

Q) What are sustainable approaches for solid waste management and highlight the weaknesses in the solid waste management system of Pakistan [20]

1) Introduction:

Solid waste refers to any non-liquid waste materials that are discarded by individuals, businesses, industries and institutions. It includes a wide range of materials generated from various activities and processes. Solid waste management is the process of managing this waste.

2) Process of Solid Waste Management (SWM):

SWM process comprises of 6 functional elements which are as follows:

Waste Generation: Solid waste is generated from various sources.

On-site Handling: This step involve collecting the waste from various locations.

On-site Processing: During the collection phase, the waste is first segregated and then placed

in appropriate containers according to the type of waste i.e Recyclable.

Waste Transportation: waste is then transported from the collection point to treatment facilities or disposal sites.

Treatment: Some waste has to be treated first, due to its hazardous nature, before it can be safely disposed.

Disposal: Non-Recyclable waste & non-recoverable waste can be disposed of through various methods.

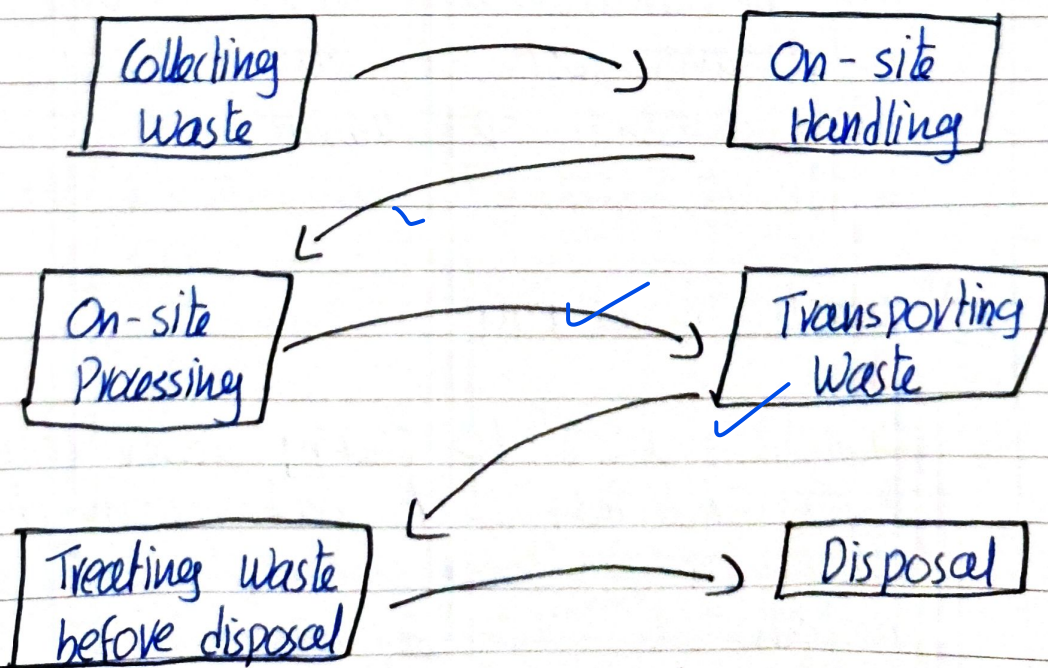


Fig 1: Overview of SWM Process

3) Sustainable Approaches to Solid Waste Management :

3.1) Source Reduction :

This involves minimising the use of packaging materials, especially non-recyclable materials such as plastic wraps. This not only results in less waste generation but also limits landfills or open dumping.

3.2) Recycling :

This encompasses promoting use of recyclable materials. This means the same materials can be cleaned and reused, which not only saves cost of raw material but also decreases open dumping or landfills since less waste needs to be disposed of.

3.3) Waste to Energy :

Introduce waste to energy converting methods or facilities, that can convert waste into energy, some examples of such methods as follows:

3.3.1) Incineration :

The waste is incinerated which generates heat. This heat is then used to spin turbines which can generate electricity.

3.3.2) Pyrolysis :

This is ~~use~~ the thermal decomposition of waste materials in the absence of oxygen. It produces a mixture of gases, liquids (bio-oil, and char, which can be used as fuel.

3.4) Public Awareness :

Meticulous campaigns should disseminate the issue of solid waste and how general population can do their part in alleviating the issue, namely by separating recyclable material from non recyclable material when disposing waste. This step could go a long way in assisting the process as less time and effort would be exerted to do this by waste management staff.

3.5) Composting :

Composting is a process that involves processing organic waste into nutrient-rich compost. ~~that~~ can be used to enrich the soil. Promoting composting facilities would not only prevent soil degradation but also assist SWM process by ~~reducing~~ reducing land fill waste.

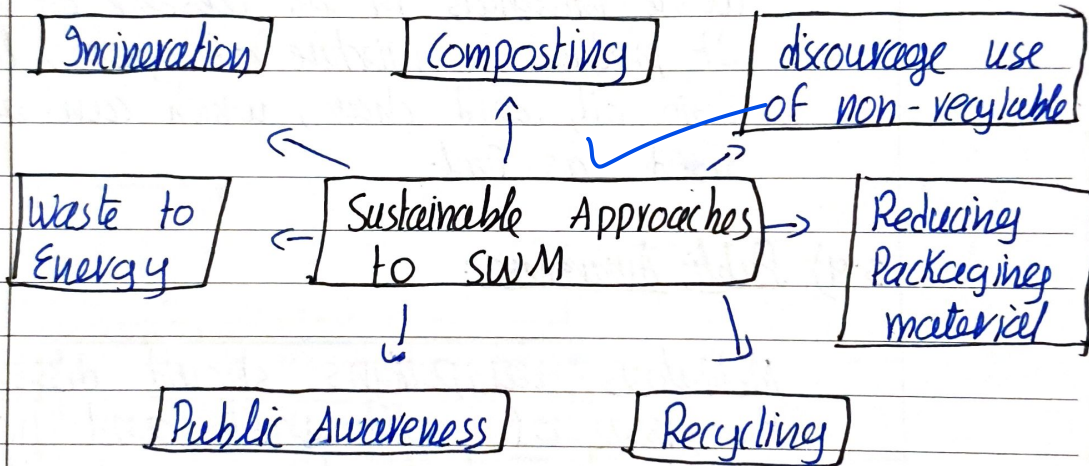


Fig 2: overview of Sustainable Approaches

4) Weaknesses in the Solid Waste Management System of Pakistan

4.1) Inadequate

Pakistan does not have adequate resources to manage waste effectively. The scarcity of resources pose a massive impediment to a well organised waste management system that can operate on a widescale area.

4.2) Huge Amount of Waste Generation

Another significant challenge is the ~~maximum~~ size waste produced in Pakistan. The International Trade Organisation indicates that the city of Karachi, alone, produces 16500 ton of waste daily.

4.3) Limited Recycling :

Only a modicum of recyclable material is used in Pakistan. Furthermore, even the recyclable material is not recycled. This not only ~~increase~~ the demand of raw materials but also leads

more land fill waste.

4.4) Informal Sector manages Waste:

Much of the waste in Pakistan is managed by the informal sector. This means they operate outside the formal, regulated framework or government law and regulations, rendering it ineffective.

4.5) Lack of Awareness:

Most people are unaware about recycling and proper disposal practices. ~~This~~ Hence, recycling bins are not properly used, and recyclable and non recyclable materials are not distinguished before disposing. This contributes to the ineffective waste management system.

4.6) Inadequate Resources:

Many cities are not supplied with essential resources for an efficient waste management system. Many public areas are not even equipped with dustbins, let alone different recycling bins to dispose waste according to its type, hence, most of the waste

is discarded inefficiently, making waste management difficult.

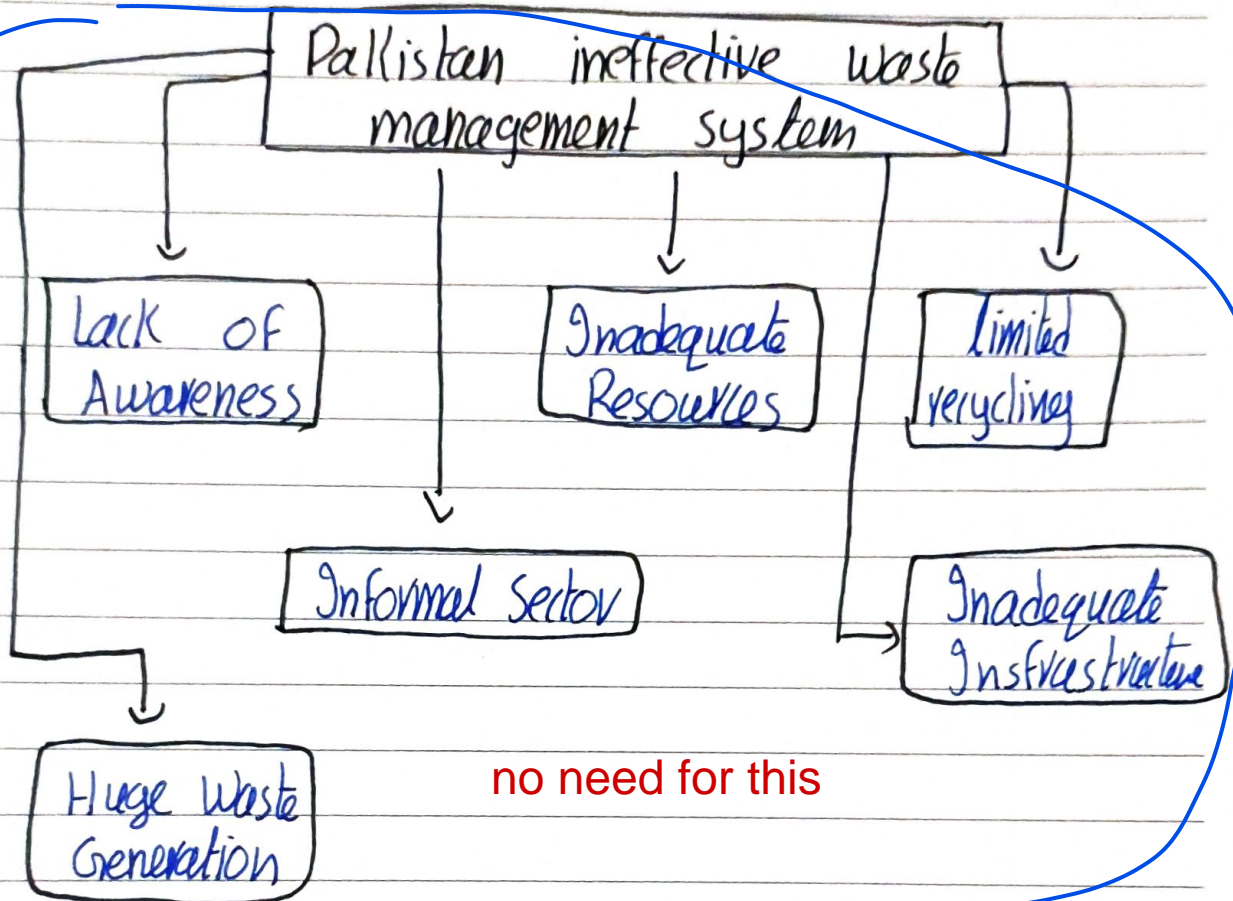


Fig 3: Pakistan's weak SWM system

5) Conclusion :

Waste management system is imperative, not only for aesthetic purposes but also, for health and environmental issues. The current SWM of Pakistan is ineffective, but by giving

Maxim.....

ans is average
material discussion is less
and the procoesses of wsm are not discussed
in actual detail

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it attention and making some changes, the
system can be improved.