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Part II

(Question No. 2)

1- Introduction:

According to website of NASA, There is an average increase of 1°C in temperature in the last 120 years. Global warming has become a threat to entire world as it is cause of what is happening in terms of seasonal and weather pattern's change. There are multiple causes of climate change including greenhouse gases, instigated green house effect, depletion of ozone layer, deforestation etc. However, what is more tough are the challenges of mitigation and adaptation.

2- Global Warming:

It is an international environmental problem which is considered a great threat in all aspects of life. IPCC (Intergovernmental Panel on Climate Change) defines global warming as:

"Global warming is an average and gradual increase in average temperature of earth's atmosphere."

Since industrial revolution, this process has gained momentum as large number of

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industries were installed which release the green house gases in the atmosphere. It was the slow process but has resulted into gradual global warming that world is witnessing right now.

3. Causes of Global Warming:

There are multiple cause of global warming among them few are as follows:

i- Green House Gases :(GHG)

Green house gases are the gases which has the ability to absorb, trap and scatter heat. They result into increase in temperature of earth atmosphere. Important green house gas which is significant cause of global warming is CO_2. Others are CH_4, CFCs and N_2O etc. It is estimated that around 90% of the global warming is induced by Green House Gases.

ii- Enhanced Green House Effect:

Green House Effect is a natural process which helps in maintaining temperature of the earth. However increased number of green house gases instigate this process which increased the temperature of the earth.

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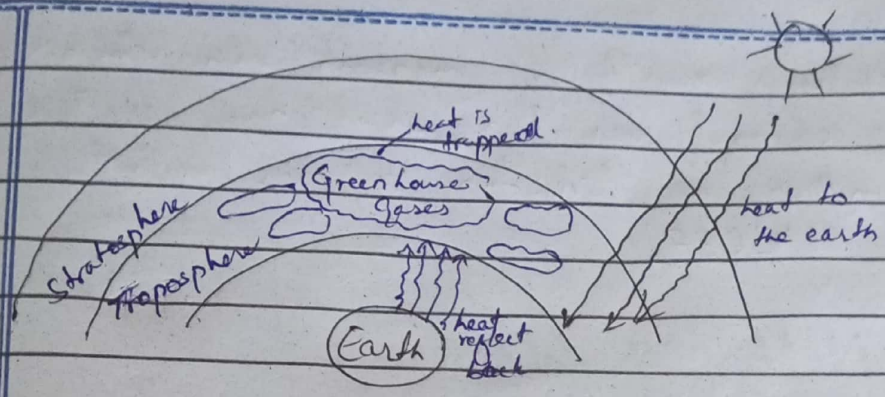
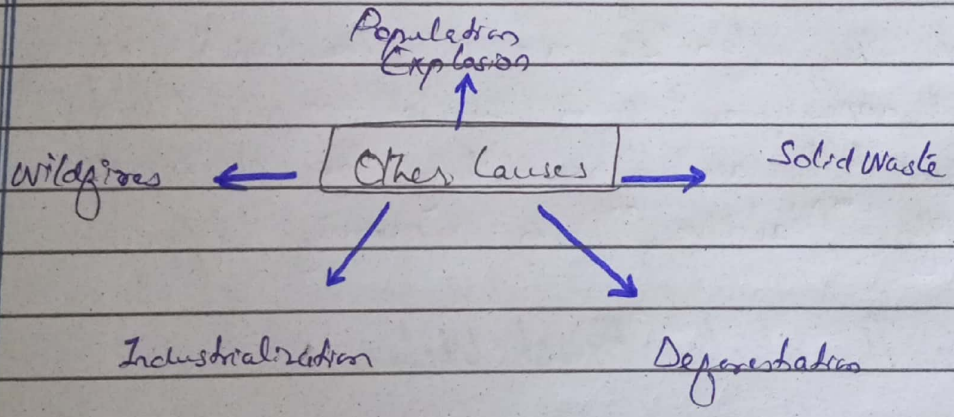


iii- Depletion of Ozone Layer:

Ozone layer in atmosphere protects the earth from harmful effects of Ultraviolet radition of sun. However, due to increased industrial activities and pollution, this layer has damaged and it results into increased in temperature of earth.

iv- Other Causes:



4- Global Warming as Menace for World:

i- Change in Weather Patterns and Disasters:

Global Warming has caused change in weather patterns which has also results into disasters. For instances, floods of

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2022 was result of monsoon rains caused by seasonal variation, which has effected 33 millions of Pakistani as per reports of UNICEF.

ii. Melting of Glaciers :

One of most common effect of Global warming is melting of glaciers. They are melting at very high rate. As per NASA, Himalayan Glaciers are melting at most rapaid rate in the world right now.

iii. Rise in Sea Level:

Along with global warming, the rise in sea level has also been observed. Most of the islands are at the risk of disappearance from world map. Many scientists are predicting the disappearance of "Maldives" in upcoming years.

iv. Threat to Fresh Water :

Glaciers are the source of fresh water, but if they are melting at a greater pace, there is a chance of threat to fresh water. World is already facing water shortage especially the third world countries.

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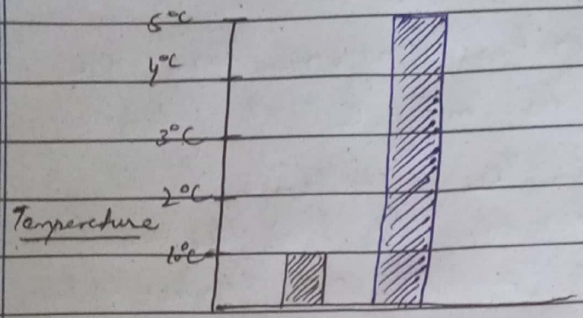
v- Threat to Life:

As per IPCC, in the last 120 years the average temperature has increased by 1°C. However, it is estimated to rise by 5°C by the end of 2050.



IPCC

vi- Threat to Coastal Life:

50% of world's population is living in coastal area. For increase, Gwadar, Chittagong port, Bombay, Melbourne etc. If sea levels will rise, this area will be covered in sea and will be threat for people who live in coastal areas and their livelihood is dependent on it.

5- Challenges and Opportunities to Counter Global Warming:

Global warming is a serious threat that everyone is facing however, there are challenges in curbing to mitigation and

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adaptation. Some of the challenges are as follows:

i- Non-Binding Decisions of International Organizations:

Different international organizations are taking measures to mitigate its global effects however, the challenge to it is non-binding decision. Most of the members which are part of UNEP (United Nation Environmental Programme) are not legally bound to its decisions, which affects the implementation of policies.

ii- Absence of World Super Powers in Implementing Environmental Policies:

World Super Powers for instance, United State is showing least interest in curbing climate changes. Their absence despite of their maximum contributions to climate degradation shows lack of commitment to curbing climate change.

iii- Global Alliances and Military Exercise:

Global alliances to compete each other and military exercise in this regard add fuel to the fire. For instance, the Indo-Pacific strategy of US and other

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such alliances are challenge to measures against climate change.

iv. Financial Constraints:

Thirds world countries have become more vulnerable to climate change. For instance, according to report of World Bank, Pakistan is 7th most vulnerable country to climate change in the world. Though it is contributing only 1% of total global emissions. Also, financial aid is required to overcome dll disastrous situation, which is not provided properly.

Opportunities:

There are two sides of a coin and this sounds true in this case. Though there are challenge in curbing climate change, but opportunities are also available which are as follows:

i- Global Platforms to Highlight Climate Issues:

As, world is witnessing new era of multipolarity and witnessing different global meetings at platforms like G-20, Brics etc. These platforms provide a better opportunity to highlight climate vulnerability.

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ii- Social Media : A Trend Setter :

In the world of globalization, social media provides another platform to set trends to highlight climate change. Different videos are circulating on social media which grab attention of concerned authorities.

iii- COP - Another beam of Hope :

A regular meeting of Conference of Parties (COP) is done annually which serves as a hope that global leaders are serious to take action against climate change. Most recent COP-28 is taking place in UAE (United Arab Emirates) to discuss climate issues.

6. Conclusion :

In a nut shell, global warming is a phenomena which is not restricted to a geographical area. It is a global threat which is posing threat to both developed and developing nature. After all, money can not buy natural and serious steps are required to save nature.

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Question 3

1- Introduction:

EIA is a process to identify the environmental impacts of a proposed project and activity. When impacts are identified, proper measures are taken to mitigate them and then final decision is made after public participation. It is a reactive approach. On the other hands SEA is a pro-active approach which helps to identify impacts of not a specific project, but entire plan, policies and projects.

2. EIA:

EIA stands for Environmental Impact Assessment. UNEP (United Nation Environmental Programme) defined EIA as:

"It is a process to identify environmental, social and economic impacts of a project prior to decision making."

EIA is a formal report and a formal process to identify, evaluate, predict, reduce or to avoid the environmental effects which are likely to cause by a proposed project or activity.

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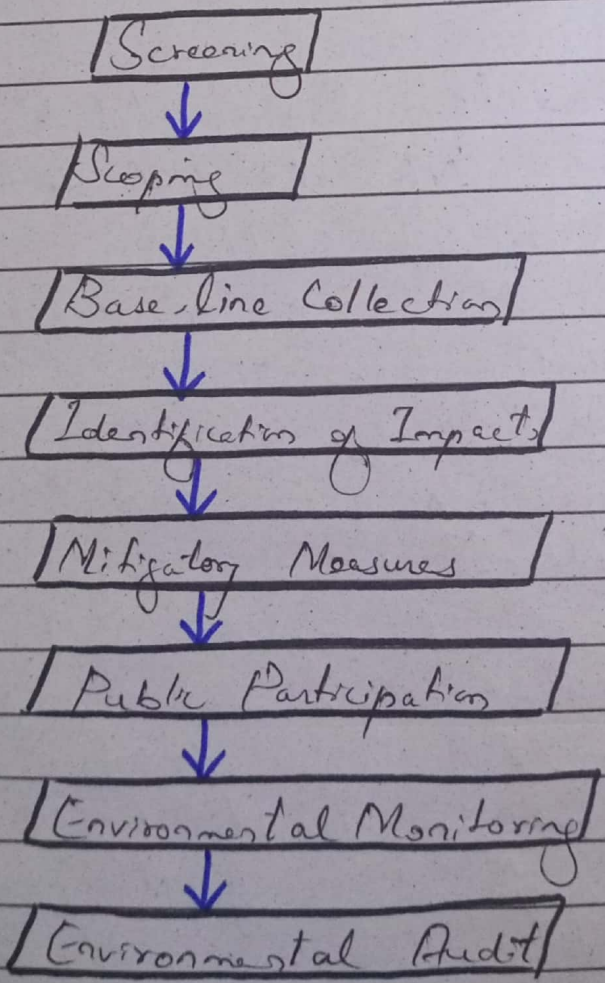
3- Need and Objectives of EIA:

It is important to carry out EIA before starting a developmental project like airport, motorways, urban housing schemes, factories etc. EIA ensures the following:

i- Ensures environmental protection
ii- Promotes sustainable development.
iii- Reduces the overexploitation of natural resources.

4. How EIA helps in Reducing Environmental Cost?

EIA is done in the following steps:



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During the process of impacts identification and then measures to mitigate them, the environmental cost can be reduced. It identifies following impacts:

a- Early Identification of Impacts:

i- Possibility of Deforestation:

During Conduction of EIA, specific preference is given to the near by green cover. If there is any near by vegetations which is likely to be affected, it is identified as prioritized impacts.

ii- Identification of Water Pollution:

In case of a development project near a water body, water body is also taken into consideration. If there is chance of pollution or its degradation, alternative measures are taken for it.

iii- Prioritizing the Biodiversity:

Biodiversity is also an another important aspect of environment which has both aesthetic and instrumental value. A forest area will never be changed into an industry, which is occupied by rich fauna and flora.

iv- Consideration of Vegetative Threats:

In developing countries, agriculture plays an

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important role in fulfilling the basic needs as well as for the economy. Therefore, agriculture is also taken into consideration before making decision.

v- Identification of Social Impacts:

Social impacts are also related with environmental aspect, therefore they are also considered in step of impacts evaluation. For instance, the impact of new construction industry on the livelihood of labours living in surrounding areas.

b- Mitigation Measure Integration:

After identification of impacts, proper mitigatory measures are devised to curb those impacts. Mitigation measure can be identified and integrated into project plans to minimize adverse environmental impacts.

c- Informed Decision-making:

As, EIA is conducted by responsive agencies as "Environmental Protection Agency in Pakistan". It enables them to make informed choices that prioritize sustainable environment.

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d- Reduction of long-term ~~Economic~~ Environmental Damage:

Through identification of proper steps in impact identification, EIA helps in preventing long term environmental damage. Therefore, it helps in avoiding subsequent cost which is used in later restoration efforts

e- Compliance with Regulations:

EIA - a formal process - is done according to environmental rules and regulations. It reduce the risk of legal consequences and associated financial risks and penalties.

f- Public and Stake Holder Engagement:

In the process of EIA, stakeholders and public participation fosters awareness and accountability. It ensures community support and contribute to effective environmental management.

g- Sustainable Development Focus:

EIA promotes the incorporation of sustainable practices, aligning projects with environmental conservation goals and minimizing overall environmental costs.

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5. Difference Between EIA and SEA :

SEA stands for "Strategic Environmental Assessment." It is an advance approach of EIA, because EIA is not conducted until an environmental relevent project enters the approval process. SEA is defined as:

> "set of analytical and participatory process for environmental consideration to incorporate the environmental consideration at the early stage of decision-making into the polices, plans and programs that affect the natural environment or natural resource."

The points of difference between EIA and SEA are as follows:

i- Difference in Approaches:

EIA is a reactive approach and is carried out once a project is proposed, while SEA is pro-active approach. It informs developmental proposals, policies and plans.

ii- Change in Perspectives:

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EIA is considered a narrow perspective, while SEA is a broader concept. It identifies the issues in a broader way.

iii. Difference in Process:

EIA is a process which helps in identification of proposed activity. On the other hand, SEA enables the development of framework against which positive and negative impacts can be measured.

iv. Difference in Decision-making Point:

EIA has well defined beginning and end. He focused on informing a specific decision at a specific point. SEA aimed at development of sustainability of framework to inform continous decision-making over a period of time.

v. Point of difference in Focus:

EIA focus on mitigation of environmental impact and its identification before the mitigation. While on the other hand, SEA focused on maintaining a chosen level of environmental quality and socio-economic conditions through identification of sustainable objectives and limits of acceptable changes.

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vi- Difference in Level of Details:

EIA is a formal report which indicates high level of details. On the other hands, SEA provides lower level of detail and focuses on vision and overall framework.

6- Conclusion:

By summarizing the discussions, it is pertinent to say that both EIA and SEA are important in environmental framework. EIA plays a vital role in reducing the environmental cost by analyzing the impacts and focus on mitigation measures.

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Question No. 4

1- Introduction:

Pollution is one of the largest environmental cause of disease and premature deaths. Therefore, it is pertinent to make or reduce the effects. There are different techniques which help in reducing the pollution. Among other sources of pollutions, air pollution is most common cause of health issues. Technologies to control

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pollution includes dust collection system, scrubbers, vapours recovery etc.

2. Need of Technologies To Counter Pollution:

According to World Bank report, pollution causes more than 9 millions of deaths at premature ages, the majority of them are due to air pollution. This number is several times higher than from AIDS, Malaria and Tuberculosis combined. Therefore, it is pertinent to control the pollution through different technologies.

3- Pollution Control Technologies: (PCT)

PCT is a term which is used in environmental management. It is defined as,

"set of processes or measures to control the emissions, effluents into air, water and soil."

Without pollution control, waste in different form will penetrate air, water and soil. Then, it became reason of different diseases and a threat for both aquatic and terrestrial life.

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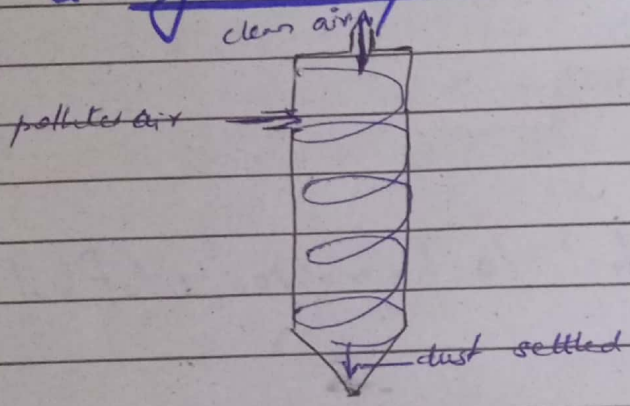
PCT

Dust Collection System | Scrubbers | Vapour Recovery | Phytoremediation

i- Dust Collection System:

To control dust and air pollution, different devices are used in this regard which are as follows:-

a- Cyclone Separator



Cyclonic separators are used to remove the particulate matter from gases by using principle of inertia. It is a device used to separate solid particles from contaminated gases. It is used in industrial applications like power generation, running turbines, chemical process.

b- Fabric Filters:

Fabric Filter is another method in which filter bags are used which are

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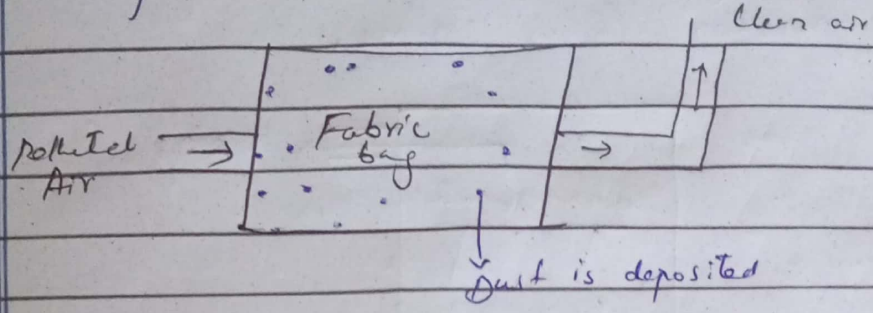
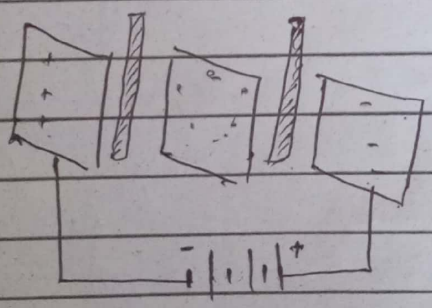
made of either nylon or cotton. They are used to capture dust from contaminated gas. It is deposited with steamed material to capture dust easily.



c. Electrostatic Precipitator:

It removes fine particles like dust, smoke etc from gas stream by using electrical energy to charge particle either positive or negative. The charged particles are then attracted to the collector plate carrying opposite charges



ii. Scrubbers:

Scrubber is a PCT which is using liquid to wash unwanted pollutants from a gas stream. In scrubbing

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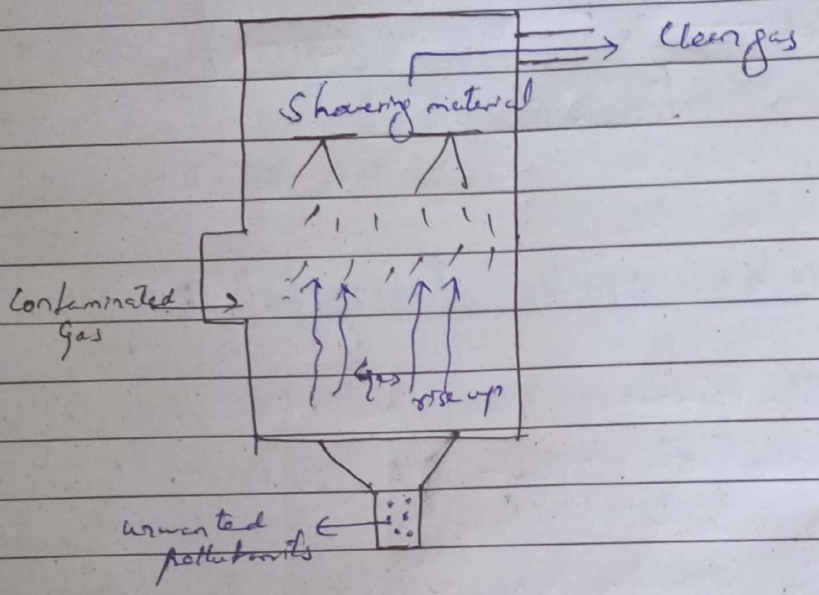
system the gas in column from downside moves up, then is washed by water or any other liquid from the top. Here the liquid gas i.e. water scrubber or a gas-solid powder i.e. dry scrubber operation takes place.



Scrubbers

Wet Scrubbers	Dry Scrubbers
liquid material is used to capture or spray unwanted particles.	Dry material is used to capture unwanted particles.

iii. Vapors Recovery :

It is a process of removing vapors of gasoline or other fuels

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so that they could not leave into the atmosphere. It is used to capture VOCs (Volatile Organic Campounds) and hazardous air pollutants that are released during storage and handling of petroleum products.

Vapours Recovery

- Stage I
- Stage II

a- Stage I :

Stage I of vapours recovery deals with the capturing of vapours emitted when the petroleum products are transferred from trucks to the fuel stations in the storage tanks. It involves the use of vapours balance system, vaccum pumps and vapour recovery nozzles.

b. Stage II :

Stage II of vapours recovery deals with the vapours that are emitted during the process when gasoline is dispersed into the vehicles at gas stations. It involves the use of vapour recovery system on pump nozzles along with network

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of pipes and storage tanks to collect and store captured vapours.

iv- Phytoremediation:

Phytoremediation is a process which describes the treatment of environmental problems through use of plants. Plants have ionic properties to absorb contaminants. Plants like mustard, alpine-penny-cress, pigweed have proven to be successful at hyper-accumulation of contamination at toxic sites.

Removing arsenic with ferns is just one example of phytoremediation.

4. Conclusion:

In a nutshell, different type of pollution control technologies are used to curb or control the negative effects. These technologies help to control pollutants at the point of source, so they cannot integrate into the environment.

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Question No. 6

1- Introduction:

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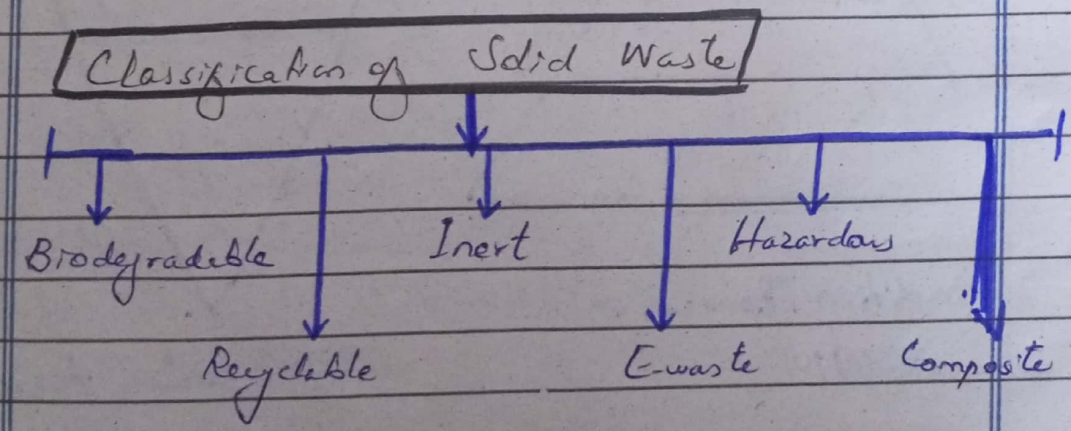
With the industrialization and population explosions, the generation of solid waste has become doubled. There are threats that if solid waste is not disposed properly, it will contribute to health impacts. Therefore different techniques are used to treat solid waste to reduce its negative impacts. It includes different chemical, biological and physical methods which aimed to reduced the harmful impacts posed by solid waste.

2- Defining Solid Waste :

Solid Waste is defined as,

"any discarded, unwanted material which is solid or semi-solid and has served its purpose, which is of no longer use."

Sources of solid waste include industries, residential areas, municipalities, minings and other formal institutions.



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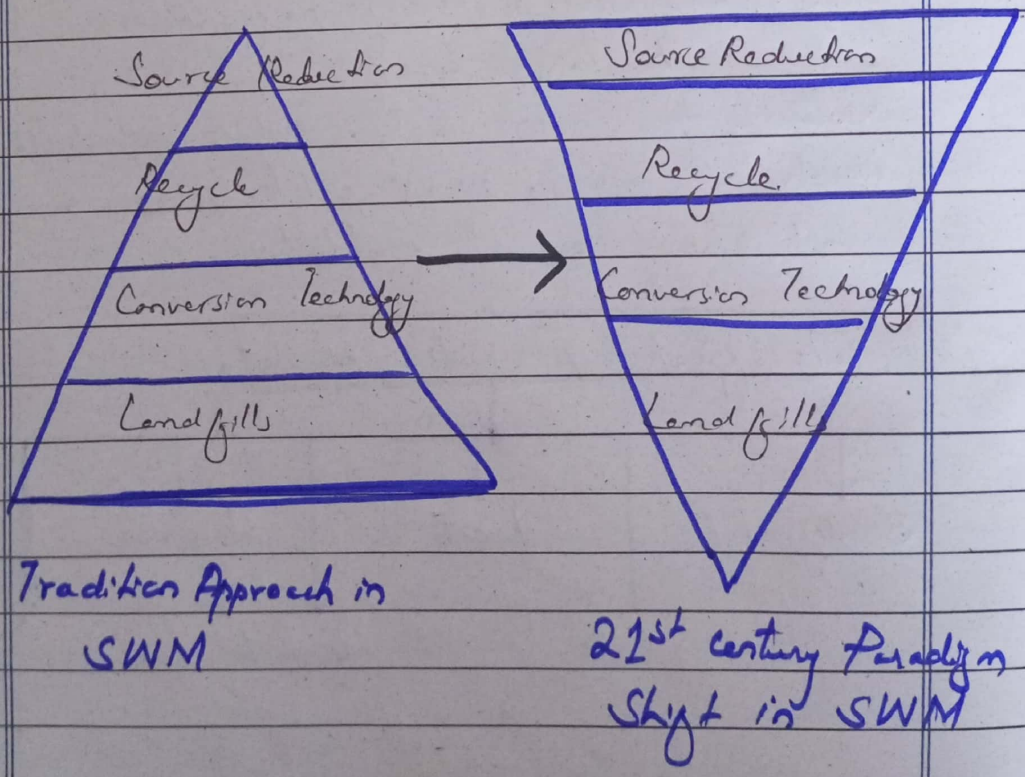
3- Solid Waste Management (SWM):

Solid Waste Management (SWM) is defined as:

"the process of collecting, transporting and disposal of solid waste to reduce the impacts on human health, environment and reputation of state."

In ancient cities, people usually threw waste in streets which was made forbidden for the first time by Athens. The technological approach to SWM began to developed for the first time in later part of 19th century. It was first started in United States.



Tradition Approach in SWM

21st century Paradigm Shift in SWM

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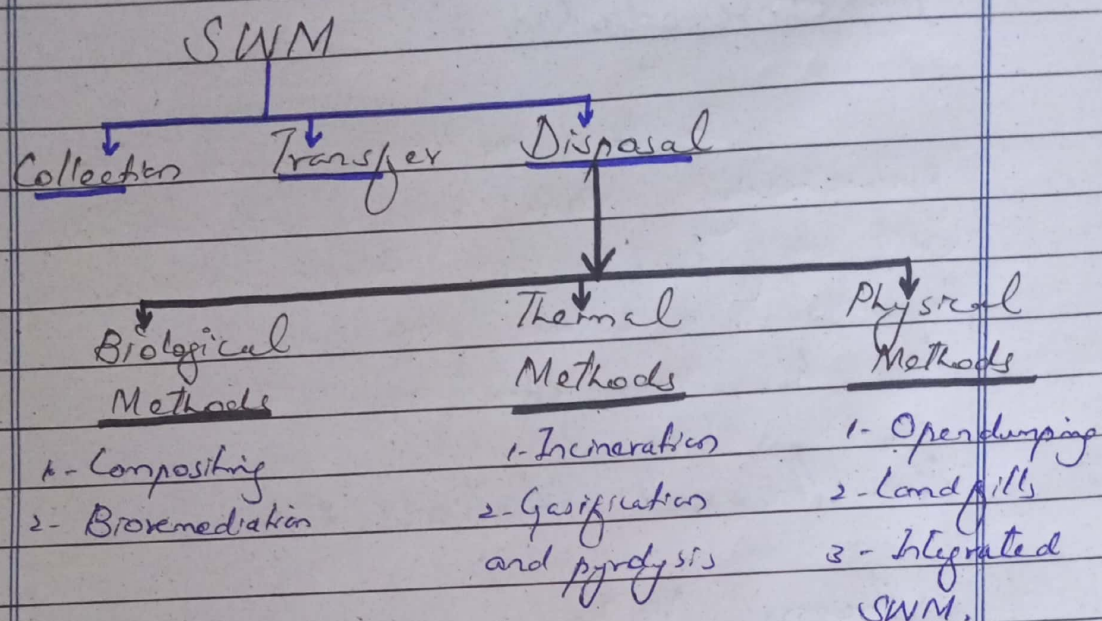
4- Approaches to Solid Waste Management (SWM):



A- Biological Methods:

Biological methods are the methods used for treatment of solid waste in which waste is treated through use of microorganisms or living organisms. It includes following methods:

i- Composting:

Composting is a process in which microorganisms like bacteria and fungi convert the degradable organic waste into humus like substance called compost. The compost is organic in nature and can also be used as a fertilizer.

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Vermi-composting is also used in which worms are added to the compost which make the compost more rich in nutrients.

ii. Bioremediation :

In this method, microbes are using for removing toxins from contaminated soil or ground water. Through microorganisms, hazardous substances are converted in to less hazardous substances.

B- Thermal Methods :

Thermal Methods are used in treatment of waste by giving high temperature and other suitable conditions. It is done in following ways:-

i- Incineration :

An incinerator is made up of heavy insulating material, in which solid waste is burned and is reduced to ash. The high levels of heat is kept inside so that waste can burn properly. Through waste, heat and electricity can be produced and it also reduces volume of the waste upto 20-30%.

ii. Pyrolysis and Gasification :

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Both processes involves breakdown of organic waste. Gasification allows a low dose of oxygen while pyrolysis is done in the absence of oxygen Both processes are used to recover heat from waste without causing air pollution.

C- Physical Methods :

Physical Methods involve treatment of solid waste physically. Physical treatment solidifies or reduce the volume of solid-waste. Some of the common physical method used for treating solid waste are as follows :

i- Open Dumping :

Open dumping is the most common practice used for treating solid waste. Open dumps are used to dump all kinds of waste. It involves uncontrolled disposal of untreated and non-segregated waste.

ii- Landfills :

Landfills is the most common management strategy for municipal solid waste - There are specific large sites for dumping waste and after a specific period of time, it is covered by different

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layers and is compressed to the ground. Two layered water resistant covering is used at the base to avoid the leachate contaminating the ground water.

iii. Integrated SWM:

Traditionally 3Rs concept (Reduce, Reuse, Recycle) was used which is recently replaced by integrated Solid Waste Management. It is now 4Rs approach that includes Reduce, Reuse, Recycle and Recovery. For example, salvage of lead from batteries, production of biofuels from biomass are included in the process of recovery.

5- Conclusion:

By summarizing the above discussion, SWM is the most important process to treat waste and is not a single step process. Different techniques are used in the process of treating waste which depends on the type of waste.

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