or minerals inputs it is important to have reliable information about what is already there. Soil testing can be helpful, but it also can be helpful, but it also can be misleading. The birth of chemical agriculture, most soil have been tested for soluble nutrients using dilute solution of mild acids in an attempt to mimic the weak acids plants give off at plant roots. This ignores the broader range of soil biology and assumes plants only access those

elements within the soluble form as shown by the testing method.

VISUAL SOIL AND CROP ASSESSMENT

Visual soil assessment is useful so as to gauge soil biology. New Zealand soil scientist Graham Shepherd has published a book on this titled Visual Soil Assessment Volume 1: Field Guide for Cropping and Pastoral Grazing on Flat to Rolling Country. While it may not be the last word on the subject, it is a surprisingly good start towards evaluating soils, their conditions and their biological activity. This system assesses texture, structure, porosity, motting, soil color, earthworm activity, aroma, root depth, drainage and vegetative cover.

V. LANDFILL ZONING

The Mulund landfill total area is 32 Hectares i.e 79 Acre. After cleaning the landfill with the help of Biomining Technique and by improving soil fertility we can use the site for public by proposing Natural Park.

VI. DISTRIBUTION OF SITE

Sr. No.	Zones	Area
1	Public Park	20
2	Energy Use	20
3	Agriculture Use	30
4	Natural Biotope	9

To Study Techniques Used for Restoration of Landfill Site in Mulund, Mumbai**CONCLUSION**

The research helps to understand different ways/ techniques to restore closed landfill. restoration of landfill through this management serve a better form of soil by reducing pollution of land and better positive effect on climate change. The proposed Public park for kunjurmarg site can be a sustainable and environment friendly solution and can generate public revenue which can help in restoration and maintain ace of the site.

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REFERENCES

1. <https://www.epa.gov/landfills/basic-information-about-landfills>
2. <https://www.ecofarmingdaily.com/build-soil/soil-fertility/>
3. <https://www.mfe.govt.nz/waste/waste-guidance-and-technical-information/types-of-landfills>
4. <https://www.tenthacrefarm.com/improve-soil-quality/>