A

MICRO-PROJECT REPORT ON

“Solid waste management showing effect on environment ”

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GOVERNMENT POLYTECHNIC, AHMEDNAGAR

CERTIFICATE

This is to certify that,

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of final year Computer Technology students have submitted their project report on

"Solid waste management showing effect on environment"

during academic session 2022- 2023 as a part of project work described by Government Polytechnic, Ahmednagar for partial fulfillment for the Diploma in Computer Technology in the fifth semester. The project work is the record of students own work under my guidance and to my satisfaction.

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ABSTRACT

Solid waste is a problem that must be properly managed to protect the human health and environment and preserve the natural resources. Many do not realise that solid wastes also make a definite impact on the climatic change. The manufacturers, users and distributors of the products as well as the disposal of the resulting wastes all results in emission of the atmospheric gases‘ green house gases’ which has affected the earth's environment to a large extent. Solid waste management refers to the collecting, treating, and disposing of solid material that is discarded or is no longer useful. Solid waste management is an important aspect of urban area management. Improper disposal of municipal solid waste can create unsanitary conditions, which can lead to environmental pollution and the outbreak of vector-borne disease.The task of solid waste management presents complex technical challenges

Solid Waste. Infectious wastes are typically generated as a result of biological, medical, or pathological activities. Hazardous waste is classified as such because: (1) it can cause injury, death, or damage or pollute air, land or water; or (2) it is ignitable, corrosive, reactive, or toxic. (e.g. solvents, fluorescents, laboratory animal carcasses, or low-level radioactive wastes generated through laboratory research.)

Increased industrialization in the wake of green revolution coupled with population explosion has paved its way to enormous solid waste generation. Inadequate techniques and paucity of technical expertise have led to generation of heterogenous categories of waste. The per capita waste generation is escalating, continuously challenging the global sustainability. Most of the waste produced in India is directly disposed of to the landfills without any proper sorting and segregation, which later produces greenhouse gases, posing risk to human health and environment. Thus, there is a need to implement strict laws, increase awareness, and utilize innovative as well as latest techniques in order to cope up with the growing threat of solid waste. Integrated solid waste management is a critical aspect of environmental hygiene which can be incorporated into environmental planning. Environment friendliness, cost-effectiveness, and social acceptability are major attributes which sum up to achieve efficient waste management system. Moving toward “zero-waste production” and “waste prevention” aims at reduction of gaseous emissions, solid residues, and pollution, contributing to the protection of climate and environment. Green technology approach is the stepping stone to waste management that seeks solutions that are environmentally and ecologically benign. Recycling and composting are the easy to go techniques which are helpful in minimizing the volume of the waste generated and producing valuable products with multipurpose utility. Waste valorization is an attractive concept gaining increased popularity due to the rapid increase in waste residues generation.

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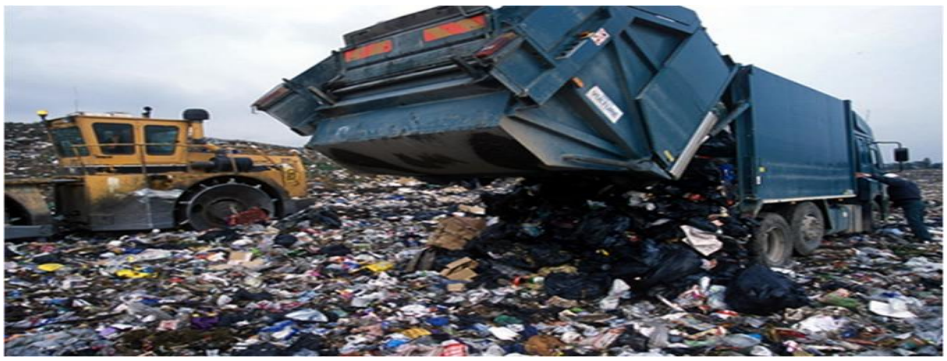
REPORT

1.0 Rationale

Solid waste management is defined as the discipline associated with control of generation, storage, collection, transport or transfer, processing and disposal of solid waste materials in a way that best addresses the range of public health, conservation, economic, aesthetic, engineering, and other environmental considerations.

Waste management rules are based on the core principle of sustainable development. This will prevent your household from undergoing severe risky results due to solid waste material. Municipalities and concerned authorities are mandated to take care that any practices they follow do not disrupt the sustainability factor. However, as more and more areas are being developed and urbanised, the country is facing a massive waste management challenge. Solid waste management is a basic service that should be provided by municipalities. As this is not just for the current generation but also for the future generations to come. The key to efficient solid waste management is by segregating waste at the source so that it can be treated accordingly i.e recycled, reused and recovered. The more waste management opportunities are created, the better it will benefit the neighborhood as well as the people living in it.



2.0 Course Outcomes Integrated

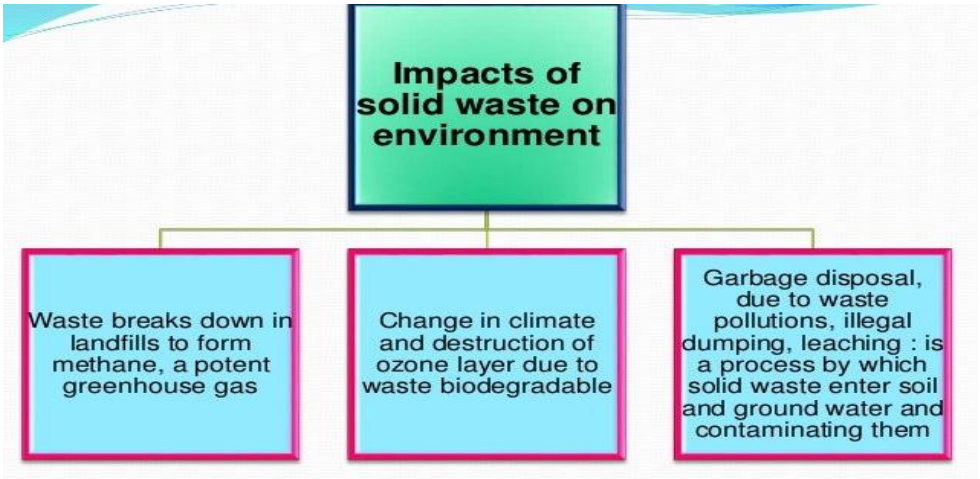
The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the studiers demonstrates the following industry oriented COs associated with the above mentioned competency

a. Develop Public awareness about environment
b. Select alternative energy resources for Engineering Practice
c. Conserve Ecosystem and Biodiversity
d. Apply techniques to reduce Environmental Pollution
e. Manage social issues and Environmental Ethics as lifelong learning

3.0 Literature Review

Solid waste management is the one thing just about every city government provides for its residents. While service levels, environmental impacts and costs vary dramatically, solid waste management is arguably the most important municipal service and serves as a prerequisite for other municipal action. As the world hurtles toward its urban future, the amount of municipal solid waste (MSW), one of the most important by-products of an urban lifestyle, is growing even faster than the rate of urbanization. Rapid industrialization and population explosion in India has led to the migration of people from villages to cities, which generate thousands of tons of MSW daily. The MSW amount is expected to increase significantly in the near future as the country strives to attain an industrialized nation status by the year 2020

Ten years ago there were 2.9 billion urban residents who generated about 0.64 kg of MSW per person per day (0.68 billion tonnes per year). This report estimates that today these amounts have increased to about 3 billion residents generating 1.2 kg per person per day (1.3 billion tonnes per year). By 2025 this will likely increase to 4.3 billion urban residents generating about 1.42 kg/capita/day of municipal solid waste (2.2 billion tonnes per year).



4.0 Actual Methodology Followed.

Types of Solid Wastes based on Origin

Here the solid waste is characterized on the basis of where it is coming from, the types of solid wastes based on origin include:

- **Residential**

  Residential waste refers to wastes from dwellings, apartments, etc., and consists of leftover food, vegetable peels, plastic, glass, metals, paper, clothes, yard waste, ashes, etc.

- **Commercial**

  Commercial waste refers to wastes consisting of leftover food, glasses, metals, ashes, etc. These are generated from stores, restaurants, markets, hotels, motels, auto-repair shops, medical facilities, etc.

- **Institutional**

  Institutional waste mainly consists of paper, plastic, glasses, etc., generated from educational, administrative and public buildings such as schools, colleges, offices, prisons, etc.

- **Bio-Medical**

  Bio-Medical waste refers to the waste generated from medical facilities such as clinics, hospitals and pharmacies. They may include human and/or animal parts, blood, surgical instruments, needles etc.

- **Municipal**

  Municipal waste includes dust, leafy matter, building debris, treatment plant residual sludge, etc. These are generated from various municipal activities like construction and demolition, street cleaning, landscaping, etc.

- **Industrial**

  Industrial waste mainly consists of process wastes, ashes, demolition and construction wastes, hazardous wastes, etc. due to industrial activities.

- **Agricultural**

  Agricultural waste mainly consists of spoiled food grains and vegetables, agricultural remains, litter, etc. generated from fields, orchards, vineyards, farms, etc.

- **Open areas**

  Open-areas waste includes wastes from areas such as streets, alleys, parks, vacant lots, playgrounds, beaches, highways, recreational areas, etc.

Types of Solid Waste based on Composition

These are the types of solid wastes which are characterized on the basis of what it contains, these include:

- **Garbage**

  This refers to animal and vegetable wastes resulting from the handling, sale, storage, preparation, cooking and serving of food. Garbage comprising these wastes contains putrescible (rotting) organic matter, which produces an obnoxious odor and attracts rats and other vermin. It, therefore, requires special attention in storage, handling and disposal.

- **Ashes and residues**

  These are substances remaining from the burning of wood, coal, charcoal, coke and other combustible materials for cooking and heating in houses, institutions and small industrial establishments. When produced in large quantities, as in power-generation plants and factories, these are classified as industrial wastes. Ashes consist of fine powdery residue, cinders and clinker often mixed with small pieces of metal and glass. Since ashes and residues are almost entirely inorganic, they are valuable in landfills.

- **Combustible and non-combustible wastes**

  These consist of wastes generated from households, institutions, commercial activities, etc., excluding food wastes and other highly putrescible material. Typically, while combustible material consists of paper, cardboard, textile, rubber, garden trimmings, etc., non-combustible material consists of such items as glass, crockery, tin and aluminum cans, ferrous and non-ferrous material and dirt.

- **Bulky wastes**

  These include large household appliances such as refrigerators, washing machines, furniture, crates, vehicle parts, tires, wood, trees and branches. Since these household wastes cannot be accommodated in normal storage containers, they require a special collection mechanism.

- **Street wastes**

  These refer to wastes that are collected from streets, walkways, alleys, parks and vacant plots, and include paper, cardboard, plastics, dirt, leaves and other vegetable matter. Littering in public places is indeed a widespread and acute problem in many countries including Pakistan, and a solid waste management system must address this menace appropriately.

- **Dead animals**

  With regard to municipal wastes, dead animals are those that die naturally or are accidentally killed on the road. Note that this category does not include carcasses and animal parts from slaughter-houses, which are regarded as industrial wastes. Dead animals are divided into two groups – large and small. Among the large animals are horses, cows, goats, sheep, pigs, etc., and among the small ones are dogs, cats, rabbits, rats, etc. The reason for this differentiation is that large animals require special equipment for lifting and handling when they are removed. If not collected promptly, dead animals pose a threat to public health since they attract flies and other vermin as they decay. Their presence in public places is particularly offensive from the aesthetic point of view as well.

- **Construction and Demolition Wastes**

  These are types of solid wastes generated as a result of construction, refurbishment, repair and demolition of houses, commercial buildings and other structures. They consist mainly of earth, stones, concrete, bricks, lumber, roofing and plumbing materials, heating systems and electrical wires.

- **Hazardous wastes**

  Hazardous wastes are defined as wastes of industrial, institutional or consumer origin that are potentially dangerous either immediately or over a period of time to human beings and the environment. This is due to their physical, chemical and biological or radioactive characteristics like ignitability, corrosivity, reactivity and toxicity. Note that in some cases, the active agents may be liquid or gaseous hazardous wastes. These are, nevertheless, classified as solid wastes as they are confined in solid containers. Typical examples of hazardous wastes are empty containers of solvents, paints and pesticides, which are frequently mixed with municipal wastes and become part of the urban waste stream. Certain hazardous wastes may cause explosions in incinerators and fires at landfill sites. Others such as pathological wastes from hospitals and radioactive waste also require special handling. Effective management practices should ensure that hazardous wastes are stored, collected, transported and disposed of separately, preferably after suitable treatment to render them harmless.

- **Sewage wastes**

  The solid by-products of sewage treatment are classified as sewage wastes. They are mostly organic and derived from the treatment of organic sludge separated from both raw and treated sewages. The inorganic fraction of raw sewage such as grit and eggshells is separated at the preliminary stage of treatment, as it may entrain putrescible organic matter with pathogens and must be buried without delay. The bulk of treated, dewatered sludge is useful as a soil conditioner but is invariably uneconomical. Solid sludge, therefore, enters the stream of municipal wastes, unless special arrangements are made for its disposal.


Origin Based
Residential
Commercial
Institutional
Bio-Medical
Municipal
Industrial
Agricultural
Open areas
Content Based
Garbage
Ashes and residues
Combustible & non-combustible
Bulky wastes
Street wastes
Dead animals
Construction and Demolition
Hazardous wastes
Sewage wastes

Choosing Appropriate Technologies

All cities must weigh a number of factors in choosing appropriate technologies for collection and disposal of solid waste.

Collection

Municipalities often spend as much as 70% of their operating budgets for SWM on hauling costs alone due to rising transportation costs, outdated, poorly maintained machinery and inefficient existing collection routes. Although cities are responsible for SWM within their jurisdictions, they do not necessarily have be owners and operators of SWM systems. In developing their own comprehensive SWM plans, cities should determine the extent of private and community service provision. The city can issue franchises or licenses to various firms who will compete for customers or can select one firm per district/area based on a competitive procurement. Experience has shown that private sector SWM costs 20-40% less than the same publicly-provided services and that privatization of SWM and facilitating the entry of micro- and small-scale providers contributes to the adaptation of 'best-practices' and appropriate technologies. However, SWM authorities must be aware that such a shift usually requires both a decrease in employment in the waste sector [link to: World Bank's Urban Waste site: Private Sector Participation] and an institutional shift of focus for public-sector SWM authorities from service provision to oversight and regulation (both to ensure that companies are meeting the relevant standards and that they are not colluding).

Disposal and its alternatives

When planning for the adoption of solid waste technologies, SWM authorities should consider the following, among other, issues:

- The planning, construction and implementation of new sanitary landfills are costly and lengthy, and small to medium-scale solid waste management practices will be needed in the interim.

- The tendency for municipalities to import expensive "end-of-pipe" technologies, such as collection vehicles and processing plants, often leads to additional unsustainable costs in training, repair and site maintenance.

- Dump-upgrading, involving such measures as landfill liners, mandated landfill disposal standards, and low-cost remediation, along with improved waste minimization strategies may prove to be cost-effective alternatives to the development of expensive new SWM sites.

Recycling, composting, resource recovery, and resale of reusable solid waste can be an effective way of minimizing waste and contributing to the economic welfare of those living at a destitute fringe within the urban community. For example, co-composting solid waste and sewage sludge produces soil conditioner and shredded automobile tires that can be added to soil to increase drought resistance. Other way is to help informal scavengers who may collect 10-15% of urban solid waste. Using recycling, reuse and "landfill mining" techniques to become more efficient and established business, cities can reduce their overall urban solid waste production by up to 30%. This assistance may help in developing cooperatives or other similar methods of labor organization and providing basic protective health and safety precautions (e.g. providing gloves and masks) for the avoidable environmental health risks these workers face.

Effective SWM, particularly when targeting informal settlements, should begin with a consultative, participatory process involving all stakeholders from slum residents and the informal sector trash workers to the municipal government and the private sector. Community-based enterprises, incentives for increased private sector participation and innovative multi-sectoral partnerships are often used to more effectively implement policy objectives such as:

- Recycling and waste minimization programs
- Resource recovery and commercial/industrial marketing or resale of reusable components of waste
- Localized appropriate technologies designed to meet economic, environmental and social preferences
- Adoption of cleaner production practices
- Separation and control of hazardous waste to reduce the distribution of their environmental impacts
- Improved institutional management and increased citizen oversight

Health

Most municipal solid waste is haphazardly dumped on public lands or unprepared landfills in an unmanaged or unregulated manner. Toxic runoff, pollution of water and soil resources, methane gas emission from unregulated landfills, and unstable areas subject to settling that often later become informal settlements are just a few of the environmental and health challenges resulting from poor SWM. Uncontrolled dumping greatly endangers the immediate health of both informal sector waste workers and nearby inhabitants, typically the poor residents of informal urban settlements, through direct hand-to-mouth contamination and inhalation of volatile chemicals and other pollutants. Additionally, uncontrolled dumping has adverse effects for all urban residents – impacting the public health of the city at large through water supply, air and soil contamination. Authorities must consider the public health impact of their current SWM strategies as well as the health benefits and cost-effectiveness of alternative strategies for upgrading SWM – e.g., whether to emphasize landfill improvements, expansion of solid waste collection, or other measures as an initial investment priority.

5.0 Actual Resources Used

S. No.	Name of Resource/material	Specifications	Qty	Remarks
1	Computer System	Computer-i5 Processor, 8GB-Ram	1	-
2	Operating System	Windows	1	-
3	Internet Browser	Google Chrome	1	-

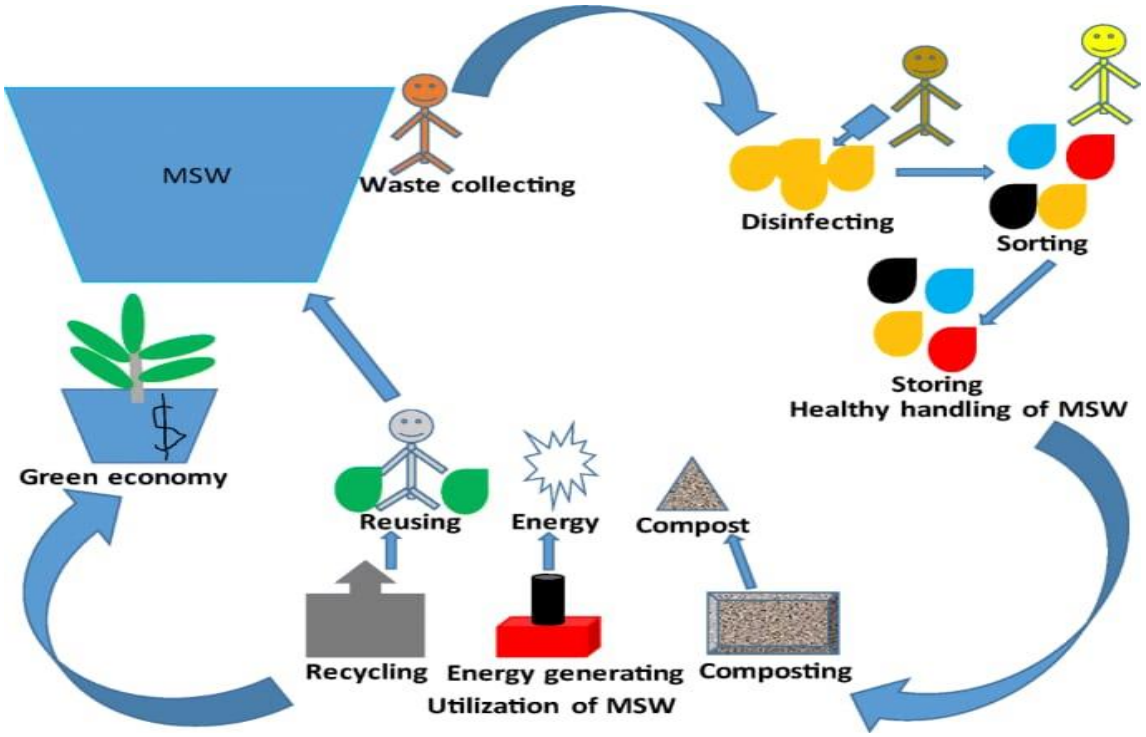
6.0 Skill Developed/ learning out of this Micro Project:

Waste management reduces the effect of waste on the environment, health, and so on. It can also help reuse or recycle resources, such as; paper, cans, glass, and so on. Upon successful completion of this course, students will be able to: Learn basic concepts of solid waste management, beginning from source generation to waste disposal in a system of municipality organizational structure.

Reducing waste will not only protect the environment but will also save on costs or reduce expenses for disposal. In the same way, recycling and/or reusing the waste that is produced benefits the environment by lessening the need to extract resources and lowers the potential for contamination.

7.0 Applications of this Micro-Project

Micro projects are meant for building up capacity and experience for representatives for specific under represented groups (women, young people, and indigenous peoples) in relation to the NPA program. The ambition is on the one side that partners who have been involved in micro projects in the future shall be better suited for engagement in main projects as partners. On the other side, micro projects might complement main projects and support the Program to foster changes that are of importance for people living in the program area. Micro projects shall in specific contribute to the Arctic dimension of the NPA program and to the EU Arctic Communication, An integrated European Union policy for the Arctic. Typically, a micro project, runs for 6 to 12 months. However, the MC may decide on other arrangements on a call-by-call basis.

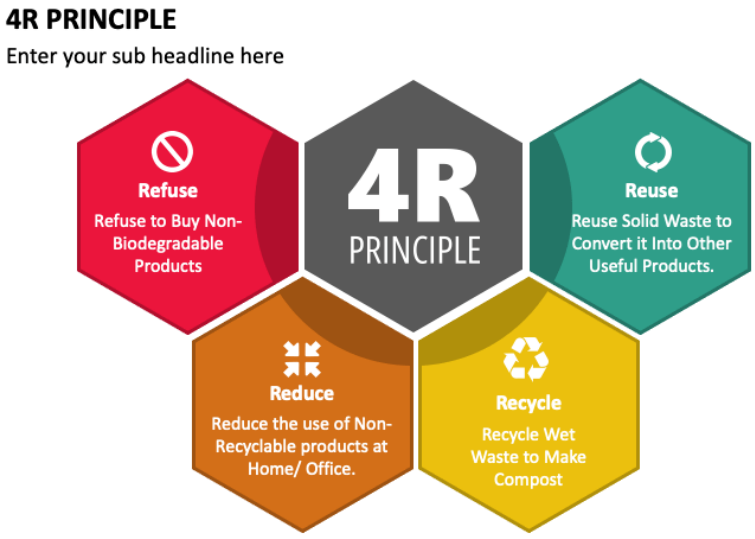


8.0 Area of Future Improvement:

The market of energy waste is growing rapidly throughout the world. Which is using waste as fuel and makes it hard to recycle, in the process of recycling which gives harmful by-products and toxic gases.

This technology helps us to recover products for waste and incinerate completely and does not focus on biomass waste. Gasification uses a large range of raw materials which involves less oxygen and produces synthetic gases which can be used to power the steam turbine to produce the electricity.

The land fill gases and methane have high global warming potential which is 23 times greater then that of the carbon dioxide. Use of better air quality has to be tested before sending to the atmosphere by applying air pollution unit and has to release cleaner and safer air which is free from toxic substance and has to be safe for human health.



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