

ES-2023-Q5

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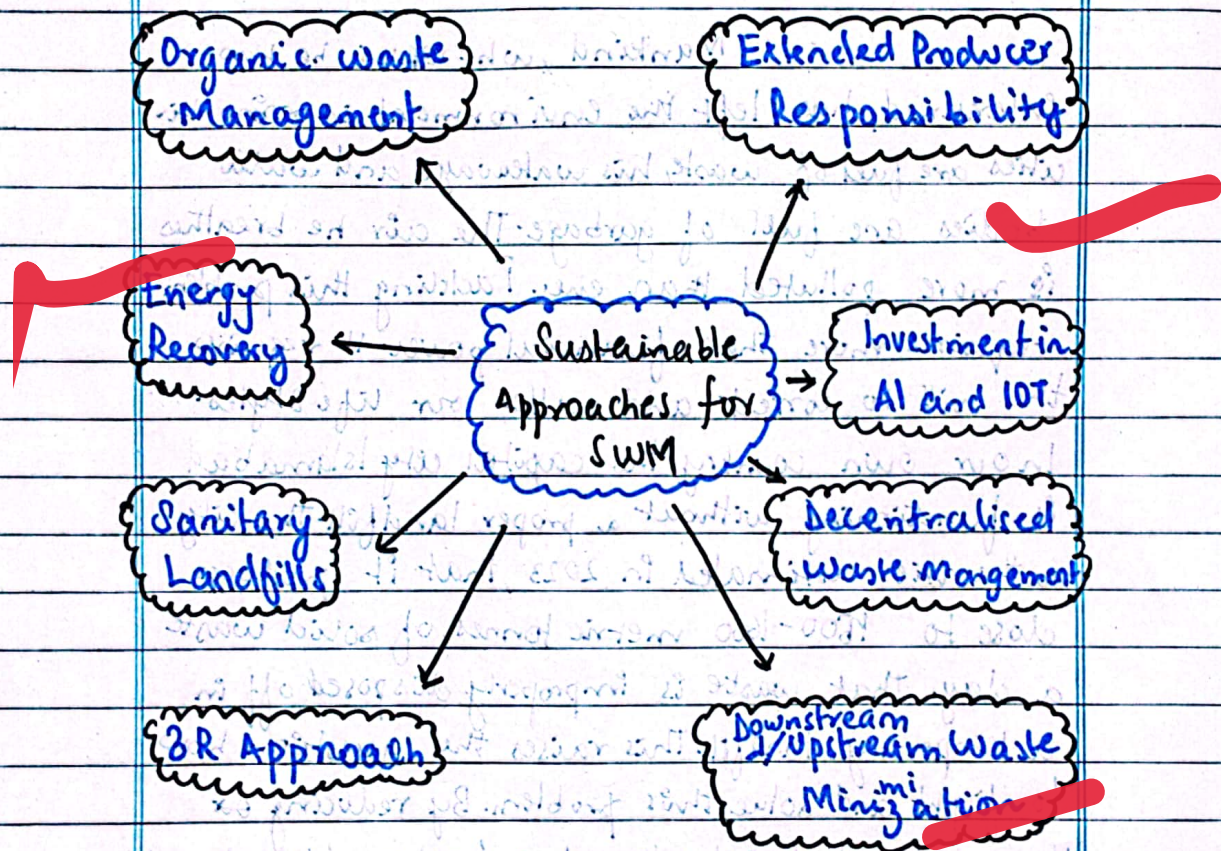
What are the sustainable approaches for solid waste management?

INTRODUCTION

Mankind, wherever he has intervened, has left the environment in ruins. His cities are full of waste, his waterways and water bodies are full of garbage. The air he breathes is more polluted than ever. Tackling this problem requires more than financial power. It requires the will to correct and alter our life styles. In our own country, the capital city Islamabad is functioning without a proper landfill. The city authorities estimated in 2023, that it produces close to 1500-1600 metric tonnes of solid waste a day. That waste is improperly disposed off in a temporary landfill. This raises the question how to fight and solve this problem. By reducing the waste that enters the chain (upstream/downstream) we can make sure there is less waste produced; moreover, developing Biogas plants and composting facilities for organic waste can result in reduction; along with these adopting the 3R (Reduce, Reuse, Recycle) in daily life can lead to sustainable management of solid waste in our cities.

DATE: ___/___/___

SUSTAINABLE APPROACHES FOR SOLID WASTE MANAGEMENT (SWM)



Utilization of Organic waste to Create Fuel and Fertilizer

The organic waste produced can be used to harness energy in the form of biogas and by the use of composting, fertilizer can be created from the same.

DATE: ___/___/___

organic waste. By layering the organic waste, and providing the right conditions, natural fertilizer can be created. In an era, where fertilizers (artificial) have wreaked havoc on our agri-ecosystems. These can be replaced by the compost created by the organic waste. Moreover, the methane released from the decomposing waste can be used for fuel purposes. Many world-wide examples are available that provide credence to this exercise.

Extended Producer Responsibility of cutting waste

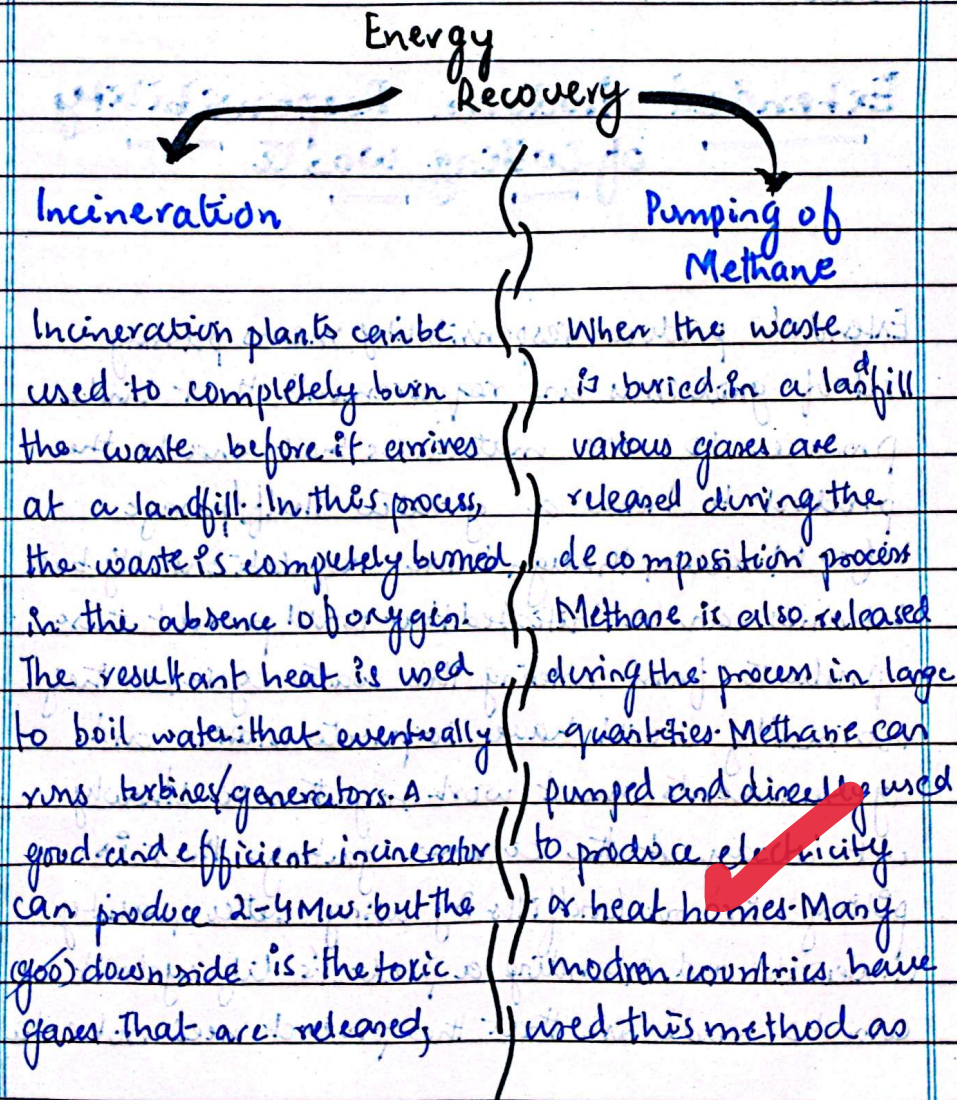
Extended producer responsibility means passing a set of guidelines and requirements that binds producer to use materials that enable the product to have a greater shelf/usage life. Moreover, through these regulations, buy-back schemes can be initiated that would prevent these products from entering the waste cycle, as they normally would have. Corporate entities and governments must work together to slowly cut away at the consumer garbage that is piling in our landfills. By using better quality materials and extending a product's lifecycle it can be made sure that the product is not

DATE: ___/___/___

The waste bin so soon

Energy Recovery from Landfills

Energy Recovery from landfills can be done in two ways:



DATE: ___/___/___

in the atmosphere during the process. } an alternative to the Incineration process.

Investment in AI and IOT to facilitate waste processing

By the use of AI and IOT, waste can be efficiently processed and (processed) worked. Waste processing requires significant ^{man} power and poses a huge risk to the labour's health and safety. By incorporating AI (Artificial Intelligence) and Internet of things based tools in the collection to processing chain, efficiency and worker safety can be increased many fold. Already such mechanisms are working in the sorting phase of the chain. The goal should be to incorporate this in the entire chain. The overall cost for process waste will also come down; as significantly less manpower will be required. Driverless garbage trucks can be made to autonomously deliver the waste to the landfill or processing site.

Improving the Conditions of already Existing Landfills

Landfills across the world pose significant risks to those ^{living} working and near the landfill.

DATE: ___/___/___

Apart from human health, the risk of chemicals seeping and contaminating the ground water remains ever high/present. It is these threats that should push mankind to develop ^{new} and safer landfill technologies. Promotion of organic technologies (microbes) that eat and consume waste should be done and trials should be conducted in waste ^{holding} sites and landfills across the world, to check the efficacy and efficiency of these microbes. Moreover design of landfills should be updated to incorporate new methods that prevents or reduces to quite an extent, the risk of contaminants seeping into the ground.

Decentralization of Waste Management System

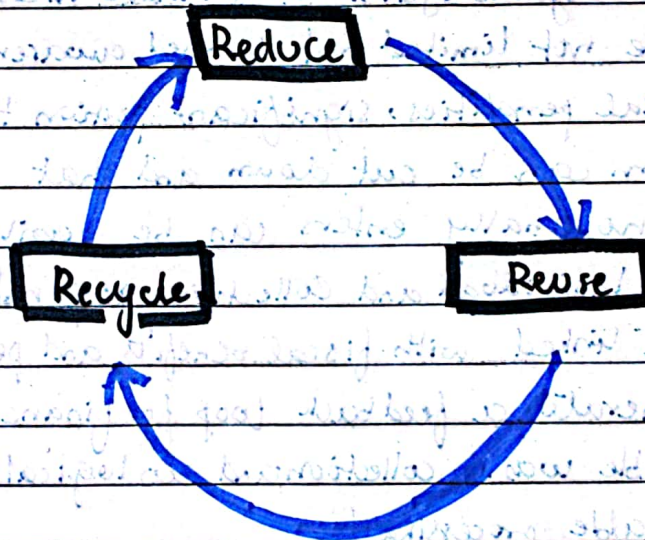
In this world of globalization, countries are trying increasingly hard to remove the barriers and move to a more interconnected and decentralized world. Similarly, waste management should be decentralized at the local level. Local neighbourhoods should have their own waste processing units. Moreover, models like the South Korean and Japanese ones can be adopted for revenue collection. Waste and garbage are processed according to their weight and the residents individually pay for

DATE: ___/___/___

It by the kilo. These efforts can be replicated to all the localities in order to instill a sense of responsibility and ownership.

Encouraging the 3R Approach across the Spectrum

The 3R cycle, taught to everybody in school,



3R Cycle

is of use no use when it is not implemented by people in their practical lives. Unless a monetary and financial incentive is not attached, the 3R cycle will be just a mere talking point. The cycle needs to meet a inflection point that the consumer feels it is better to recycle, reuse or reduce not because it is 'bad' for their pocket

DATE: ___/___/___

but provides them more financial benefit too

Downstream and Upstream waste Minimization

The best way to reduce the current influx of the waste entering the systems is to employ measures that drastically cut down the production of such waste entering the system. Through these measures, which are not limited to limited awareness or financial penalties, significant portion of the system can be cut down and that portion which normally enters can be easily managed; individual and collective responsibilities should be linked with fiscal benefits and penalties that generate a feedback loop for financially sustainable waste collection and ecologically sustainable processing too.

CONCLUSION

Waste management is a severe crisis that every country has to tackle. However, through prudent and pragmatic thinking, countries can collectively and individually devise ecologically sustainable, financially suitable, socially acceptable and public doable scheme.

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