

ROLE OF ENGINEER IN "ECO SYSTEM RESTORATION"

ABSTRACT

❖ Many of the world's ecosystems have undergone significant degradation with negative impacts on biological diversity and peoples' livelihoods. It is necessary to restore and conserve ecosystem because without it life would be impossible. Over the years many steps have been approached to ensure ecosystem restoration by individuals, many teams and organizations. Among them engineer's also play an important role

INTRODUCTION

❖Ecosystem Restoration is the "**process of assisting the recovery of an ecosystem that has been degraded, Damage or destroyed**" (SER Primer, 2004).

❖ Ecosystem provides many of the basic services that make life possible. Life cannot exist without a working ecosystem. Ecosystem science is a multi disciplinary subject. Each profession has its own role to play in this. An engineer's role in this matter is diverse as well.

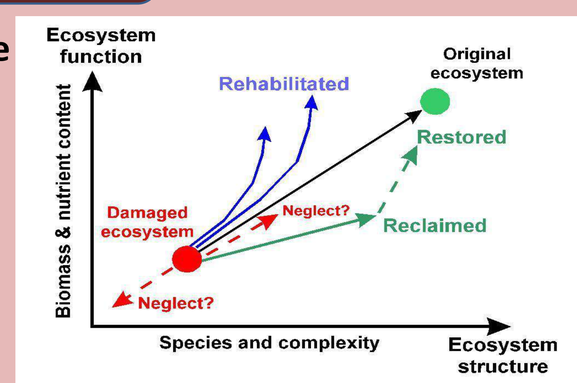

FIG 01: Ecosystem restoration Graph

METHODS

❖**ROLE OF ENGINEERS IN ECOSYSTEM RESTORATION** –

➢ROLE OF CIVIL ENGINEERING –

Civil Engineering plays an important role in ecosystem restoration by **sustainable construction**.

- They help **plan dams and levees** to regulate water flow through the area.
- Building **sustainable sewage.**
- **Environmental engineers** use the principles of engineering, soil science, biology, and chemistry to develop solutions to environmental problems.
- Role of structural engineers in **green building**.

➢ROLE OF ECOLOGICAL ENGINERING -

- **Ecological engineering** uses ecology and engineering to predict, design, construct or restore, and manage ecosystems.

➢ROLE OF ELECTRICAL AND ELECTRONIC ENGINEERING -

- **Sustainability**: Electrical Engineers help the environment
- through improved energy efficiency, electrical vehicles, Electricity transmission, distribution and generation
- Explore renewal energy.



FIG 02 : Recycle Cycle

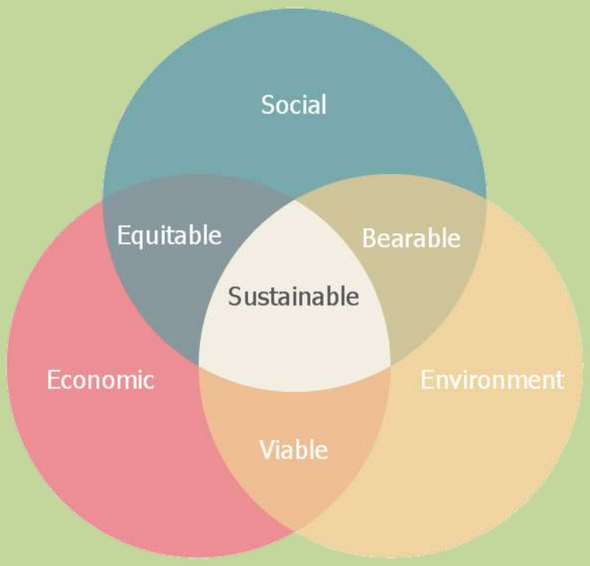

FIG 03 : Sustainable Development Diagram

➢ROLE OF CHEMICAL ENGINEERING –

- They develop advanced technologies, monitoring devices, modeling techniques, and operating strategies that **reduce** the volume and toxicity of **pollutants** allowed to enter the air, waterways, and soil reducing impact of industrial, power plants, vehicles etc.

➢SOME OTHER ROLES ARE -

- Many engineers develop new technologies such as **solar panels** and **hydrogen fuel cells**.
- Engineers can also help **fight climate change** by **reducing greenhouse gases.**
- **Air quality engineers** have helped reduce air pollution by contributing to designs for cleaner engines and power plants.
- Companies, industries and factories can help in recycling e-waste and other waste products.

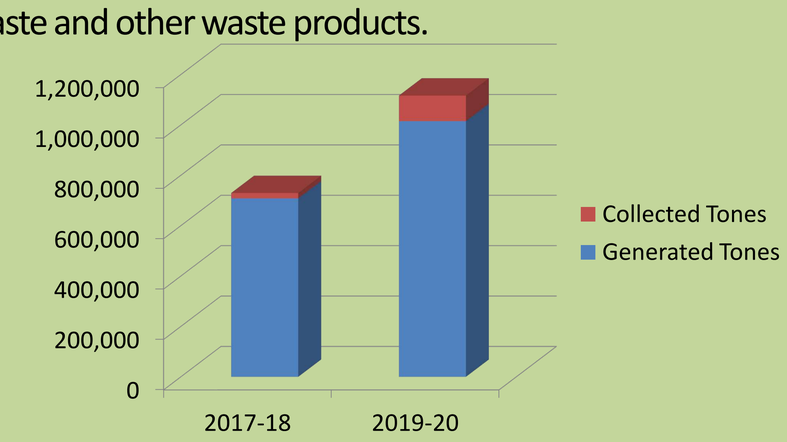

FIG 04 : E-Waste Generated and Collected in India

RESULTS

❖Thus an engineer's role in "ecosystem restoration" can be said to be very diverse. Some examples are –

- **India's largest sewage treatment plant to come up at Okhla.** The plant will be able to treat 124 million gallons of wastewater per day.
- During the pandemic, masks disposal is also a major global concern. As a solution production of bricks from masks is also seen.
- In December 2019, India has built 21,000 miles of roads using plastic.
- Tejas Sidnal, an architect from Goa together with his team made tiles from carbon waste.

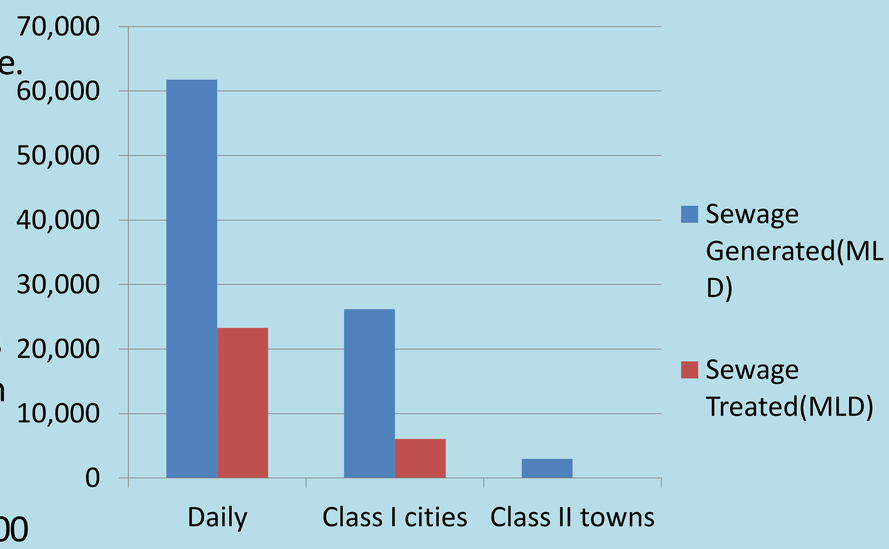

FIG 05: Daily Sewage generated v/s treated in India

CONCLUSION

❖In the past 60 years, more than 60% of the Earth's ecosystem has been degraded. To date we have extracted approximately 37 billion tons of resources from the earth. That's this year's alone. We can check the updates here - https://www.theworldcounts.com/stories/impact-of-ecosystem-destruction

This may be sound like an exaggeration but we're well on our way to our own destruction, slowly and surely. But the great thing about us humans, is that we learn from our mistakes. Efforts are being made to address these global concerns. And **Engineers** play an **important role** in this factor.

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ROLE OF AN ENGINEER IN " ECOSYSTEM RESTORATION "

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Introduction

With ecological restoration, practice to renew, restore the degraded, damaged, or destroyed ecosystem habitats with active sustainable ways is the need of the hour. Engineers too are working for the same.

In India, a startup had successfully developed a technology **replacing toxic metals like lead and mercury in a dry cell with aloe vera extracts** and other herbs to make a battery electrolyte or the '**green e-cell**' thus generating electrical energy from the chemical energy of aloe vera that is eco-friendly and non-hazardous.

Engineering graduates **Nimisha Varma** of Lucknow and **Naveen Suman** of Bundi (Rajasthan) are accredited for this.

Objective

Electrical energy, man's greatest discoveries helped build new civilizations with energy sources from fossil fuels, nuclear fission, water, solar energy, wind, and bio-waste.

All these non-conventional energy sources take a vital role in the global growth because conventional energy sources are exhausting rapidly in present days due to some disadvantages. Now there is keenness in finding out new techniques to generate electricity in an eco friendly manner.

One such solution is the **startup, Aloe E-cell**, which can bring revolution in the next few years. It gave us a direction **towards the eco-friendly environment** by introducing a new technique in the generation of electricity i.e., **a new type of electrical battery** using aloe vera gel.

Method

The **proposed power management circuit** includes two sub-circuits; an energy storage system and a voltage regulation system as shown in **Fig 1**.

a. **The energy storage system** acts as an energy storage reservoir capable to accumulate energy to be harvested from the Aloe Vera to achieve a certain threshold voltage before periodically activating the circuit.
b. **The voltage regulation system** is used to manage the amount of voltage required to fit the operation of the load to function smoothly.

Therefore, the design of the circuit aims to enable a specific interface, which **can collect and manage electrical energy generated from the Aloe Vera plants** with limited current capability as well as provide the required output power to electrical appliances in different ways, like in **manufacture of eco-friendly batteries**, **power plugs, etc.**

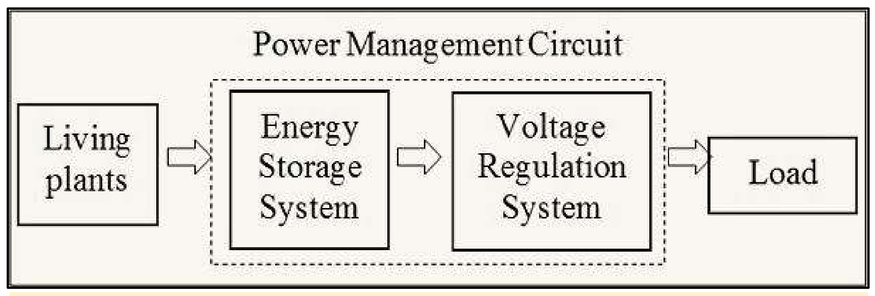

Fig 1: Block diagram of the energy harvesting system.



Aloe e-cell

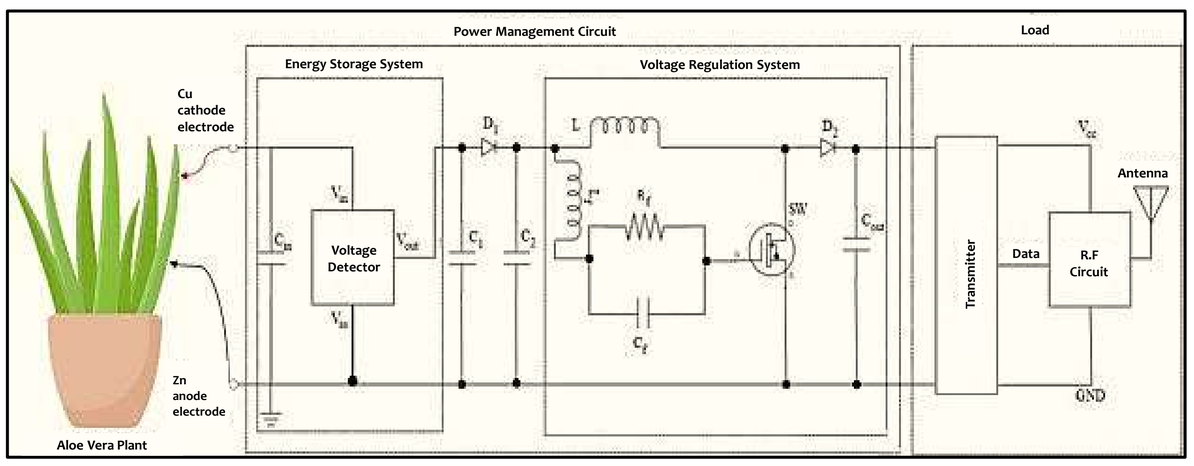

Fig: Schematic of the proposed power management circuit connected to Aloe Vera.

Result

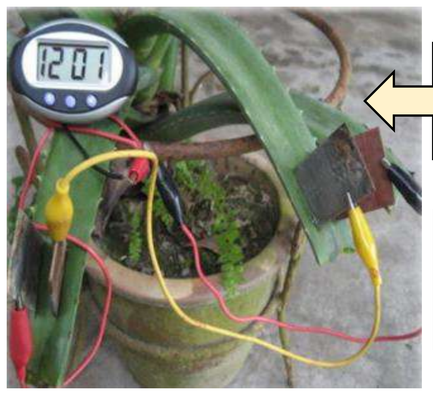

Fig: Digital clock powered by organic energy source

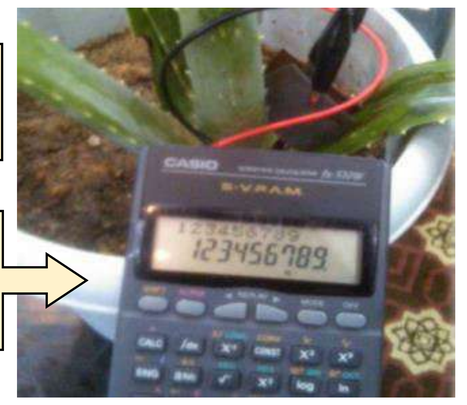

Fig: scientific calculator showing simple numerical value

So, the main idea is to make aloe e-cells that will not only **save the environment** but also provide many **farmers with jobs**. Also, the e-cells production **cost would be 10% less** and would **last 50% more** than the normal batteries. The **Aloe E-Cell Private Limited** is the company that will start producing the aloe e cells along with their electrical instruments.

HOW IT TACKLES CLIMATE CHANGE?

- Pressure levied on the Indian Economy can be decreased up to 78% saving approximately 109 Billion Dollars annually which is wasted in importing raw materials from different countries.
- 71.6% Reduction in environmental pollution caused due to usage of batteries.
- 97% Reduction in Disease statistics caused due to usage of dry cell batteries.
- 89% Reduction in usage of zinc used in batteries.

Advantages

1) Battery using Aloe Vera provides **agricultural and natural benefits**.
2) Cheapest raw material available for a battery, so **cost-cutting in production**.
3) 100 % Made In India battery, so **boon to the Indian Economy**.
4) **Non-hazardous chemicals** like Nickel, Cadmium, Chromium, Alkali, etc. are used.
5) **Non-explosive material** like Potassium Hydroxide is present in the cell which makes it safe for human use.
6) It contains clean and green aloe vera so **disposal and health advantage**.

Conclusion

- Every year **tonnes of batteries are dumped** into the landfill. These household batteries **contain highly toxic substances**, which eventually **re-enters the environment**. Which as a result, affects the environment badly. The **startup, Aloe E-cell**, can bring revolution in the next few years. It gave **us a direction towards an eco-friendly environment**.
- There are lots of other ideas and our nation is full of young and innovative minds which need to be explored and also need some opportunities to come up with their innovative ideas; the ideas might sound weird to some people but it wouldn't mean those ideas are not worth it. Risk is included but one needs to take up the risk to work on what they want to.

Acknowledgement

We would like to express our special thanks of gratitude to our teachers (alphabetically): Sir. Dibya Jyoti Dang, Sir. Hirakjyoti Barman, Sir. Jiban Jyoti Kalita, Ma'am Karishma Gogoi, Sir. Rituraj Nath, Ma'am Saheera Azmi Hazarika as well as our principal Dr. Dilip Kumar Bora who gave us the golden opportunity to do this wonderful project on the topic "Role of an engineer in ecosystem restoration".

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SAVE NATURE SAVE EARTH

ROLE OF ENGINEER IN " ECO SYSTEM RESTORATION "

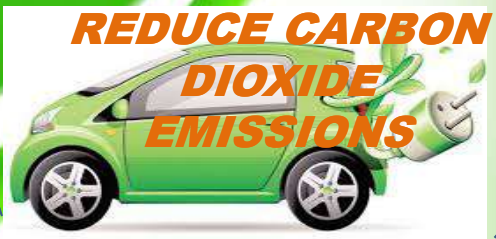
SAVE WATER

1.USE HYDRO ELECTRIC POWER PLANT TO REDUCE AIR POLLUTION



" HAPPY WORLD ENVIRONMENT DAY "

2.USE ELECTRIC VEHICLES TO REDUCE CARBON DIOXIDE EMISSIONS



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ROLE OF ENGINEER IN "ECOSYSTEM RESTORATION"

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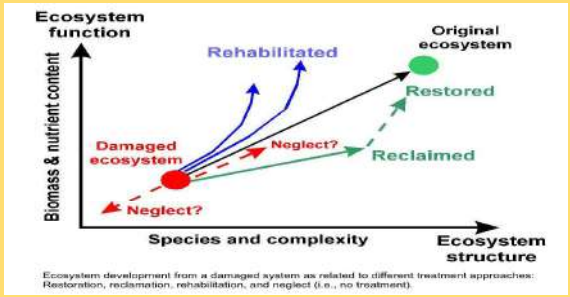
INTRODUCTION

Ecosystem restoration is defined as " the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed.

Potential for habitat restoration is increasingly used as a argument for reintroducing ecosystem engineers. Ecological effects of engineers on many other species occur in virtually all ecosystem because the physical state changes directly create non food resources such as living space, directly control abiotic resources and indirectly modulate abiotic forces that in turn, affect resource used by other organism. Ecosystem engineering is a concept that had, until recently, been applied only to modern environments in which biological interactions can be observed directly. The distinction reveals important criteria of demarcation for what is and.. . Is not physical ecosystem engineering, exposes context dependency for effects that enhance prediction of effect magnitude and significance, and helps clarify the purpose of the concept and how one might use it.

METHODOLOGY

- Restoration methodologies have been developed worldwide for different degradation scenarios including for extreme ones like landslides, mining, forest fires, etc.
- An important milestone for the discipline has been the publication of the standards for the practice of ecological restoration by the society for ecological restoration, the leading global body for the discipline of universal application, these standards provide the core principal and framework for restoration.
- Ecological restoration is still a developing in India, with a limited number of practitioners and project. Most initiatives are small and site-specific. On the other hand, the need for restoration is considerable and urgent.
- Beaver increased habitat heterogeneity and plant richness at plot and site scales.



Ecosystem development from a damaged system as related to different treatment approaches: Restoration, reclamation, rehabilitation, and neglect (i.e., no treatment).

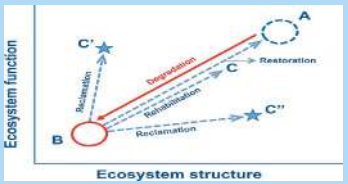
DESCRIPTION

Ecosystem restoration means assisting in the recovery of ecosystem that have been degraded or destroyed, as well as conserving the ecosystems that are still intact. Healthier ecosystems, with richer biodiversity, yield greater benefits such as more fertile soils, bigger yields of timber and fish, large stores of greenhouse gases.

All kinds of ecosystem can be restored, including forests, farmlands, cities, wetlands and oceans. Restoring can happen in many ways- for example through actively planting or by removing pressure so that the nature can recover on its own. Its not always possible or desirable to return an ecosystem to its original state.

ADVANTAGES	DISADVANTAGES
1. Ecological restoration prevents the potential of habitat loss.	The natural system are constantly changing.
2. Ecological Restoration helps mitigate climate change and threatened or endangered species.	Humans have an imperfect understanding of natural systems.
3. Ecological restoration helps in preservation/restoration of the original habitat and species.	The lack of available information about earlier success and failure.





COVID-19 IMPACTS

COVID-19 also play a vital role in today's ecosystem. The global outbreak of COVID-19 is affecting a part of human lives, including the physical world. The measure taken to control the spread of the virus and slow down on economic activities have significant effect on our ecosystem. It also has the positive and negative impact of COVID-19 pandemic in the environment, by reviewing the available scientific literatures. The pandemic situation significantly improves air quality in different cities across the world.



RESULTS

- Restoration remove 13 to 26 gigatons of greenhouse gases from the atmosphere.
- In all cases ecological restoration will improve the biological diversity on degraded landscapes, increase the population and distribution of rare and threatened species, enhance landscape connectivity, increase the availability of environmental goods and services, and contribute to the improvement of human well-being.
- Successful restoration generates a wide range of benefits not only forest quantity and quality, but enhance food security, improved air and water quality, climate changes resilience job creation .



Future prospect

Engineering is increasingly recognized as a relevant ecological driver of diversity and community composition. Also engineering impacts on the ecosystem which may vary from negative to positive, and from trivial to enormous. It also revealed that the effects of engineering in ecosystem restoration is positive and corresponds to a 25% increase in species richness, indicating that ecosystem engineering is a facilitative process which acts globally and impacts on all environment system such as animal ecosystem, marine ecosystem or terrestrial ecosystem etc . So, in the future engineering will create new habitats or microhabitats which may have stronger effects than those which are modified or may disturb the ecosystem. And with this we can say, engineering attempts to build an integrative framework which may effects on species diversity



CONCLUSION

We should now understand ecosystem are created by interrelationship between living organism and physical environments that inhabit land, air, water. As our ecosystem provides habitat to wild plants and animals also.. It promotes live people , animals and plant depend on healthy ecosystem. We need to understand that our everyday wants will not be possible without a healthy environment.

Thus , if we want to save the environment then, we should stop exploitations of natural resources. We also need to understand that restoration is a slow process that can't be rushed.



REFERERNCE

- **Ecological Restoration**
  - Andrew F. Clewell and James Aronson
- **Large scale Ecosystem Restoration**
  - Mary Doyle and Cynthia A. Drew
- **Internet**

ROLE OF ENGINEER IN "ECOSYSTEM RESTORATION"

INTRODUCTION

Restoration seeks to re-establish native population , communities and ecosystem processes following environmental degradation

A complimentary option for restoring ecologically degraded systems is to re-establish species that are noted for their ecosystem engineering activities and which were most likely a key element of undisturbed reference conditions, but whose populations have been depleted through human activity.







- Restoration attempts often fail, but may benefit from utilising ecosystem engineers.
- Beaver increased habitat heterogeneity and plant richness at plot and site scales.
- Ecosystem Engineers contribute significantly to meeting common restoration goals.

METHODS

- Preventing further loss of protected populations or wildlife habitat
- Erosion control
- Rangeland forage production
- Preservation of cultural landscapes

CIVIL DEPARTMENT
Chumpi Sonowal and Nharika Baruah

ROLE OF ENGINEERS IN
'ECO SYSTEM RESTORATION'



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Engineering –"The art of directing the greatest source of power and nature to use end benefits of man"-
Thomus Tregold





ABSTRACT



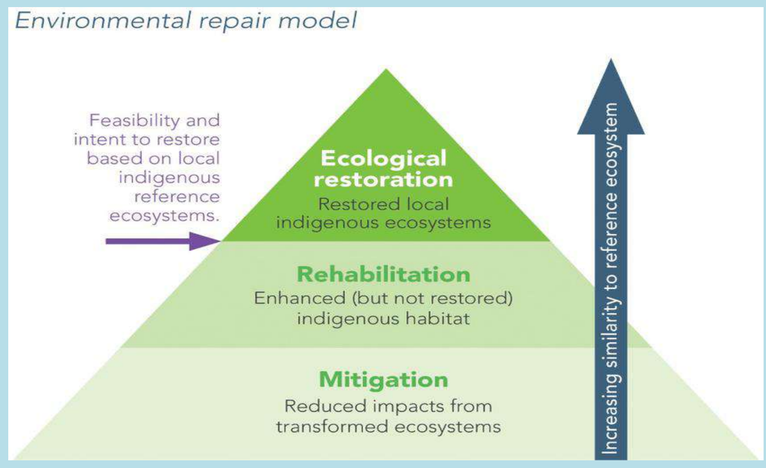
Ecosystem restoration means assisting in the recovery of ecosystem that have been degraded or destroyed as well as conserving the ecosystem that are still
intact. Here engineers can play an important role in restoration of the ecosystem by developed by building and planning projects that preserve natural resources
are cost efficient and support human and natural environment.

OBJECTIVES

- For spreading awareness about ecological restoration.
- Supporting the study of ecological restoration.
- Reduce ecological degradation.
- Decrease hazardless product.



METHODOLOGY



- Design and build projects that meet basic human needs like - portable water, food ,housing transportation ,communication.
- Engineers are involved in developing and extracting natural resources in many different ways so they can improve the efficiency of extracting and processing remaining petroleum and gas reserves and efficiency of electric power stations by using superconductors for power distribution.
- Engineers can assist in ecological restoration in several ways by
  – (a)improving the way to recycle and reuse domestic waste
  (b)designing better solid waste collection and storage facilities.
  (c)improving and reuse construction material such as concrete and asphalt from roads and ways to reuse scrap metal.
- Solving environmental problem by construct wetland and agricultures, integrating water resource management planting rain gardens for absorbing rainwater.

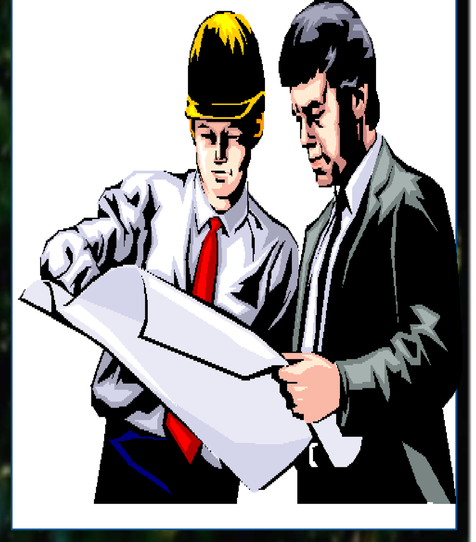
CONCLUSION

Approximately 15 million engineers populate the world today by many fields. Nowadays art using of engineering to solve ecological problems emerged as a new branch called ecological engineering. Ecosystem can be restore by -planting trees, cleaning rivers. In the field of ecosystem restoration engineers play important role by applying their technical skills they help the environment in recovering. People and plant are only as healthy as the ecosystem because they are dependent on each other. Conserving the ecosystem hat are still intact but bringing the ecosystem back to life is the main duty for us.

References: http://www.ecologyandsociety.org/vol20/iss4/art43/
https://guides.nyu.edu/posters
https://www.youtube.com/watch?v=-SvwEztWmNc

Role of Engineer in Eco System Restoration





Eco system: An ecosystem is a geographic area where plants, animals, and other organisms, as well as weather and landscapes, work together to form a bubble of life. **Ecosystems** contain biotic or living, parts, as well as abiotic factors, or nonliving parts

ECOSYSTEM DEGRADATION:

Ecosystem degradation is the deterioration of the environment through depletion of resources such as air, water and soil, habitat destruction, the extinction of wildlife, etc. The degradation of ecosystem is an environmental problem that diminishes the capacity of species to survive.

HOW?

1. High growth rate of population
2. Repid industrialization
3. Increasing pollution
4. Use of pesticides and fertilizers
5. Over misuse of natural resources

Ecosystem Restoration:

Restoration ecology is the science study supporting the practise of renewing and restoring degraded,damaged,or destroyed ecosystems and habitants in the environment by active human intervention and action

Ecosystem restoration: Roles of Engineers:

The role of engineers in saving ecosystems and affecting the sustainable development is very important because the engineers can use creativity, technology and scientific knowledge to solve practical problems.



➢Engineers need to understand the relevant waste regulations and the issues behind it. For example, site waste management plans place clear responsibilities on engineers to initiate excellence by eliminating waste in design.

➢Engineer should encourage maximum use of recycled materials by avoiding over-prescriptive specification and motivating the supply chain to increase its use of recycling.

➢Most projects require extensive environmental input. This will normally be in the form of environmental impact assessments and environmental surveys. Engineers should investigate these issues early, as some surveys may need to be made years in advance of a project starting on site.

Air pollution is increasing at a rapid rate across the world, wreaking havoc with the environment and the health of humans. In fact, every year an estimated 4.2 million people die globally every year as a result of exposure to outdoor air pollution, according to the World Health Organization(WHO). The role of an environmental engineer is not only to identify common air pollutants, but also to design and enforce effectual solutions. There are a number of control mechanisms that can be utilized to reduce the amount of pollutants emitted by a manufacturing plant.

➢**Engineer** should minimise adverse impact on the environment during both construction and operation phases. The areas of concerns are:

1)Land use 2)Ecology and Bioderversity
3)Energy and Carbon
4)Landscape
5)The Historic Environment
6)WasteManagement
7)Material Use 8)Effects on neighbors



Healthy Ecosystems Promote Healthy Life

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ROLE OF ENGINEER IN "ECO-SYSTEM RESTORATION"

INTRODUCTION

▪ The engineering profession is now in the position to make a substantial contribution to the "greening" of the planet through ideas such as ecological engineering. It can be viewed as designing or restoring ecosystems according to ecological principles learned over the past century.





GOALS IN ECOSYSTEM ENGINNERING

The restoration of ecosystems that have been substantially disturbed by human activities such as environmental pollution or land disturbance. #1

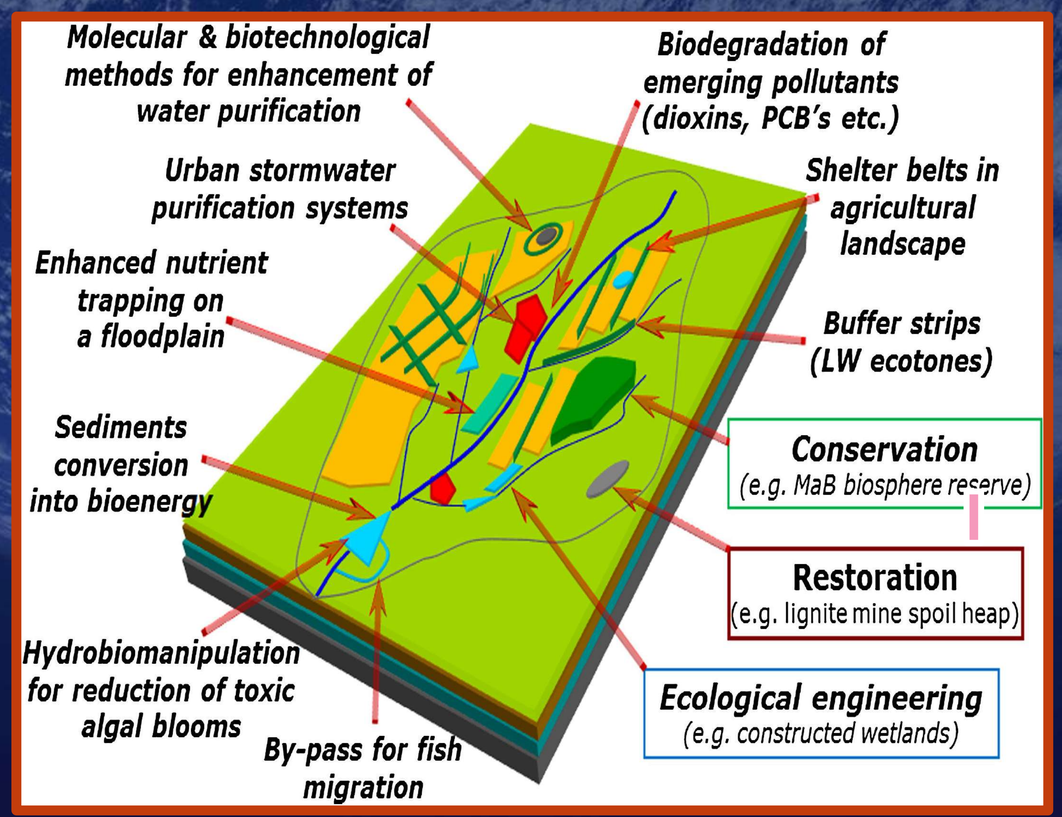
#2 The development of new sustainable ecosystem that have both human and ecological value.

ECOLOGICAL RESTORATION

▪ The focus of ecological engineering and ecological restoration is similar. Both strive for ecosystem functioning and biotic resilience from disturbances be comparable to the historic conditions through the creation of the most natural system obtainable. Both ecological engineering and ecological restoration stress on minimal human maintenance and continued interference.

RESTORATION OF RIVERS

➢Prevent siltation of the river bed (soil erosion of the agricultural lands is one of the main factors behind siltation of rivers).
➢Introducing irregular flow patterns to increase the hydrological capacity (introducing gravels).
➢Prevent the construction of reservoirs by large scales in rivers.
➢Restoration strategies increase the complexity and heterogeneity of the river environment.





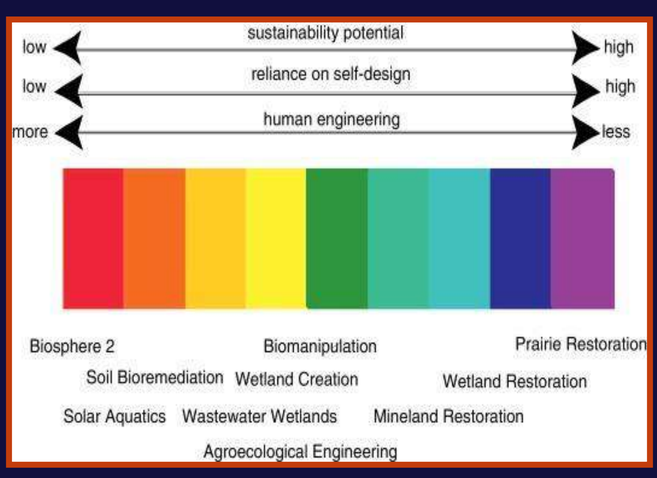
CONTROL OF AIR POLLUTION

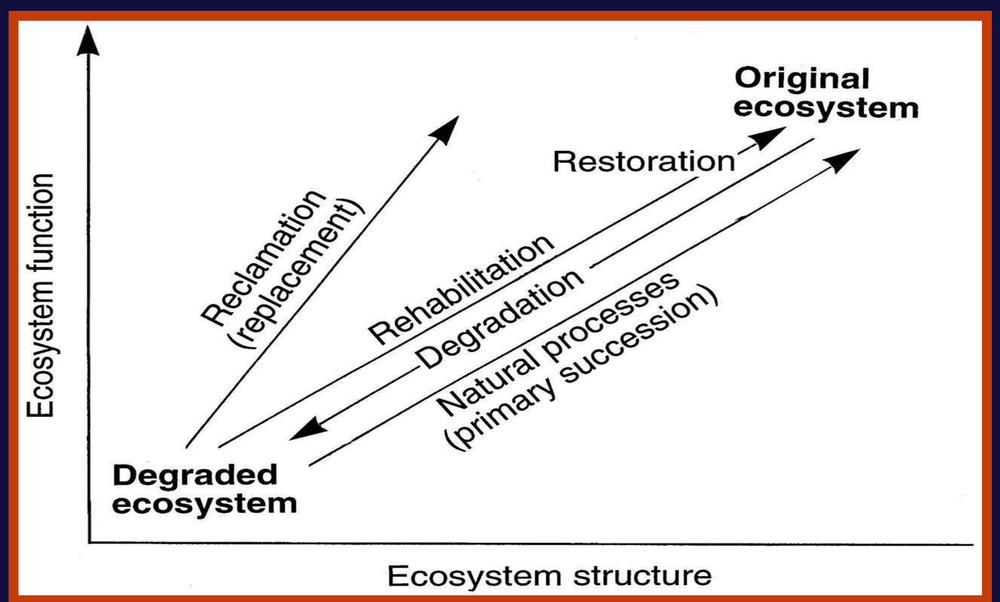
▪ Existing APCDs include electrostatics precipitators (ESPs), fabric filters (FF or baghouse), flue gas desulfurization (FGD) and many more . ESPs are designed to reduce fly ash emissions by creating an ionized field that removes charged particles. They have low operating costs, but a limited capacity to remove mercury because it is not generally adsorbed in the fly ash at combustion temperatures.

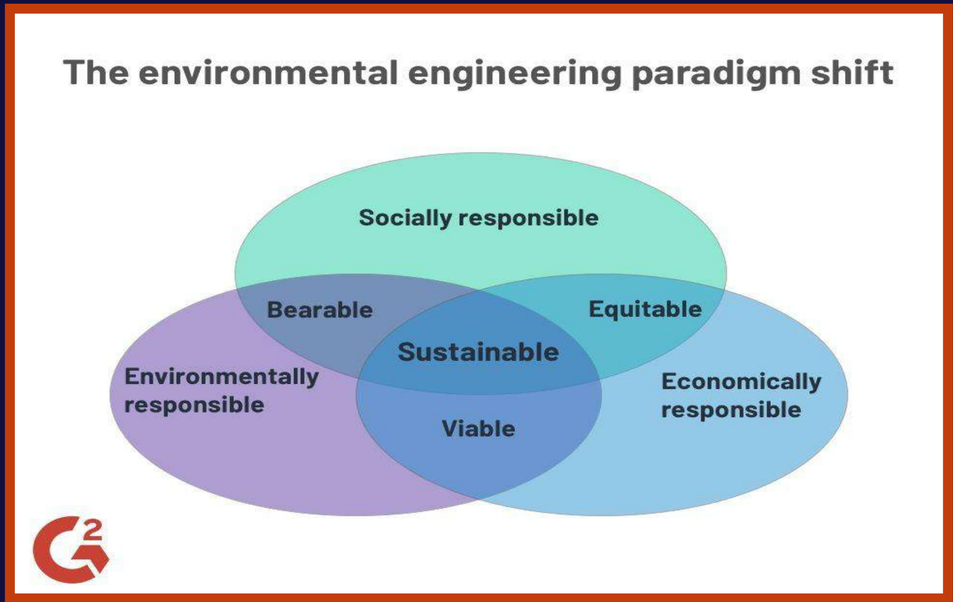
REHABILATE AND RESTORE

Researchers have suggested a science-based, four-step strategy for carrying out most forms of ecological restoration and rehabilitation –

- Identify the causes of the degradation.
- Stop the abuse by eliminating the sharply reducing these factors.
- If necessary, reintroduce key species to help restore natural ecological processes.
- Protect the area from further degradation and allow secondary ecological succession to occur.







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ROLE OF ENGINEER IN "ECO SYSTEM RESTORATION"

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What is "ECOSYSTEM"

•Ecosystem restoration is defined as "a process of reversing the degradation of ecosystems, such as landscapes, lakes and oceans to regain their ecological functionality; in other words, to improve the productivity and capacity of ecosystems to meet the needs of society. This can be done by allowing the natural regeneration of overexploited ecosystems or by planting trees and other plants" (UNEP, 2019).



Photo sequence showing mangrove restoration at Palk Bay, India. (ODMCAR Foundation)

ENGINEERS RESPONSIBILITIES TOWARDS ENVIRONMENT

Professional engineers play an important and significant role towards ecosystem. They work to improve the-

•welfare, health and safety, with the minimal use of natural resources and paying attention with regard to the environment and the sustainability of resources.

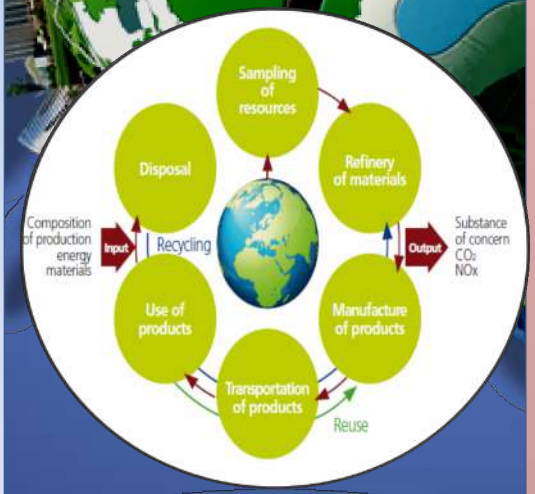
•The sustainability is influenced by the challenges and opportunities.

•To provide anoptions and solutions to maximize social value and minimize environmental impacts are to be provided by Engineers

OBJECTIVE:

•The objective of ecosystem restoration is to contribute to theconservation and sustainable use of biodiversity as well as create social, economic and environmental benefits, whereby healthy and connected ecosystems should contribute to improve food andwater security, peoples' livelihood sand to mitigate and adapt toclimate change" (CBD, 2019).

•Considering ecosystems as socioecological areas which deliver multiple functions that benefit a diversity of stakeholders can help to identify the drivers of ecosystem degradation and loss,the existing interests to manage the landscape, economic issues and long-term goals for the ecosystem.



Principles used by Engineers to achieve sustainability

Living within the environmental goals,

- ☐ *Ensuring a strong , healthy and justified society,*
- ☐ *Promotion of good governance,*
- ☐ *Achieving a sustainable with an efficient economy, using science responsibly.*
- ☐ *Engineers have a responsibility to maximize the value of their activity to build a sustainable planet. In order perceive attainable goal and recognition of the changes over time and demand of the society.*
- ☐ *Empathies the important potential role for engineering*
- ☐ *Empathies about the environmental limits and finite resources*
- ☐ *Reduce the demand of resources*
- ☐ *Reduction of waste production by using effectively the resources that are used*
- ☐ *Make use of systems and products which reduce embedded carbon, energy and water use, waste and pollution, etc.*
- ☐ *Adoption of full life cycle assessment as normal practice including the supply chain,*
- ☐ *Adopt strategies such as salvaging, reprocessing, decommissioning and discarding of components and materials,*
- ☐ *During Design stage itself minimization of any adverse impacts on sustainability .*
- ☐ *Carrying out a comprehensive risk assessment prior to starting of the project.*
- ☐ *Risk assessment should ensure and includes the potential environmental, economical and societal impacts, way ahead of the natural life of the engineering venture.*

Acknowledgements-

TEAM- 1.HIRAK JYOTI MOHAN(M.E)
2.RIKIRAJ DAS(M.E)
3.ANKUR PRATIM BARMAN(M.E)

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Engineering and Sustainable Environment. Amit Bijon Dutta 1, **Dr. Ipshita Sengupta**

Role of Engineer in “Eco System Restoration”

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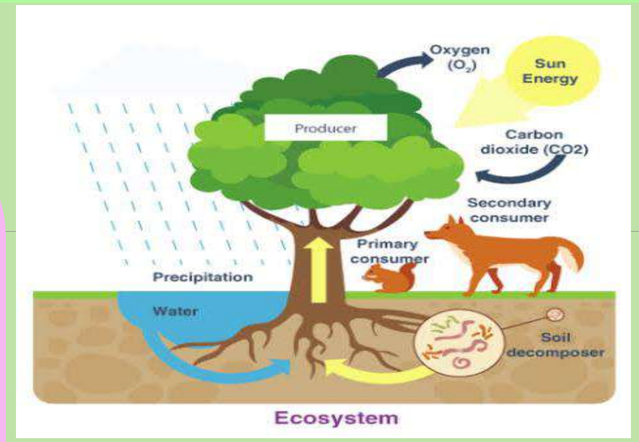
Abstract

On the increase of the human population and human needs our ecosystems are destroying. To ensure the live of human being, restoration of ecosystem becomes most important now. Engineers can improve and modify their designing and innovative ideas to restore the eco systems as all the biotic and abiotic components of the World depend on the ecosystem.

Introduction:

An ecosystem refers to a geographical area in which plants, animal, other micro and macro organisms, weather and landscape work together to form a bubble of life. It contains both biotic and abiotic factors. But in the recent year, due to various human activity and natural disaster eco-systems are destroying and disturbed rapidly.

Ecological restoration is defined as the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. Engineer should work for natural goods and services. They should work for flood control, providing clean water, remediation of contaminants, erosion control and environmental pollution control





Importance of Eco-System Restoration:

- Healthy soil sustain life on earth
- Our relationship with nature is failing
- Indigenous culture and knowledge are being lost
- Human health is dependent on ecosystem health

Job of an Ecological Engineer:

The engineers who uses ecology and engineering to predict, design, construct or restore and manage ecosystem that integrate human society with its natural environment for the benefit of both are known as Ecological engineers. The main jobs of them are-

- Design of ecological systems as an alternative to man-made/ energy intensive systems to meet various human needs.
- Management, utilization and conservation of natural resources
- Restoration of damaged ecosystems and the mitigation of development activities.
- Management, utilization and conservation of natural resources

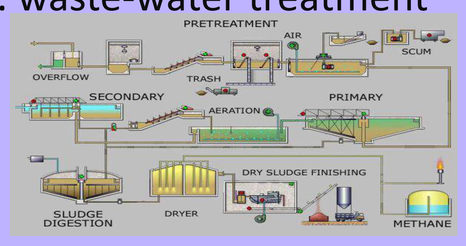
Eco-system Restoration Initiatives:-

As crisis is the mother of invention, Engineers have design various machines and technique to restored various eco systems-

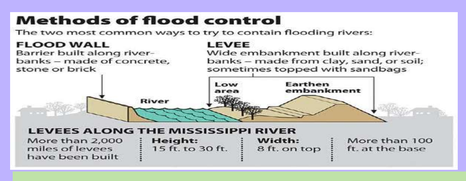
1. Organic farming



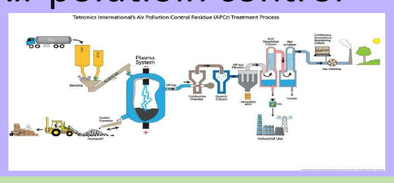
2. waste-water treatment



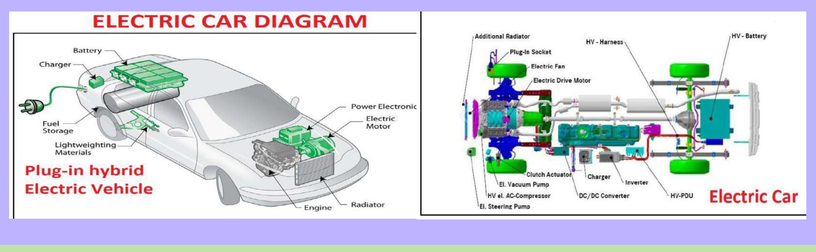
3.Flood control



4. Air polutioin control



4. Electric vehicles:



Conclusion:

Engineers should work for sustainable development. The design of various machines and vehicles, running of an industry, construction of buildings and roads etc. should be eco-friendly and those should be benefited for both biotic and abiotic components of ecosystem.

Future Works:

1.Flood control of Assam and Kerala.
2.Invention of vehicles run by renewable energy sources.
3. Prevention of deforestation.

Acknowledgements:

1.Principal, Dhemaji Engineering College, Dhemaji.
2.Coordinators of the poster competition organizing committee.
3.Teaching and non-teaching stuffs, Dhemaji Engineering College.

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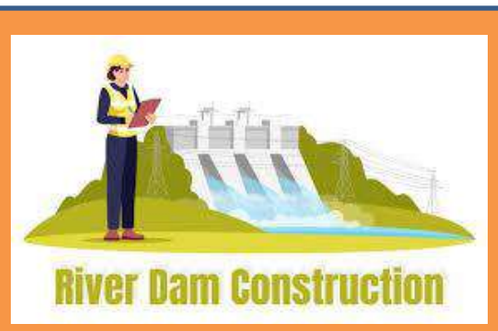
“One of the first condition of happiness is that the link between man and nature shall not be broken” ----Leo Tolstoy

ROLE OF ENGINEERS IN ECOSYSTEM RESTORATION





•There has never been a more urgent need to restore damaged ecosystem than now.
•Croplands,forests,savannahs and other terrestrial and all other aquatic ecosystems are all in dire need of protection and restoration.
•The United Nations has declared the decade "2021-2030"as The "UN Decade on Ecosystem Restoration"
•The objective of this decade is to "prevent,halt and reverse the degradation of ecosystem worldwide".





❖Engineers play a significant role in ecosystem restoration.Engnieers build dams due to which there is electricity production and storage of large quantities of water..
❖Wastes generated from industries produce hazardous chemicals and metallic substances which are dumped into the river without being treated.So,it is the duty of engineers to prevent such activities or treat them properly
❖It must have a proper drainage system otherwise bacteria and viruses will harm the people and the aquatic organisms..
❖Water is a blessing without which we cannot even think of surviving..By keeping the taps open only when required saves a lot of water.Also,rainwater harvesting is a very good method of conserving rainwater.





➢Engineers nowadays are recycling plastic by making roads out of plastic which is referred to as polybend.It is a good initiative taken rather than burning them as they produce poisonous gases or burying them as they are non-biodegradable.
➢The prices of petrol and diesel are rising day by day..So, there is an urgent need to solve this problem.
➢Meanwhile engineers have applied CNGs which have started to run in cities and towns. But it is not much used as much petrol and diesel are used.
➢If the prices of CNGs become lower then everyone will start using CNGs in their vehicles.
➢Also, for ecosystem restoration electric run vehicles which can be charged should be used leaving behind petrol and diesel which causes global warming.
➢Thus, the duty of every engineer is to dedicate themselves properly to ecosystem restoration as they are experts on applied science and the future ecosystem restoration depends on engineers.Thus,engineers are the diamonds of the society.

"LET US ALL UNITE TO MAKE OUR ECOSYSTEM CLEAN,GREEN AND FRESH"

PRESENTED BY:
1.JIDAN PAIT(C20/45)
CIVIL ENGINEERING
2.LAMBUDHAR MILI(C20/27)
CIVIL ENGINEERING
3.RISHABH DOLEY(C20/40)
CIVIL ENGINEERING
4.RUWADJYOTI NARAH(C20/35)
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ROLE OF ENGINEER IN "ECOSYSTEM RESTORATION"

Kapilmuni Regon, Binod Doley, Migang Doley, Trinayan Pegu
Dhemaji Engineering College, (Mechanical Engineering)

Introduction

Ecosystem restoration means assisting in the recovery of ecosystems that have been degraded or destroyed, as well as conserving the ecosystems that are still intact. Healthier ecosystems, with richer biodiversity, yield greater benefits such as more fertile soils, bigger yields of timber and fish, and larger stores of greenhouse gases.

As an engineer we

"Protecting people from environment
Protecting the environment from people
Improving the overall quality of the world around"

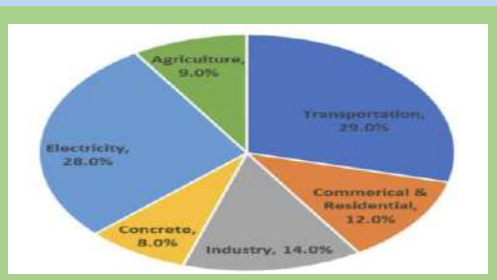


Fig.1

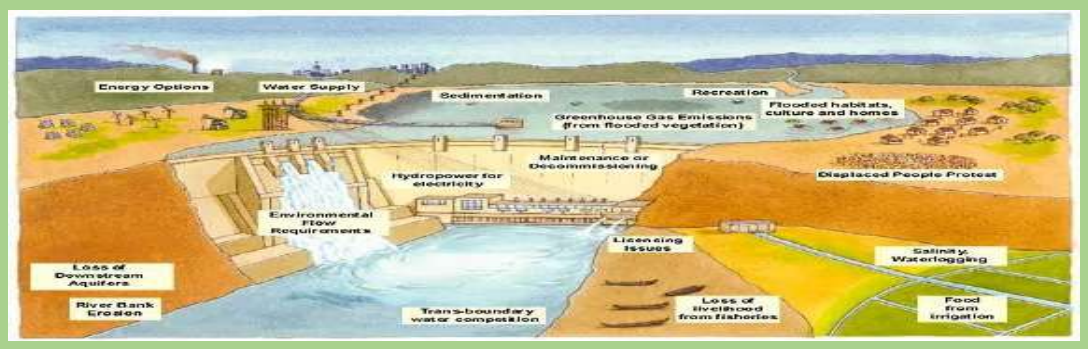
Above diagram shows the major problem of our ecosystem .

Some important step

- Increase the use of green energy.
- Save every drop of water.
- Plants tree for the future
- Increase the use of organic fertilizer.
- Increase the use of natural fabric.
- Stop construct of dam.
- Reduce the use of cement.

Problem

- conventional energy (as in oil, coal and gas) produce carbon dioxide, use gas that has negative effects on climate, they are also very addictive to modern society.
- As a of agriculture dependent country we must take care of our soil because of using chemical fertilizer our soil are losing their capability, negative impact on our ecosystem.
- Now in this modern civilization(faction), use of syntactic fabric is very common but it's not eco- friendly, negative effects on our ecosystem.
- As a growing country we must care of development and ecosystem, For example construction of dam is very costly but it's efficiency is very low, negative impact on our social- life and ecosystem.
- In this modern days construction of larger scale, small scale building are very high. In this conversation industry use of cement is almost 70%, starting from row material to convert cement is very costly and negative impact on our ecosystem.
- **Below diagram shows the effect of dam**



Discussion

In fig.2 we see that our conventional energy use is very high(almost 85%), if we exchange them with green energy source our ecosystem pollution level, ecosystem is improved.

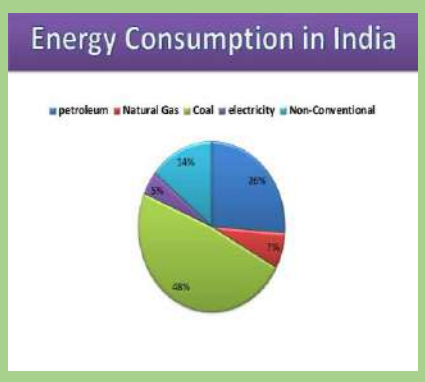


Fig.2

In fig.3 we see that use of chemical fertilizer increasing day by day. Use of chemical fertilizer is very harmful for our soil, water and human health. If we replace them with organic fertilizer pollution level soil and water is decrease.

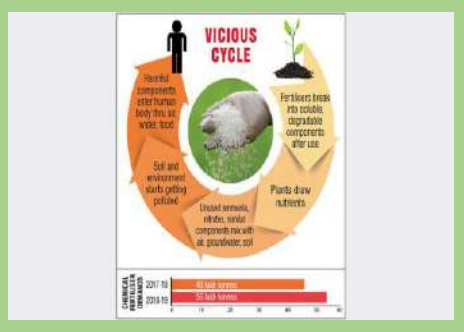


Fig.3

In Fig.4 we see that use of synthetic materials are very high, if we replaced them with natural materials like cotton ,natural fibers, then definitely pollution , toxic gases are decreased.

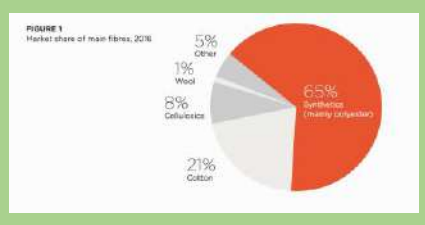


Fig.4

In fig 1 we show that contribution of concrete in pollution Level of global scale is very high ,in concrete cement is the highest contributor in pollution if we decreased the use of cement in construction we definitely improve our air, soil, water pollution Level. For example if we use lime stone (chuna, Indian technology) in small scale construction we can decrease the use of cement .

Conclusion

If we flow the above instruction we can definitely improve our ecosystem.

"Protecting people from environment
Protecting the environment from people
Improving the overall quality of the world around"

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Acknowledgement

We would like to express special thanks of gratitude to our teachers as well as our principal Dr. Dilip Kumar Bora who gave us the golden opportunity to do this wonderful project on the topic "Role of engineer in ecosystem restoration" which also helped us in doing a lot of Research and we came to know about so many new things. We really thankful to them.

ROLE OF ENGINEERS IN "ECOSYSTEM RESTORATION"

International Principles and Standards for the Practice of Ecological Restoration (the Standards) was developed through consultation with professionals within the Society for Ecological Restoration and their peers in the global scientific and conservation communities.

The first edition was launched in 2016 at the United Nations Biodiversity Conference in Cancún, Mexico.

Ecosystem engineers create, maintain and modify habitats by substantially changing the chemical and physical composition of substrates. Termites are particularly important ecosystem engineers as they manipulate the ecosystem

The main role of engineer in ecosystem is to protect public health by preserving and enhancing the environment.

Ecological engineers plays an important role because it combines basic and applied basic sciences for the restoration and constructions of aquatic and terrestrial ecosystem.

ECOSYSTEM RESTORATION IS THE PROCESS OF ASSISTING THE RECOVERY OF AN AN ECOSYSTEM THAT HAS BEEN DAMAGED OR DESTROYED.

- The ecosystem is the structural and functional unit of ecology where the living organisms interact with each other and the surrounding environment.





Krishtinaa Duari(Civil Branch)
Nidarshana Gogoi(Mechanical Branch)
Susmita Nath(C.Science Branch)
Ankitashree Borah (C.Science Branch)

THE UPPERHAND OF ENGINEER IN ECOSYSTEM RESTORATION

Prepared by:
Name: Manab Pratim Rajbongshi
Branch: Civil Engineering

Ecosystem



It can be simply described as a part of the environment limited by geographical boundaries in which all the living organisms thrive in which each of them plays an essential role and constitute together to form the ecosystem. The weather and landscape are also a part of an ecosystem as they have an impact on all the living organisms and interactions between them alter the ecosystem.

Ecological Problems

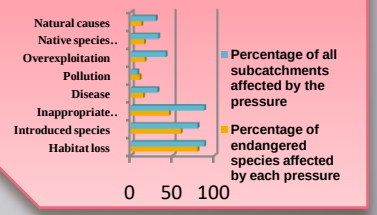
The major factors which lead to the destruction of the ecosystem are:

- Land disturbance
- Pollution
- Overpopulation
- Landfills
- Deforestation
- Large carbon emissions

Impact of degrading ecosystem

All the living organisms are totally dependable on the ecosystem and even a slight disorder in the natural balance of the ecosystem has a large impact on them.

When natural habitats are destroyed or natural resources are depleted, the environment is degraded. Different human activities has pushed the existence of many wildlife species to the brink of extinction and this loss of biodiversity has been attributed in particular to human overpopulation, continued human population growth and overconsumption of natural resources by the world's wealthy. Since the establishment of agriculture over 11,000 years ago, humans have altered roughly 70% of the earth's land surface, with the global biomass of vegetation being reduced by half, and terrestrial animal communities seeing a decline in biodiversity greater than 20% on average. Climate change in the past century has already had a measurable impact on ecosystems. Earth's climate system has changed since the preindustrial era, in part due to human activities, and it is projected to continue to change throughout the twenty-first century. Observed changes in climate, especially warmer regional temperatures, have already affected biological systems in many parts of the world. There have been changes in species distributions, population sizes, and the timing of reproduction or migration events, as well as an increase in the frequency of pest and disease outbreaks.

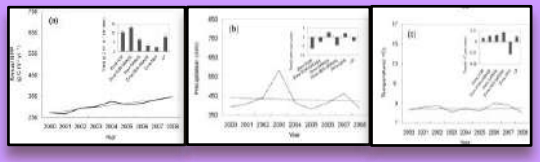


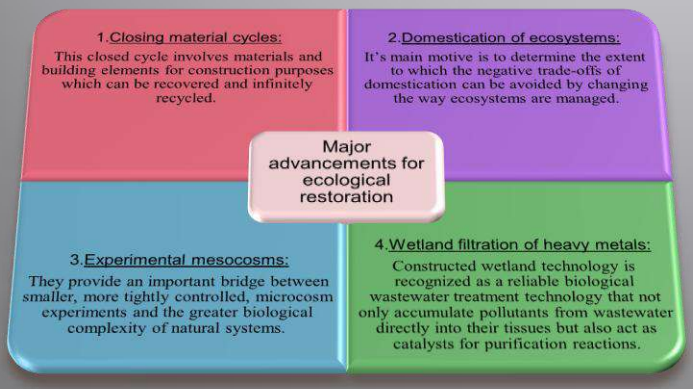
Elevation of ecosystem by an engineer

The interaction between the environment and the humans promotes our survival but the ill human activities have severely affected the environment which has led to its fall. The overexploitation of the environment has pushed it to the brink of extinction which has also led to the depletion of our survival. So it is important that how we improvise and adapt ourselves in order to manipulate the surroundings for the beneficial of the environment including us. Presently the engineer minds have led to astonishing researches as well as game changing technological advancements which can ensure a better future. The use of ecology and engineering to predict, design, construct or restore, and manage ecosystems that integrate human society with its natural environment for the benefit of both is in progression. The term ecological engineering has come up as a liberator for the wounded ecosystem and it can be looked as designing societal services such that they benefit society and nature, and that they should be systems based, self-organized, sustainable and integrate society with its natural environment. One important foundation on which ecological engineering works is that it fits into the basic foundations of ecology being sensitive to the chains and cycles of our ecosystems. Our day-to-day life is based on energy and its hunger has always been increasing which eventually resulted to the ecological problems. In this aspect ecological engineering is a revolution which ensures the efficient use of natural resources without affecting the environment adversely. It is a perfect blend between ecology and technology.

Escalation of ecosystem under engineers

Although the ecosystem has been misused over and over again but the different methods of ecological engineering that are implemented has brought a positive change in the ecosystem. The closed material cycles, domesticated ecosystem, experimental mesocosms, wetland filtration have all ultimately led to the controlled and productive use of resources. Except these methods new technologies are increasingly improving research on migration, human-wildlife conflict, relocation and re-introduction of species, and predator-prey interactions. Technology could also be applied to strategically assess biodiversity hotspots where human interference should be limited.





ROLE OF ENGINEERS IN ECOSYSTEM RESTORATION

Abstract

•Engineers are organisms that change the abiotic environment by physically altering structure . As a consequence they often , but not invariably , have effects on other biota and their interactions , and on ecosystems processes. The physical ecosystem engineering concept interconnects a number of important ecological and evolutionary concepts and is particularly relevant to environmental management.

POINT A

Sustainable infrastracture to minimise ecological effects.

•Solar roof installation on rooftop for energy cycling.

•Factory setup at locations with sources of renewable inexhaustible energy source.

POINT B

Development of an efficient machine system to minimise green house gas effects and water resource pollution

•High efficiency power generators installments in factories.

•Installation of catalytic converters at factories emitting smoke.

POINT C

Endear advance and development in alternatives.

•Development of alternatives to current existing used resource.

•Development of bio fuels to conventional fuels.







REFERENCE

•How To Make Poster In Powerpoint - By Solution Pharmacy – Youtube

•Poster Presentations - Youtube

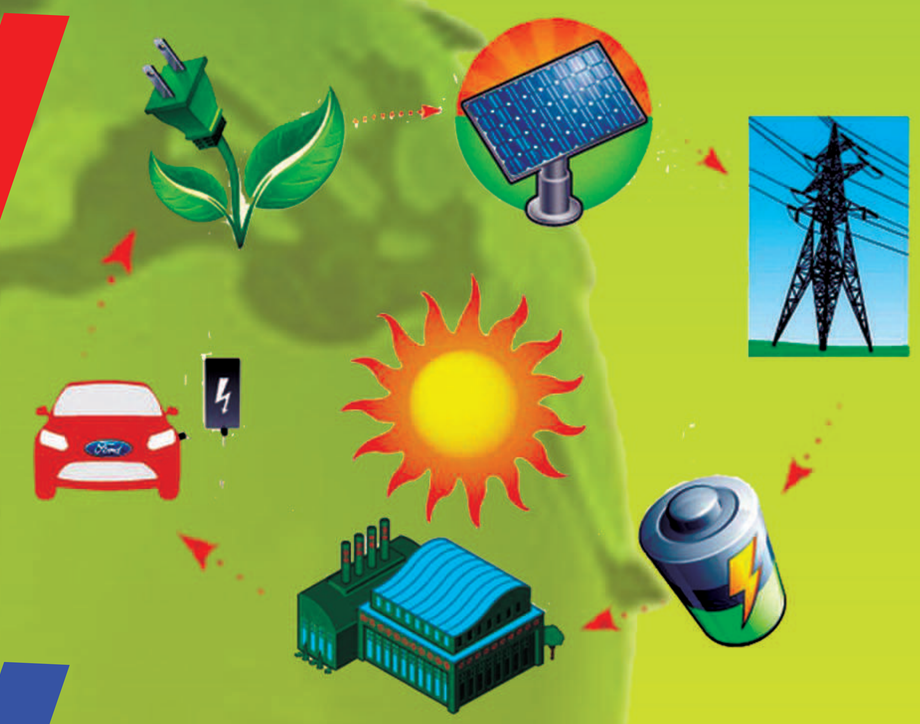
DHEMAJI ENGINEERING COLLEGE

WORLD ENVIRONMENT DAY

Alternative ways to restore and save our eco system Without using of Minerals

● It's Eco-friendly

Solar energy is an alternative for fossil fuels as it is a non-polluting, clean, reliable and renewable source of energy. It does not pollute the air by releasing harmful gases like carbon dioxide, nitrogen oxide or sulfur oxide. So, the risk of damage to the environment is reduced. Solar energy also does not require any fuel to produce electricity and thus avoids the problem of transportation of fuel or storage of radioactive waste.



● It's a Renewable Resource

Solar energy is a renewable source of energy as it can be used to produce electricity as long as the sun exists. Sunshine occurs naturally. As long as we are alive, we are always going to see the sun, which means it is infinite. This energy can be harnessed by installing solar panels that can reduce our dependence on other countries for a consistent supply of coal to produce electricity. This makes it an attractive energy prospect for most countries that are looking to go completely green in the future.



● Wind Energy



Wind power consists of converting the energy produced by the movement of wind turbine blades driven by the wind into electrical energy.

Wind energy is a source of renewable energy. It does not contaminate, it is inexhaustible and reduces the use of fossil fuels, which are the origin of greenhouse gasses that cause global warming.

It does not emit toxic substances or contaminants into the air, which can be very damaging to the environment and to human beings. Unlike fossil fuels and nuclear power plants, wind energy has one of the lowest water-consumption footprints, which makes it a key for conserving hydrological resources.

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Mechanical Department

Bhargav Jyoti Dutta
Mechanical Department

ROLE OF ENGINEER IN "ECOSYSTEM RESTORATION"

-Pradipta Choudhury -Shahidur Rahman
-Kamal Nayan Medhi -Jugal Kalita

"What is ecosystem ? "

- When we hear this word the first think that comes to our mind is the nature and its beauty.
- It is the vital part of our life as without the interaction with the ecosystem no human can sustain on this planet.
- The trees that gives us oxygen, water that fills our thirst, the animals, the soils etc. are our ecosystem.
- The beauty of the mother Earth lies in the lush green surroundings giving us oxygen, food , shelter etc.



"Our ecosystem is in danger !! "

- In today's world our unhumanly activities are causing havoc to our ecosystem.
- Environmental degradation is an alarming issue that needs to be addressed before it is too late.
- We the people should bring a positive attitude and behavior towards nature, for a better life of our future generation.
- Every individual should pledge to cause little or no damage to our ecosystem & help for its restoration.



"Engineers as the surviours of ecosystem"

- Erosion control measures are taken while designing a concrete structure like buildings, bridges, dams etc.
- Nowadays with improvement and advancement in technology eco friendly structures are made for example a 'green building'. Green buildings preserve precious natural resources and improve our quality of life.
- Engineers can emphasis on making less expensive agricultural tools for a better agricultural yield which ultimately adds on to the ecosystem restoration.
- Nowadays acc blocks are used in many construction works by civil engineers which are environment friendly.

IF YOU WANT TO SAVE YOUR MOTHER EARTH THEN PLEASE READ IT AND FOLLOW THEM:

Ecosystem is important ecological processes and regulation of energy flow and providing stability. It plays a major role in nutrient cycle and in maitaining proper balance among different various level of organisms



do's

1. Use Organic farming.
2. By Using degraded and disused farmlands for forest restoration.
3. Reduce over fishing, polluting air/ water, oserving vegitation.
4. By Closing Drainage channels for peatlands to halt their emission and protect more plants and animals

don'ts

1. Avoid Chemicals in Farming
2. Avoid logging, fire wood cuttingand overgazing.
3. Avoid Overfishing, extraction of more and more water for irrigation
4. Avoid unnessary use of any forms of energy



Due to some extreme work and industrilization done by us (Human), the earth and its ecosystem which was earllier a beautiful, clean and peaceful place for animals, human and plants is now destoryed. The result of which is seen through pollution, Climate, change, land clearing, population decline. Due to such acts by Human our earth has gone through the state where the bio - diversity is in the verge of completed destruction, which has affected the flora and fauna of earth.

If some extreme acts continued then it will be tough for us and the animals to survive.

So, UN has Decided to Declare 2021 - 2030 as . 'ECOSYSTEM RESTORATION DECADE'.

* AS AN ENGINEER WE ALSO HAVE SOME DUTIES TO SAVE OUR MOTHER EARTH AND RESTORE ECOSYSTEM *



ENVIRONMENTAL ENGINEER

* BY ENVIRONMENTA CLEANUP AND QUALITY WATER TREATMENT
*SMART WATE DISPOSEL
* DESIGINING INDUSTRAIL SYSTEM AND FILTERS
*BY DESIGNING SUSTAINABLE HOUSES OR GREEN BUILDING.
* PREVETING AIR POLLUTION BY ENGINEERING SMOG-EATING BUILDING



MECHANICAL ENGINEER

* ELEMENATING EXCESSIVE USE OF RESORCES BY OPTIMIZING AND IMPROVING
* BY FINDING PROPER SUBSTITIVES FOR FOSSIL FUEL ENGINES OR BY DEVELOPNG HYDROGEN COMBUSTION ENGINES THE EMISSIONS WILL BE DRASICALLY DECREASED



CIVIL ENGINEER

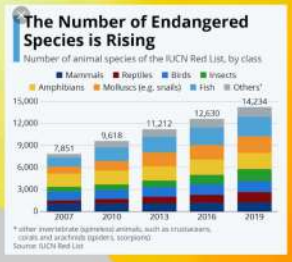
* ADAPTING TO THR NEW NORMAL WITH CLIMATE RESIDENT DESIGN.
* USING SAFER TRANSPORTATION USING CYBERNETICS
* CAN MAKE ECO SUITABLE CONSTRUCTION.* CAN DESIGN ' SMOG - EATING' BUILDING.

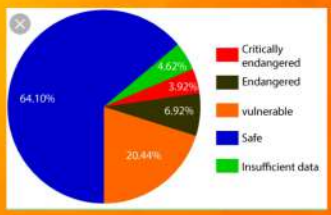


SOFTWARE ENGINEER

* BY CONTRIBUTING TO OSS
* BY USING SUSTAINABILITY APPS.
* BUYING REFURBISHED
* ECOSIA

NUMBER OF ENDANGERED SPECIES





ECOSYSTEM RESTORATION IS A GREAT COMPENSATION BY US TO THE NATURE

PROGYASREE BORTHAKUR (CIVIL), PALLAVI BHATTACHARYA (CIVIL)

Dhemaji Engineering College

Department of Mechanical Engineering

Role of Engineer in "Eco System Restoration"



What is ECO SYSTEM RESTORATION?

Eco System Restoration is a process of assisting recovery of eco systems that have been damaged, degraded or destroyed and these are done through scientific aids and engineered through scientific tools and techniques.

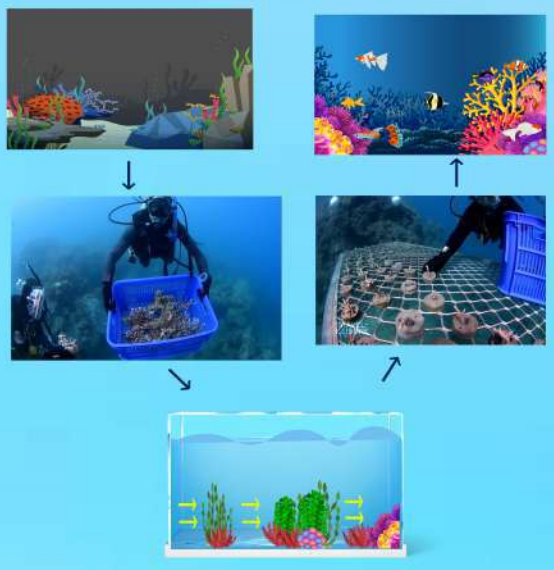
GREAT BARRIER REEF OF AUSTRALIA

Case Study 1:
In 2016 & 2017, two mass bleaching events and cyclone Debbie had significant impact on Great Barrier Reef. 1/3rd was affected.

In order for restoration of coral reef, coral propagation was done using two engineered methods

To collect and put into nurseries built underwater, let them grow and implant them back into reef at damaged sites.

Coral raceways: engineered tubs use raw water that cycles through them for 5 to 6 months, to replenish them. And then implanted back into reef.



TRINITY RIVER RESTORATION PROGRAM

Case Study 2:
River restoration/ Coastal area restoration is conducted to improve the environmental health of a river or coastal area in support of bio-diversity restoration, recreaction, soil erosion control, flood management.



In these river restoration projects **Revetments** are used.

Revetments are slopping structures placed on back or cliffs in such a way as to absorb the energy of the incoming water.

It was used in **Trinity river restoration** program and it has also been used in many river construction and restoration program.





Tetrapods are a type of structure in coastal engineering, used to prevent erosion caused by weather and long shore drift and also used during coastal area restoration

Done by
Rashmi Saikia

WORLD ENVIRONMENT DAY 2021

ENGINEERS : THE HEALERS OF TOMORROW

THE DEVELOPMENT IN TECHNOLOGY AND TECHNICAL SECTOR HAS RESULTED IN BETTER IMPLEMENTATION OF HUMAN MINDS FOR THE EXPLOITATION OF NATURAL RESOURCES WITHOUT ACTUALLY HARMING THE ENVIRONMENT

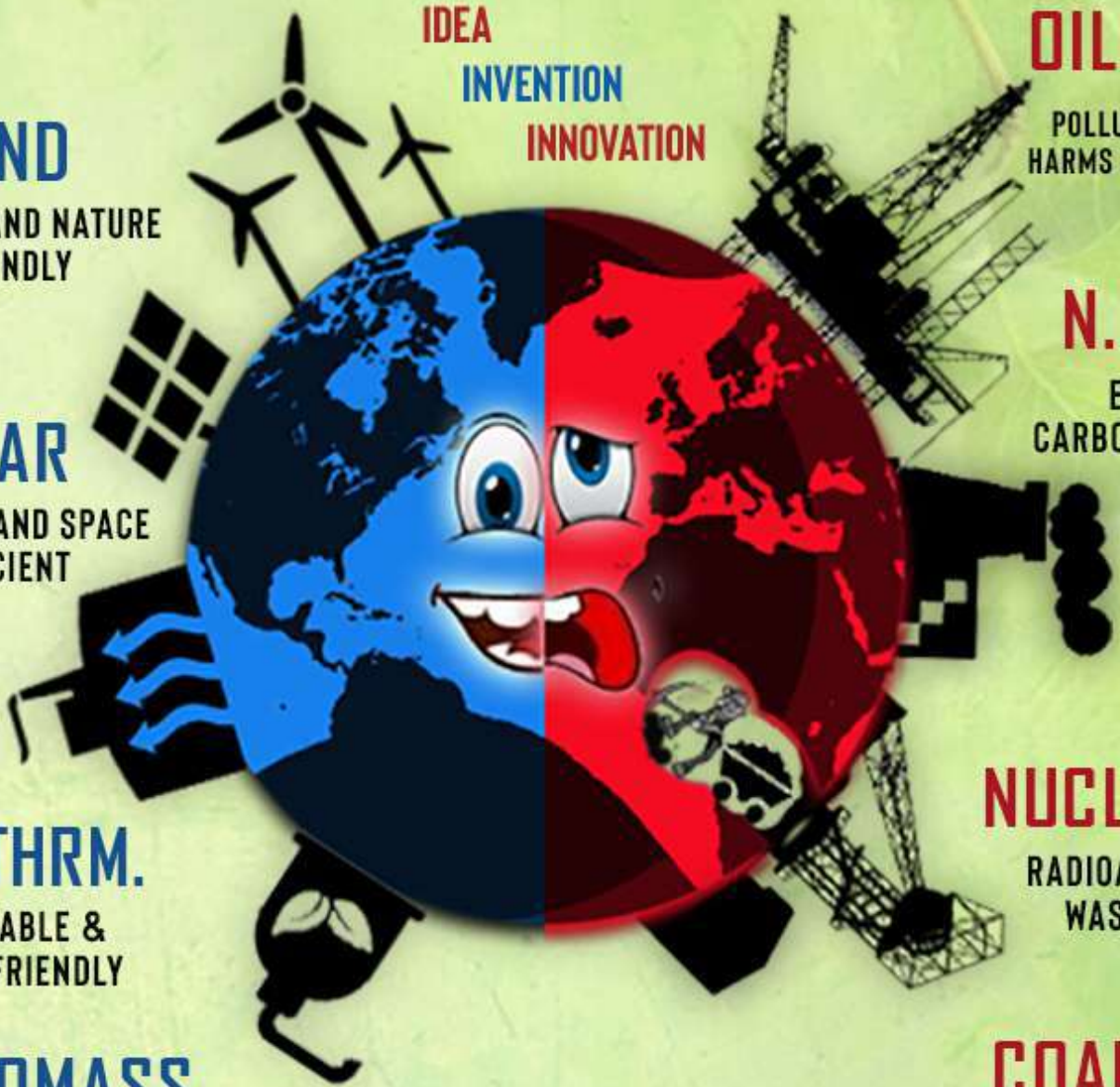
IDEA
INVENTION
INNOVATION

WIND
ABUDANT AND NATURE FRIENDLY

OIL RIGS
POLLUTES WATER
HARMS AQUATIC LIFE

N. GAS
EMITS
CARBON DIOXIDE

SOLAR
ABUDANT AND SPACE EFFICIENT



NUCLEAR
RADIOACTIVE WASTES

GEO THRM.
SUSTAINABLE & NATURE FRIENDLY

BIOMASS
CARBON NEUTRAL & LESS GARBAGE

COAL
SOURCE OF AIR POLLUTION & GREENHOUSE GAS

CHOOSE YOUR RESOURCES WISELY!



"TURN THE BOLT & HEAL THE WORLD !"



POSTER DESIGNED BY:
JYOTISHMAN DOHOTIA , HRISHIKESH MEDHI
SALMAN AZIZ BARBHUIYA , SUAIB AHMED

Role of Engineers in Ecosystem Restoration

ECOSYSTEM ?

An ecosystem is a community of living organisms in conjunction with the nonliving components of their environment, interacting as a system.

Ecosystem restoration

Restoration ecology is the science study supporting the practice of renewing and restoring degraded, damaged, or destroyed ecosystems and habitats in the environment by active human intervention and action

Role of Engineer

Engineers should minimize adverse impact on the environment during both construction and operation phases. The areas of concerns are

- Land use
- Landscape
- Ecology and biodiversity
- The historic environment
- Water resources
- Energy and carbon
- Water management

Engineers need to understand the relevant waste regulations and the issue behind it. For example, site waste management plans place clear responsibilities on engineers to initiate excellence by eliminating waste in design.

•**Engineer** should encourage maximum use of recycled materials by avoiding over-perspective specification and motivating the supply chain to increase its use of recycling.

Air pollution is increasing at a rapid rate across the world, wreaking havoc with the environment and the health of humans. In fact, every year an estimated 4.2 million people die globally every year as a result of exposure to outdoor air pollution, according to the World Health Organization (WHO). The role of an environmental engineer is not only to identify common air pollutants, but also to design and enforce effectual solutions.

ECOSYSTEM DEGRADATION:
Ecosystem degradation is the deterioration of the environment through depletion of resources such as air, water and soil, habitat destruction, the extinction of wildlife, etc. The degradation of ecosystem is an environmental problem that diminishes the capacity of species to survive.







ROLE OF ENGINEER IN ECO SYSTEM RESTORATION

The past few decades have seen growing realisation that the present model of development is unsustainable. The current generation, in the process of satisfying their basic needs and enjoying a better quality of life, is going to deprive the future generations quality of life. Hence the loss of biodiversity with the depletion of rainforests or over-fishing is the cumulative effect our consumption patterns are having on the environment and climate, our way of life is placing an increasing burden on the planet. The increasing stress we put on resources and environment -al system such as water, land and air cannot go on forever. Especially as the world population continues to increase. and the planet is more burden through reckless anthropogenic work such as climate change. Warming of climate is evident from increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising of global mean sea level. We have already started seeing and might see more in future, falling crop yields in many areas, particularly developing regions, depleted water resources, sea level rise threatening many cities, more high intensity of storms, forest fires, droughts, flooding and heatwaves

Engineers are required to protect our environment in terms of inventing safe elemental substances, sustainable environment, recyclable and renewable energy resources and so on to ensure a better life for us and our future generation.

- Engineers should encourage a user-friendly attitude from the project team towards the community, placing emphasis on environmental measures that affect quality of life, such as noise, dust and traffic.
- Engineers should consider using local meetings, press releases, literatures, mailshots, local radio and so on to generate confidence within the community. This leads to fewer complaints and minimises any negative press. Engineers should also embrace new technology such as web logs, text messaging etc.
- Engineers need to be passionate about equality and diversity issues and able to mentor and encourage their supply chain regarding the benefits of diversity. They should set the vision such as local employment or training to re-skill local people and engage with and encourage suppliers. This vision will also encourage suppliers to recognise that diversity within a workforce is a source of strength.
- Engineers should consider forming links with local schools, including site visits, which generates interest, involvement and ultimately employment in the industry.



- Engineers should seek to minimise adverse impact on the environment during both construction and operation phases. The areas for concerns are :-
  - LAND USE
  - LANDSCAPE
  - ECOLOGY AND BIODIVERSITY
  - WATER RESOURCES
  - TRANSPORT
  - ENERGY AND CARBON
  - WASTE MANAGEMENT
  - THE HISTORIC ENVIRONMENT
  - EFFECTS ON NEIGHBOUR
  - MATERIAL USE
  - RELATION WITH LOCAL COMMUNITY AND OTHER STAKEHOLDERS
- Engineers can use creativity, technology and scientific knowledge to solve practical problems.

HEALTHY ECOSYSTEM HEALTHY LIFE

REDUCE
REUSE
RECYCLE
REPAIR
RETHINK
REFUSE

SAVE OUR PLANET EARTH







STOP GLOBAL WARMING

ECO SYSTEM RESTORATION

RESTORES SOIL AND WATER CYCLE AND REVERSES DESERTIFICATION

HAPPY ENVIRONMENT DAY

EROSION CONTROL

Engineers uses the plants and trees to prevent soil erosion. There are different methods of engineering for erosion control they used as follows-

- CHECK DAMS
- WATERWAYS
- RETAINING WALLS
- TERRACING
- EMBANKMENT
- SPURS AND SILLWAYS

They are used to slow down the water's velocity and thus helps in preventing erosion.

SOIL RESTORATION

Soil restoration is the process of improving the structure, microbial life, nutrient density and even all carbon levels of soil. Soil restoration begins with photosynthesis. The ways of restoring damaged soil includes-

- USE OF ORGANIC FARMING TECHNIQUES:
  - GREEN MANURE AND COVER CROPS
  - ORGANIC COMPOST
  - CROP ROTATION
- SOIL REMEDIATION
  - PHYTOREMEDIATION
  - BIOAUGMENTATION
  - LAND-BASED TREATMENTS
- DESALINIZATION
  - INSTALLING DRIANAGE SYSTEM
  - LEACHING OUT SALINE SOILS
  - USE OF SALT TOLERANT PLANTS
  - APPLICATION OF GYPSUM

REPLANTING

Replanting is necessary to keep the fertility of the soil and recovering biodiversity. Reforestation is necessary in distinguished areas of forests to recreate the loss of nature due to natural disaster or human negligence. Replanting helps environment from global warming and climatic changes by maintaining a balance in the environment. Reforestation helps in preserving various species of animals and plants that are affected due to deforestation. Endangered species of plants and animals can also be revived by reforestation process.

INTACT ECOSYSTEMS

The intact ecosystem is an unbroken natural landscape of a forest ecosystem and its habitat. Keeping bio-climate eco-system intact helps human stay healthy. The benefits provided by intact ecosystem includes ecological functions such as -

- CARBON STORAGE
- NUTRIENT CYCLING
- WATER AND AIR PURIFICATION
- MAINTENANCE OF WILDLIFE HABITAT
- GOODS SUCH AS FOOD, FUEL AND OTHER BIOPRODUCTS

Borneo is the world's largest intact forest system that holds one-quarter of the planet's primary forest remaining.

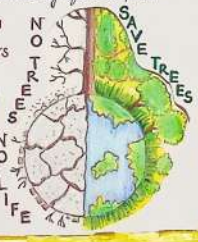
SUSTAINABLE LIVELIHOODS

A sustainable livelihood is such that can cope with and recover from the stresses and shocks and maintain or enhance its capabilities and assets both now and in future without undermining the natural resource base. The objectives of the sustainable livelihood program is to reduce poverty and inequality by generating employment among poor households and by moving highly vulnerable households into sustainable livelihoods and towards economic stability. Livelihood skills include technical and vocational abilities such as carpentry, sewing, weaving, gardening etc. It also includes physical abilities of people to carry out activities regardless of their educational levels. The concept of sustainable livelihood is composed of three pillars - ECONOMIC, ENVIRONMENTAL AND SOCIAL also known informally as - PROFITS, PLANET AND PEOPLE

PROTECT OUR OCEAN



ON THIS WORLD ENVIRONMENT DAY, LET'S TAKE AN OATH TO VALUE WHAT WE HAVE IN NATURE AND TREAT IT IN THE RIGHT WAY BY RESTORING ECOSYSTEM

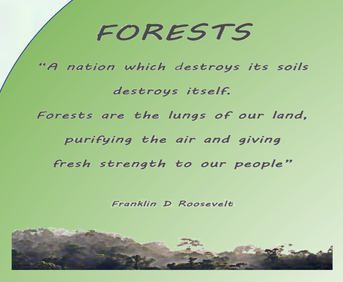


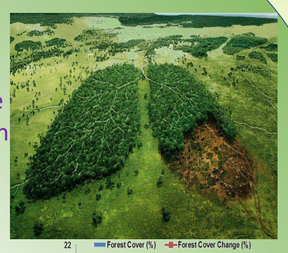


SIDDHARTH SAHA
COMPUTER SCIENCE ENGINEERING
DHEMAJI ENGINEERING COLLEGE
DHEMAJI

ROLE OF ENGINEER IN “ECO SYSTEM RESTORATION”

DEFORESTATION





WHAT IS DEFORESTATION

Deforestation, clearance, clear cutting or clearing is the removal of a forest or stand of trees from land high is than converted to a non forest use .

CAUSE OF DEFORESTATION

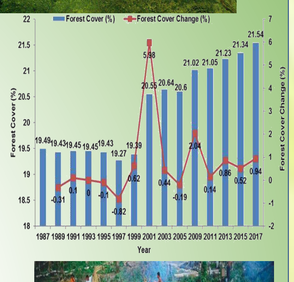


1. Shifiting cultivation

a. Intensive or modern agriculture destroy the forest on a large scale
b. It is principal cause of deforestation in some countries like America (35%), Asia (50%) & Africa (70%) Network.

2 Construction of dams & Reservoirs

a. For building big dams , large scale devastation of forest takes place Which breaks the natural ecological balance of the region.
b. Forest is cleared to make way for the construction of these transport



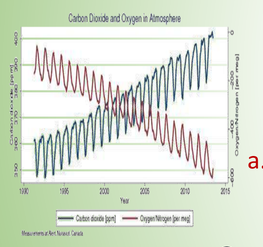
3. Increase of population

a. To meet the demands of rapidly growing population , agriculture lands and settlement are created permanently by cleaning forests.



4. Urbanization & Industrialization

a. Since Industrialization & urbanization needs land to grow, so major amount forest lands are cut in order to promote Industrialization & urbanization.



EFFECT OF DEFORESTATION

Greenhouse emission, Soil emission, Biodiversity losses, Floods, loss of fertile land, Effect on climate & environment change, Loss of medical plants, Decrease O_2 & increase CO_2 .

TAKING OF ACTION

Tracking tree cover in real time (Global Forest Watch 2.0): Tracking tree cover as accurately as possible in real time is key to assessing the extents of deforestation and attempting to prevent it where possible.

Cloud based land use analysis : It is a cloud based platform which allow any country to do analysis of their current forests and other land uses .

Audio detection device(rain forest connection): is a fascinating idea that looked to audio rather than visual cues to prevent illegal logging in rain forest .

Crowdsource apps : uses the power of large numbers of people who now increasing have access to technology such as internal across the globe.





GLOBAL WARMING



WHAT IS GLOBAL WARMING ?

Global warming is a phenomenon where the earth's average temperature rises due to increased amounts of greenhouse gases. ... Contrary to popular belief, greenhouse gases are not inherently bad. In fact, the greenhouse effect is quite important for life on earth.

CAUSE OF GLOBAL WARMING

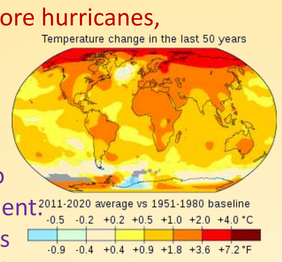
Global warming is a serious issue and is not a single issue but a number of environmental issues. Global warming is a rise in the surface temperature of the earth that has changed various life forms on the earth. The issues that cause global warming are divided into two categories include “natural” and “human influences” of global warming.



Natural Causes of Global Warming
Human Influences on Global Warming

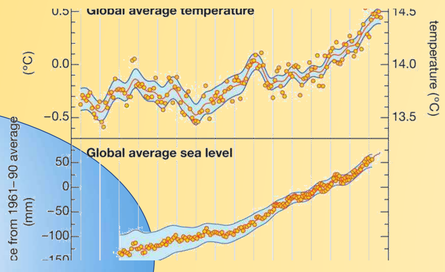


THE EFFECT OF GLOBAL WARMING The greenhouse gases will stay in the atmosphere for many years since hundreds years ago. However, the effect that global warming will cause on earth are extremely serious. There are many effects that will happen in the future if global warming continues. That includes polar ice caps melting, economic consequences, warmer waters and more hurricanes, spread of diseases and earthquake

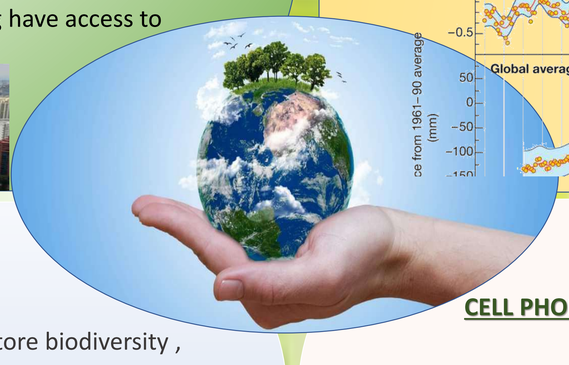


TAKING OF ACTION

Climate change technologies are largely theoretical at this stage and fall into two main categories: greenhouse gas removal and solar radiation management. So far these methods have been developed and tested via laboratory studies and simulations, with only a few small-scale prototypes tested in the field. No technologies have yet been deployed at a large-enough scale to have global impacts. But they are worth watching as the public and private sectors seek new solutions for specific applications.

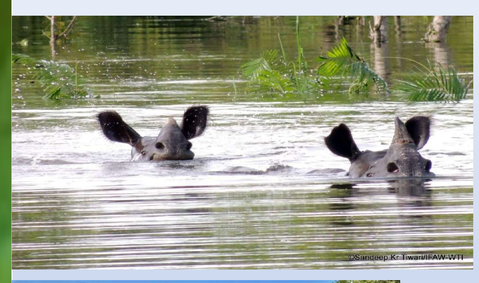






RIVER RESTORATION

River restoration is the process of managing rivers to reinstate natural process to restore biodiversity , providing benefits to both people and wildlife



IMPACT :

FLOODS

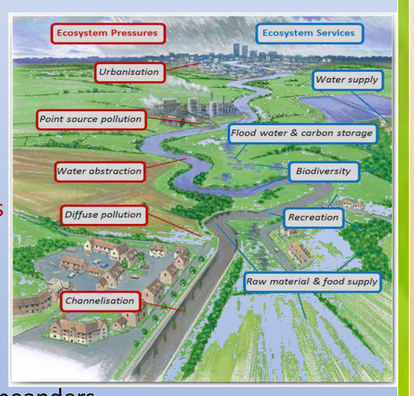
- Human and animals loss
- Affects the major roads
- Communication breakdown
- Increase in air/ water pollution

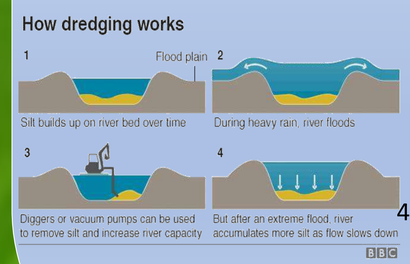




WATER POLLUTION

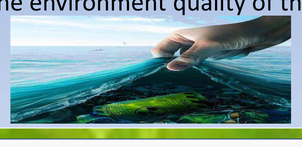
- Contamination of drinking water
- Increase in water born diseases such As cholera, malaria, caused by mosquitoes, ringworm caused by dirty water.
- Oil spills wiping away aquatic animals
- Toxic chemicals killing fauna and flora animals





TAKING OF ACTION

1. Build flood defense like dams, embankments And flood walls .
2. Straighten and deepen the river and cut off meanders
3. make storage areas for extra water.
4. trees are planted near to the river = greater interception =lower river discharge this is a relatively low cost option, which enhances the environment quality of the drainage basin



CELL PHONE RADIATION AND TOWERS EFFECT ON BIRDS IN OUR ENVIRONMENT



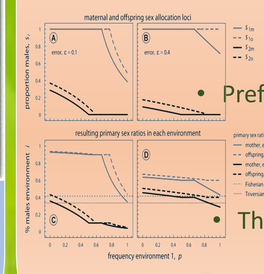
- Radiation impacts on wild birds documented nest abandon Plumage , determination and death.
- Radio frequency radiation(RFR) can blot out a birds perception of the earth’s field and also disrupt a birds internal clock based on the sun’s changing position.
- Typical effects of radiation from cellular communication antennas on resident , breeding and migration birds, site abandonment, feather deformation, locomotion problems weight loss, weakness and death.
- Long-term exposure to EMF radiation at close ranges on Roots has damaging effects on the nervous and immune System of bird species.





Ecological Effects of Cell Phone Radiation





TAKING OF ACTION

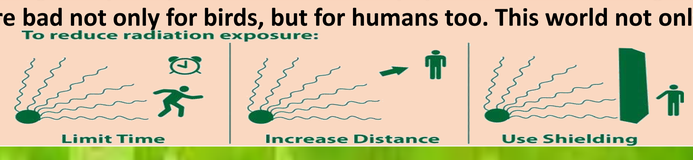
- Try to minimize the use of mobile internet to reduce the amount of radiation in the atmosphere.
- Prefer not to use mobile phone when the signal is weak Because during weak signals the radiation becomes very Strong to connect the nearby mobile tower.
- Prefer not to use multiple sim cards as more numbers of sim card will release more radiation .
- Limit the maximize number of the tower to be installed in a Particular city .



The electromagnetic radiation increases day by day so we can develop the new technology to reduces the radiation .

Due to high frequency and radiations, the population of birds are getting loss.

Radiation are bad not only for birds, but for humans too. This world not only for humans .



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Thanks again to all who helped us .

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