

In 1983 there was a conference of UNESCO and UNEP at MINSK where four different area of biosphere reserve were demarcated. It includes

1. CORE ZONE - IN this zone human intervention is minimal and only activities like education, research and training are allowed.

In 2012, Supreme court banned tourism in the core areas of national park.

In 2013, Supreme court stated that 20% of core area would be allowed for human intervention.

In the Core zone of Biosphere Reserve human activity are regulated by three acts -

1. Forest Act, 1927
2. Wildlife Protection Act, 1972
3. Forest Conservation Act, 1980

Buffer Zone In this area human intervention on a low scale would be allowed and activities like timber collection, fishing, grazing, hunting would be allowed in this area.

Human Activities in buffer zone is managed by Environment protection Act of 1986.

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Restoration Zone In this area Restoration of land would be conducted through afforestation as in this area anthropogenic activities were responsible for environmental degradation.

Stable Cultural Zone This area reflects the cultural diversity of biosphere reserve in which the traditional land use pattern which happen to be commensurate with environment needs to be maintained and protecting.

18 Biosphere Reserves

1st Nilgiri (Karnataka, Kerala, Tamilnadu), 1986

17th → Sesachallam B.R. (Andhra Pradesh)
↳ (Red Sanders)

18th → PANNA B.R. (Madhya Pradesh), 2011

Out of 18, 14 Biosphere Reserves of India have been included in UNESCO's World Network of Biosphere Reserves. The purpose of which is exchange of experience, research and training among Nations.

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|-------------------------------|---------------------------|
| 1. Nilgiris | 7. Panchmarhi (M.P) |
| 2. Great Nicobar | 8. Gulf of Mannar |
| 3. Nanda Devi (Uttarakhand) | 9. Simlipal (Odisha) |
| 4. NOKREK (Meghalaya) | 10. Sunderban (W.B) |
| 5. AGASTHYMALAI (Kerala + TN) | 11. Kanchenjunga (Sikkim) |
| 6. Amarkantak (M.P) | (in 2018) |

Keystone Species

eg - Lemurs, fig plant, star fishes.

Keystone species are responsible for maintaining the structure of ecosystem. They also determine the abundance and ensure the survival of other species. They can be both plants and animals.

Umbrella Species

If conservation initiative for one species is taken the habitat of other species also get protected. The main species here is referred to as umbrella species.

But if the symbol of one species is used for conservation initiative but the intention is to protect other species, it would be referred to as flagship species.

Indicator Species → Indicator species are used for identification of an ecosystem and also to know about its condition. But the conclusion should not be based on indicator species only. Other parameters need to be.

EDGE Species

Edge species is stand for evolutionary, distinct and globally endangered, they happen to be only surviving member of their Genus.

Ex- Elephant.

Biodiversity Hotspots

According to Norman Myers an area can be declared as hotspot provided it fulfills two conditions.

1. At least 1500 plant species or 0.5% of entire plant species of the world, are endemic in this area.
2. About 70% primary vegetation of this area has been lost due to human activities.

There are four Biodiversity hotspots in India.

1. Western Ghats
 2. Himalayas
 3. Hilly Areas of India - Myanmar Border.
 4. Andaman & Nicobar Island (part of Sundaland).
- } → Critically Threatened.

Himalayas - Vulnerable

Natural

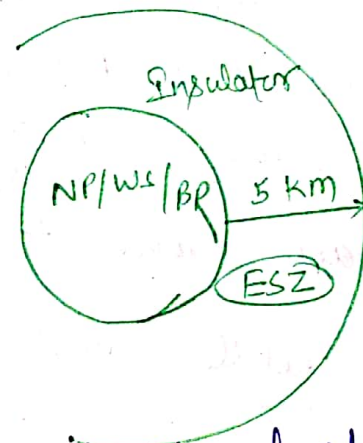
1. Landslides
2. Cloud Bursting
3. Earthquakes

Anthropogenic Activities.

1. Global Warming
2. Degradation due to Tourist centre
Bio medical
Dam & Reservoirs

Biodiversity Mega Hotspot

These are areas of enriched Biodiversity threatened due to human intervention and they lie at the conference of more than two countries. There are 12 Mega Hotspots in the world one of which is located in India. The NAMDAPHA National park in Arunachal Pradesh which is situated at the conference of India, Myanmar, and China.



ECO SENSITIVE ZONE (ESZ)

Beyond the protected area to a stretch of about 5 km Eco sensitive zone should be established which would be acting as a insulator to disallow the impact of anthropogenic activity on the protected area. Reference to ESZ has been made in the National wildlife action plan (2002 - 2016) and also in Environment Protection Act, 1986. Activities in these areas can be divided into three

1. Permissible Activity - which includes day to day activity like agriculture.

2. Regulated Activity which are regulated through laws and includes establishment of river embankment

broadening of Roads and establishment of Hotels and Resorts.

3. Prohibited Activity - which include the establishment of Industries.

Westernghats cover an area of roughly 1,64,000 sq km. Degradation in W.G has taken place due to a number of factor which includes extension of Agriculture,

establishment of industries,

Establishment of power project,

Illegal mining activity.,

westernghat also prone to landslide.

Madhav Gadgil Committee (2011) - Recommended that

1,24,000 sq km of western ghat should be declared as

Ecosensitive zone. which was rejected by the government

and another committee Kasturi Rangan 2013, recommended

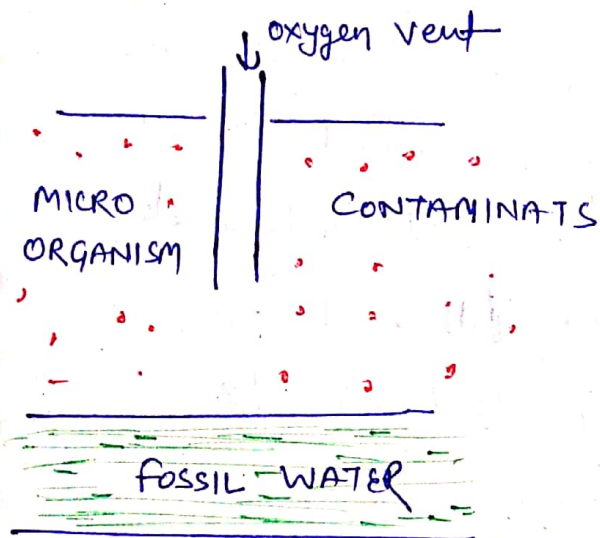
that 59,940 sq km. of westernghat should be

declared as E.S.Z.

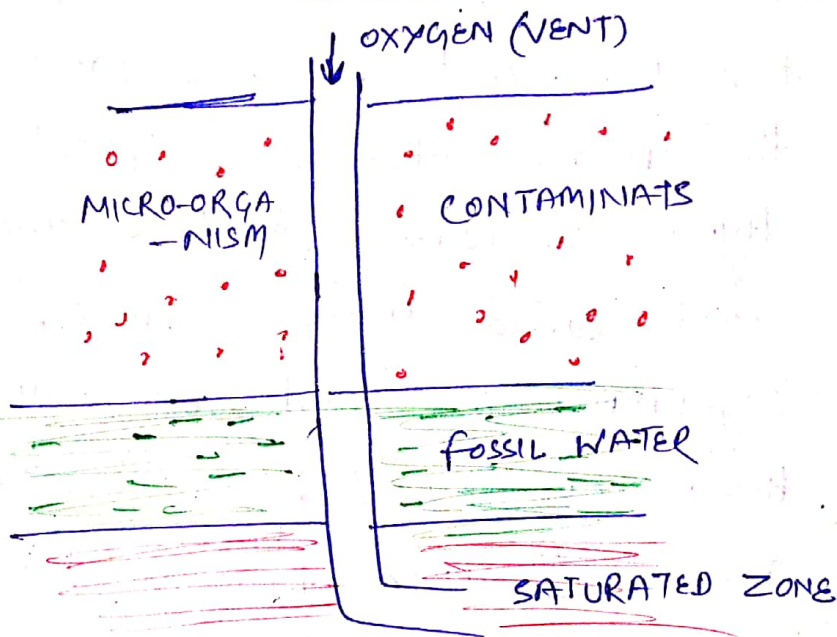
NEW TECHNIQUES OF BIOREMEDIATION

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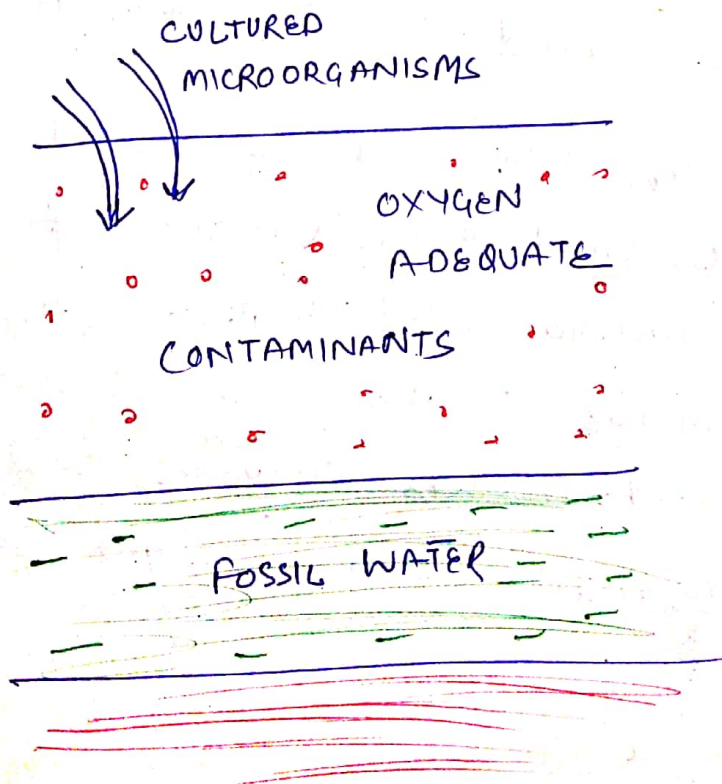
BIOVENTING



BIOSPARGING



BIOAUGMENTING



Phytoremediation

It is process through which plants are used for removing pollutants. They absorb these pollutant and derive nutrients from them and discharge product which do not hamper the environment. These plants are referred to as Hyper accumulators (Poplar) and their characteristic doing so is called Hyper tolerance. But, when micro-organisms are used for removing contaminants the process is called Bioremediation.

for eg. ~~Pseud~~ Pseudomonas Bacteria can be used for removing Oil spill.

In the year 2010, the Chitra Oil Spill near Mumbai was removed by oil zipper technology. But this technology can not be applied for Mangrove Areas.

The Malabar Botanical Institute and The Bharat Petroleum limited developed three variants of Bacteria two of a Bacteria called BURKHOLDERIA and one of Pseudomonas for the purpose of removing oil spill. These variant secrete enzymes called Catechol - 2,3 deoxygenases which are hydro carbon degenerating enzymes.

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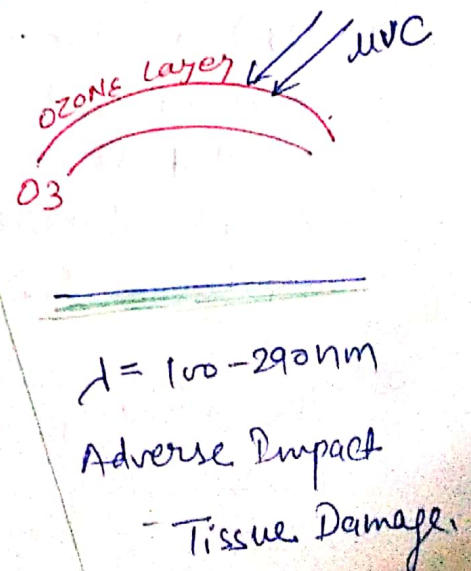
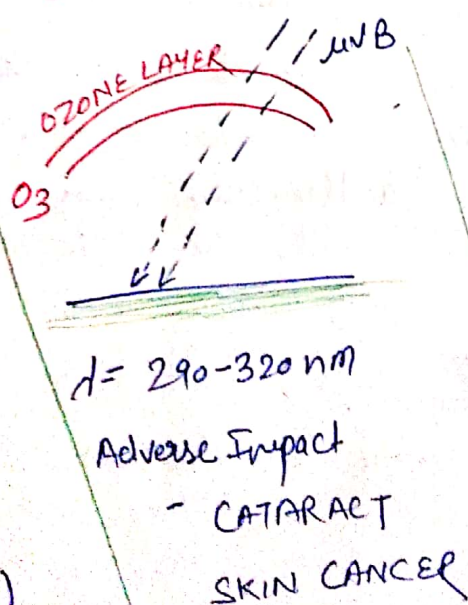
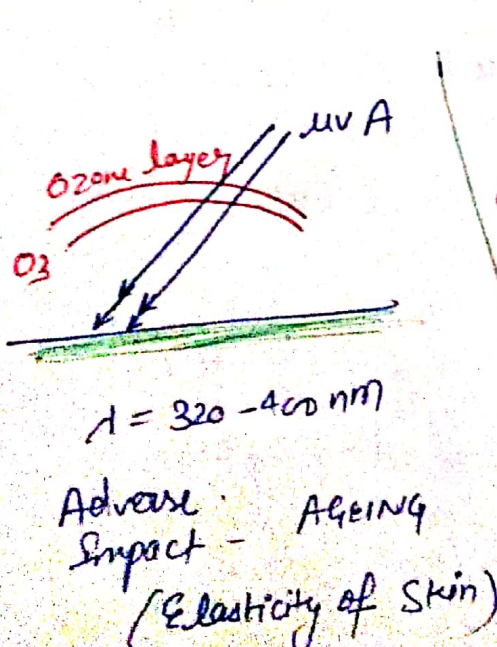
There are three new techniques of Bioremediation.

1. Bioventing - If contaminants are present ^{in those area} where oxygen is inadequate in soil then with the help of a vent oxygen would be supplied in a regulating manner which would be utilized by microorganism for the decomposition of contaminants.

2. But a more suitable technique would be Biosparging. In which oxygen is supplied to the saturated zone below the water table and oxygen sparges out of water in a regulating manner which is utilised by microorganism for the decomposition of contaminants.

3. Bio Augmenting
If oxygen is adequately but microorganism are lacking cultured microorganism can be developed in the lab and supply to the soil for this purpose this process is called Bio Augmenting.

UV Radiation (Types)

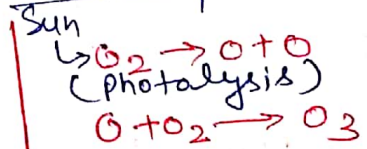
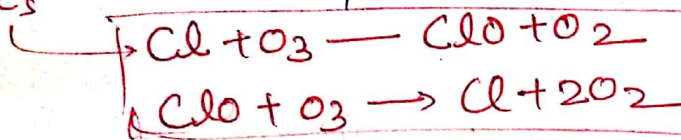


Ozone Layer & Ozone Layer Depletion (10)

Ozone is an allotrope of oxygen and is bluish coloured gas. It is generated in the atmosphere due to the influence of solar radiation on oxygen present in atmosphere which makes them split into oxygen atoms and this process is called photolysis.

Oxygen atoms combined with oxygen molecules to generate ozone and the oxygen-ozone cycle is referred to as CHAPMAN CYCLE. Ozone layer is present in stratosphere from a stretch of 15-50 km.

CFCs



The thickness of ozone layer is measured in DOBSON unit. Ozone layer is confined to stratosphere ~~also~~ although oxygen is also present in troposphere because of three ~~reasons~~ reasons —

1) Unlike troposphere the temperature enhances if we move upward in stratosphere as such stratosphere is regarded as a more stable zone. As such there is hardly any convectional current in stratosphere.

2) The intensity of solar radiation responsible for photolysis is very low in case of troposphere.

3. Stratosphere is a dry region and in troposphere water vapour is present. Ozone is unstable for water vapour.

Ozone layer filters the harmful U.V radiation which can be of three type.

UVA, UVB, UVC

1. UVA Ray UV.A Radiation naturally reaches the surfaces of the earth and it not at all hindered by the ozone layer.

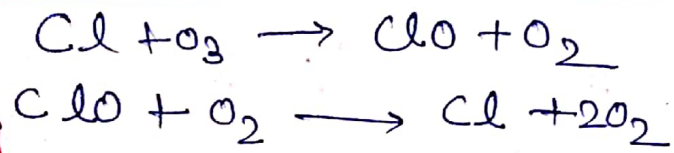
UV B, partially reaches the surface of the earth. If it reaches in abundance it can be responsible diseases for CATARACT and Skin Cancer.

UV C, completely hindered by ~~earth~~ ^{ozone} layer and would be responsible for tissue damage.

Ozone Depleting Substances includes CFCs, N_2O ,

CH_4 (Methane), HCFCs, . But maximum damage to ozone layer is done by free Radical Catalyst which includes OH, NO, Cl, Br. In which the damage done more by Br/immense.

CFCs are never directly responsible for ozone layer damage but they emit chlorine under the influence of Solar Radiation.



Br is responsible for ozone layer damage but is never found in free state in atmosphere. Extraction of Brominated compound can take place from Brine pools and they are mainly used in fire Retardants (BFRs). The adverse impact of BFRs it is Bioaccumulative in nature and also act as Endocrine Disruptor which would be responsible for hormonal imbalance inside our body.