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"WASTE MANAGEMENT AND SUSTAINABLE DEVELOPMENT"

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ABSTRACT: - From waste management point of view, it is the human habit to generate wastes. In developing countries, the participation level of local citizens is very low, practices of waste management are carried out mainly by the poor for their survival - 2% population in Asia, Latin America and Africa are dependent on waste for their livelihood. Nowadays, wastes have tremendous impact on the environment, and their management is of paramount importance in preserving the environment. The major waste management and disposal methods are- Waste recycling, incineration, chemical thermal and biological treatment, landfills vermicomposting etc. Despite the various new technologies that are emerging for solid waste disposal - land filling still remains the most common solution.

KEYWORDS :- Management, landfills, incarnation, sustainable development, garbage, pollution, gases, environment.

INTRODUCTION:-

Waste management is rather committed to inspiring educating, and empowering current and future generations to proactively protect our planet, and it is among the key issues for reaching sustainable development and circular economy. Some of the solid and liquid waste (other than nuclear waste) management — disposal methods are.

Aim of the study- To successfully and easily manage waste.

REVIEW OF LITERATURE -:

In developing cities municipalities and decision makers need simple and effective indicators to access the sustainability of their current waste management system . It is evident that waste management becomes easier if we initially segregate wastes before recycling it. Waste management projects include the entire life-cycle of waste right from its point of generation to its final treatment and disposal. Thus in developing countries waste management is o big challenge (Zafar end Salinan 2020). In India also there is enormous amount of industrial end solid waste and proper disposal of these wastes is necessary so that it does not contribute to the problems of pollution (Siindari and Manew 2010) The Primary goal of solid waste management is reducing and eliminating adverse impacts of waste materials on human health.

Management of Waste:-

Land Fills -Disposing of waste in a landfill is the most traditional method of waste disposal, and it remains a common practice in most countries. Historically, landfills were often established in disused quarries, mining i landfill can be a hygienic and relatively voids or borrow pits. A well run inexpensive method of disposing of waste materials.

Older of poorly managed landfills can create number of adverse including wind-blown litter, attraction, of vermin environmental impacts, and soluble contaminants (leachate) leaching into and polluting groundwater. Another product of landfills containing putrescible wastes which is landfill gas (mostly composed of methane and carbon dioxide), is produced as the waste breaks down.

Characteristics of a modem, well-run landfill include methods to contain leachate, such as clay or plastic liners. Disposed waste should be compacted and covered to prevent vermin and wind-blown litter. Many landfills also have a landfill gas extraction system installed after they are closed to extract the gas generated by the decomposing waste materials. This gas is often burnt to generate power. Generally, even flaring the gas off is a better environment outcome then allowing it to escape to the atmosphere, as this consumers the methane (a far more potent greenhouse gas than carbon dioxide).

Landfills can be therefore be categorized into two-

Open-air Landfills -

1. Early landfills were typically open-air natural (wetlands, ravines) or manmade depression (gravel pits or quarries) in the topography, or just hill sides or an area of flat land, if nothing else was available.
2. Major problems with this system included,
3. Wind dispersing debris.
4. Rodent, insect and bird infestation (sometimes disease-carrying)
5. Pollution of ground and surface water.
6. spontaneous combustion hazard
7. Foul odors.

Sanitary Landfills -

1. A waste disposal site in which each day's accumulation of debris is covered by a blanket of sediment.
2. Trucks bring in day's waste; place it in active area where it is compacted and at the end of day covered by layer of sediment.
3. Each day's accumulation unit is called a cell.
4. Called sanitary because greatly reduces risks of vermin, smell, fire and wind-blown debris, but still allows major environmental pollution.
5. Sanitary Landfill Hazards.

Methane -

1. Cells greatly restrict amount of 02 that can reach decaying garbage and cell becomes anaerobic (without oxygen) and this leads to formation of methane.
2. Methane is colourless, odorless, and highly combustible (same gas that comes from a stove, but stove gas has had an odor added to it so that leaks would be obvious)
3. Gas can travel great distances underground, especially in winter when ground is frozen, and can enter basements resulting in expulsions
4. If allowed to escape adds to global warming.

Leachate -

1. Rainwater can infiltrate through sediment cover and enter cell where it will react with wastes creating polluted liquid (leachate).

Chemical composition of leachate depends upon -

I. Material in wastes
II. Its reactivity
III. Climate
IV. Length of time in contact with wastes.
V. Depth to water table.
VI. Degree of anaerobic/aerobic conditions

Leachate commonly contains metals (iron, manganese, and zinc) and nitrates, phosphates, but also can have lead, cadmium, and mercury. Also can contain organics (including-pathogens)

Improved Sanitary Landfills –

One which allows for the collection and removal of leachate and methane from the landfill as well as monitoring the area around the landfill to determine if contaminates are escaping.

Structure -

1) Underlying the landfill is a continuous impermeable barrier of uncreative plastic or clay that prevents leachate from escaping or ground water from entering.
2) Horizontal pipes at the bottom of the landfill collect leachate which is pumped to the surface where it can be processed to remove contamination.
3) Overlying the landfill and below a soil cover is another impermeable barrier which greatly reduces the amount of infiltration into the buried landfill, thereby greatly reducing the amount of leachate that will be present.
4) Penetrating almost every cell are vertical wells for collecting methane gas generated within the landfill.
5) If volume of gas is small it can-be burned off if large enough and will be generated for a prolonged period of time can be have economic value.
6) Surrounding the landfill are a series of monitoring well from which groundwater can be samples to test for leachate pollution.
7) If leachate detected in monitoring well, will require pumping out water and treating it for contamination for long into the future.
8) Geological Factors to be considered in sitting a Landfill
9) Nature of underlying rock or sediment.
10) Elevation of land.

11) Water table elevation and fluctuation.
12) Ground water flow direction.

Nature of Underlying Rock or Sediment -

1) Sediment should be impermeable so as to restrict any possible imitation of leachate and stop it before it reaches groundwater.
2) Clay is best material for this purpose.
3) Bedrock can also have low permeability, but fractures, joints, bedding planes and faults can provide passages for leachate.
4) Rock type also important, limestone tends to be reactive with leachates.

Elevation of Land -

As a merit of dumping waste continuously, the land starts getting elevated there. The mixture of decaying organic matter and other toxic wastes, impact the quality of soil around landfill site .Soil in the area may get saturated with hazardous substance – about one third of any landfill waste is composed to biodegradable organic substance .Some geologists are of opinion that landfills are a cheap way to deal waste disposal, in spite of slowly elevating the land there, these are of the best ways to manage waste

Incineration-

The process of destroying the waste material by burning it, is known as incineration, in terms of waste management. It is carried out on small scale by individuals and on a large commercial scale by industry as well .It is a method of waste treatment (specially biomedical waste) involving burning it .This process the waste into ash ,flue gas and heat and also reduces the volume of solid waste . The best advantage of incineration is that it makes waste management efficient and easy, and it burns up to 90% of total generated waste, it is widely used in developing countries. Somehow, incineration as a waste management tool is becoming controversial for a few reasons- like it destroys raw materials besides waste and creates toxic gas and ash which can pollute ground water and harm local population. There are many advantages of waste incineration using modern incinerations, they reduce the amount of toxic products and utilize waste –to-energy technology; reduce pollution using filters for trapping pollutants. Incineration plants if located near big cities and towns save on transportation of waste as these will not have to carried to long distances for dumping .These plants work at high temperatures that can destroy harmful germs and chemicals ; they can operate in any weather but they produce smoke during burning process. Modern incinerations are computerized making operation easy.

Volume Reduction-

This means various techniques for making the waste fit into less space and easier to handle in bulk. Usually achieved by compaction or fragmentation.

Compaction-

The Waste is compacted or compressed. It also breaks up large or fragile items of waste.

1) This process is conspicuous in the feed at the back end of many garbage collection vehicles.
2) See car crusher.
3) In landfill sites, the waste is often compacted by driving over it with a heavy excavator-type vehicle with spiked wheels.

Shearing- The waste is sliced with heavy metal shears.

Grinding-The waste is ground up by a hammer mill.

Wastes material from Nuclear Reactors Solids-

Mostly contaminated by contact with radioactive material such as tools, reactor parts, and clothing.

- Philosophy tends to be "delay and decay".
- Generally placed in drums encased in concrete and buried.
- Must be monitored for 100-1000 years.

Liquids - Depends if Low or High Level Radiation -

High level/ long term – radiation requires Permanent storage. Liquid wastes have been stored underground in steel Tanks, but radiation causes steel to weaken and corrode. Hanford Nuclear Repository has lost into the ground 200,000 gallons of the 5 million gallons stored there since the 1950s. This material has now made it into the Columbia River.

Gases - Generally short half-lives and so released into atmosphere.

1. Non-toxic solid waste should be properly segregated and disposed off in landfills that are properly sealed to avoid leakage and contamination of surrounding land and groundwater.
2. Toxic waste should be treated or disposed off in a proper manner.
3. Sewage and industrial waste water should be adequately treated and raw materials recovered from it where possible before it is released into our rivers and water ways.

The 3 R principles of Reduce, Reuse, and Recycle should be followed in that order. Reduction is the best option, if we reduce at source, there is a smaller change of waste generation and the pressure own our already stretched natural resources is reduced. Reuse is the next best option, as the product is reused in its current form without any energy expended to convert it into a new term. Recycling is the last option, as although it converts a waste into a new resource, it uses energy to transform that resource in a new usable product. Thus, by following the "Three R" principle, we can cut down the waste generated and ensure that the minimal residual waste does not harm our environment.

CONCLUSION-:

One can follow the 3 'R' principles in the following ways for making waste recovery recycling and management possible: -

1. Use only as much as needed, be it any resource water, food, paper etc.
2. Before throwing away something think about whether it is really a waste. Reuse rinse water to water garden, donate old clothes to the needy instead of throwing them away.
3. If the item is not usable in proper form; It can be recycled, paper, glass, metals all can be recycled.
4. One should segregate the waste into wet and dry garbage. Wet garbage includes most kitchen waste. Most of it can be used for composting, while most dry garbage is recyclables.
5. As far as possible one should avoid using of non-biodegradable materials such as Styrofoam and certain types of plastics. Such materials can take hundreds of years to
6. Decompose.
7. Do not litter or throw garbage in public places. The proper disposal garbage is an important part of waste management.
8. Behaving as conscious consumer, one should not buy products that are packed. One should choose products that are made from recycled material or are organically grown.

REFERENCES:-

1. "Waste Management" Book by Jacqueline Vaughan (2008)
2. "Water Management Practices" ISBN 1466585188 (20414) by John Pichtel.
3. Solid Waste Management: An Indian Pevspective (2012) by M.S. Bhatt.
4. Waste Management and Resource efficiency Proceedings of 6th IconSWM (2016) editor Sodhan Kumar Ghosh.
5. "Environmental waste Management" edited by Ram Chandra ISBN: 9780367575489(2020)
6. Household Recycling and Consumption work by Kathryn wheder', marian Glucksmann, ISBN- 1137440430(2015)
7. “Journal of Materials Science and Waste Management ” 20(2) 201 S , Article By Sarah al Saeed and Al Hosseni Aghezzel
8. ”Segregation of Waste ”, The Neutron ,E 2 Feb 2019
9. “Bioenergy Consume ” Zafar and Salman ,2020
10. Journal of Material Cycles and Waste Management August 2020 , Edited by E.angelos Gidarakos