A LECTURE NOTE
ON
TH 5-ENVIRONMENTAL STUDIES
SEMESTER -3

Prepared by – Mr Radha Krusha Mallick

Guest Faculty

Mechanical Engineering

GOVT. POLYTECHNIC, MALKANGIRI

:- SYLLABUS :-

1. **THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES**

Definition, scope & importance, need for public awareness.

2. **NATURAL RESOURCES**

Renewable & non renewable resources:

(a) Natural resources & associated problems:

- Forest resources: Use & over exploitation, deforestation, case studies, Timber extraction mining, dams & their effects on forests & tribal people.
- Water resources: Use & over utilization of surface & ground water, floods drought, conflicts over water, dam's benefits & problems.
- Mineral Resources: Use & exploitation, environmental effects of extracting & using mineral resources.
- Food resources: world food problems, changes caused by agriculture & over grazing, effects of modern agriculture, fertilizers - pesticides problems, water logging, salinity.
- Energy resources: Growing energy need, renewable & non-renewable energy sources, use of alternate energy sources, case studies.
- Land Resources: Land as a resource, land degradation man induces land slides, soil erosion & desertification.

(b) Role of individual in conservation of natural resources.

(c) Equitable use of resources for sustainable life styles.

3. SYSTEMS
- concept of an eco system.
- structure & function of an eco system.
- producers, consumers, decomposers.
- Energy flow in the eco systems.
- Ecological succession.
- Food chains, food webs & ecological pyramids.
- Introduction, types, characteristic features, structure & function of the following eco system.
- Forest ecosystem
- Aquatic eco system (ponds, streams, lakes, rivers, oceans, estuaries)

4. BIODIVERSITY AND IT'S CONSERVATION
- Introduction - Definition: genetics, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social ethical, aesthetic & optin values.
- Biodiversity at global, national & local level.
- Threats to biodiversity: Habitats loss, poaching wild life, man wildlife conflicts.

5. ENVIRONMENTAL POLLUTION:

Definition causes, effects & control measures of:
(a) Air pollution
(b) water pollution
(c) soil pollution
(d) Marine pollution
(e) Noise pollution
(f) Thermal pollution
(g) Nuclear hazards.

Solid waste Management: causes, effects and control measures of Urban & industrial wastes.

Role of an individual in prevention of pollution.

Disaster management: Floods, earth quake, cyclone & landslides.

6. SOCIAL ISSUES AND THE ENVIROMENT

- Form unsustainable to sustainable developments.
- Urban problems related to energy.
- water conservation, rain water harvesting, water shed management.
- Resettlement & rehabilitation of people; its problems & concerns.
- Environmental ethics: issue & possible solution.
- climate change, global warming, acid rain, ozone layer depletion, nuclear accidents & holocaust, case studies
- ~~water~~ Air (prevention & control of pollution) Act.
- water (prevention & control pollution) Act.
- Public awareness.

7. HUMAN POPULATION AND THE ENVIROMENT:

- population growth & variation among nations.
- population explosion - family welfare progras.
- Enviroment & human health.
- Human rights
- value education
- Role of information technology in enviroment & human health.

1st CHAPTER
THE MULTIDISPLINARY NATURE OF ENVIROMENTAL STUDIES :-

Dt - 17.07.19

The Mutidisplinary Nature of Enviromental Studies :-

Defination :-

↳ The word 'enviroment' is derived from the French word "environner" means to encircle or surrounding
↳ It is a composite word for the conditions surrounding in which organisim or group of organisim live.
↳ The enviroment is very wide term which incleeles total Phylical & biotic world, where biological beings live, grow, get nourise & developed their natural characteristics.

** Enviroment is the sum of all social, economical Biological, physical or chemical factors, which consitute the surroundings of the living organisim who is both creater & moulder of this enviroment.

Scope & importants :-

↳ Enviroment consist of all living & non-living things which surround us.
↳ Therefore the basic components of the enviroment are
(i) Atmosphere or the air
(ii) Hydrosphere or the water
(iii) Lithosphere or the rocks & soil
(iv) Biosphere
↳ Enviroment influence & shaped our life. It is from the enviroment that we get food to eat water to drink, air to breath & all neccesity of day to day life are available from our enviroment.
↳ Thus environment is the life support system. Hence the scope & importants the enviroment needs to be well understood.
↳ It is now universally realised that any Nature develop mental activities have to be viewed in the light of it's ultimate enviromotal impact.
↳ The tremendous increase in industrial activities during the last few decates & the release of obnoxious (undisirable) industrial waste in the enviroment having considerable concerns in recent year from the point of view of the enviromotal Polution.

↳ Environmental pollution on one hand & deforestation, soil erosion, population explosion, global warming interaction in eco system & biosphere are threathing the very existance of life on the earth.

↳ Environment is responsible for creating condition suitable for the excitance of a healthy biosphere on the planet.

↳ The load of pollutant discharge is also diluted & chemically modified.

↳ It regulates the temp on earth where like activities are possible.

↳ Over explotation of natural resources & polution of enviroment are destroying the vital life support system on which all life depends.

↳ Air, water, soil, marine polution, decreasing agricultural land, food adulteration, extinsion of various plants & factor which are making our life more & more difficult. The future of entire humanity is at stake.

↳ Instate of these sum enviromental problems are also there like solid waste management, mining impact, impact of hydroelectric projects, effect of nuclear hazards & effects of industrial effluents.

↳ These problems should also have some solution because there effect as very dangerous.

↳ Moreover technology should be developed to reduce the pollution at every state.

↳ Environment studies is very important for getting clean drinking water, hygeric living conditions, clean & fresh air, fertile land healthy food etc.

Need for public awareness:- Dt - 18-07-19

↳ After the scientific & industrial revolution in the recent past there has been immense impact of man on his environment.

↳ Man has failed to realised that any new factor upsets the balance of the eco systems.

↳ Huge industrial installations every year, introduction of a faster mode of transport, changing the food habits, deforestation & decreasing the agricultural land, wide ~~spread~~ spread use of insectiside, pesticide, improper use of fertilisers & chemicals in environment are the main contributing factors which challenged the life of man, animals & other organisim.

↳ Air pollution, water pollution, soil pollution, marine pollution, noise pollution, global warming, effect of nuclear hazard are some measure factors for which public ourness is necessary.

↳ The active co-operation of everyone at every level of social organisation, scientist, educationist, social worker ~~politicid~~ politicians, administrater & public are needed for issues concerning environment.

↳ Movement which begin at grass root levels effects

the idology & policies of a contry for the nation as a whole more effectively than the policies introduce from top to downward.

↳ when the opinion of public will change it will effect the goverment policies will fit in to action.

↳ therefore little efforts on the part of each indivisual shall add of to introduce significant improvement of the enviroment.

↳ Only by celebrating the world enviromental day, we can't get rid of this concern.

↳ Goverment along can't do anything until & unless every citizen is aware of the enviromental pollution & there effects.

↳ this is the time to make aware & motivate each & every indivisual on enviro metal concessness.

2nd CHAPTER

-: NATURAL RESOURCES :-

dt - 20.07.19

↳ Things / material of the nature that can be put to sum use by human beings for their growth, development, comfort & other necessities are called as natural resources.

↳ For example air, water, soil, forest, animals, minerals, metals, energy & other substances are some examples of natural resources. that are utilies by human beings.

↳ The resources are not equally distributed through out the world. we can realised the value of resources only when it is scarce.

Types Of Natural Resources :-

All the natural resources can be devided into 2 catagories.

i) Exhustable natural resources
ii) Inexhustable natural resources

Exhustable Natural Resources :-

↳ These are soils, forest, water, coal, peat, petroleum, natural gas, mineral, etc.

↳ These are consumed or exhusted through continuous use or misuse.

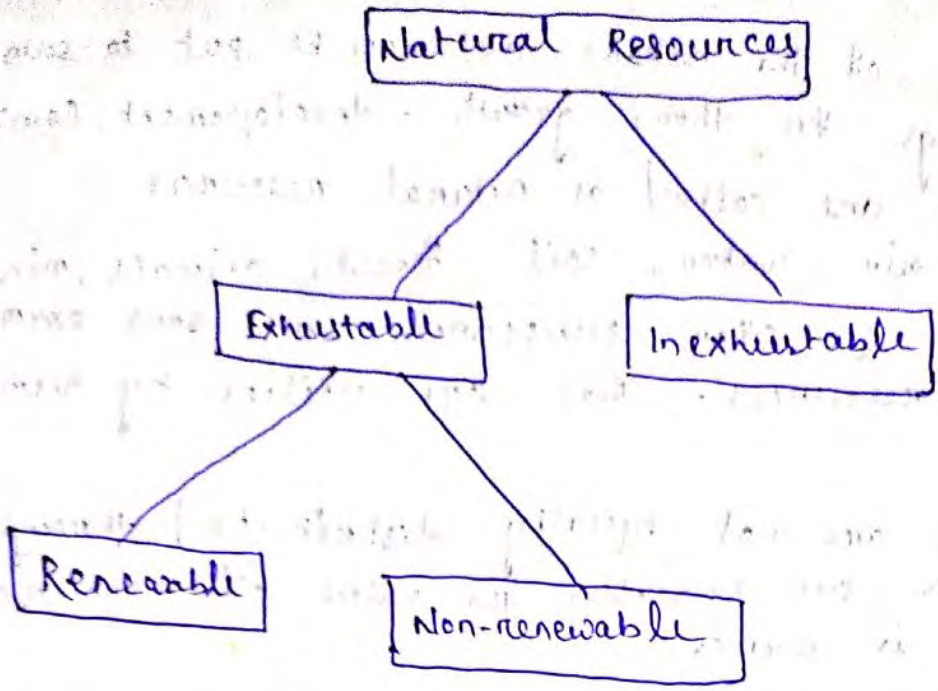
↳ Exhustable natural resources can be further devided in to 2 catagories.

i) Renewable natural resources
ii) Non-renewable natural resources

Inexhustable Natural Resources :-

↳ These are those resources which can not be exhusted through continuous use or misuse.

↳ Ex - air, sunlight etc.



Renewable Resources :-

↳ The natural resources which are consume/exhausted/depleted to continuous & can be recovered by very hard efforts taken for long periods are called renewable resources.

↳ Ex- Soil, forest, ground water, etc.

↳ In other words we can say that all renewable resources are replenished or refilled through natural cycle or manually.

↳ For example oxygen in air is replenished through photosynthesis.

↳ Most of the renewable resources are interdependent to eachother.

↳ Forest maintained the environment / climate, plants needs to check soil incision & soil is needed for plants.

↳ Air and insects are needed for pollination these resources as the life support system which can fulfill all human needs, but it's productivity/ renewability is limited or depend upon availiability of water, nutrients & environmental condition.

Non Renewable Resources :-

↳ Non renewable resources are not replenishable or we can't get back them in our lifetime if they're consumed or exhausted completely.

↳ Non renewable resources are metals, coal, petroleum, minerals, stones, salts etc.

↳ Minerals are often called the "STOCK" resources because their new material can only be extracted from the earth's crossed once.

↳ Coal, petroleum & natural gases are called as "FOSSIL FUELS" because their formed from dead remains ~~from~~ of plants & animals buried in the earth long long ago.

↳ Their called fuels because they are burnt to give energy.

↳ Minerals, rocks, salts & chemical etc are termed as "ABIOTIC RESOURCES" because biological activities are not involved in their formation.

DT - 22.07.19

Natural Resources & accociated problem :-

↳ Being most highly developed / evolved animal, man posses certain special characteristics.

↳ Man applic all their power & intelligent for food & developement

↳ They adopt new ways to fulfill their needs & often ~~thei~~ make improvement in old way derive resources & to fulfill their desired more efficiently. This is how they developed new technology for utilisation of natural resources.

↳ Human beings utilies most of the resources like air, water, land, minerals, fuels, flora, fauna energy etc. For their growth & development.

↳ Now the problem is how & up to what extend human being should utilies various resources.

↳ The use of natural resources should depend on knowledge, availability, type, quantity, value & necessity.

↳ The use of resources should be in limit not to exhust them so that ecological balance with in the nature should also remain undisturb.

Forest Resources:-

↳ India is one of the 12th mega diversity contries. commanding 7% of the world's bio diversity & supporting 16% of measure forest types.

↳ But nearly half of the contries area is degraded, affected by problem of soil degradation & erossion.

↳ 16% forest are located in ecologically sensitive zone.

↳ These forest need to this manage in way to ensure that, they are ecologically protected & maintained.

↳ Accordingly to the forest serve of 1997, the contry has 76.5 million hectar of forest.

↳ The degraded area was 26.13 million hector & their was another 5.72 million hector of scrup. thus In total 31.85 millions hector of forest where degraded or open.

↳ It was reported that the contries achivement in raising forest plantetion in terms of area has been impressive.

↳ Up to 1998 the total area of tree plantation was 28.38 million hector of which about 17 million hector where plant before 1990.

↳ The current anncial rate of plantetion is 1.2 million.

↳ The quality these plantation varries considerably.
↳ It should be noted that forest plantation are a means to needs the increasing demands for industrial raw material or for direct consumption.
↳ Non wood forest product (~~not~~ NWFTs) have a great potential to suppon the socio-economic developement of the contry.
↳ These product are essential to local communities
↳ some product have grate potential for export.
↳ some products have also provideel employment & income earning.

nv. Dnp

Over Exploatation :-

Deforestation :-

↳ The conversion of forested areas to non-forest is calleel deforestation.
↳ This removal or destruction of a significant areas of forest cover has resulted in a degradeel environment with reduce bio diversity.
↳ De forestation (whether deliveretel or unintentled) is the result of the removal of forest trees with out sufficient reforestation.
↳ There are many causes, ranging from extremely slow forest degradation to sudden & catastrophic wild fire.
↳ De forestation can be the result of the deliverate removal of forest cover for agriculture or reveral developement or it can be an unintentional consiquence of uncontroll grazing (which can prevent the natural regeneration of young trees)

Dt- 27.07.19

Causes of Deforestation :-

↳ Market driven forestripractises are often are of the leading cause of forest degradation.
↳ The pricipal human related causes of deforestation are agricultural & life stock grazing, degradation of petroleum extract etc.

↳ The causes also include demand for farm land & fuel wood. The underline causes include poverty, lack of reform.

↳ The causes of deforestation as complex & often differ in each forest & country.

→ Fire was ~~the~~ first tool that allowed humans to modify the landscape

Environmental effect :-

* Atmospheric pollution :-

→ Deforestation is often sited as one of the measure cause of the enhanced greenhouse effect.

→ Trees & other plants remove carbon (in the form of carbon dioxide) from the atmosphere during the process of photosynthesis.

→ Both the decay & burning of wood releases much of this stored carbon back to atmosphere

* Wild life :-

→ Some forest are reach in biological diversity.

→ Deforestation can cause the destruction of the habitats that support this biological diversity. Thus causing population shift & extinsion.

→ The presence or absence of trees can change the quality & quantity of water from the surface, in the soil (ground water) or in the atmosphere.

→ This, in term changes erosion rates & the availibility of water for either eco system function or human services

* Soil erosion :-

↳ Deforestation generally increases rate of soil erosion by increasing the amount of run off & reducing the protection of the soil from the trees litter.

↳ The trees themselves enhance the loss of grass from tree canopies.

↳ The bare inter canopy areas become highly erodable.

* Land slides :-

↳ Tree roots bind soil together if the soil is sufficiently shallow they act to keep the soil inplace by also binding with the underline bed rock.

↳ Tree removal on steep slopes with shallow soil thus increases the risk of land slides which can threaten people living nearby.

Dt - 29.07.19

Controlling Deforestation :-

* Farming :-

· New methods are being developed to farm more food crops on less farm land, (such as high yield hybrid crops).

* Forest management :-

Efforts to stop or slow deforestation have been attempted for many centuries because it has long been known that deforestation can cause environmental damage sufficient in some cases to cause society to collaps.

Case studies :-

* Brazil :-

↳ In brazil the rate of deforestation is driven by commodity prices.

↳ Recent development of new variety of soyabean

has lead to displacement of farmers, either into the forest for beef ranches

* Indonesia:-

There are large area of forest as indonesia that are being lost as native forest is cleared by larged multination al pulp companies & being replace by plantetions.

* United State:-

↳ Upon arrival European - Americans began clearing large areas of forest for wood & agriculture.

↳ From 1850 to about 1920 the amount of forest land in the United state actually increase.

Timber Extraction:-

↳ One world bank study in 1989 has argued that crop estates are a better employment generation option than even forest plantetions.

↳ In Malleysia timber using industries that is timber extraction is on large scale.

↳ In Indonesia timber manufacturing employment is as high as 3.7 million

↳ In India also, millions of people are engaged in timber industries not only their earning but solving the problem of unemployment to some extent.

↳ ply wood industries are also increasing day by day. so there is a gap bet demand & supply which result in import of loggs from other countries like Malleysia, Indonesia, etc

↳ Day by day the demands of logs is increasing due to population growth which leads to timber shortage.

Mining :-

↳ Mining is the extraction of valiable minerals or other geological material from the earth.

↳ Materials recover by mining include bauxite, coal, dimond, iron precisus metaal like Uranium, Molybdenum, Nickel, Lead lime stone, rock stock etc.

↳ Any material that can't be grown from agricultural processes must be mined.

↳ Mining in a wider sense can also include extraction of petroleum, natural gas & even coater

Dams & their effects on forest & tribal people :-

↳ About 40,000 large dams with a hight of more than 15 meter have already been build & several thousands are under construction.

↳ All the reservioures together have a water spread of more than 4,00000 km 2.

↳ All measure dams are constructed in mountained reason where their is plenty of rainfall.

↳ These placess clothed with reach vegetation & forest.

↳ Besides the water spearad, the space for residence of engg. and supporting staff for machinery & for roads are al aquired from the forest areas.

↳ The trees, plants & other vegetation are removed & ~~the~~ fauna are driven away.

↳ As more & more people occupies the dam side, forest are destroyed for getting fuel & timber to the developer.

↳ The tribal & local people who have been occupying their land are displaced to remote areas.

↳ Many of them are not properly rehabilitated by the goverment athorities.

↳ Tribal not only loose their habitat & social setup but also loose their occupation & libley hood.

↳ Fertile soil are lost in the reserviours.

↳ Such human rights violation create unrest among the trival and courts alone can come forward for their health.

↳ The massive resistance are visiable in the case of Nermada valley project in India.

↳ The story of chipko moment in UP & appiko moment in karnataka are examples of popular moments againest massive dam project.

Water Resources :-

→ water is a crucial natural resource & it's availability greatly influences the health of the people & development potential of the area.

→ water as a resources in a relation to it's needs is becoming deficient now a days.

→ Proper assesment of the availibility of this resources from surface & sub surface sources is crucial for it's proper planing, development & efficient management.

→ About 70% of the global surface is covered with water in the form of Oceans, seas, lakes, ponds.

→ total quantity of water available on the earth is 1386 million cubics kilometer.

→ 97.3% of the water available on earth is saline & only 2.7% is available as fresh water.

→ Most of which lies frozen in polarision or in deep aquifer not available for use.

→ The min annual rainfall taking the contrey as a whole is 1170 mm.

→ This gives a annual precipitation of about 4000km cube.

→ A significant part of precipitation returns backs to the atmosphere in the process of evaporation.

→ A large part of the remaining precipitation seeps in to the ground & the balance flows through streams, rivers & in water bodies adding to the surface flow.

→ A part of the water which seeps in to the ground remains as soil moisture in the upper layer & the rest ends to the ground water resources.

01-05-08-19

Over utilization of surface & ground water :-

↳ The exploation of ground water resources more than it's annual replenishment as caused the continuous declaining of water tables, rapid deterioration of ground water quality.

↳ Due to this high cost of energy is required to lift the water from great depths which become uneconomical for poor farmers to continue agriculture.

↳ Though India is placed with a good water resources but it's distribution over the country is not uniform or improper.

↳ Even in the high rainfall area like Meghalaya & Kerala, water scarcity is failed in summer month due to over exploitation of water & mismanagement.

↳ There is large amount of rainfall annually flowing out as run-off to sea.

↳ There is an uneven distribution of water resources coupled with over utilization of ground water resources as resulted in an imbalance.

↳ There is exist gap bet' available utilisable water resources & future need of water for the country

↳ Due to over utilization of water, Punjab, Haryana, Tamilnadu, Gujarat & some other state where the water tables have declined steeply.

↳ In Gujurat more than 90% well's water table droped by 0.5m to 9.5 m

↳ In Hariyana the avg. depth of ground water is fallen 1 - 33 cm annually in different parts of the state

Floods and Droughts :-

Floods :-

↳ Floods are the most common natural disastons. The properties of floods are

i) overflow of in land or tidal water.
ii) Surface waters unusal rapid water
iii) A mud flow

↳ These might occur during continuous rainfall lasting for several days or by the colaps of land along the shore of a lake of river

↳ Floods may wash away houses & properties.

↳ Flash floods are caused by sudden & intense accumulation of water moving with grate feeds & force.

↳ Hence the damage is also grate.

Drought :-

↳ Drought occur due to claimate change.

↳ It takes place due to the deficiency of precipitation over a long time which result in water shortage.

↳ Agriculture, Industry & domestic field gate affected by field, which result in migration of people which other places

↳ The impact of drought are famine, mall nutrition, food insecurity, epidemics & migration to other places.

↳ shortage & failure at rain may include people to clean whatever vegitation is left in order to sustain their lively wood.
↳ Drought is also known as creeping hazard because it develops over months & prolongs to n years.

Dt-06.08.19

Conflicts over water :-

↳ water being the basic requirement for life & necessary of all most all socio - economic activities is facing greater demand.
↳ It's releative demand increases with degree of scarcity.
↳ A large part of the country already faccess water scarcity condition. & it is expected that by the middle of the next century most resions of the country wood face some degree of scarcity.
↳ These condition have already created a number of interstate water dispute.
↳ If such condition continues, it is expected that the next world war will be on water.
↳ Bitterness over these dispute is increasing with passage of time.
↳ water demand in mega cities are growing much faster which putting heavy strain on the water resources.
↳ It is creating difficult problem for the surrounding reeral areas leading to serious conflicts.
↳ Since the urban water supply are met from surface flows (river), there will be conflict with upstream user.

↳ over the quantum of withdrawal, while the down stream users will be affected by the less quantity of water as well as the polluted waste water released by urban areas.

↳ such conflicts already exist bet" Delhi & Haryana, bet" Chennai & the farmers in drought prone district of Andhrapradesh, bet" Chattisgarh & Odisha.

↳ In feature such conflicts are likely to increase in number & escalate in magnitude unless & untill & effective mechanism is evolved to resolve those conflicts judiciously & expeditiously.

Dams benefits & Problems :-

Benifits :-

↳ water is essential for sustenance of all forms of life on earth.

↳ It is not evenly distributed all over the world & even it's avdilability at the same location is not uniform over the year.

↳ Management of river waters has been, therefore one of the most prime issues under consideration.

↳ Optimal management of river water resources demands that specific plans should be evolved for various river basines which are found to be technically physible & economically vaiable after carring out extensive serves.

~~After~~

↳ Man has be constructing dams & reservoirs for storing surplus river water available during raing seasn & for utilisation of the same during lean period.

↳ The dams and reservioirs could wide playing important role for harnessing the river water.

Dams & reservioirs contribute significantly in fullfilling the following the basic human needs

i) water for drinking & Industrial use
ii) Irrigation
iii) Flood control
iv) Hydro power generation
v) Drought control
vi) Recreation

Problems :-

↳ For such dam projects thousand of acres of land is aquired, result the public become landless.
↳ As far as relief & rehabilitation are concerned people are not given properly.
↳ Due to these dams most affected people are tribal, poor, lagelber class people etc. they ~~they~~ can't oppose of their own.
↳ The condition of the rehabilitation are such that the affected family are to be offered choices that should infact make the quality of there life better than the condition they encountered in there original inhabitation.
↳ Elaborate mechanisims have also been established to moniter & ensure these rehabilitations.

MINERAL RESOURCES:-

↳ Mineral beings the vital raw material for many basic industries, play a important role in the industrialaisation & overall development of the nation.

↳ Minerals are generally called the "stock" as they are the non-renewable resources.

↳ Minerals are the chemically bonded substances, created through chemical process betn organic & inorganic mattens present in the earth's crust.

↳ They may be solid or liquid.

↳ Since the P of a nation depend upon the proper use of minerals, hence they should be conserved & should n't be misused.

↳ Goverment should promote the riserch in this field of mining minerals.

Use & exploitation:-

↳ Mineral available in earth crust can be derided in to 3 types:

i) Metallic minerals
ii) Non-metallic minerals
iii) Mineral fuels

Metalic Minerals:-

↳ we cann't extract metal directly from minerals so there is difference betn minerals & ores.

↳ For extracting metal minerals are treated by different proces before extraction.

↳ Metallic minerals are generally found in combined state.

↳ According to availibility of metals, metallic minerals are fonther divided in to following type:

i) Ferrous Alloy:-

↳ Most common metal (which is used largly) is iron.

↳ Other than iron alluminium, lead, zinc, copper etc also present.

↳ All are found in reach quantity, found in netive as well as in combined state

↳ Iron pyrite, Lynonite, Haematite, magnetite, etc are examples of ferrous Alloy.

ii) Non - Ferrous Alloy:-

↳ The minerals / alloys of this type content the metal like titanium, antimony, Arsenic, lithium, Beryllium, etc.

↳ These metals are costlier the Ferrous alloy.

↳ Here iron is found as impurities.

iii)

The minerals or alloys containing very list quantity of metal whose extraction is costlier.

These metals are generally used in jewellary Ex - Gold, Plastinum, silver etc.

ii) Non-Metallic Minerals :-

↳ Minerals, whose yield product are other than metals comes in this heaf as non metals.

Ex- Graphaite, pyrolusite, Dolomite, Quartz, lime stone, Mica, Borax, phosphate, calcite, etc are the examples of non metallic minerals.

iii) Mineral fuels :-

↳ These include the material used to provide energy, example - coal, natural gas, fon fuel, & petroleum etc.

↳ coal is most commonly available fuel used as domestic as well as industrial fuel.

↳ It is of different types example - anthracite, bitumineus, lignite, pit.

↳ The type & quality of the coal, depend upon the percentage of carbon present in them.

↳ It is the principal source of energy in the world.

↳ Petroleum is used in the manufacture of large number of petrochemicals

↳ It is drilled out from the source as crude oil.

↳ crude oil is refined in petrol, disel, kerosine etc, which is used as mineral fuels.

Dt- 10.09.19

Enviromental effects of extracting & using Mineral resources :-

↳ Mining, Minerals & mineral based industries play an extreamely important role in the development of man kind.

↳ The total geographycal area of India is 329 milion hectors. Constitute 2.4% of the world land area.

↳ Out of this about 82500 hectors is sustaining mining.

activities of some kind on the other.

↳ As the mining activities grow, the per capita availibility of land is declained at a very high rate.

↳ The environment is more damaging by open cast mining than underground mining.

↳ Not only environment, mining also effect human health.

↳ Over exploation causes the wastage of mineral wealth & quality of land surface.

↳ Mineral deposite should'nt be over exploited because they are Non-renewable.

↳ Derelict land is that land which has been abandoned as useless.

↳ Dereliction is the result of thoughtless, uncontrolled exploitation of natural resources.

↳ There are following environental effect for mining.

(i) Land degradation due to lowering of the surface table at some places & creation of large mounds at other places.

(ii) Deforestation in the mining areas i.e the loss of valiable soil cover resulting in enhancement of soil errosion.

iii) The loss of top & sub soil.

iv) Adverse effect on ground water table i.e the local water table is lower as a result of open cast mining.

v) Due to increased discharge of rain water passing through the terrains, disturbed by the surface mining, the local drainage system is polluted, which on joining the main drainage system affects it also.

vi) The frequency of land slides increases substancially

vii) The errosion of soil is enhanced.

(viii) The agricultural land are affected by silt (clay or mud) & the fine material generated by mining. It also clogs the surface water channels.

(ix) The disturbance caused adversely affects the well balanced PH & diminishes or decreases the regenerative quality of soil

(x) The heavy earth-moving machinary & blasting caused problem of noise, vaibration, & the release of noxious (deadly or injurious or poisionous) gases in the atmosphere.

(xi) Mine drainage has polluted stream, river, lakes even seas.

(xii) Mining & minerals based industries with their effluents (water mixed with waste material) create pollution problems.

(xiii) Asbestous, cement & other chemical industries are very hazardous. so people are not supposed to leave in surrounding areas.

(xiv) The people related with mining & extraction effected by polluted environment (dust & poisionous gases) lead to skin & long diseases.

(xv) Deforestation & claimate change results poor rainfall & affects flora & fauna.

(xvi) Mining causes the reduction of forest i.e deforestation. wild life also affected, land becomes barren & these results in increased incidents of land slides.

FOOD RESOURCESS :-

world food problems :-

↳ Before the 21st century it was felt that world food production is not sufficient for the present population.

↳ Food production was less because people were using the old techniques.

↳ Later on when population pressure starts, new ways of food production using fertilizer, pestisides, insectisides etc are discovered to increase the yield.

↳ In 1999 International food policy research institute (IFPRI) reported the increase in world food consumption by 2020, dissusing the impact of this on both developed & developing countries.

↳ The report considers the 6 emerging issues such as Nectritions, grain priceses, WTO (world trade organis Agro Ecological approches to small scale farming, biotechnology, Information technology & precission farming.

↳ In world food ~~some~~ submit it 1996 in rom the following points were discussed :

(i) Reduce world hunger
(ii) Agricultural supply and demands
(iii) population growth.

Charges caused by agriculture & overgrazing :-

↳ Agriculture in USA & India was food raising activities & over half of the current crops comes from plants such as ~~some~~ corn, cotton, potatoes, Tabaco etc.

↳ The agricultural methods is most part of the world were primitive.

↳ Fields were dug by oxen pulling wooden plows, seeds were broadcast by hands & grains were harvested with scythes (sickle).

↳ From the Indians the 1st American settlers learned how to clear land till the field & grow the corn that was crucial to their initial survival.

↳ The mid 1800's began an era of grate change which brought advances in cultivation method, breeding of improved crop varities & use of fertilizer with crop rotations to maintain soil productivity.

↳ Ever since colonial days, agricultural leaders have been interested in increasing the productivity.

↳ As land become less available, people become more intrested in maintaing soil fertility & increasing crop yields.

↳ In 1914 govt. responded to this needs by providing funds for state agricultural extention programs to assist farmer in adopting improved farming methods.

↳ In 1930's National attention was focused on the need for soil & water conservation measures to maintain farm productivity.

Over grazing:-

↳ Grazing management is the foundation of grass land based live-stock production since it affects both animal & plant health & productivity.

↳ Over grazing can occur under continuous or rotational grazing.

↳ It can be caused by having too many animals on the farm or by not properly controlling they are grazing activities.

→ over grazing reduces plant ~~leave~~ leaf areas which reduces intersection of sunlight & plant growth.
→ Plants becomes weakend & have reduced root length.
→ The reduced ~~de~~ root length makes the plants more susceptible to ~~depth~~ death during dry weather.
→ Over grazing can increase soil erosion. Reduce soil depth, soil organic matter & soil fertility hence the land future productivity.
→ However the loss of soil depth & organic matter takes years to correct.
→ These loss is critical in determining the soil water holding capacity.

Dt - 17.08.19

Effect of Morden Agriculture :-

→ Bet 1950 & 1975 agricultural productivity in American history change most rapidly.
→ Total farm output increase more than, half.
→ This change was due to technological inovation, development of hybrid strains & other genetic improvement in the use of pestisides & photilizers.
→ Not only in America, all over world productivity & means of farming were changed.
→ Thus the agriculture has become more intensive producing higher yields ~~for~~ per acer.
→ Although the intensification of agriculture has vastly increase productivity, it also has some demerits such as rapid erossion of top soils to contamination of drinking water by the chemical used ~~to~~ to enhance farm land productivity.

Dt - 19.08.19

→ An avg. of 10 times as much soil erodes from America agricultural fields as is replaced by natural soil formation processes.

→ Because it takes of to ~~100~~ three hundred years for 1inch agricultural top soil to from form.

→ soil i.e lost is essentially irreplaceable.

Fertilizers - Pesticides problems

Fertilizers :-

→ Nutrients are lost from agricultural fields through run off, drainage or attachement to ~~in~~ eroded soil particle.

→ The amount losts depend on the soil type, organic matter content, the claimate, slope of the land, depth to ground water as well as on the amount & type of fertilizer & irrigation used.

→ The 3 measure nutreant in fertilizers are Nitrogen, phosphorus & potassium.

→ OF these Nitrogen is most readyly lost because of its high soliability in the nitreate form.

→ Leaching of Nitreate from agricultural fields can elevate consentrasion in underline ground water to levels ~~o~~ unacceptable for drinking water quality.

→ Phosphorus does not leach as readily as Nitreate because it is more tightly bound to soil particle.

→ Potossium does not cause water quality problems because it is not hazardous in drinking water & it is tightly held by

the soil particle so can't be removed easily by leaching.

Pesticides :-

↳ The trends towards intensi crop production in modern farming has led to increased potential for damage by pastes & diseases.

↳ Use of pesticides has raisen 10 times over the past 40 years as agriculture has become more intensive.

↳ One drawback to is that pesticides generally killed not only the paste of concern but also a wide range of other organisim including beneficial insects & other paste predator

↳ Once the effect of pesticides wears off, the pest species is lightly to recover more rapidly

↳ Another drawback to the increasing pesticides use in the development of resistance in pest species.

↳ The individual paste that servive the pesticide application continue to bride, gradually producing a population with greater tolerance to the pesticides.

WATER LOGGING :-

↳ Another problem associated with excessive irrigation on poorly drained soil is water logging.

↳ This occurs in poorly drained soil where water can't penitrate deeply.

↳ There may be an impermiable clay layer below the soil.

↳ The irrigation water eventually recess the water table in the ground - the upper table of the ground water from the birth.

↳ The raised water table results in the soil becoming water locked.

↳ When soils are water locked air spaces in the soil are field with water. & plant roots due to lack of oxigen suffocates.

↳ water logging also damages soil structures.

Dt - 20.08.19

Salinity :-

↳ In many areas of India, crop production is limited because of salinity or Alcalinity or both. It is estimated that about 7 milion hectors in the country have either gone water cultivation or produces low yeld of crops.

↳ Three class of salain & Alkali soils are recognaise.

Salin Soils :-

↳ The soil containeis toxic concentration of soliable salt in the root zone are called salaine soils.

↳ Electrical conductivity in the saturation extract of such soils taken as a measure of salts is greater than 4 milli ʊ per centimeter.

Non - Salin Alkali or Sodic Soil :-

↳ These soil don't containt any large amount of neutral salts, so the electrical conducting is less than 4 milli ʊ per centimeter.

Salin - Alkali soils :-

↳ This group of soil is both salaine & alkali.

↳ They have appreciable amount of soluable salt in it.

Adverse effects of salinity :-

↳ Causing low yields of crops or crop failure in extreme cases.

↳ The limiting of the choice of crops because some crops are sensitive to salinity or alkalinity or to both.

Creating difficulties in the construction of building & roads & their maintainance.

ENERGY RESOURCES

↳ Energy is needed by all living organisms & vegitation for biochemical reactions of their cells.

↳ It is a power which is needed in one form or other for workdone.

↳ Long before most of the power available to human socity was limited to solar energy trapped by green plants which produced organic matter.

↳ Biological oxidation of organic matter provided food to musel power.

↳ For the developmental activity, energy sources have their own importance.

Growing Energy needs :-

↳ Energy is the prime i/p of a country.
↳ It is converted in to heat & electricity.
↳ For every activity perform required energy in form of heat, light, electricity & food for our body (food energy is measured in calories.
↳ In has 1st growing developing economi, with the GDP growth rate exceeding 6% in recent year.
↳ This growth has been accompany it's by a steady increase in energy consumption.
↳ Primary commercial energy demand greed at annual rate of 6%.
↳ It will go more rapidly than in the past as countries reforms process accelerate.

Renewable & Non-renewable Resources :-

↳ There are 2 types of energy sources to need the requirement.

i) Renewable or Non-convesional or in exhustable energy sources.
ii) Non-renewable or conversional or exhustable energy sources.

Renewable Energy sources :-

↳ This sources are continuously replaced by natural process.
↳ Ex - Solar energy, wind energy, bio energy, hydropower etc.
↳ These energy system converts such energy in to a form which we can use.
↳ Renewable energy sources are essentially flows of energy.

→ At present total non-conversional potential of 1,26000 mega watt accessed different non-conventional energy sources.

→ At present most important non-conventional energy source is wind energy for which a capacity of 1800 megawatt has been set up in the country.

→ There is also a large potential on tapping of ocean energy, Geothermal energy & Tidal power.

→ But the technoeconomic viability for power generation from these sources has still to be established.

NON-Renewable Energy sources:-

→ These are traditional sources available to us.

→ Ex are :- coal, petroleum, Natural gas, etc.

→ All the sources are limited & takes milions of years for formation.

→ As a result of unlimited use, they will exhust one day. Therefore we should conserve this for longer period.

→ In addition to commercial fuel, coal, oil-natural gas, India consumes large quatities of traditional fuels.

→ The traditional energy sector is not well documented. Fire wood dung cake & agricultural waste continues as the primary source of energy for cooking in over 90% of rural household.

Use of alternate energy sources:-

Bio energy:-

- Bio mass a renewable energy resources divided from the cabonicious waste of various humang natural activities.
- It is derive from numerous sources including the byproducts from the wood industries, agricultural crops, raw material from the forest, household waste etc.
- Biomass doesn't add carbon dioxide to the atmosphere as it observe the same amount of carbon in growing as it releases when consumed as a fuel.
- It's advantage is that can be used to generate electricity with the same equipment i.e now being used for burning sugarcane well.
- Bioenergy in the form of bio gas which is derive from biomass is expected to become one of the key energy resources for global sustainable developme
- Biomass occurs higher energy efficiency in the form of biogas than by direct burning.

Hydrogen Energy:-

- Hydrogen is a clean fuel & energy storage medium for various application.
- Hydrogen can be produced by biological conversion of various organic effluents like distillery, starch etc. & as by product in chemical process.
- Hydrogen contained in metal hydroxite can be used in vehicles.

Tidal & Ocean energy:-

Tidal energy:-

↳ Tidal electricity generation involves the construction of a barrage across an estuary (ముఖద్వారం) to block the incoming & outgoing tide.

↳ The head of the water is then used to drive turbines to generate electricity from elevated water as in hydro electric dam.

↳ A tidal range of at least 7m. is required for economical operation for the turbines.

Ocean energy:-

↳ Ocean covers more than 70% of earth surface making them world's largest solar collector.

↳ Ocean energy drought on the energy of ocean wave tides or on the thermal energy stored in the ocean.

↳ The ocean contained 2 types of energy i.e thermal energy from sun's heat & mechanical energy from the light's wave.

↳ Ocean thermal energy is used for many applications including electricity generation.

Dt - 24.08.19

Geo-Thermal Energy:-

↳ The earth's population lives between 2 grate sources of energy, the hot rocks beneath the surface of the earth & the sun in the sky.

↳ Geo thermal energy is based on the core of the earth which is very hot.

↳ Geo thermal energy which is derive from high temp. geo thermal fluids, can be utilies for power generation, thermal applications like space heating & cooking.

↳ Geothermal energy has been commercially exploited in as many as 20 country, with about 90,000 megawatt installed capacity.

Chemical sources of energy:-

→ Fuel cells electrochemically produce direct current through a reaction bet' hydrogen & oxygen.

→ Such cells are electrochemical devices that convert the chemical energy of a fuel directly & very efficiently in to electricity.

LAND RESOURCES:-

→ our lif depend on the land for food, fiber, fuel & other basic amenities.

→ Therefore it is the valiable gift of nature to humanbeings.

→ Top layer of the land is called soil, which is renewable resource & essential for serviral of life.

→ Though it is life support system but it is over used so rises the enviornmental problems.

Land as a Resources:-

→ There are 4 class of land which are suitable for cultivation & other purposes.

→ ~~They are~~ Their details & limitation as follows:-

Class-1 (Green colour):-

→ Soils in class-1 have very few or no limitations that restrict their use.

→ This type of land is nearly lable & the erosion hazard is low.

→ The soils are deep, well drained, easily worked & fairly well supplied with plant nutrients or are highly responsive to the application of fertilizers

→ Soils in this class are suit to a wide range of plants, may be used for cultivated crops.

Class-2 soil (Yellow colour) :-

→ Soils in class-2 have some limitation which reduces the choice of plants or require simple conversion praticess.

→ The limitations of soil in class-2 may result from the effects of 1 or more of the following factors, A gentle slope, a slight susceptibility to erresion, less than ideal soil depth, occesional damaging overflow, weightness which can be corrected by draiage, slight to moderate salinity which is easily corrected but lightly to reoccur, a slight clamatic limition on soil use & management.

→ These soil may be use for growing cultivated crops, raising pastures, forest & for wideliife food & cover.

Class-3 soil (Red colour) :-

→ Soils in class-3 have moderate limitation which reduce the choice of plant & require special conservation praticess.

→ Limitations of soil class-3 may result from the effects of 1 or more of the following factor.

→ Moderately sloping land, moderately susceptible to water or wind erresion, frequent overflow accompanied with some crop damage, weightness or continueing water logging after draiage, low moisture holding capacity, moderate salinity & moderate clamatic limitation,

↳ The soils can use for raising limited cultivated crops, pasture, forest.

Class -4 soil (Blue colour) :-

↳ soils in class 4 have seriour limitation that restrict the choice of plants, and require very careful management.

↳ The restriction use of these soil are greater than those in class -3 & choice of plants is very limited.

↳ The use of these soil for cultivated crops is limited as a result of the effect of 1 or more permanent features! such as :- steep slopes, serious susceptibility to water & wind erosion, frequent overflow accompanied with serious crop damage, excessive weightness with a continueing hazard of water logging, seriour salinity & adverse claimate conditions.

↳ The soils can be used for rarely selective crops, pasture & forest.

Dt - 26.08.19

Soil Erosion :-

↳ Soil erosion means the removal of material from the surface of the soil by an external agency like running water, high speed wind etc.

↳ Since the superficial layer of the soil are the richest in plant food & thus the process of soil erosion involves a definite loss of valuable plant nutrients.

↳ When soil erosion is intense, the natural soil profile is destroyed, may never attened full development.

Types of soil erosion!-

Normal OR Geologic erosion!-

↳ Geologic erosion takes place steadily but so slowly that ages are required for it to make any mark alteration in the measure features of the earth surface.

↳ There is always an equilibrium bet' the removal & formation of soil, so that unless the equilibrium is disturbed by some outside agency, the nature & characteristics of the soil are restored.

Accelerated soil erosion!-

↳ The removal of surface soil from areas denuded of their natural protective cover as a result of human & animal interfarance takes place at a much faster rate than that at which it is build up by the soil forming process.

↳ This accelerated dettachment rapidly ravages the land & this type of soil erosion are ~~scarcely~~ ~~force~~ seriously concern.

WIND ERROSION!-

↳ wind erosion takes place normally in aride (dry or waterless) & semi aride areas where the velocity is high.

↳ The soil particle in the land surface are lifted & ~~grow~~ blown up as dust streams.

↳ The fertile soil is blown away by winds & the subsoil is exposed as a result.

the productive capacity of the soil is considerable reduced.

WATER ERROSION:-

↳ Soil errosion caused by water can be distiguished in three form:-

SHEET ERROSION:- It removes a thing covering of soil from large areas often from entire fields more or less uniformly during every rain which produces is run off.

RILL ERROSION:- when sheet errosion to allowed to continued unchecked, minute finger shaped grooves or forms over the entire field such thin channeling as rill errosion.

GULLY ERROSION:- when a rill errosion is neglected, timi groups grooves developed in to wider & diper chanels which may assume a huge size this is called gully errocion & the most spectacular avidence of the destruction of soil.

LAND SLIDE & SLIP ERROSION

↳ The fundamental cause of 'lands slides are topography of the region and geological structure the kinds of rocks and their physical characteristics

↳ land slide is defined as a outward & downward moment of the slope forming material, composed up natural rocks, soil artificial fills etc.

STREAM BANK EROSION:-

↳ Torrents are defined as hill streams characterised by wide spreading beds on an emergence from the hill; with flashy flow & swift current.

↳ During the rainy season when with every heavy downfall in the catchment they get swollen with floods.

DT - 27.08.19

Land Degradation:-

↳ Due to use & over exploitation, land resources are degraded. It is due to the more & more pressure with increasing population.

↳ Land degradation is a real alerm because soil formation is a very slow process.

↳ In millions of years we have a layer crossed of fertile soil i.e formation of 1cm soil crossed from parent material take 300 to 400 years.

↳ Fertile soil have high percentage of organic matter & micro organisim.

↳ Some 1.9 million hector of agricultural land have been degraded & million hectors are converted to Non-agricultural use such as home, highway, shopping center, factries, reservaiour etc.

↳ In India about 175 million land is affected by degradation problem.

Land Slides:- (Man Induced)

↳ A land slides is a sudden collapse of a large mass of hill side.

↳ There are many different types of land slides where not only earth but rock, mud & debris flow down the side of a slope.

↳ Man can also cause slides by mining the earth, underground excavation, pumping & draining ground water lable.

↳ Man induced land slides are generally done for the developement process i.e industrial forming roads & highways, agricultural use homes, etc.

↳ No heavy damage occurs in man induced land slides.

↳ They use heavy explosives for that so in this case no serious castalities or damage occurs because proper warning was issude earlier to shift for safer placess.

Desertification :-

↳ It is a process by which productive potential of arid or semi-arid land falls.

↳ The decrease in productivity is varries from 10% to 50%.

↳ Thes desertification leads to the conversion of irrigated crop land to desert (where productivity is min^m)

↳ It is characterised by devegitation, loss of vegital cover, diplicion of ground water, salization & soil erosion.

↳ Deforestation is also one of the cause of desertification because after forest grass land are huged by human. So human activity also responsible for desertification.

Role of an individual in conservation of natural Resources.

↳ Planning of a suitable strategy for the conservation of our natural resources & most judicious execution of planed strategy is called as conservation management.

↳ Environmental planing, evaluation, monitering & impact accessment are methods of conservation management.

↳ we have to learn to leave with the nature for this every individual has to play his role to conserve the nature & natural resources.

i) People should at once stop the over utilization of natural resources instate they must be proper use.

ii) we should take help from the government for plantation programms. Every body should take part in plantation & care the plant.

iii) we should protect wild life.

iv) Mixed croping, crop rotation & proper use of fertilizer insecticides, pesticides should be tought to farmer. Encourage the use of manures, bio fertilizer & organic fertilizer.

v) we should make habit for waste disposal; compose & to restore biodiversity.

vi) Try to educate local people for the protection & judicious use of natural resources.

vii) we should use electrical appliances only when it is needed.

viii) Maintain a balance bet^n resources and human needs.

Dt: 29.08.19

ix) Maintain the essential ecological processes & the life support system.

x) Install rain water harvesting system in houses & colonies.

xi) Recycling of the waste & the waste water for agriculture purposes.

xii) The fossile fuel should be used only when no other alternative source is available.

xiii) We must developed energy saving method to avoid wastage of energy.

xiv) Prevent soil errosion.

xv) Utilise renewable energy sources as much as possible.

Equitable use of resources for sustainable lifestyle.

→ The equal distribution of natural resources should be for all erasepective of rich or poor.

→ There must be an equilibirium balance bet^n the need & consumption of drinking water, food, fuel, etc.

→ The developed countries are utilizing more resources as compared to developing countries

→ This inbalance is responsible for sharp increase in population in developing country.

→ Developed country like USA, Canada, Japan, Australia etc have 22% of world's populatio

utilizing 86% of natural resources.

→ There it is needed to divert the resources to poorer countries to narrow down the gap between the two.

→ To achive sustainable life style there must be equal distribution of global resources to meet everyone's need.

3RD CHAPTER

-: SYSTEMS :-

Dt - 07.09.19

↳ The scientific study of the interaction of organisim with there physical environment & with each other is called "ecology".

↳ It mainly concern with the directive influences of abiotic & biotic environmental factors over the growth, distribution, beheviour & servival of organisims.

↳ The word ecology comes from to greek words "oikos" meaning household or place to leave or habitation & "logos" means study. Thus ecology deals with the study of organisim & there habitat i.e environmental biology.

Concept of ecosystem :-

↳ Eco-system is defined as a commenity of organisims interacting with one another & the environment which they live.

↳ A home can be a drop of water for an amoeba or for a lion may be many miles of land over which it's serches for it's foods.

↳ A pond, forest, lake, river, an ocean, a dam, a garden, a cropland, a city, aquirium may be an examples of eco system.

↳ Fonther an ecosystem may be natural, manmade or artificial like an aquairium.

↳ An ecosystem concept is that the living organisim of a commenity not only interact among themselves but also have functional redationship with there non-living environment. This structural & functional system of communities & there environment is called as ecosystem.

Stuctural function of an ecosystem :-

→ Fuctioning :-

↳ Functioning of the eco system is self regulating & self sustening.

↳ This dependupon flow of energy, cycling of material etc.

→ Depending upon the species, diversity & the manner in which they are organised, ecosystem are all following types:-

i) Permanent & natural ecosystem:-

↳ These operate under natural conditions without any interference (even by human beings)

↳ These can be farther classified in to terrestrial ecosystem.

(a) Terrestrial Ecosystem:-

↳ This ecosystem operate on land hence forest, desert, grass land & agro ecosystem included in this type.

(b) Aquatic Ecosystem:-

↳ This ecosystem operates in water.

↳ It can be farther devide in to 2 types

* Fresh water ecosytem
* Marine ecosystem

↳ Fresh water ecosystem are usually name after the size & nature of the fresh water body such as pond, lake & river.

↳ Marine ecosystem is longest ecosystem on the earth. which consist of several sub division each having it's physical, chemical & biological characteristics.

(ii) Temporary & natural ecosystem:-

↳ These are short lived but operate under natural condition

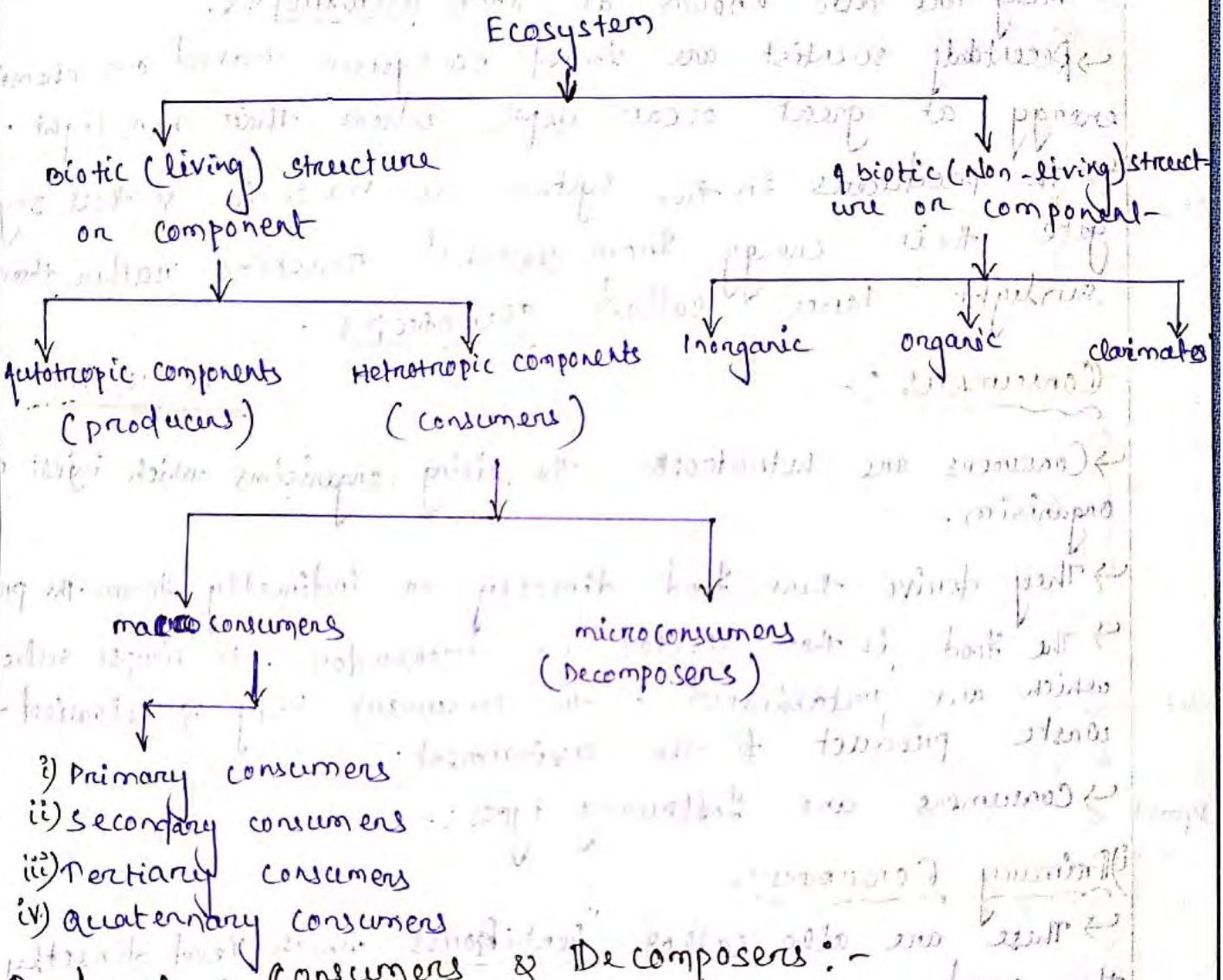
(iii) Artificial Ecosystem:-

↳ These are man made like fishery, tanks, dams, fish aquirium etc.

Structure of an ecosystem :-

Structure :-

↳ The structure of ecosystem provides information about the range of climatic conditions that prevail in the area, composition & organisation of biological communities & abiotic compounds.



Producers, Consumers & Decomposers :-

Producers :-

↳ All green plant are producers. They are also called converts or transformers.

They are living members of the eco-system that utilies sunlight as their energy sources & inorganic material from soil, air & water to transform them by the process of photosynthesis in to more complex energy reach chemicals as their own food.

↳ Producers are largly photosynthetic plant & their kind varies with the kind of eco system.
↳ In thins forest thees trees are the most important producers.
↳ In lakes & ponds the producers are rooted on large floating & microscopic plants (phytoplankton) usually the algae
↳ They are also known as photo autotrophs.
↳ Recently scientist are found eco system based on chemical energy at great ocean depth where their is no light.
↳ The producers in this system are bacteria & these organisms gate their energy from chemical reaction rather than sunlight hence called chemotrops.

Consumers :- Dt - 10/9/19

↳ Consumers are heterotrophs, the living organisims which inject other organisim.
↳ They derive their food directly on indirectly from the producers
↳ The food is then directed i.e broken down to simple substances which are metabolised in the consumers body & released as waste product to the environment.
↳ Consumers are following types :-

i) Primary Consumer :-
↳ These are also called "herbivores" which feed directly on the producers
↳ They varry with the kind of eco-system.
↳ A deer & giraffe is a primary consumer in forest-eco-system. while cow or a goat is in a grassland or crop eco-system.

ii) Secondary Consumers :-

↳ They are also called carnivores or meat eaters.

iii) Tertiary Consumers :-

↳ The most of ecosystem some organisim that it other carnivores are called tertiary consumers.

iv) Omniverse Consumers :-

↑ person or animal eating plants & animals is called Omniverse.

v) Top Carnivores :-

↳ Some eco system have animal like lion or vulture which are not killed or rarely killed by other animals are called top carnivores.

vi) Detritivores :-

↳ These are the bottom living which subsist on the organic detrites from autotrophic layers.

↳ Ex - Beetles, Termights, ants, Crabs, etc.

Decomposers :-

↳ They are also the living components mainly bacteria & fungie which breakdown complex compounds of dead protoplasm of producers & consumers to simple organic compound & ultimately into inorganic nutrients.

↳ In all the eco-system these biotic structure prevails.

↳ Molds & Mushrooms of the forest are the largest of the decomposers that are visibles.

↳ The role of decomposers in eco system is very important as they are responsible of the completion of ecosystem mineral cycle.

→ They are also called as micro consumers or saprobs or saprophits or saprotrops (sapros means rotten)
→ Ex - Bacteria & fungides.

Dt - 21.09.19

Energy flow in the eco-system :-

→ Energy is needed for every biological activity.
→ Solar energy is transformed in to chemical energy by a process of photosynthesis
→ This energy is stored in plant tissue & their t/f in to chemical energy by a process of photosy mechanical & heat during metabolic activities.
→ In the biological world the energy flows from sun to plants & then to all heterotropic organism like animals man & other nightro organisim i.e from producers to consumers.
→ 1% of the total sunlight falling on the green plants is utilised in photosynthesis. which is sufficient to maintain all life on this earth.
→ there is no 100% flow of energy from producers to consumers.
→ some energy is always loss to environment.

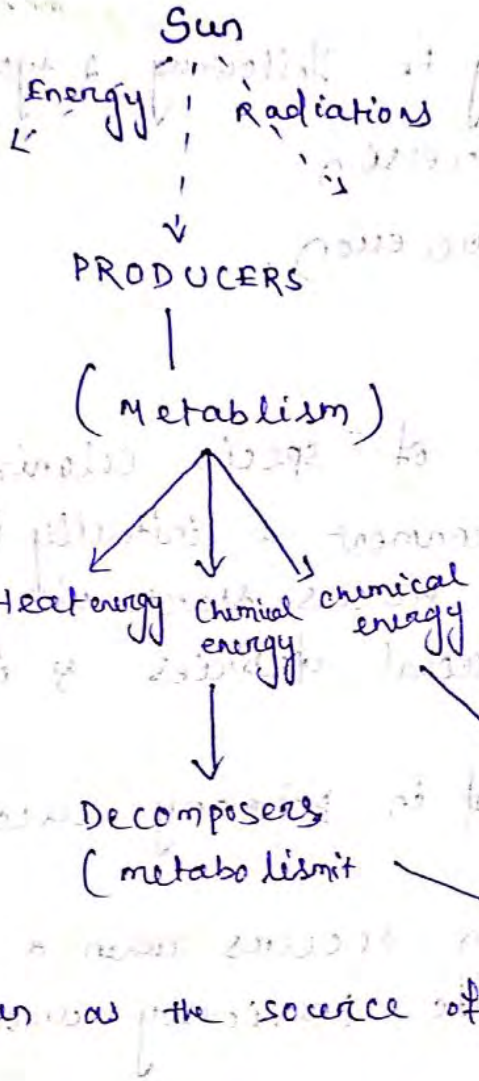
1st law of thermodynamics :-

Law states that energy be can neither be created nor be destroyed but it can be transformed from one form to another.

2nd law of thermodynamics :-

→ This law states that energy transformation involved degradation or dispation of energy from a concentrate to a dispersed from.

↳ we have seen dicipation of energy occcers at every trophic level.
↳ there is loss of 90% energy & only 10% is transfered from one trophic level to the other.



Ecological Succession :-

↳ Biotic communities are not static, they change with time.
↳ this change can be understood on several levels.
↳ changes take place continously in the community structure, organisation, the associated animals & the environment at a place in the course of time, this fenomenon is called "ecological succession".

↳ The rate of successional change is rapid initially & gradually it slows until a point of dynamic equilibiricum is reached & the community is more or less stable.

↳ A complete succesion is called a "SERE".

↳ The succession may be following 2 types :-

i) Primary succession

ii) secondary succession.

i) Primary succesion :-

↳ It is the process of specis colonization & replacement in which the environment is initially (vertically) free of life i.e the process starts with base rock or river delta or glacial debries & it ends when climax is reached.

↳ The SERE envolved in primary succession is called "PRE-SERE".

↳ Primary succession occurs when a community begins to developed on a site previously unoccupaid by living organisim.

ii) Secondary Succesion :-

↳ The term secondary succesion refers to community development on location or sites previously occupied by well developed communities.

↳ It occurs where a community has been disrepted & the surface is completely or largly devoid of vegitation.

↳ It may be due to earthquake, fire or even clearing of forest by man.

↳ In each case organisim modify the environment in a way that allow once species to replace another.

↳ The SERE involves in secondary succession is called "SUB SERE".

Hydro SERE (HYDRACH) :- The succession which starts in the aqueatic environment.

MESO SERE (MESARCH) :- The succession when begin in an area which is an intermediate type with adiqeate moisture is called MESARCH.

XERO SERE (XERACH) :- The succession when starts in dry habitat having min^m amount of moisture such as rocks, dry deserts etc are called XERACH.

LITHO SERE :- The succession initiating on rocks.

PSAMMOSERE :- Succession initiating on sand.

HALO SERE :- succession initiating on saline water or soil.

Autotropic Succesion :-

It is characterised by early & conitinued dominace on autotropic organisim like green plant.

Hetretopic succesion :-

It is characterised by early dominace of hetrotrop such as animal, bacteria, fungi etc.

Autogenic Succession :-

In some cases the replacement of one type of community by another is due to modification of the environment by community themselves is called Autogenic succession.

ALLOGENIC SUCCESSION:-

In some cases if replacement is largly due to forcess other than the effects of communities on the environment it called ALLOGENIC SUCCESION.

Food change:-

Dt-30.09.19

FOREST ECO-SYSTEM:-

→ Ground 40% of land is occupied by forest. But in India it is 1/10.

→ In India protical rain forest are found in western ghathe, Andamans, North-east Himalaya.

→ So these have maxm bia diversity.

→ The different components forest eco system are

Abiotic Components:-

→ These are the inorganic & organic substances present in the soil & atmosphere.

→ In addition to the mineral present in the forest we find the dead organic debries.

Biotic components:-

The living organisim present in the food chain occcur in the following order.

Producer:-

→ These are mainly trees that so much ~~pesis~~ spesis divercity & greater degree of starticatio. specially in tropical moist deciduous forest.

→ In northern conniferous forest nedalle leafe evergreen tree, specially the spruces, firs pines are found with poor development of shrubs & herb layes.

→ Deciduous forest is greatly modified by man & much of it is replaced by cultivated & forest edge communities.

→ Thus trees are of diffierent kinds depending upon the kind of forest.

→ Besides trees shrubs & ground vegetation are also presen-.

Consumers :-

Primary Consumers :-

↳ These are the herbivores that include the animals feeding on tree leaves as ants, flies, beetles, leafhoppers, bugs etc.

↳ Many of the larger herbivorous vertiprates like moose, snow shoe are found on gro broad leaf developmental community.

↳ Similarly some animal like elephant, dear, Nilagai, mole, flying foxess, fruit bats etc are grazing

Secondary Consumers :-

These are the carniverous like snake, birds lizards, fox etc feeding on herbivoars.

Terti

These are the top carniverous like lion, tiger etc. that it carnivores of secondary consumer level.

Decomposers :-

These are wide verity of micro organisim like bacteria (bacillus), clostridium, csdumons, fungi, specis like aspergillus, caprinus, pulipurose, fusaricum, trichoderma.

Rate of decomposistaion in tropical & subtropic forest is more rapide than that in the temperate one.

Aquatic eco-system:-

↳ More than 70% of land is covered by water. The important aquatic ecosystems are:

Marine (ocean) ecosystem:-

↳ The marine environment of seas & ocean is large occuping 70% of the earth surface.
↳ Eeach ocean indeed represents a very large & stable eco-system.
↳ Oceans play & important role in regulating meaning geochemical & hydrological cycle, there by regulating the earth's claimate

Producers:-

↳ These are autotrophs which are mainly the phytoplankton they traps radiant energy from sun through there figments.
↳ A number of macroscopics sea weeds (brown, & red) are also come in this catagories
↳ There in the disting zone are different depth on the water.

Consumers:-

These are hetrotropics macro consumers being dependent for there nutritions on the primary producers.

The herbivores like crustacions, molluscs fishes etc which feed directly on producers are called primary consumers.

The carrivores fishes like shad, herring etc feeding on herbivrons are called

secondary consumers.

The top carnivores fishes like cod, haddock halibut etc that feed on secondary consumers are called tersiary consumers.

Decomposers :-

The microves active in the decay of dead organic matter are mainly bacteria some fungaile.

Pond ecosystem :- Dt-15.10.19

→ Ponds are small bodies of water in which the litoral (costal) zone is relatively large & the limnetic & profundal reasons are small or absent

→ Ponds may refound it's most reasons of adiquait rainfall.

→ They are continuesally ring form as a body of standing water where organic material aqumulate

Abiotic components :-

→ Apart from heat, light, the basic inorganic & organic compound elements are water, CO_2, oxygen, calcium, nitrogen, phosphorus, Amino acid etc.

Biotic components :-

Producers :-

These are autotrophic, green plants & bacteria.

They fix radiant energy & with the help of minerals from the water & mud form complex organic substance like carbohydrates,

protine & lipids.

i) Macrophytes :-

→ these are mainly rooted large plants which includes smartly or completely summersed, floating hydrophytes.

→ Ex are :- Nymphel, shgittaria, hydrola, Utricular, Azolla, sylvinya.

Phytoplankton :-

These are like Ulothrics, spidogyra, Kladofloara, oedogonium etc.

Consumers :-

Most of the consumers are herbivors, ecept insects & some large fish.

Primary consumers :-

These are herbivores also know as primary macro consumers kidding directly on living plants.

secondary consumers :-

These are carnivours like insects & fish which feed on primary consumers (herbivours) like zoo plankteroop.

Terticiary Consumers :-

These are some large fish which feed on smaller fishess.

Decomposers :-

These are micro consumers which absorbs only a fraction of the decompose matter.

They decompose organic matter both producers as well as consumers in simple forms.

Thees they play an important role in returns of mineral elements again to pond.

Marine or Ocean eco system :-

The marine environment of sea & ~~ocean is~~ large

Estuaries :-

↳ Estuaries derive from the word "aestus" means tide.

It is a semi enclosed costal body of water which thees a free connection with the open sea.

It is thees strongly affected by tidal action & with in it sea wate is mixed with fresh water

Not all rivers open in to estuaries some simply discharge their run of in to the ocean.

Estuaries differ in size safe & volume of water flow.

Estuaries could be considered as transition zones bet' the fresh water & marine habitats

physico chemical acpects on estuaries:-

Current & salainity both are important here.

Estuarine currents result from the interaction of an one direction stream flow which varries with season & rain fall with oscilation ocean tide & with wind.

The salainity varrey bets. 0.5 to 0.35 %.

The water table in the estuarie flacuate regularly as like that of river & the temp. also fluctuate.

The seasonal & tidal cycle cause changes in nutrient consentration in the estuary.

Biotic community of estuary:-

The reason of estuaries as classified into upper, middle, lowere reaches increasing range of salainity & the mouth with salainity nearly equal to the sea.

The animals inveting the estuarine reason has been classified in to 2 types:-

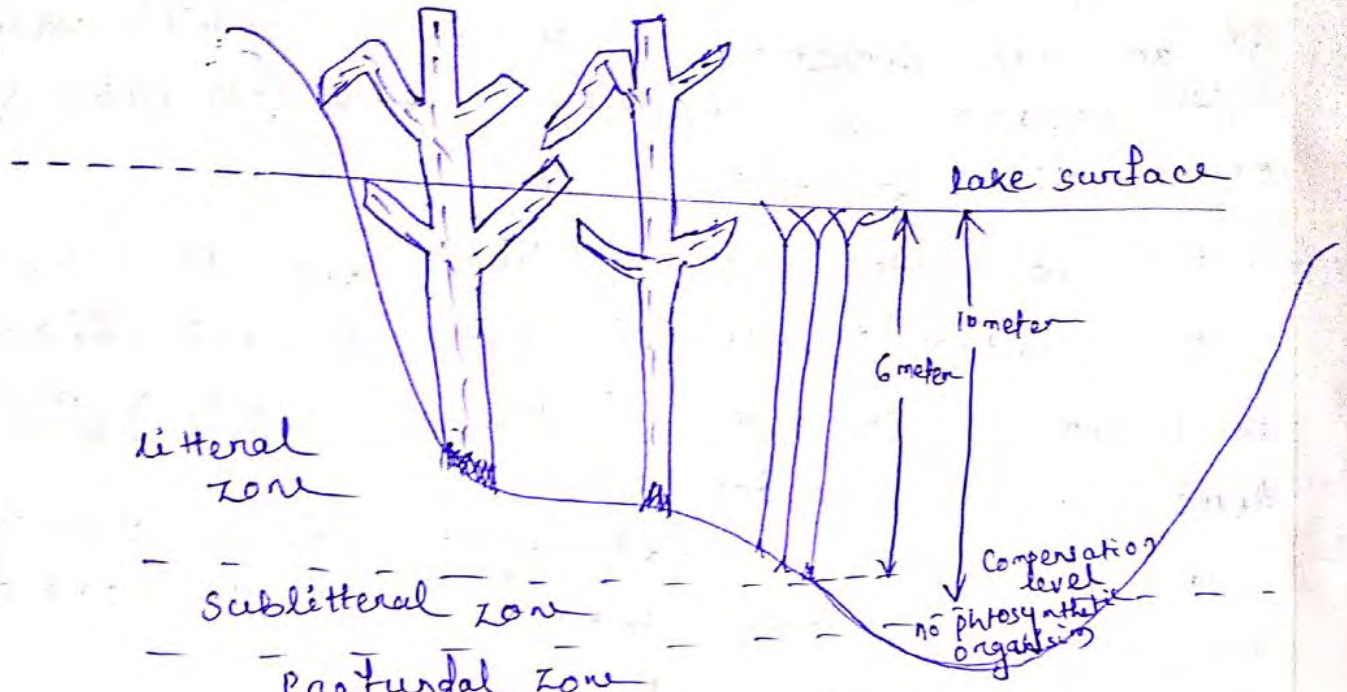
(i) Oligohaline (0.5% to 5%.)

(ii) Mesohaline (5% to 18%.)

It has also reported an abandance of phyto-planktonic several species of dytous synedra, naricula etc & blue green algilike microcystis, oscillatoria etc

In short the estuarine ecosystem is a complex & interesting one.

Lake ecosystem:-



(Different zone of a deep fresh water lake)

→ Lakes are inland depression containing standing water.

→ They varry is size & depth.

→ In lake there are 3 to 5 well recognised horizontal zones.

Littoral zone:- Shallow water near the shore forms this zone which contains upper warm & oxyla oxygen reach circulating water layer.

Sublittoral zone:- It extends from rooted vegitation to the non circulating cold water with poor oxygen content.

Limnetic zone:- It is the open water zone away from the shore.

profundal zone:- It is the deep water area benith limnetic zone. It is beyond the depth of effective light penitration

Abyssal zone:- It is found only in deep lakes since it begins at about 2000 meter from the surface

physico chemical properties of lake:-

↳ Lakes have the tendency to become thermally statified during summer & winter to undergo definite seasonal periodicity in depth.

↳ Light too penitrips only to a certain depth depnding on terbidity.

Biotic Community of lake:-

Organism depending on different leayers are found.

Neuston:- These including floating plant such as dock weeds & many types of animals. Animals are called epineustone while other incleeding insects called hyponeustone.

planktones:- These are small plants & animals whose power of locomotion is very limited. shorter zoo plank tons are very active called as nekto planktones

Nekton:- These animals are swimmers.

Bethos:- These includes the organism living at the bottom of the water mass.

Streams:-

↳ Biotic community in streams is quite different from that of pond.

→ More streams in the visinity of urban area are polluted.

→ Streams are fresh water aquatic system where water current is a measurd controlling factor.

Stream Communities:-

→ Stream generally exhibits 2 measure habitats i.e
(i) Rapid & (ii) pools

→ Some with in the catagories the type of the bottom whether sand, pebbels, clay, bed rock is very important in determining the nature of communities & population density.

→ Current is the measure factor for rapid but had bottom may offer favaourable surfaces for organisims.

→ Benthic invertibrates have higher density in rapid but ~~clas~~ claws, burrowing. Odanata & ephemeroptera are more abandant in pools.

→ Planktons are at the mercy of the current - organisim in rappids & in lesser extend in pools.

BIODIVERSITY AND ITS CONSERVATION dt- 17/10/19

↳ Biological diversity means the variability among living organisim from all sources.

↳ The verity & variability among living organisim & the ecological complexess in which they occurs is called biodiversity. i.e biodiversity is a property of living system.

↳ Biological diversity of total verity of life on our planet.

↳ Total number races, verity or species i.e the some total of various types of microes, plants, animals present in a system is record as biological diversity or biodiversity.

Genetic, specis & ecosystem diversity:-

↳ Biodiversity is usually analized at 3 levels i.e species, genetic & eco system.

Diversity of biotic community & eco systems:-

↳ Depending largly upon the availibility of abiotic resources & condition of the environment an ecosystem develops it's own characteristics community of living organisim.

↳ A small pond constitutes, a eco system & possesses a set of flora & fauna different from a river which is another type of ecosystem.

↳ Different types of forest, grassland, lakes, ponds, rivers, etc represent diverse ecosystem is with a characteristics biotic community.

Diversity of species composition with in a community:-

→ The biotic components in an eco system may be composed of a few species only or a large number species of plant, animals & microves which react & interact each other & with the abiotic factors of the environment.

→ The richness of species in an ecosystem is usually records are species diversity.

Diversity of genetic organisation with in a species:-

→ With in a species there are often found a no of verity or races or strains which slightly ~~river~~ defter from each other in 1, 2 or a no of character such as shape, shine, quality of their product, resistance to insects, paste & dieses, abilety to with stand adverse condition of environment.

→ These differencess as due to slight variation in their genetic organisation.

→ This diversity of in genetic make up of a species is referred to as genetic diversity.

Biogeographicall classification of India:-

→ India is one of the 12th mega biodiversity countries in the world.

→ The country is divided in to 10 biogeographic Reasons.

→ The wide verity in physical features & climatic condition have resulted in a diversity of ecological habitats like forest, grass lands

wait lands, costals, marine ecosystem & deserts.

→ Biogeographically India is situated at the trijunction of 3 realms namely aphro-tropical Indo-malaican & palio-arcpic realms & therefore has characteristics elements each of them.

→ This assembles of 3 distings realms makes the county rich & unique in biological diversity.

→ with only 2.4% of the land area, India accounts for 7-8% of the recorded species of the world.

→ Following 13 biogeographical reasons have been identified in India.

i) Himalaya
ii) The Desert
iii) Deccan periscula
iv) Malabari
v) Andaman Islands
vi) Nicobar Islands
vii) Gangetic planes.
viii) Laccadive Islands
ix) Maldivel chagoas Islands
x) Western Ghats
xi) Burmal Bangalian Forest
xii) Marine coast
xiii) Coromodal Mahanandigan

Dt - 18/10/19

Values of Biodiversity :-

↳ Biodiversity is a valuable natural resource for the survival of ~~pt~~ mankind.

↳ Man has domesticated a no of economically important plants & animal species.

↳ Many plants & animals including wild life are of very important for human being.

↳ They can be used directly or indirectly to have consumptive, Productive, social, Ethical, Aesthetic & option values

Consuntive value :-

↳ Most of the developing contries obtained fuel wood from forest.

↳ Still more than 1500 million people cook their food by burning wood.

↳ About 1000 million cubic meters woood is used for fuel across the groove.

↳ Various tribal socities fully depend on forest for their habitation & lively food.

Productive value :-

↳ Bamboos, grasses, canes, essential oils, taning materials, dyes, gums, resions, drugs, spices, soap substitude, rudrakhya, Lak, honey wax, tosser, mahua seeds, mahua flowers & other seeds are forest products have their high commercial values.

↳ In addition to these various herbs & animal body parts are sold in commercial market both at national & International levels.

↳ Some benifits like water quality, recreation, education, Scientific reserch, regulation of climate etc are indirect values to biodiversity that provide economic advantages to the people without consumption of the resource.

Social values:-

↳ Social value is one of the instrumental values.
↳ The biodiversity has disting social value attached with different societies.
↳ Goods & services provided by ecosystems to our society include:
(i) Provision of food, fuel & fibre
(ii) Provision of shelter & building materials
(iii) Purification of air & water.
(iv) De-toxification & De-composition of waste.
(v) Generation & renewable of soil fertility including
(vi) Nutrients cycles.
(vii) Stablization & moderation of earth climate.
(viii) Live stock braiding, medicines & other products.
(ix) Maintance of genetic resources as key input to our society

Ethical values:-

↳ Ethical or religious value are also one of the indirect values of biodiversity.
↳ The Ethical & religious value of biodiversity is rooted in the understanding that humanity is a part of the nature & we are just one species among others.
↳ All species have an inherent right to exist.
↳ Future generation also have an inherent write to know them & to have the choice of using them or not.
↳ Religious is also have a ~~right~~ significant impact on our attitude to our nature resources.

Aestetic value:-

↳ The Aestetic value of biodiversity has been expressed in many ways through Art, poetry, songs, litreture, music & dance.
↳ Forests are closely link with our religious & culture.
↳ Human roll has great eviousnary attachment with forest has our ancestors lived in forest.
↳ Many type of trees are worshiped by hindus in all over India & tribal socities also i.e pipple, tulsi, banyan etc.

→ Some animals like cow, is worshiped by hindus.

Option values:-

→ Biological resources exist in this biosphere are very important for human beings.

→ The option value biodiversity suggest that any species may proof to be a miracles species.

→ Option value is indirect to human society at some point in near future.

Biodiversity at Global national & local level:-

Biodiversity at Global level:-

→ It is estimated that their exist 5 to 30 millions species of leaving forms on our earth & of their only 1.5 millions have been identified which includes 3 lakhs species of green plants & fungi, 8 lakh species of insects, 4000 species of vertibrates & 3,60,000 species of micro organisms.

→ The data related to different species in different parts of the world are different.

* For example:- Approximately 2 lakh species of plants are in south America.

→ Precipitation & temp as among the most important determinants of diversity.

Estimated no. of species world wide:-

Taxonomic Group	No. of species
Bacteria	3600
Blue green algi	1700
Fungai	46983
Bryophytes	17000
Gymnosperms	750
Anagiosperms	2,50,000
Insects	7,50,000
Sponges	5000
Cuscecies	9000

Mallases → 38000
Fishes → 50,000
Amfibians → 19,056
Reptiles → 6,300
Birds → 9036
Mamals → 4008

Biodiversity at National levels:-

→ India is located in south Asia bet^n latitudes 6° & 38° N & langitude 69° & 97° E.

→ The Indian subcontinent extending over a total geographical area of about 3029 million hectors is bounded by Himalay's in the north, the Bay of Bengal in the East, the Arabian sea in the west & Indian Ocean in the South.

→ The wide verity in phisical feature & climatic situation have resulted in a diversity of ecological habitats.

→ This richness in biodiversity is due to immense variety of climate & altitudinal condition coupled with varries ecological habitats.

Number of recorded

FLORA

Taxon	no. of species
Bacterial	850
Algal	2500
Fungi	23000
Lichers	16000
Bryophyta	2700
Pteridophyta	1022
Gymnosperms	64
Angiosperms	17000
Total	48736

FAUNA:-

Protozoans	2577
Porifera	519
Cnidaria	237
Ctenophora	10
Platyhelminthes	1627
Nematoda	2350
Rotifera	310
Kinorhyncha	10
Gastrotricha	88
Acanthocephala	110
Sipuncula	38
Mollusca	5042
Echiura	33
Annelida	1093
Onychophora	1
Arthropoda	57525
Phoronida	3
Bryozoa	170
Entoprocta	10
Brachiopoda	3
Chaetognatha	30
Echinodermata	765
Hemichordata	12
Fishes	2546
Amphibians	204
Reptiles	428
Birds	1228
Mamalas	372
Total	526,188

Based on available data

Biodiversity at local level:-

↳ The biodiversity at local level can be well understand by demarketting plants, places, zones, rich in biodiversity.

↳ This can be understand as compositional i.e. rich in plants & animals of same habitats & genetic make up.

↳ The local biodiversity is studied on following lines.

(i) Richness of species at a given place.

(ii) Physical characteristics of habitat & vegitation in particular area.

(iii) Change in species composition across different habitats

(iv) Local diversity based on climate, Geographical, ecological & other processes responsible for creation

(v) Rate of change across radient & conditions.

↳ It is said that environmental variables are responsible for diversity but temprature play an important role if affective biodiversity of an area. Thus local areas are well affted in a hetrogenous & homogeneous habitats.

2 Hotspots of Biodiversity:-

The most thrated of on all biologically rich areas are called hotspot.

Threads of Biodiversity:-

↳ One of the major threat to biodiversity is space, food & raw material for expanding human & plant establishment.

↳ The following major causes & issues related to threads to biodiversity.

i) Habitat loss

ii) Poaching of wildlife

iii) Man wild life conflicts.

(i) Habitat loss :-

→ Habitat loss due to human activity & other disturbances well known factor.

→ Varrying human disturbance are changing ecosystem & are thus threating the bio-diversity.

→ Due to habitate degradation & loss wild population becomes more volnerable to predactures & deases.

→ This is especially true for wild life which suffer due to habitat loss & fragmentation.

→ Habitat loss is instailment so that the habitate is divided in to small & scattered fetchs i.e habitat fragmentation.

(ii) Poaching of wild life :-

→ Poaching is another threat to wild life.

→ As an anxic period Hunters, collectors & smugglers are the major threats to the no. of species including in dangered species.

→ They collected furies, Hides, Horns, tusks & some living speciments, herbal products are smuggled.

5th chapter

ENVIRONMENTAL POLUTION Dt - 19.10.19

Air pollution:-

Air pollution may be defined as the presence in the outer atmosphere of one or more contaminants or combination there of in such quantities & of such duration, may tened to be injurious to human, plant or animal life or property or which non regionably interfear with the comfortable enjoyment of life.

Causes of Air pollution:-

The air pollutants may be classified in different ways.

Imp (1) According to Origin:-

i) Primary pollutants which are directly emitted in to the atmosphere are found as CO, NO_2, SO_2 & hydrocarbone all these are primary pollutants.

ii) Secondary pollutants which are derive from the primary pollutants due to chemical or auto chemical reaction in the atmosphere.

Ex - Ozone, peroxy-acyl nitreate (PAN), Photochemical smug etc.

(2) According to chemical composion:-

(i) Organic pollutants. Ex - hydrocarbone, haldihides, ketones, Amines & alcohalls.

(ii) Inorganic pollutants. Ex - carbone compounds such as:- Co & carbonates, Nitrogen compounds such as:- NOx, NO_3, suphar compound:- H_2S, SO_2, SO_3 & H_2SO_4.

Hallogen compound:- HF, HCL & metallic floride.

Oxydising agent:- O_3

(iii) Inorganic particle such as fly ash, sillica, asbestus, dust from transport, mining, metalogical & other industrial activities.

According to state of matter:-

(i) Gaseous pollutant which get mixed with the air & don't normally setelout.

Ex - CO, NOs & SO_2

(ii) Particulate pollutants which comprise of finally divided solids on liquids & often exist in coloidal state as Aerosol..

Ex:- Fumes, smoke, mist, fog, smog, dust & sprays

Effect of Air Pollution:-

Damage to material:-

↳ The material may be affected by air pollutant include metal, building material, rubbers, paper, textile, leather, glass, dyes, enamails, surfacecoating

↳ The types of possible damage to these material by air polution includes corrosions, deposition, abrasion, direct & indirect chemical attak etc.

↳ The intensity of damage depends upon factor such as moisture, temperature, sunlight, air moment & the nature & concentration of the pollutant.

Damage to vegitation:-

↳ Air pollutant such as sulphar dioxide, HF, smog, oxidant like ozone, ethiline from auto mobiles, Nox, clorine & herbisides exhust toxic effect from vegitation.

↳ The damage usually manifest in the form of visual injury such as chlorotic making, banding, silvering, bronzing of the undersidle of the leaf.

↳ Retardetion of plant growth may occurs in some cases.

Damage to farm animals :-

→ Arsenic, lead, florides are the main pollutants which cause damage to life stock.

→ These air borne contaminant accumulate in vegitation & poisition the animal when they eat the contaminated vegitation.

→ cattle & sheep are particularly susceptable to florida toxicity which may cause florosis of teeth & bone.

→ Life stock near smelting & other industrial operation suffer from arsenic posionic with simtoms like saliation, thirst, liver necroxis, inflaration and depresation of central nervous system.

→ Lead poisionic occurs in horses and other animals with symtoms such as lethargic, gastri.. paralicis & breathing troubles.

Darkning of sky & reduction in visibility :-

→ Sky darkning may because by heavy smoke & fog or by dust strome.

→ The reduction in visibility may be dice to smoke & fog & industrial fumes which contaiat particulates in the size range of 0.4 to 0.9 micrometer that scatter light.

→ The intensity of these effect depends upon the particle size, the angle of the sun, aresol density, thickness of the air, wind speed, humidity.

Effect on human health & human activity :-

→ Air pollution can effect health of workers with in the industrial premisses causing sickness, absenteeism & drop in production.

→ However appart from the effect on industrial workers, air pollution also affects larger segments of general population.

→ Epidemiological & toxicological studies indicate a link betn air pollution & respiratory condition like chronic bronchetes, asthma, pulmonary diesss & lungs cancer.

→ Irritation of nose, eyes & throat & bad odours, due to air pollutant cause annoyance, allergy & other health hazards.

Control measure of Air pollutant :-

The following are the general methods of air pollution control :-

(i) Controlling the air pollution at source
(ii) Site selection / zoning
(iii) controlling air pollution by device on equipments or process modification
(iv) Air pollution control by growing vegitation
(v) Air pollution control by fuel selection & utilization

(i) Controlling of air pollution at source :-

→ Modifing the process in such a way that pollutants don't form atall beyond the permissible limit.

→ Before release the pollutants they should be reduce to tolerable level by methods equipment to destroy, alter & trap.

→ This step can also be done in 2 ways first is that we should select the raw material in such a way to release min pollutant.

→ The substiments may also be used if needed.

→ Secondly use suitable fuels avoiding sulpher content.

→ Equipment alteration such as the use vented tanks should be avoided & for industry new furnesses & modified equipment should be used.

ii) Site selection on zoning :-

↳ To installed the industries site selection is important. which result in the production of single source of pollution.

↳ control measures based on the knowledge of the mechanics of the atmosphere is called zoning.

↳ while setting the factories the metrological & micrometrological condition should be considered.

iii) Controlling air pollution by devices on equipments on process modification :-

Methods .. equipment used in control gaseous pollutants

For gaseous pollution the following methods are

* absorbtion
* adsorbtion
* combustion
* Cold trapping y condenser

*absorbtion :- scrubbers are mostly used for the removal of gaseous pollutants which use suitable liquid as absorbant to remove or modified one or more of the pollutants.

*Adsorption :- → Here the gaseous effluents are passed through consolid absorbant taken in suitable containers.

↳ the efficiency of adsorition depends upon the surface area for unigate of the absorvent.

Pollutants	Absorbant	Adsorbants
NOx	H_2O & liquid HNO_3	silica gel, corrosive geolights
HF	H_2O & NaOH	Porous pellets of sodium chloride, lime stone
H_2S	Ethanol amines, ferrol, sodium alanine, soda ash, etc.	iron oxide
SO_2	water, alkaline H_2O, alluminium sulphate, sulphites of barium, calcium, sodium	alkaline, limestone, dolomite

Controlling of air pollution by growing vegitation

→ planting of trees is very helpful in reducing air pollution.

→ Trees should be planted all around the sources in order to reduce the spreading of air pollution from pollutant coming out from the industry or source.

Air pollution control by fuel selecting & utilization:-

Fuel should be selected in such a way that combostion gives more efficiency & less polluting gases.

Incomplete combostion of hydrocarbon fuel should be avoided.

Water pollution:-

The water i.e feed for drinking is called poatable water.

Characteristics of portable water are

→ It should be colour less, odour less & test less.
→ Free from terbidity & other suspended impurity.
→ Free from germs, bakteria & other pathogenic organisim.
→ Should'n't contain toxic desolve impurities such as heavy metal, pestiscide etc.
→ Should have pH in the range of 7 to 8.5.
→ It should be moderately soft having hardness 50 - 100 PPM (parts per million)

Causes of water pollution:-

The various type of water pollutant are:-

Oxygen demanding waste:-

→ These include domestic & animal sewage, biodigradable organic compound & industrial wastes from food processing plants, meat processing plant, slaughter house, paper & pulp meals, tanaries, etc.
→ All these waste under go degradation & decomposision by bacteria activities in presence of disolved oxygen.
→ This results in rapid depletion of disolve oxygen from the water which is harmful to aquatic organisim.
→ The optimum desolve oxygen in natural water is 4-6 PPM which is essential for supporting

aquatic life.

→ Any decrease in this desolved oxygen value is an index as pollution.

Deses causing wastes :-

These include pathogenic micro organisms which may enter the water along with swells & other waste & may easi cause tremendes damage to public health which cause dangerious water bur diseases. such as cholera, tif. , disenerty, polio, infectious hepatities, etc.

Synthetic organisim compound :-

These are the man made material such as sythetic pestisides, synthetic detergent, food additives, insectisids, Harmaceutical biproduct, plastics, etc.

Most of these chemical are potential toxic to plant animals & human.

Sweages & agricultural run off :-

Sweage & run off agricultural land supply plant neutrient which may simulate the growth of algi & other aqeatic weeds in the reciving water body, which degrade the value of the water body.

Oil :-

Oil pollution may take place because of oil leel from carbo oil tanker on the seas, or leakage from oil pipe line crossing water waste from reseaver.

Oil pollution result in reduction of light transmission through surface water there by reducing photosynthesis by marine plants.

Effect of water pollution:-

Some important effects of various types of water pollutant are

i) Tannery effluents contains several consitituents which are deleterious, irrespective off the factod that where they are discharge in to river, stream, land or sea.

ii) It impacts persistance dall brownish colour to the reciving water causing esthetic & other problems described earlier.

iii) Highly repulsive odour is impacted to the receiving water by the dekave consitituent like proteins, amino acids.

iv) The acidic or alkaline effluents are corosive to concreate & metal pipes.

v) Excess ossicl in the effluents is also corosive & is unsuitable for irrigation.

vi) The effluents may contains pathogenic bacteria

vii) The dissolved chromium with toxied to pesic & aquatic life.

viii) The suspended solid interfere with the photosynthetic activities aquatic flora.

ix) Radio active isotopes are toxics to life form.

Control measures of water pollution:-

↳ Scitific techinics are necessary to be adopted for the environmental control of catchment areas of rivers, lakes, ponds & streams.

↳ Industrial plants should be based on recycling operation.

↳ The possible reuse or recycle of treated sewages effluents & industrial ways should be intacites & encorage.

↳ Instead of throughing waste in to the water, the recycling should be done for better use.

↳ Minm ; appropriate quantity & concentrasion of fertilizers, pestisides & insectesides should be used because excess will cause pollution.

Frequent plant should be concentrated & govt. should also help by funding for domestic, sewages & industrial effluence.

water resources should be used in the best possible economic ways.

To conduct seminar & traing courses for helping those who are directly or indirectly engaged in water management & water pollution control.

Govt. should encourage people to participents in reserch program like disposal of so else & industrial effluence

Local authorities, industrial list, govt. official with public participation should coordinate to find different ways to control water pollution

Soil Pollution:-

Causes of soil pollution:-

→ Soil pollution differs from water pollution & air pollution because the pollutant remains in direct contact with the soil for relatively longer period & hence alter the chemical & biological properties of the soil.

→ The hazardous chemical can also enter the human food chain from soil or water plants.

→ The measure sources of metallic contamination of soil is include mining, smelting, sludge, fertilizer, pesticides, etc.

→ Metal such as Cd, Pb, Hg, Ni, Mo, Cr, etc are toxied to plant & animal life.

In discriminate dumping of industrial waste & municipal waste leads to the leaching & seepage of toxic substances in to the soil & pollution of ground water.

as generated from thermal power plants industrial waste discharged in to streams or dumped in to the surrounding land, mining waste non-biodegradable organic pollutants, industrial sludges, heavy metal cause serious soil pollution problems etc.

commercial & domestic urban waste such as plastic metal cans, glasses, waste paper, fiber, rubber etc contribute to soil pollution.

Effects of soil pollution :-

→ Soil pollution was originally defined as the contamination of the soil system by considerable quantities of chemical or other substances resulting in the reduction of it's fertility or productivity with respect to the qualitative & quantitative yield of the crops.

→ Soil pollution is receiving greater attention due to it's direct impact on public health.

→ The measure effects of various types of pollutants are

i) Effect of modern agricultural practice :-

a) Synthetic fertilizers :-

These are employed to increase the soil fertility & crop productivity.

These fertilizers concentrate the essential nutrients in top soil layer however the soil enriched by chemical fertilizer can't support the microbial flora which are so essential to enrich the humus that health in plant growths.

Excessive & indiscriminate use of chemical fertilizer may result in the reduction of crop field.

b) Pestisides :-

Pestiside pose potential hazard to animals, human & aquatic life.

They also caused the deleterious effect on soil fertility & crop productivity.

Pestisides applied to crops are unittened in the soil in considerable quantities.

They entered in the cyclic environmental proces such as absenvation by soil litching by water & contaminate both lithosphere & biosphere

Pestisides including orbisides, fungisides & rodentiside are persistant pollutants.

Pestiside may enter the food change & poles serious health hazards.

Some of them under go metapolic transformation & they are degradation product are even more dangerous than their respective parent compound

some of the pestisides are carsinogenic while their metapolic product too are toxic.

Effect of Industrial effluents:-

Solid, liquid & gaseous chemical from various industries like paper, iron, fertilizer automobile, steel, ~~plastic~~ pestisides, tanneries, coal based thermal power plants etc. contain a verity of pollutants such as toxic heavy metals solvents, detergents, plastics, suspended particu & non biodegradeable chemicals.

If there not properly treated are source & give rise to water, air & soil pollution.

Fly ash resulting from coal based thermal power plant is one of the alarming & continuously increasing source of soil pollution leading to degradation of soil.

(iii) Effects of urban waste :-

Millions tonns of urbah waste are produced every year from critically polluted cities.

The in adiquetly treated or untreated sewage not only pose serious health hazards but also pollute soil & decrease it's fertility & productivity.

some soild waste clogging of ground water filter.

Suspended matter present in sewage can act as a blanket on the soil & interfear with it's productivity.

Control measures of soil pollution :-

The various approches to control soil pollution are

implementing stringent & proactive pollution control program.

Lunching extensive afforesttation & community forestive program.

Implementing deterent measure against deforestation.

Banning the use of highly toxic & resistant synthetic chemical pesticide.

Encouraging use of bio pestisides in place of toxic chemical pestisides.

Impacting informal & formal public awarness programe to educate large no of people regarding the health hazard & undesireable effects of pollution.

Effective treatment of domestic sewage by suitable biological & chemical method & adopting modern methods of sludge disposal.

Industrial waste have to be properly treated bef sources.

Municipal waste have to be properly collected & segregated scientifically.

Avoiding excessive use of chemical fertilizer & insectisides & providing more organic manures to the field.

*Marine Pollution :-

when marine water is polluted it affects the animal & other food chain components.

Sources of marine pollution :-

Rivers are the main source of marine pollution. They carry waste in their drainage & joins the sea or ocean. The drainage includes sewage slows, industrial effluents detergents agrow chemical, plastic

, metal scraps etc.

Catchment area like India & other countries, many big cities & industries are situated along the post lines. Large amount of waste from vortails & other human activities, sewages from corporation & industries are mixed in sea water.

Ships which carry toxics substances lubricating oil, paints, heavy oil, fuels, some time by accident or by leakages pollute the marine water. testing of automic weapons, space air craft, missiles & other radio active wastes when dumbed in seas causes marine pollution.

Marine pollution also caused by oil drilling in seas, trawling activities & heat release from industry etc.

Effects of Marine pollution:-

Oil is most dangerous pollutants when afloat on sea or mixed with water is a great threat to marine life specially fish birds, invertibrates, algi.

Oil at sea also affect sensitive flora & fauna, phytoplanktons, zoo planktons & other animals.

plastic & plastic material when dumped in to sea animal take it through their foods in stomach which causes ulcer & reduces

hunger.

Marine pollution the effect of food change in sea. serious diseases like cancer are the caused when affected sea food are taken by human beings.

Heavy metals, factory material, mineral oil, acids & other biocides are also measure threats to marine life when mixed with sea water.

major effect thing is a heavy loss of economy after getting polluting animal & chemicals from marine.

Control measure of marine pollution:-

Dumping of oil, hazardious & toxics substances, radio active lab biproducts in to sea should be banned or should be properly treated before dumping.

Draiage, sewage sludge, effluents from industries should not be discharge in to the river which joins sea.

Developmental activities on costal areas should be minimize.

Toxics pollutants from industries & treatment plants should not be discharge in to sea.

Nuclear explosions & other nuclear activities in sea should be minimized.

Oil drilling should not be allowed in coastal areas.

Ships & boats should have certain facilities for reds

Effective major should be developed to check the leakage in ships & oil tankers.

Noise pollution :-

The tongue may be defined as unwanted sound at a wrong time & a wrong place.

sources :-

Prolong of a loud sound is generally considered as noise which is mostly caused because of industries, vehicles, aeroplane, etc.

Although noise is undesirable it should be meaningful or meaning less ; meaningful noise is generally needed for inviting attaintion or expecting a consequent response such as a cry of baby or a streamy by a person for health.

On the contrary irresponsible or meaning less noise is disturbing & anoying.

Dt - 28.10.19

Effects of noise :-

Physiologically effects :-

At high levels of about 150 dB, imediate permanent hearing emparement may be caused.

At sound level in the range of 120 to 150 dB effects on respriority system, dizziness, disorientation, loss of physical control, other physiological changes resulting from stress, nausia & vomating may be caused.

Local sound can cause ~~&~~ increased ~~expretion~~ of many hermons in turn trigger various effect such as increase of blood sugar level, supresion of immunity steten decreasing the efficiecy of liver to detoxified blood.

Sycologically effects :-

Local contineous noise reduces the working efficiency, interfer the communication, increase the frequency of error which may at time cause accident.

Noise reduces the mental capability.

Noise has sycologically effect on humans ranging from mid distress to complete disorder

Noise interfears with deep sleeps & interupts sleeps.

Because slep is important to ~~emo~~ inotional stability, Noise may contribute to distress & inotional disturbance.

Noise also aggrivates many existing psycological condition & metal illness.

Hearing loss :-

Prolonged exposers to loud noise can cause temporary or permanent loss of hearing.

People working in noisy places such as industrial establishment, factory etc often suffer from temporary loss of hearing.

very loud, sudden & impulsive noise are capable of causing aquiet damage to auditory system & permanent loss of hearing.

Other health effect of noise pollution :-

Noise affect the cardiovascular system also.

loud noises tend to decrease the o/p of blood from heart which results in decrease heartbeat-rate.

changes in breathing amplitude have been reported due to sudden & impulsive noises.

High noise may cause headache, irritability & fatigue.

Control measures of noise Pollution :-

Reduction of noise at the source of it's origin :-

Often a little precasion can reduce much of the nuisance caused by loud noise.

This can be achived by replacement of noisy rattling devices or machines with quiter once.

Noise table can be reduce effectively by

replacement of noisy & rattling parts, providing better cushioning to check the vibration, proper oiling & greasing to ensure smooth running & using effective silencers.

Application of sound proofing techniques :-

Sound waves are absorved by porous material such as perforated seeds & other objects.

Sound barriers plays around the source of origin of local noises drastically reduce the intensity of sound on the other side of the obstracle.

Keeping residencial locality free of noisy industries:

Reciderncial locality should be established away from noisy industries, busy highways, aerodrums.

This shall curb much of nuisance caused by noise pollution.

Enectaquiment of scrtrict lagistation & it's effective complains :-

we most of the countries including our own, legal frame work against noise pollution has been developed.

However in most of the cases little efforts are made to enforce these rules & regulations effectively.

Noise control method in Industrial plants:-

Excessive noise is produce from various types of machine, petrol & diesel engine, electric motors, construction side equipment, pumps & pumping system, compressed air system, air distribution system etc.

It is always advantageous, economical & effective to identify the noise sources & noise problems right in the design & execution stages & incorporate the necessary noise control measures rather than attending to the problems at the latter stage.

Thermal Pollution:-

The term thermal pollution has been used to indicate the detrimental effects of heated effluents discharge by various powerplants.

Addition of excess of undesirable heat to water or environment which makes it harmful for living organism.

Sources of thermal pollution:-

Nuclear powerplants:-

Nuclear powerplants, including drainage from hospitals, institutes, nuclear experiment & explosions, discharge a lot of unutilised heat & trapped radio nuclides in to the near by water streams.

Heated effluents from powerplant are discharge at 10°c higher than the ambient receptor & seriously affect the aquatic

Coal fired power plants :-

Some thermal power plants ultimately discharge effluents having temp difference of 15°C between effluent & water body.

The thermal power plant utilise coal as fuel & they constitute measure source of thermal pollutants.

The heated coil are cooled with water from near by lake or river & discharge the hot water back to the respective water body & thein by increasing the temp. of the water body.

The heated effluents decrease the dissolved oxygen contain of the water which result seen killing of aquitic organisms.

Industrial effluents :-

Industries generating electricity like coal as fuel & nuclear power thermal plant require hege amount of cooling water for heat removal.

Other industries like textiles, paper & pulp as well as sugar also release heat in water but to a much lesser extend.

Hydroelectric power:-

The generation of hydroelectric power sometimes results in -ve loading in water systems.

Apart from electric power industries, various factories with cooling contribute to thermal loading.

It has been reported that about 18% more heat is given to cooling ponds in nuclear power plants than any other plant of equivalent size.

Domestic sweage:-

The muncipal sweage normally has a higher temp than reciving water.

The discharge water not only rases the steam temp. to a measureable extered but also create numerous diliterious effect on aquatic biota which measures major the decrease containt of disloves oxygen. dems

Dt-29.10.19

Effects of thermal pollution:-

Reduction in desolved oxygen:-

Consentration of desolve oxygen decrease with increase in temp of water.

Ex:- The desolve oxygen containt is 14.6 ppm in water at a temp of 32° F. & 6.6 PPM at 64° F.

Change in water properties:-

A rise in temp. changes the physical & chemical properties in the water.

The vapour pressure increase sharply while the viscocity of water decreases.

Increase in toxicity :-

The rising temp increases the toxicity of the poision present in water.

A 10° c rise in temp. doubles the toxic effect of potasium cianite while an 30°c rise in temp. tripples the toxics effect of o-xylene causing massive motality of fish.

Interferenca with biological activities :-

Temp is considered to be of vital importance to physiology, metapolysim & biochemical process is controlling respiratory rates, dication, excretion & overall development of aquatic organism.

The temp changes totally disturb the eco system.

change in metaboliic rate :-

Fishes show a marked rise basal rate of metaboligin with temp to the lithal point.

The respiratory rate, oxygen demand, food intake & swimming in fishes increase.

Increase vulnerability to deases :-

Activities of several pathogenic micro organism are assisted by high temp.

Hot water causes bacteria deseases in certain fishes such that they felt to developed x above critical temp.

Undesirable changes in algi population :-

The life in an eco system is greately influenced by the algal growth.

Excess nectrients from the wash out water

cause an excessive algal growth with consequent acceleration of eutrophic & other undesirable changes.

Bio chemical oxygen demand :- (BOD)

when the temp of stream carrying biodegradable organic matter rises, the intensified action of aquatic organism causes BOD to be accomplished at a lower temp.

when the temp of stream carrying biodegradable organic matter rises, fish death may occur.

Control of thermal pollution :-

Heat must be removed from the condensed falling water prior to their disposal in to water bodies.

The measure principles involved in the process of heat losses are

i) Conduction
ii) Convection
iii) Radiation
iv) Evaporation

Neuclear Hazards :-

Hazards means dangerous to human being or show by external source.

This external source is from environment.

Sources of nuclear hazards :-

The 2 main sources of radio active neuclear pollu are natural & man made.

Natural :-

The natural sources of radio activity are consist mainly of the cosmic radiation recivied from the space. & the naturally occurring radio isotop

present in the

Another source of natural radiation is the presence of radio nuclides in the lithosphere, hydrosphere & atmosphere.

All the elements above atomic no 82 (lead) are radio active in nature & emit a variable quantity of radiations.

The most abundant naturally occuring radio nuclidites on the earth at Uranium, thorium, Potasium - 40.

Man made source:-

Man causes radio active pollution by testing of nuclear wepones, establishment of nuclear power plant mining & refining of protonium, thorium & preparation of radio active isotope.

Nuclear weapons:-

Testing of nuclear arms comprises.

→ The used of uranium 235 & plutonium 239 for fission.

→ Hydrogen & lithium are fission material.

Huge clouds of fine radio active particles & gases are throwns off in the environment & are carried away a distance are by wind.

Atomic reactors & Nuclear fuels:-

At almost all stages of the nuclear fuel cycle liquid, gaseous & solid radio active waste are released having a tremendous potential to contaminate the environment.

Radio active Isotopes:-

Radio active isotopes & their compounds find wide uses in scintific research institution containing varying amounts of radio active material.

when this waste water reaches different water sources such as rivers, streams, lakes etc. a cause serious water pollution.

Radio active Iodine & phosphorus also enter the food chain to water & may finally reach man through fish eating.

Other sources:-

During ~~the~~ different medical treatment, varying consentration & variation enter the human body for instant.

Exray & theraphy for cancer patient often includes radium & other isotope radiation.

Effects / Hazards associated with Radio active pollution

No physical, chemical & biological process can influence the process of radio active emission.

Most of the radiations have a high penitrating power. Thick seeds of hill, cement concreate walls etc can't contained them.

They can easily penitrate to deep seated organ & cause injury.

A no of radio active isotopes have a very long half life i.e almost more than thousand of years. This make this radio active waste almost a permanent hazard for the biosphere.

Nucleick acid (DNA & RNA) effectively absorve these radiations. which causes carsinogenic, mutagenic effects.

Like any other element, radio active isotopes are also absorved, accumulated by bio magnifies thousand of times.

Thus the entire food chain becomes contaminated organisim. at higher tropics table may therefore recive a highly concentreated socra of radio active material through their food supply.

There is no other way to dispose of these hazardus waste except to store them for thousands or millions of year away from living organism.

Even the safest burial places for radio active waste which represent the based of humans efforts have shown signs of radio active effect.

Control:-

Control of natural radio active pollution may not be possible.

Out of all the sources, only artificial radio activity is the scope of intervention, where ever controls can be thought off.

Radio active pollution can be controlled by strict enforcement of laws & safty measures.

The low or high lable waste have premendes capacity to pollute the environment.

As low lable waste are often produce in large quantity, their containment is not possible.

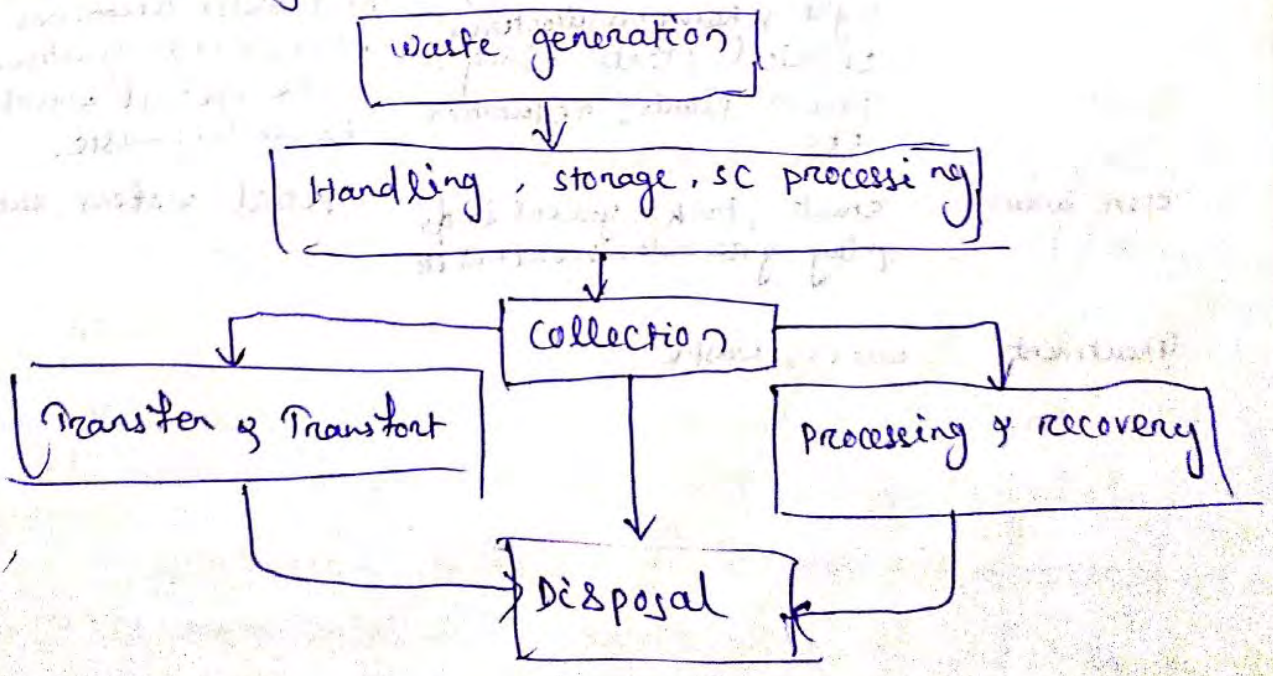
They are subjected to a treatment for removal of radio activity. & then discharged in to water bodies or land in usual ways.

High lable waste on the other hand can't be disposed freely in the environment but have to be concerned contaiment & stored out of the rich of human environment

Imp Solid waste mangement :-

Any material i.e thrown away or discharged as useless & unwanted by human or animal activities is considered as solid waste.

The mangement of waste is the fundamental concern of the activities encompassed in solid waste management.



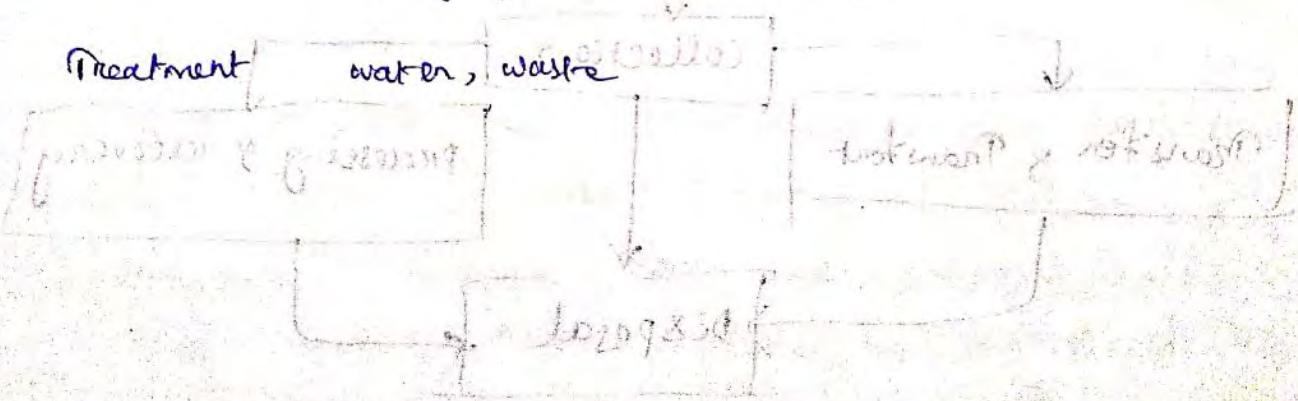
Sources of solid waste:-

Sources of solid waste can be classified into following categories.

i) Racidencial
ii) Commercial
iii) Municipal
iv) Industrial
v) Open areas
vi) Treatment plants
vii) Agriculture
viii) Hazardous waste construction ~~sites~~.

Residential	single family & multi family houses low medium & high ris aparents etc.	Food wastes, rubbish, ashes, special wastes.
Commercial	Restaurant, markets, stores, hotels, institutes, office, jworkshops etc.	Food wastes, rubbices, ashes demolitions & construct wastes, special wastes.
Industrial	construction, fabrication, light & heavy manufactoring, chemical plants, mining, power plants, deducation etc.	Food useles, rubbibes, ashe demolitions & construction waste special wastles, hazardous waste
open areas	sheets, Parks, vacant lands, play grounds, beaches etc.	special wates, rubbish

Treatment water, waste



Effects of solid waste:-

The accumulation of waste at any place is a bad & nasty situation.

Verities of micro organisim like bacteria, fungi, vairouses, worms, etc creep in to the accumulated waste & start it's decomposition. Later on they grow & increase in no.

various types of germs dereloped in the waste. They rich us through air, water & food.

Most of the infectious deases like cholera, dirrhoea, dihidration etc spread in this ways.

Air pollution, water pollution & soil pollution are caused due to the accumulation of different types of the waste.

waste material when accumulated here & there disturbs the drainage system.

Decomposing waste rich under grouned contaminate under ground water & soil.

Improper disposal of solid waste produce fouls smell & breede various types of insects.

Control measures of urban & industrial waste:

waste management in the collection, transport processing disposal of waste material so as to reduce there effect on local environment & community.

Method of solid waste disposal:-

Physical removabal:-

It is generaly done by manual activity like collection of waste & sorting out in to reusable, decomposiable & non decomposible then disposal become easy.

Dumping:-

Transfer of solid way from a place of collec to the site of disposal is called dumping. corporation & muncipal bodies collect on dum them on some suitable & [illegible] site located far away from human habitatio

Compaction & bailing:-

The solid waste are often spread on a plane & hard surface & latter pressed by bulldozer which is called compaction. These compacted layer are rolled & piled, This called bailing.

Now such compacted & baled solid way are easy to handle.

3-R (Reduce, Reuse, Recycle) of solid waste:-

Reduce:-

We should reduce the household waste by using mass parts of the goods.

When we purchases the thing avoid polythin & heavy packages.

Hazardous waste can be controlled by reduction at source.

Gaseous waste are generally reduce & remove to combustion, absorvetion, adsorvetion technic.

Reuse:-

After selecting the waste (which can be reuse after proper treatement).

some of the waste materials can be reuse after washing.

Furniture, cloths & other repairable article should be reuse after repair instead of throughing.

Recycling:-

Drainage system are associated with sweage treatment device that controlliz ed toxic effect of sweage before releasing it to the local water system.

with the help of following processes recycling of waste occurs.

i) sweage treatment (setting, neutralization, pulverisation, composting)

ii) Sanitary land filling (scientifically treated)

iii) Thermal process (burning under controlled conditions)

N.B:-

Burning in the presece of air incinration
& absence of air pyrolises.

Dt - 31.10.19

Role of an individual in prevention of pollution:

An individual can do the following safety measure to prevent the pollution.

i) Once should start first in the field on environmen ourness the protect from pollution.

ii) Once should go place to place to teach the lesson of ourness & prepare volunters.

iii) Give the message to save environment through papers, adds, magazines, TV & radio.

iv) To promote for plantention & conservation of forest to organise seminar on the subject-related to pollution.

v) Ourness is very effective in childhood so onces to go to the school, organise rallies to teach the lesso, on environment.

vi) World forest day, world environmental day & other source function should be organise from general ourness.

Population growth should be reduce.
One should use & promote mass (public) transport system.
One should discourge the use of chemical fertilizer insectiside & pestisides but should encourage the use of biofertilizers.

Desarster management:-

Flood:-

Floods are one of the very few well recorded natural feronenan, the catastropic damages caused by them attracted focused attaintion in recent decades.

With increasing population pressure & acilirated economic developement, the adverse effect of floods are being increasingly felts now.

Floods caused greeate distreated wherever they damage crops, properties & endanger lives

Adverse effect of floods:-

Apart from the causuality, injuries & disablement, many section of the populati get affected by the floods.

Croped area get summersed, eroded & strewn with stone leading to loss of crop production & conrequentional disruption.

Many houses are destroy completely & oth area damaged.

damage & loss to public & private utility as well as industrial disruption occurs

Breakdown of economic activity occurs with corresponding loss of wells.

Preparedness :-

Desirestered preparedness would be defined as the detailed planning for the prompt & efficient response immediately as soon as the antisipted event materialisest.

This effort to be very comprehensive inclusive of public education & awareness campen, provision for the issue of timely warning, development of orderly evacuations plans & preparation for providing the evacuees with food, clothing & selter on emergency bases.

The moment the desirsten strikes will also mark the start of the emergency response period.

The immediate onsite responses are of contrary action of local residence but their effectiveness should be improved by their advance training.

Earthquake :-

Earthquake are considered to be one of the most dangerious & destructive natural hazards The commencement of these phenomenon is usually sudden with little or no warning. It is not yet possible to predict earthquak

& to make prepartion damage & colaps of building & other manmade structure.

Actually earthquake consist of a sudden sering (vibration) of ground caused by distrubances in the earth crossed.

An earthquake generate a set of horizental & vertical vibration of the ground which are randonce in character.

Impact & effect :-

Tippical impact & effects of earthquake desinters are :-

i) loss of life
ii) Injury
iii) Damage to & destruction of property
iv) Disroption of production
v) Distroption of life style
vi) loss of livelyhood.
vii) Disrouption if essertial services.
viii) Damage to national infrastructure & distroption to administressive & organisaral system.
ix) Nationdl econonic loss
x) Sociological & shycological after effect, et

Cyclones :-

Cyclones are one of the most destructive natural hazards in the tropics & are responsible for deaths & destruction of more than any other natural calamities.

Cyclones bring with them extreamly violent winds heavy rain causing floods & strong tides causing costal destruction

Effects :-

Seviour tropical cyclones are responsible for large casualities & considerable damage to property & agriculteural crops.

The destruction is confined in the costal district & the max^m destruction begin with in 100 km from the center of the cyclone.

Principal dangers from the cyclones are extreamly strong wind potential rain & high storm tides.

Heavy rainfall & floods cum in order of devastation.

They are often responsible for much loss of life & damage to property.

The collapse of building, falling of trees, flying debries, air craft accidents & desease from contaminated food stream

water in the post cyclone periode also contribute to loss of life & destruction of property.

Preparedness:-

preparedness means major with govt organisation, community & individual to respond rapidly & effectively to desinster situations.

The preparedness majors include the formation of vaiable desizster mitigation plans.

It would consist of a plan of action to be implement-ed on the received of the cyclone alert message from cyclone warning center.

A cyclone alert is issued generally 48hours before the possibility of the area being affected.

The identification of strong buildings which would withstand the fury of the storm is an important segment of the action plan.

The safe storge of non-perisable food, other essential needs, adequate collection of drinking water or medicine have to be made.

Land slides:-

Often it is not realised that a large part of India consist of mountainous terrain.

land slides affect the remotely located often isolated, small community in villages on regions of the country where external assistance takes time to rich.

Many times the information about the occurance such events and the damaged on ten days to reach to discrit & state headquaters.

Because of these region landslide assume the status of measure natural desicters even though affected area & population ~~of though~~ may be rather small.

Relief & Rehabilitation:-

Essentially the relief states comprises the following

i) Serch & reskew
ii) Medical assistance to the injure.
iii) Desposal of the dead
iv) Food & water
v) Emergency selter for the homeless
vi) Opening of access road if block a restoration of communication channels.
vii) Shycological councelling of the servivor who have lost their closed relative.
viii) Repair of houses & facilities.
ix) Technical & finacial assistant to restart economic activity to restore regular work & income.
x) Reconstruction to proper planning.

:- SYLLABUS :-

1. **THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES**

Definition, scope & importance, need for public awareness.

2. **NATURAL RESOURCES**

Renewable & non renewable resources:

(a) Natural resources & associated problems:

- Forest resources: Use & over exploitation, deforestation, case studies, Timber extraction mining, dams & their effects on forests & tribal people.
- Water resources: Use & over utilization of surface & ground water, floods drought, conflicts over water, dam's benefits & problems.
- Mineral Resources: Use & exploitation, environmental effects of extracting & using mineral resources.
- Food resources: world food problems, changes caused by agriculture & over grazing, effects of modern agriculture, fertilizers - pesticides problems, water logging, salinity.
- Energy resources: Growing energy need, renewable & non-renewable energy sources, use of alternate energy sources, case studies.
- Land Resources: Land as a resource, land degradation man induces land slides, soil erosion & desertification.

(b) Role of individual in conservation of natural resources.

(c) Equitable use of resources for sustainable life styles.

3. SYSTEMS
- concept of an eco system.
- structure & function of an eco system.
- producers, consumers, decomposers.
- Energy flow in the eco systems.
- Ecological succession.
- Food chains, food webs & ecological pyramids.
- Introduction, types, characteristic features, structure & function of the following eco system.
- Forest ecosystem
- Aquatic eco system (ponds, streams, lakes, rivers, oceans, estuaries)

4. BIODIVERSITY AND IT'S CONSERVATION
- Introduction - Definition: genetics, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social ethical, aesthetic & optin values.
- Biodiversity at global, national & local level.
- Threats to biodiversity: Habitats loss, poaching wild life, man wildlife conflicts.

5. ENVIRONMENTAL POLLUTION:

Definition causes, effects & control measures of:
(a) Air pollution
(b) water pollution
(c) soil pollution
(d) Marine pollution
(e) Noise pollution
(f) Thermal pollution
(g) Nuclear hazards.

Solid waste Management: causes, effects and control measures of Urban & industrial wastes.

Role of an individual in prevention of pollution.

Disaster management: Floods, earth quake, cyclone & landslides.

6. SOCIAL ISSUES AND THE ENVIROMENT

- Form unsustainable to sustainable developments.
- Urban problems related to energy.
- water conservation, rain water harvesting, water shed management.
- Resettlement & rehabilitation of people; its problems & concerns.
- Environmental ethics: issue & possible solution.
- climate change, global warming, acid rain, ozone layer depletion, nuclear accidents & holocaust, case studies
- ~~water~~ Air (prevention & control of pollution) Act.
- water (prevention & control pollution) Act.
- Public awareness.

7. HUMAN POPULATION AND THE ENVIROMENT:

- population growth & variation among nations.
- population explosion - family welfare progras.
- Enviroment & human health.
- Human rights
- value education
- Role of information technology in enviroment & human health.

1st CHAPTER
THE MULTIDISPLINARY NATURE OF ENVIROMENTAL STUDIES :-

Dt - 17.07.19

The Mutidisplinary Nature of Enviromental Studies :-

Defination :-

↳ The word 'enviroment' is derived from the French word "environner" means to encircle or surrounding
↳ It is a composite word for the conditions surrounding in which organisim or group of organisim live.
↳ The enviroment is very wide term which incleeles total Phylical & biotic world, where biological beings live, grow, get nourise & developed their natural characteristics.

** Enviroment is the sum of all social, economical Biological, physical or chemical factors, which consitute the surroundings of the living organisim who is both creater & moulder of this enviroment.

Scope & importants :-

↳ Enviroment consist of all living & non-living things which surround us.
↳ Therefore the basic components of the enviroment are
(i) Atmosphere or the air
(ii) Hydrosphere or the water
(iii) Lithosphere or the rocks & soil
(iv) Biosphere
↳ Enviroment influence & shaped our life. It is from the enviroment that we get food to eat water to drink, air to breath & all neccesity of day to day life are available from our enviroment.
↳ Thus environment is the life support system. Hence the scope & importants the enviroment needs to be well understood.
↳ It is now universally realised that any Nature develop mental activities have to be viewed in the light of it's ultimate enviromotal impact.
↳ The tremendous increase in industrial activities during the last few decates & the release of obnoxious (undisirable) industrial waste in the enviroment having considerable concerns in recent year from the point of view of the enviromotal Polution.

↳ Environmental pollution on one hand & deforestation, soil erosion, population explosion, global warming interaction in eco system & biosphere are threathing the very existance of life on the earth.

↳ Environment is responsible for creating condition suitable for the excitance of a healthy biosphere on the planet.

↳ The load of pollutant discharge is also diluted & chemically modified.

↳ It regulates the temp on earth where like activities are possible.

↳ Over explotation of natural resources & polution of enviroment are destroying the vital life support system on which all life depends.

↳ Air, water, soil, marine polution, decreasing agricultural land, food adulteration, extinsion of various plants & factor which are making our life more & more difficult. The future of entire humanity is at stake.

↳ Instate of these sum enviromental problems are also there like solid waste management, mining impact, impact of hydroelectric projects, effect of nuclear hazards & effects of industrial effluents.

↳ These problems should also have some solution because there effect as very dangerous.

↳ Moreover technology should be developed to reduce the pollution at every state.

↳ Environment studies is very important for getting clean drinking water, hygeric living conditions, clean & fresh air, fertile land healthy food etc.

Need for public awareness:- Dt - 18-07-19

↳ After the scientific & industrial revolution in the recent past there has been immense impact of man on his environment.

↳ Man has failed to realised that any new factor upsets the balance of the eco systems.

↳ Huge industrial installations every year, introduction of a faster mode of transport, changing the food habits, deforestation & decreasing the agricultural land, wide ~~spread~~ spread use of insectiside, pesticide, improper use of fertilisers & chemicals in environment are the main contributing factors which challenged the life of man, animals & other organisim.

↳ Air pollution, water pollution, soil pollution, marine pollution, noise pollution, global warming, effect of nuclear hazard are some measure factors for which public ourness is necessary.

↳ The active co-operation of everyone at every level of social organisation, scientist, educationist, social worker ~~politicid~~ politicians, administrater & public are needed for issues concerning environment.

↳ Movement which begin at grass root levels effects

the idology & policies of a contry for the nation as a whole more effectively than the policies introduce from top to downward.

↳ when the opinion of public will change it will effect the goverment policies will fit in to action.

↳ therefore little efforts on the part of each indivisual shall add of to introduce significant improvement of the enviroment.

↳ Only by celebrating the world enviromental day, we can't get rid of this concern.

↳ Goverment along can't do anything until & unless every citizen is aware of the enviromental pollution & there effects.

↳ this is the time to make aware & motivate each & every indivisual on enviro metal concessness.

2nd CHAPTER

-: NATURAL RESOURCES :-

dt - 20.07.19

↳ Things / material of the nature that can be put to sum use by human beings for their growth, development, comfort & other necessities are called as natural resources.

↳ For example air, water, soil, forest, animals, minerals, metals, energy & other substances are some examples of natural resources. that are utilies by human beings.

↳ The resources are not equally distributed through out the world. we can realised the value of resources only when it is scarce.

Types Of Natural Resources :-

All the natural resources can be devided into 2 catagories.

i) Exhustable natural resources
ii) Inexhustable natural resources

Exhustable Natural Resources :-

↳ These are soils, forest, water, coal, peat, petroleum, natural gas, mineral, etc.

↳ These are consumed or exhusted through continuous use or misuse.

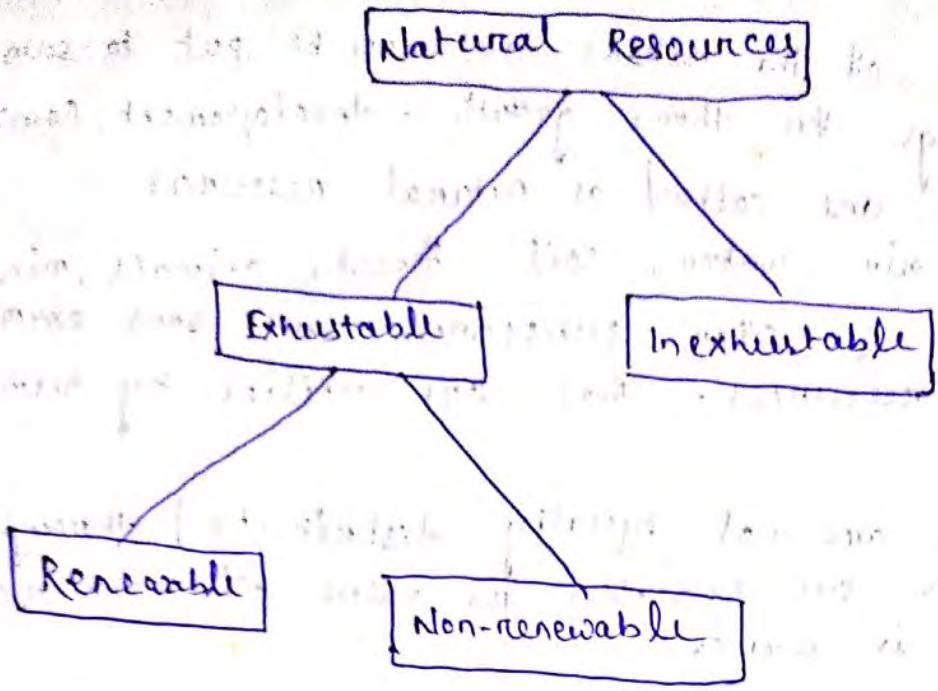
↳ Exhustable natural resources can be further devided in to 2 catagories.

i) Renewable natural resources
ii) Non-renewable natural resources

Inexhustable Natural Resources :-

↳ These are those resources which can not be exhusted through continuous use or misuse.

↳ Ex - air, sunlight etc.



Renewable Resources :-

↳ The natural resources which are consume/exhausted/depleted to continuous & can be recovered by very hard efforts taken for long periods are called renewable resources.

↳ Ex- Soil, forest, ground water, etc.

↳ In other words we can say that all renewable resources are replenished or refilled through natural cycle or manually.

↳ For example oxygen in air is replenished through photosynthesis.

↳ Most of the renewable resources are interdependent to eachother.

↳ Forest maintained the environment / climate, plants needs to check soil incision & soil is needed for plants.

↳ Air and insects are needed for pollination these resources as the life support system which can fulfill all human needs, but it's productivity/ renewability is limited or depend upon availiability of water, nutrients & environmental condition.

Non Renewable Resources :-

↳ Non renewable resources are not replenishable or we can't get back them in our lifetime if they're consumed or exhausted completely.

↳ Non renewable resources are metals, coal, petroleum, minerals, stones, salts etc.

↳ Minerals are often called the "STOCK" resources because their new material can only be extracted from the earth's crossed once.

↳ Coal, petroleum & natural gases are called as "FOSSIL FUELS" because their formed from dead remains ~~from~~ of plants & animals buried in the earth long long ago.

↳ Their called fuels because they are burnt to give energy.

↳ Minerals, rocks, salts & chemical etc are termed as "ABIOTIC RESOURCES" because biological activities are not involved in their formation.

DT - 22.07.19

Natural Resources & accociated problem :-

↳ Being most highly developed / evolved animal, man posses certain special characteristics.

↳ Man applic all their power & intelligent for food & developement

↳ They adopt new ways to fulfill their needs & often ~~thei~~ make improvement in old way derive resources & to fulfill their desired more efficiently. This is how they developed new technology for utilisation of natural resources.

↳ Human beings utilies most of the resources like air, water, land, minerals, fuels, flora, fauna energy etc. For their growth & development.

↳ Now the problem is how & up to what extend human being should utilies various resources.

↳ The use of natural resources should depend on knowledge, availability, type, quantity, value & necessity.

↳ The use of resources should be in limit not to exhust them so that ecological balance with in the nature should also remain undisturb.

Forest Resources:-

↳ India is one of the 12th mega diversity contries. commanding 7% of the world's bio diversity & supporting 16% of measure forest types.

↳ But nearly half of the contries area is degraded, affected by problem of soil degradation & erossion.

↳ 16% forest are located in ecologically sensitive zone.

↳ These forest need to this manage in way to ensure that, they are ecologically protected & maintained.

↳ Accordingly to the forest serve of 1997, the contry has 76.5 million hectar of forest.

↳ The degraded area was 26.13 million hector & their was another 5.72 million hector of scrup. thus In total 31.85 millions hector of forest where degraded or open.

↳ It was reported that the contries achivement in raising forest plantetion in terms of area has been impressive.

↳ Up to 1998 the total area of tree plantation was 28.38 million hector of which about 17 million hector where plant before 1990.

↳ The current anncial rate of plantetion is 1.2 million.

↳ The quality these plantation varries considerably.
↳ It should be noted that forest plantation are a means to needs the increasing demands for industrial raw material or for direct consumption.
↳ Non wood forest product (~~not~~ NWFTs) have a great potential to suppon the socio-economic developement of the contry.
↳ These product are essential to local communities
↳ some product have grate potential for export.
↳ some products have also provideel employment & income earning.

nv. Dnp

Over Exploatation :-

Deforestation :-

↳ The conversion of forested areas to non-forest is calleel deforestation.
↳ This removal or destruction of a significant areas of forest cover has resulted in a degradeel environment with reduce bio diversity.
↳ De forestation (whether deliveretel or unintentled) is the result of the removal of forest trees with out sufficient reforestation.
↳ There are many causes, ranging from extremely slow forest degradation to sudden & catastrophic wild fire.
↳ De forestation can be the result of the deliverate removal of forest cover for agriculture or reveral developement or it can be an unintentional consiquence of uncontroll grazing (which can prevent the natural regeneration of young trees)

Dt- 27.07.19

Causes of Deforestation :-

↳ Market driven forestripractises are often are of the leading cause of forest degradation.
↳ The pricipal human related causes of deforestation are agricultural & life stock grazing, degradation of petroleum extract etc.

↳ The causes also include demand for farm land & fuel wood. The underline causes include poverty, lack of reform.

↳ The causes of deforestation as complex & often differ in each forest & country.

→ Fire was ~~the~~ first tool that allowed humans to modify the landscape

Environmental effect :-

* Atmospheric pollution :-

→ Deforestation is often sited as one of the measure cause of the enhanced greenhouse effect.

→ Trees & other plants remove carbon (in the form of carbon dioxide) from the atmosphere during the process of photosynthesis.

→ Both the decay & burning of wood releases much of this stored carbon back to atmosphere

* Wild life :-

→ Some forest are reach in biological diversity.

→ Deforestation can cause the destruction of the habitats that support this biological diversity. Thus causing population shift & extinsion.

→ The presence or absence of trees can change the quality & quantity of water from the surface, in the soil (ground water) or in the atmosphere.

→ This, in term changes erosion rates & the availibility of water for either eco system function or human services

* Soil erosion :-

↳ Deforestation generally increases rate of soil erosion by increasing the amount of run off & reducing the protection of the soil from the trees litter.

↳ The trees themselves enhance the loss of grass from tree canopies.

↳ The bare inter canopy areas become highly erodable.

* Land slides :-

↳ Tree roots bind soil together if the soil is sufficiently shallow they act to keep the soil inplace by also binding with the underline bed rock.

↳ Tree removal on steep slopes with shallow soil thus increases the risk of land slides which can threaten people living nearby.

Dt - 29.07.19

Controlling Deforestation :-

* Farming :-

· New methods are being developed to farm more food crops on less farm land, (such as high yield hybrid crops).

* Forest management :-

Efforts to stop or slow deforestation have been attempted for many centuries because it has long been known that deforestation can cause environmental damage sufficient in some cases to cause society to collaps.

Case studies :-

* Brazil :-

↳ In brazil the rate of deforestation is driven by commodity prices.

↳ Recent development of new variety of soyabean

has lead to displacement of farmers, either into the forest for beef ranches

* Indonesia:-

There are large area of forest as indonesia that are being lost as native forest is cleared by larged multination al pulp companies & being replace by plantetions.

* United State:-

↳ Upon arrival European - Americans began clearing large areas of forest for wood & agriculture.

↳ From 1850 to about 1920 the amount of forest land in the United state actually increase.

Timber Extraction:-

↳ One world bank study in 1989 has argued that crop estates are a better employment generation option than even forest plantetions.

↳ In Malleysia timber using industries that is timber extraction is on large scale.

↳ In Indonesia timber manufacturing employment is as high as 3.7 million

↳ In India also, millions of people are engaged in timber industries not only their earning but solving the problem of unemployment to some extent.

↳ ply wood industries are also increasing day by day. so there is a gap bet demand & supply which result in import of loggs from other countries like Malleysia, Indonesia, etc

↳ Day by day the demands of logs is increasing due to population growth which leads to timber shortage.

Mining :-

↳ Mining is the extraction of valiable minerals or other geological material from the earth.

↳ Materials recover by mining include bauxite, coal, dimond, iron precisus metaal like Uranium, Molybdenum, Nickel, Lead lime stone, rock stock etc.

↳ Any material that can't be grown from agricultural processes must be mined.

↳ Mining in a wider sense can also include extraction of petroleum, natural gas & even coater

Dams & their effects on forest & tribal people :-

↳ About 40,000 large dams with a hight of more than 15 meter have already been build & several thousands are under construction.

↳ All the reservioures together have a water spread of more than 4,00000 km 2.

↳ All measure dams are constructed in mountained reason where their is plenty of rainfall.

↳ These placess clothed with reach vegetation & forest.

↳ Besides the water spearad, the space for residence of engg. and supporting staff for machinery & for roads are al aquired from the forest areas.

↳ The trees, plants & other vegetation are removed & ~~the~~ fauna are driven away.

↳ As more & more people occupies the dam side, forest are destroyed for getting fuel & timber to the developer.

↳ The tribal & local people who have been occupying their land are displaced to remote areas.

↳ Many of them are not properly rehabilitated by the goverment athorities.

↳ Tribal not only loose their habitat & social setup but also loose their occupation & libley hood.

↳ Fertile soil are lost in the reserviours.

↳ Such human rights violation create unrest among the trival and courts alone can come forward for their health.

↳ The massive resistance are visiable in the case of Nermada valley project in India.

↳ The story of chipko moment in UP & appiko moment in karnataka are examples of popular moments againest massive dam project.

Water Resources :-

→ water is a crucial natural resource & it's availability greatly influences the health of the people & development potential of the area.

→ water as a resources in a relation to it's needs is becoming deficient now a days.

→ Proper assesment of the availibility of this resources from surface & sub surface sources is crucial for it's proper planing, development & efficient management.

→ About 70% of the global surface is covered with water in the form of Oceans, seas, lakes, ponds.

→ total quantity of water available on the earth is 1386 million cubics kilometer.

→ 97.3% of the water available on earth is saline & only 2.7% is available as fresh water.

→ Most of which lies frozen in polarision or in deep aquifer not available for use.

→ The min annual rainfall taking the contrey as a whole is 1170 mm.

→ This gives a annual precipitation of about 4000km cube.

→ A significant part of precipitation returns backs to the atmosphere in the process of evaporation.

→ A large part of the remaining precipitation seeps in to the ground & the balance flows through streams, rivers & in water bodies adding to the surface flow.

→ A part of the water which seeps in to the ground remains as soil moisture in the upper layer & the rest ends to the ground water resources.

01-05-08-19

Over utilization of surface & ground water :-

↳ The exploation of ground water resources more than it's annual replenishment as caused the continuous declaining of water tables, rapid deterioration of ground water quality.

↳ Due to this high cost of energy is required to lift the water from great depths which become uneconomical for poor farmers to continue agriculture.

↳ Though India is placed with a good water resources but it's distribution over the country is not uniform or improper.

↳ Even in the high rainfall area like Meghalaya & Kerala, water scarcity is failed in summer month due to over exploitation of water & mismanagement.

↳ There is large amount of rainfall annually flowing out as run-off to sea.

↳ There is an uneven distribution of water resources coupled with over utilization of ground water resources as resulted in an imbalance.

↳ There is exist gap bet' available utilisable water resources & future need of water for the country

↳ Due to over utilization of water, Punjab, Haryana, Tamilnadu, Gujarat & some other state where the water tables have declined steeply.

↳ In Gujurat more than 90% well's water table droped by 0.5m to 9.5 m

↳ In Hariyana the avg. depth of ground water is fallen 1 - 33 cm annually in different parts of the state

Floods and Droughts :-

Floods :-

↳ Floods are the most common natural disastons. The properties of floods are

i) overflow of in land or tidal water.
ii) Surface waters unusal rapid water
iii) A mud flow

↳ These might occur during continuous rainfall lasting for several days or by the colaps of land along the shore of a lake of river

↳ Floods may wash away houses & properties.

↳ Flash floods are caused by sudden & intense accumulation of water moving with grate feeds & force.

↳ Hence the damage is also grate.

Drought :-

↳ Drought occur due to claimate change.

↳ It takes place due to the deficiency of precipitation over a long time which result in water shortage.

↳ Agriculture, Industry & domestic field gate affected by field, which result in migration of people which other places

↳ The impact of drought are famine, mall nutrition, food insecurity, epidemics & migration to other places.

↳ shortage & failure at rain may include people to clean whatever vegitation is left in order to sustain their lively wood.
↳ Drought is also known as creeping hazard because it develops over months & prolongs to n years.

Dt-06.08.19

Conflicts over water :-

↳ water being the basic requirement for life & necessary of all most all socio - economic activities is facing greater demand.
↳ It's releative demand increases with degree of scarcity.
↳ A large part of the country already faccess water scarcity condition. & it is expected that by the middle of the next century most resions of the country wood face some degree of scarcity.
↳ These condition have already created a number of interstate water dispute.
↳ If such condition continues, it is expected that the next world war will be on water.
↳ Bitterness over these dispute is increasing with passage of time.
↳ water demand in mega cities are growing much faster which putting heavy strain on the water resources.
↳ It is creating difficult problem for the surrounding reeral areas leading to serious conflicts.
↳ Since the urban water supply are met from surface flows (river), there will be conflict with upstream user.

↳ over the quantum of withdrawal, while the down stream users will be affected by the less quantity of water as well as the polluted waste water released by urban areas.

↳ such conflicts already exist bet" Delhi & Haryana, bet" Chennai & the farmers in drought prone district of Andhrapradesh, bet" Chattisgarh & Odisha.

↳ In feature such conflicts are likely to increase in number & escalate in magnitude unless & untill & effective mechanism is evolved to resolve those conflicts judiciously & expeditiously.

Dams benefits & Problems :-

Benifits :-

↳ water is essential for sustenance of all forms of life on earth.

↳ It is not evenly distributed all over the world & even it's avdilability at the same location is not uniform over the year.

↳ Management of river waters has been, therefore one of the most prime issues under consideration.

↳ Optimal management of river water resources demands that specific plans should be evolved for various river basines which are found to be technically physible & economically vaiable after carring out extensive serves.

~~After~~

↳ Man has be constructing dams & reservoirs for storing surplus river water available during raing seasn & for utilisation of the same during lean period.

↳ The dams and reservioirs could wide playing important role for harnessing the river water.

Dams & reservioirs contribute significantly in fullfilling the following the basic human needs

i) water for drinking & Industrial use
ii) Irrigation
iii) Flood control
iv) Hydro power generation
v) Drought control
vi) Recreation

Problems :-

↳ For such dam projects thousand of acres of land is aquired, result the public become landless.
↳ As far as relief & rehabilitation are concerned people are not given properly.
↳ Due to these dams most affected people are tribal, poor, lagelber class people etc. they ~~they~~ can't oppose of their own.
↳ The condition of the rehabilitation are such that the affected family are to be offered choices that should infact make the quality of there life better than the condition they encountered in there original inhabitation.
↳ Elaborate mechanisims have also been established to moniter & ensure these rehabilitations.

MINERAL RESOURCES:-

↳ Mineral beings the vital raw material for many basic industries, play a important role in the industrialaisation & overall development of the nation.

↳ Minerals are generally called the "stock" as they are the non-renewable resources.

↳ Minerals are the chemically bonded substances, created through chemical process betn organic & inorganic mattens present in the earth's crust.

↳ They may be solid or liquid.

↳ Since the P of a nation depend upon the proper use of minerals, hence they should be conserved & should n't be misused.

↳ Goverment should promote the riserch in this field of mining minerals.

Use & exploitation:-

↳ Mineral available in earth crust can be derided in to 3 types:

i) Metallic minerals
ii) Non-metallic minerals
iii) Mineral fuels

Metalic Minerals:-

↳ we cann't extract metal directly from minerals so there is difference betn minerals & ores.

↳ For extracting metal minerals are treated by different proces before extraction.

↳ Metallic minerals are generally found in combined state.

↳ According to availibility of metals, metallic minerals are fonther divided in to following type:

i) Ferrous Alloy:-

↳ Most common metal (which is used largly) is iron.

↳ Other than iron alluminium, lead, zinc, copper etc also present.

↳ All are found in reach quantity, found in netive as well as in combined state

↳ Iron pyrite, Lynonite, Haematite, magnetite, etc are examples of ferrous Alloy.

ii) Non - Ferrous Alloy:-

↳ The minerals / alloys of this type content the metal like titanium, antimony, Arsenic, lithium, Beryllium, etc.

↳ These metals are costlier the Ferrous alloy.

↳ Here iron is found as impurities.

iii)

The minerals or alloys containing very list quantity of metal whose extraction is costlier.

These metals are generally used in jewellary Ex - Gold, Plastinum, silver etc.

ii) Non-Metallic Minerals :-

↳ Minerals, whose yield product are other than metals comes in this heaf as non metals.

Ex- Graphaite, pyrolusite, Dolomite, Quartz, lime stone, Mica, Borax, phosphate, calcite, etc are the examples of non metallic minerals.

iii) Mineral fuels :-

↳ These include the material used to provide energy, example - coal, natural gas, fon fuel, & petroleum etc.

↳ coal is most commonly available fuel used as domestic as well as industrial fuel.

↳ It is of different types example - anthracite, bitumineus, lignite, pit.

↳ The type & quality of the coal, depend upon the percentage of carbon present in them.

↳ It is the principal source of energy in the world.

↳ Petroleum is used in the manufacture of large number of petrochemicals

↳ It is drilled out from the source as crude oil.

↳ crude oil is refined in petrol, disel, kerosine etc, which is used as mineral fuels.

Dt- 10.09.19

Enviromental effects of extracting & using Mineral resources :-

↳ Mining, Minerals & mineral based industries play an extreamely important role in the development of man kind.

↳ The total geographycal area of India is 329 milion hectors. Constitute 2.4% of the world land area.

↳ Out of this about 82500 hectors is sustaining mining.

activities of some kind on the other.

↳ As the mining activities grow, the per capita availibility of land is declained at a very high rate.

↳ The environment is more damaging by open cast mining than underground mining.

↳ Not only environment, mining also effect human health.

↳ Over exploation causes the wastage of mineral wealth & quality of land surface.

↳ Mineral deposite should'nt be over exploited because they are Non-renewable.

↳ Derelict land is that land which has been abandoned as useless.

↳ Dereliction is the result of thoughtless, uncontrolled exploitation of natural resources.

↳ There are following environental effect for mining.

(i) Land degradation due to lowering of the surface table at some places & creation of large mounds at other places.

(ii) Deforestation in the mining areas i.e the loss of valiable soil cover resulting in enhancement of soil errosion.

iii) The loss of top & sub soil.

iv) Adverse effect on ground water table i.e the local water table is lower as a result of open cast mining.

v) Due to increased discharge of rain water passing through the terrains, disturbed by the surface mining, the local drainage system is polluted, which on joining the main drainage system affects it also.

vi) The frequency of land slides increases substancially

vii) The errosion of soil is enhanced.

(viii) The agricultural land are affected by silt (clay or mud) & the fine material generated by mining. It also clogs the surface water channels.

(ix) The disturbance caused adversely affects the well balanced PH & diminishes or decreases the regenerative quality of soil

(x) The heavy earth-moving machinary & blasting caused problem of noise, vaibration, & the release of noxious (deadly or injurious or poisionous) gases in the atmosphere.

(xi) Mine drainage has polluted stream, river, lakes even seas.

(xii) Mining & minerals based industries with their effluents (water mixed with waste material) create pollution problems.

(xiii) Asbestous, cement & other chemical industries are very hazardous. so people are not supposed to leave in surrounding areas.

(xiv) The people related with mining & extraction effected by polluted environment (dust & poisionous gases) lead to skin & long diseases.

(xv) Deforestation & claimate change results poor rainfall & affects flora & fauna.

(xvi) Mining causes the reduction of forest i.e deforestation. wild life also affected, land becomes barren & these results in increased incidents of land slides.

FOOD RESOURCESS :-

world food problems :-

↳ Before the 21st century it was felt that world food production is not sufficient for the present population.

↳ Food production was less because people were using the old techniques.

↳ Later on when population pressure starts, new ways of food production using fertilizer, pestisides, insectisides etc are discovered to increase the yield.

↳ In 1999 International food policy research institute (IFPRI) reported the increase in world food consumption by 2020, dissusing the impact of this on both developed & developing countries.

↳ The report considers the 6 emerging issues such as Nectritions, grain priceses, WTO (world trade organis Agro Ecological approches to small scale farming, biotechnology, Information technology & precission farming.

↳ In world food ~~some~~ submit it 1996 in rom the following points were discussed :

(i) Reduce world hunger
(ii) Agricultural supply and demands
(iii) population growth.

Charges caused by agriculture & overgrazing :-

↳ Agriculture in USA & India was food raising activities & over half of the current crops comes from plants such as ~~some~~ corn, cotton, potatoes, Tabaco etc.

↳ The agricultural methods is most part of the world were primitive.

↳ Fields were dug by oxen pulling wooden plows, seeds were broadcast by hands & grains were harvested with scythes (sickle).

↳ From the Indians the 1st American settlers learned how to clear land till the field & grow the corn that was crucial to their initial survival.

↳ The mid 1800's began an era of grate change which brought advances in cultivation method, breeding of improved crop varities & use of fertilizer with crop rotations to maintain soil productivity.

↳ Ever since colonial days, agricultural leaders have been interested in increasing the productivity.

↳ As land become less available, people become more intrested in maintaing soil fertility & increasing crop yields.

↳ In 1914 govt. responded to this needs by providing funds for state agricultural extention programs to assist farmer in adopting improved farming methods.

↳ In 1930's National attention was focused on the need for soil & water conservation measures to maintain farm productivity.

Over grazing:-

↳ Grazing management is the foundation of grass land based live-stock production since it affects both animal & plant health & productivity.

↳ Over grazing can occur under continuous or rotational grazing.

↳ It can be caused by having too many animals on the farm or by not properly controlling they are grazing activities.

→ over grazing reduces plant ~~leave~~ leaf areas which reduces intersection of sunlight & plant growth.
→ Plants becomes weakend & have reduced root length.
→ The reduced ~~de~~ root length makes the plants more susceptible to ~~depth~~ death during dry weather.
→ Over grazing can increase soil erosion. Reduce soil depth, soil organic matter & soil fertility hence the land future productivity.
→ However the loss of soil depth & organic matter takes years to correct.
→ These loss is critical in determining the soil water holding capacity.

Dt - 17.08.19

Effect of Morden Agriculture :-

→ Bet 1950 & 1975 agricultural productivity in American history change most rapidly.
→ Total farm output increase more than, half.
→ This change was due to technological inovation, development of hybrid strains & other genetic improvement in the use of pestisides & photilizers.
→ Not only in America, all over world productivity & means of farming were changed.
→ Thus the agriculture has become more intensive producing higher yields ~~for~~ per acer.
→ Although the intensification of agriculture has vastly increase productivity, it also has some demerits such as rapid erossion of top soils to contamination of drinking water by the chemical used ~~to~~ to enhance farm land productivity.

Dt - 19.08.19

→ An avg. of 10 times as much soil erodes from America agricultural fields as is replaced by natural soil formation processes.

→ Because it takes of to ~~100~~ three hundred years for 1inch agricultural top soil to from form.

→ soil i.e lost is essentially irreplaceable.

Fertilizers - Pesticides problems

Fertilizers :-

→ Nutrients are lost from agricultural fields through run off, drainage or attachement to ~~in~~ eroded soil particle.

→ The amount losts depend on the soil type, organic matter content, the claimate, slope of the land, depth to ground water as well as on the amount & type of fertilizer & irrigation used.

→ The 3 measure nutreant in fertilizers are Nitrogen, phosphorus & potassium.

→ OF these Nitrogen is most readyly lost because of its high soliability in the nitreate form.

→ Leaching of Nitreate from agricultural fields can elevate consentrasion in underline ground water to levels ~~o~~ unacceptable for drinking water quality.

→ Phosphorus does not leach as readily as Nitreate because it is more tightly bound to soil particle.

→ Potossium does not cause water quality problems because it is not hazardous in drinking water & it is tightly held by

the soil particle so can't be removed easily by leaching.

Pesticides :-

↳ The trends towards intensi crop production in modern farming has led to increased potential for damage by pastes & diseases.

↳ Use of pesticides has raisen 10 times over the past 40 years as agriculture has become more intensive.

↳ One drawback to is that pesticides generally killed not only the paste of concern but also a wide range of other organisim including beneficial insects & other paste predator

↳ Once the effect of pesticides wears off, the pest species is lightly to recover more rapidly

↳ Another drawback to the increasing pesticides use in the development of resistance in pest species.

↳ The individual paste that servive the pesticide application continue to bride, gradually producing a population with greater tolerance to the pesticides.

WATER LOGGING :-

↳ Another problem associated with excessive irrigation on poorly drained soil is water logging.

↳ This occurs in poorly drained soil where water can't penitrate deeply.

↳ There may be an impermiable clay layer below the soil.

↳ The irrigation water eventually recess the water table in the ground - the upper table of the ground water from the birth.

↳ The raised water table results in the soil becoming water locked.

↳ When soils are water locked air spaces in the soil are field with water. & plant roots due to lack of oxigen suffocates.

↳ water logging also damages soil structures.

Dt - 20.08.19

Salinity :-

↳ In many areas of India, crop production is limited because of salinity or Alcalinity or both. It is estimated that about 7 milion hectors in the country have either gone water cultivation or produces low yeld of crops.

↳ Three class of salain & Alkali soils are recognaise.

Salin Soils :-

↳ The soil containeis toxic concentration of soliable salt in the root zone are called salaine soils.

↳ Electrical conductivity in the saturation extract of such soils taken as a measure of salts is greater than 4 milli ʊ per centimeter.

Non - Salin Alkali or Sodic Soil :-

↳ These soil don't containt any large amount of neutral salts, so the electrical conducting is less than 4 milli ʊ per centimeter.

Salin - Alkali soils :-

↳ This group of soil is both salaine & alkali.

↳ They have appreciable amount of soluable salt in it.

Adverse effects of salinity :-

↳ Causing low yields of crops or crop failure in extreme cases.

↳ The limiting of the choice of crops because some crops are sensitive to salinity or alkalinity or to both.

Creating difficulties in the construction of building & roads & their maintainance.

ENERGY RESOURCES

↳ Energy is needed by all living organisms & vegitation for biochemical reactions of their cells.

↳ It is a power which is needed in one form or other for workdone.

↳ Long before most of the power available to human socity was limited to solar energy trapped by green plants which produced organic matter.

↳ Biological oxidation of organic matter provided food to musel power.

↳ For the developmental activity, energy sources have their own importance.

Growing Energy needs :-

↳ Energy is the prime i/p of a country.
↳ It is converted in to heat & electricity.
↳ For every activity perform required energy in form of heat, light, electricity & food for our body (food energy is measured in calories.
↳ In has 1st growing developing economi, with the GDP growth rate exceeding 6% in recent year.
↳ This growth has been accompany it's by a steady increase in energy consumption.
↳ Primary commercial energy demand greed at annual rate of 6%.
↳ It will go more rapidly than in the past as countries reforms process accelerate.

Renewable & Non-renewable Resources :-

↳ There are 2 types of energy sources to need the requirement.

i) Renewable or Non-convesional or in exhustable energy sources.
ii) Non-renewable or conversional or exhustable energy sources.

Renewable Energy sources :-

↳ This sources are continuously replaced by natural process.
↳ Ex - Solar energy, wind energy, bio energy, hydropower etc.
↳ These energy system converts such energy in to a form which we can use.
↳ Renewable energy sources are essentially flows of energy.

→ At present total non-conversional potential of 1,26000 mega watt accessed different non-conventional energy sources.

→ At present most important non-conventional energy source is wind energy for which a capacity of 1800 megawatt has been set up in the country.

→ There is also a large potential on tapping of ocean energy, Geothermal energy & Tidal power.

→ But the technoeconomic viability for power generation from these sources has still to be established.

NON-Renewable Energy sources:-

→ These are traditional sources available to us.

→ Ex are :- coal, petroleum, Natural gas, etc.

→ All the sources are limited & takes milions of years for formation.

→ As a result of unlimited use, they will exhust one day. Therefore we should conserve this for longer period.

→ In addition to commercial fuel, coal, oil-natural gas, India consumes large quatities of traditional fuels.

→ The traditional energy sector is not well documented. Fire wood dung cake & agricultural waste continues as the primary source of energy for cooking in over 90% of rural household.

Use of alternate energy sources:-

Bio energy:-

- Bio mass a renewable energy resources divided from the cabonicious waste of various humang natural activities.
- It is derive from numerous sources including the byproducts from the wood industries, agricultural crops, raw material from the forest, household waste etc.
- Biomass doesn't add carbon dioxide to the atmosphere as it observe the same amount of carbon in growing as it releases when consumed as a fuel.
- It's advantage is that can be used to generate electricity with the same equipment i.e now being used for burning sugarcane well.
- Bioenergy in the form of bio gas which is derive from biomass is expected to become one of the key energy resources for global sustainable developme
- Biomass occurs higher energy efficiency in the form of biogas than by direct burning.

Hydrogen Energy:-

- Hydrogen is a clean fuel & energy storage medium for various application.
- Hydrogen can be produced by biological conversion of various organic effluents like distillery, starch etc. & as by product in chemical process.
- Hydrogen contained in metal hydroxite can be used in vehicles.

Tidal & Ocean energy:-

Tidal energy:-

↳ Tidal electricity generation involves the construction of a barrage across an estuary (ముఖద్వారం) to block the incoming & outgoing tide.

↳ The head of the water is then used to drive turbines to generate electricity from elevated water as in hydro electric dam.

↳ A tidal range of at least 7m. is required for economical operation for the turbines.

Ocean energy:-

↳ Ocean covers more than 70% of earth surface making them world's largest solar collector.

↳ Ocean energy drought on the energy of ocean wave tides or on the thermal energy stored in the ocean.

↳ The ocean contained 2 types of energy i.e thermal energy from sun's heat & mechanical energy from the light's wave.

↳ Ocean thermal energy is used for many applications including electricity generation.

Dt - 24.08.19

Geo-Thermal Energy:-

↳ The earth's population lives between 2 grate sources of energy, the hot rocks beneath the surface of the earth & the sun in the sky.

↳ Geo thermal energy is based on the core of the earth which is very hot.

↳ Geo thermal energy which is derive from high temp. geo thermal fluids, can be utilies for power generation, thermal applications like space heating & cooking.

↳ Geothermal energy has been commercially exploited in as many as 20 country, with about 90,000 megawatt installed capacity.

Chemical sources of energy:-

→ Fuel cells electrochemically produce direct current through a reaction bet' hydrogen & oxygen.

→ Such cells are electrochemical devices that convert the chemical energy of a fuel directly & very efficiently in to electricity.

LAND RESOURCES:-

→ our lif depend on the land for food, fiber, fuel & other basic amenities.

→ Therefore it is the valiable gift of nature to humanbeings.

→ Top layer of the land is called soil, which is renewable resource & essential for serviral of life.

→ Though it is life support system but it is over used so rises the enviornmental problems.

Land as a Resources:-

→ There are 4 class of land which are suitable for cultivation & other purposes.

→ ~~They are~~ Their details & limitation as follows:-

Class-1 (Green colour):-

→ Soils in class-1 have very few or no limitations that restrict their use.

→ This type of land is nearly lable & the erosion hazard is low.

→ The soils are deep, well drained, easily worked & fairly well supplied with plant nutrients or are highly responsive to the application of fertilizers

→ Soils in this class are suit to a wide range of plants, may be used for cultivated crops.

Class-2 soil (Yellow colour) :-

→ Soils in class-2 have some limitation which reduces the choice of plants or require simple conversion praticess.

→ The limitations of soil in class-2 may result from the effects of 1 or more of the following factors, A gentle slope, a slight susceptibility to erresion, less than ideal soil depth, occesional damaging overflow, weightness which can be corrected by draiage, slight to moderate salinity which is easily corrected but lightly to reoccur, a slight clamatic limition on soil use & management.

→ These soil may be use for growing cultivated crops, raising pastures, forest & for wideliife food & cover.

Class-3 soil (Red colour) :-

→ Soils in class-3 have moderate limitation which reduce the choice of plant & require special conservation praticess.

→ Limitations of soil class-3 may result from the effects of 1 or more of the following factor.

→ Moderately sloping land, moderately susceptible to water or wind erresion, frequent overflow accompanied with some crop damage, weightness or continueing water logging after draiage, low moisture holding capacity, moderate salinity & moderate clamatic limitation,

↳ The soils can use for raising limited cultivated crops, pasture, forest.

Class -4 soil (Blue colour) :-

↳ soils in class 4 have seriour limitation that restrict the choice of plants, and require very careful management.

↳ The restriction use of these soil are greater than those in class -3 & choice of plants is very limited.

↳ The use of these soil for cultivated crops is limited as a result of the effect of 1 or more permanent features! such as :- steep slopes, serious susceptibility to water & wind erosion, frequent overflow accompanied with serious crop damage, excessive weightness with a continueing hazard of water logging, seriour salinity & adverse claimate conditions.

↳ The soils can be used for rarely selective crops, pasture & forest.

Dt - 26.08.19

Soil Erosion :-

↳ Soil erosion means the removal of material from the surface of the soil by an external agency like running water, high speed wind etc.

↳ Since the superficial layer of the soil are the richest in plant food & thus the process of soil erosion involves a definite loss of valuable plant nutrients.

↳ When soil erosion is intense, the natural soil profile is destroyed, may never attened full development.

Types of soil erosion!-

Normal OR Geologic erosion!-

↳ Geologic erosion takes place steadily but so slowly that ages are required for it to make any mark alteration in the measure features of the earth surface.

↳ There is always an equilibrium bet' the removal & formation of soil, so that unless the equilibrium is disturbed by some outside agency, the nature & characteristics of the soil are restored.

Accelerated soil erosion!-

↳ The removal of surface soil from areas denuded of their natural protective cover as a result of human & animal interfarance takes place at a much faster rate than that at which it is build up by the soil forming process.

↳ This accelerated dettachment rapidly ravages the land & this type of soil erosion are ~~scarcely~~ ~~force~~ seriously concern.

WIND ERROSION!-

↳ wind erosion takes place normally in aride (dry or waterless) & semi aride areas where the velocity is high.

↳ The soil particle in the land surface are lifted & ~~grow~~ blown up as dust streams.

↳ The fertile soil is blown away by winds & the subsoil is exposed as a result.

the productive capacity of the soil is considerable reduced.

WATER ERROSION:-

↳ Soil errosion caused by water can be distiguished in three form:-

SHEET ERROSION:- It removes a thing covering of soil from large areas often from entire fields more or less uniformly during every rain which produces is run off.

RILL ERROSION:- when sheet errosion to allowed to continued unchecked, minute finger shaped grooves or forms over the entire field such thin channeling as rill errosion.

GULLY ERROSION:- when a rill errosion is neglected, timi groups grooves developed in to wider & diper chanels which may assume a huge size this is called gully errocion & the most spectacular avidence of the destruction of soil.

LAND SLIDE & SLIP ERROSION

↳ The fundamental cause of 'lands slides are topography of the region and geological structure the kinds of rocks and their physical characteristics

↳ land slide is defined as a outward & downward moment of the slope forming material, composed up natural rocks, soil artificial fills etc.

STREAM BANK EROSION:-

↳ Torrents are defined as hill streams characterised by wide spreading beds on an emergence from the hill; with flashy flow & swift current.

↳ During the rainy season when with every heavy downfall in the catchment they get swollen with floods.

DT - 27.08.19

Land Degradation:-

↳ Due to use & over exploitation, land resources are degraded. It is due to the more & more pressure with increasing population.

↳ Land degradation is a real alerm because soil formation is a very slow process.

↳ In millions of years we have a layer crossed of fertile soil i.e formation of 1cm soil crossed from parent material take 300 to 400 years.

↳ Fertile soil have high percentage of organic matter & micro organisim.

↳ Some 1.9 million hector of agricultural land have been degraded & million hectors are converted to Non-agricultural use such as home, highway, shopping center, factries, reservaiour etc.

↳ In India about 175 million land is affected by degradation problem.

Land Slides:- (Man Induced)

↳ A land slides is a sudden collapse of a large mass of hill side.

↳ There are many different types of land slides where not only earth but rock, mud & debris flow down the side of a slope.

↳ Man can also cause slides by mining the earth, underground excavation, pumping & draining ground water lable.

↳ Man induced land slides are generally done for the developement process i.e industrial forming roads & highways, agricultural use homes, etc.

↳ No heavy damage occurs in man induced land slides.

↳ They use heavy explosives for that so in this case no serious castalities or damage occurs because proper warning was issude earlier to shift for safer placess.

Desertification :-

↳ It is a process by which productive potential of arid or semi-arid land falls.

↳ The decrease in productivity is varries from 10% to 50%.

↳ Thes desertification leads to the conversion of irrigated crop land to desert (where productivity is min^m)

↳ It is characterised by devegitation, loss of vegital cover, diplicion of ground water, salization & soil erosion.

↳ Deforestation is also one of the cause of desertification because after forest grass land are huged by human. So human activity also responsible for desertification.

Role of an individual in conservation of natural Resources.

↳ Planning of a suitable strategy for the conservation of our natural resources & most judicious execution of planed strategy is called as conservation management.

↳ Environmental planing, evaluation, monitering & impact accessment are methods of conservation management.

↳ we have to learn to leave with the nature for this every individual has to play his role to conserve the nature & natural resources.

i) People should at once stop the over utilization of natural resources instate they must be proper use.

ii) we should take help from the government for plantation programms. Every body should take part in plantation & care the plant.

iii) we should protect wild life.

iv) Mixed croping, crop rotation & proper use of fertilizer insecticides, pesticides should be tought to farmer. Encourage the use of manures, bio fertilizer & organic fertilizer.

v) we should make habit for waste disposal; compose & to restore biodiversity.

vi) Try to educate local people for the protection & judicious use of natural resources.

vii) we should use electrical appliances only when it is needed.

viii) Maintain a balance bet^n resources and human needs.

Dt: 29.08.19

ix) Maintain the essential ecological processes & the life support system.

x) Install rain water harvesting system in houses & colonies.

xi) Recycling of the waste & the waste water for agriculture purposes.

xii) The fossile fuel should be used only when no other alternative source is available.

xiii) We must developed energy saving method to avoid wastage of energy.

xiv) Prevent soil errosion.

xv) Utilise renewable energy sources as much as possible.

Equitable use of resources for sustainable lifestyle.

→ The equal distribution of natural resources should be for all erasepective of rich or poor.

→ There must be an equilibirium balance bet^n the need & consumption of drinking water, food, fuel, etc.

→ The developed countries are utilizing more resources as compared to developing countries

→ This inbalance is responsible for sharp increase in population in developing country.

→ Developed country like USA, Canada, Japan, Australia etc have 22% of world's populatio

utilizing 86% of natural resources.

→ There it is needed to divert the resources to poorer countries to narrow down the gap between the two.

→ To achive sustainable life style there must be equal distribution of global resources to meet everyone's need.

3RD CHAPTER

-: SYSTEMS :-

Dt - 07.09.19

↳ The scientific study of the interaction of organisim with there physical environment & with each other is called "ecology".

↳ It mainly concern with the directive influences of abiotic & biotic environmental factors over the growth, distribution, beheviour & servival of organisims.

↳ The word ecology comes from to greek words "oikos" meaning household or place to leave or habitation & "logos" means study. Thus ecology deals with the study of organisim & there habitat i.e environmental biology.

Concept of ecosystem :-

↳ Eco-system is defined as a commenity of organisims interacting with one another & the environment which they live.

↳ A home can be a drop of water for an amoeba or for a lion may be many miles of land over which it's serches for it's foods.

↳ A pond, forest, lake, river, an ocean, a dam, a garden, a cropland, a city, aquirium may be an examples of eco system.

↳ Fonther an ecosystem may be natural, manmade or artificial like an aquairium.

↳ An ecosystem concept is that the living organisim of a commenity not only interact among themselves but also have functional redationship with there non-living environment. This structural & functional system of communities & there environment is called as ecosystem.

Stuctural function of an ecosystem :-

→ Fuctioning :-

↳ Functioning of the eco system is self regulating & self sustening.

↳ This dependupon flow of energy, cycling of material etc.

→ Depending upon the species, diversity & the manner in which they are organised, ecosystem are all following types:-

i) Permanent & natural ecosystem:-

↳ These operate under natural conditions without any interference (even by human beings)

↳ These can be farther classified in to terrestrial ecosystem.

(a) Terrestrial Ecosystem:-

↳ This ecosystem operate on land hence forest, desert, grass land & agro ecosystem included in this type.

(b) Aquatic Ecosystem:-

↳ This ecosystem operates in water.

↳ It can be farther devide in to 2 types

* Fresh water ecosytem
* Marine ecosystem

↳ Fresh water ecosystem are usually name after the size & nature of the fresh water body such as pond, lake & river.

↳ Marine ecosystem is longest ecosystem on the earth. which consist of several sub division each having it's physical, chemical & biological characteristics.

(ii) Temporary & natural ecosystem:-

↳ These are short lived but operate under natural condition

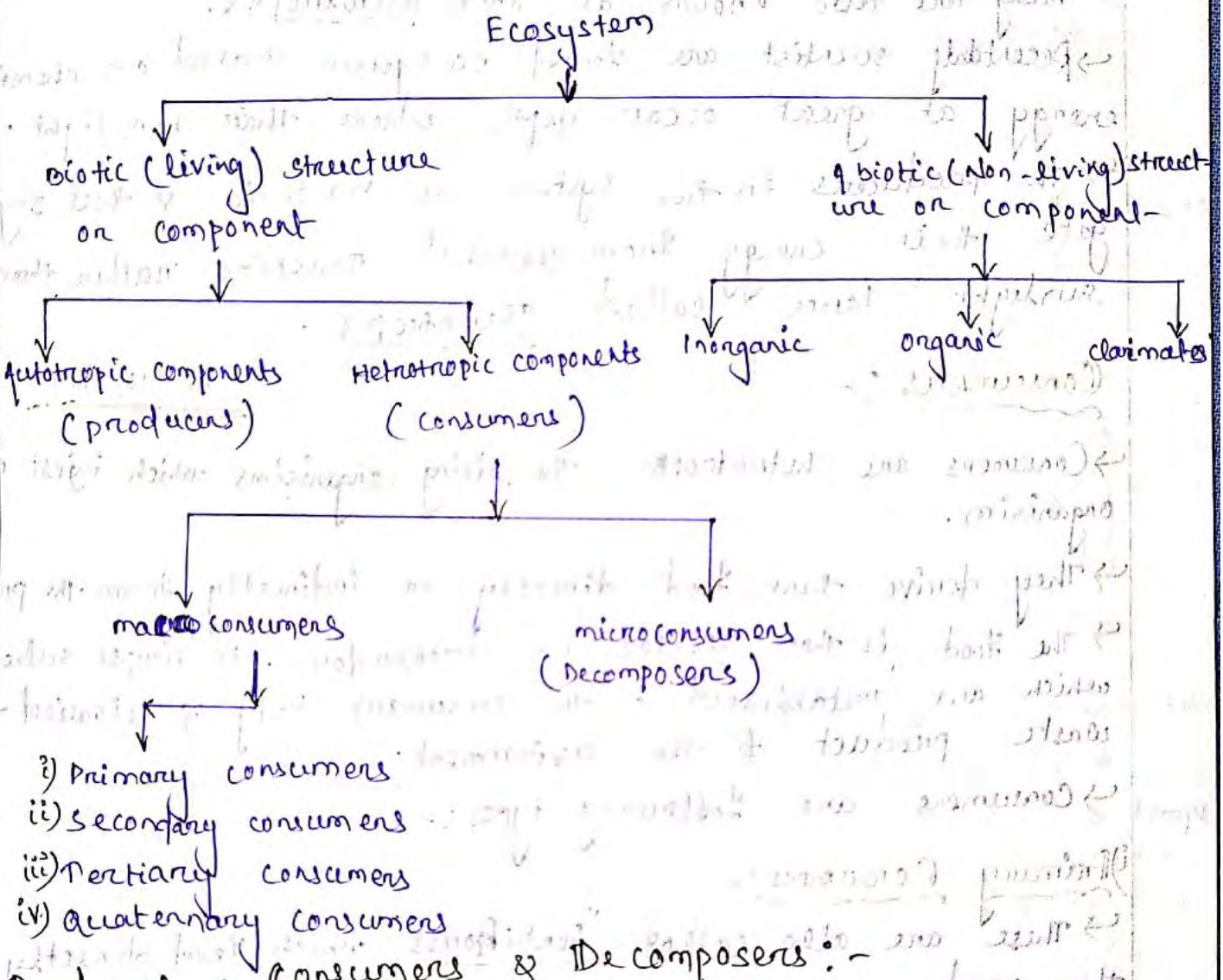
(iii) Artificial Ecosystem:-

↳ These are man made like fishery, tanks, dams, fish aquirium etc.

Structure of an ecosystem :-

Structure :-

↳ The structure of ecosystem provides information about the range of climatic conditions that prevail in the area, composition & organisation of biological communities & abiotic compounds.



Producers, Consumers & Decomposers :-

Producers :-

↳ All green plant are producers. They are also called converts or transformers.

They are living members of the eco-system that utilies sunlight as their energy sources & inorganic material from soil, air & water to transform them by the process of photosynthesis in to more complex energy reach chemicals as their own food.

↳ Producers are largly photosynthetic plant & their kind varies with the kind of eco system.
↳ In thins forest thees trees are the most important producers.
↳ In lakes & ponds the producers are rooted on large floating & microscopic plants (phytoplankton) usually the algae
↳ They are also known as photo autotrophs.
↳ Recently scientist are found eco system based on chemical energy at great ocean depth where their is no light.
↳ The producers in this system are bacteria & these organisms gate their energy from chemical reaction rather than sunlight hence called chemotrops.

Consumers :- Dt - 10/9/19

↳ Consumers are heterotrophs, the living organisims which inject other organisim.
↳ They derive their food directly on indirectly from the producers
↳ The food is then directed i.e broken down to simple substances which are metabolised in the consumers body & released as waste product to the environment.
↳ Consumers are following types :-

i) Primary Consumer :-
↳ These are also called "herbivores" which feed directly on the producers
↳ They varry with the kind of eco-system.
↳ A deer & giraffe is a primary consumer in forest-eco-system. while cow or a goat is in a grassland or crop eco-system.

ii) Secondary Consumers :-

↳ They are also called carnivores or meat eaters.

iii) Tertiary Consumers :-

↳ The most of ecosystem some organisim that it other carnivores are called tertiary consumers.

iv) Omniverse Consumers :-

↑ person or animal eating plants & animals is called Omniverse.

v) Top Carnivores :-

↳ Some eco system have animal like lion or vulture which are not killed or rarely killed by other animals are called top carnivores.

vi) Detritivores :-

↳ These are the bottom living which subsist on the organic detrites from autotrophic layers.

↳ Ex - Beetles, Termights, ants, Crabs, etc.

Decomposers :-

↳ They are also the living components mainly bacteria & fungie which breakdown complex compounds of dead protoplasm of producers & consumers to simple organic compound & ultimately into inorganic nutrients.

↳ In all the eco-system these biotic structure prevails.

↳ Molds & Mushrooms of the forest are the largest of the decomposers that are visibles.

↳ The role of decomposers in eco system is very important as they are responsible of the completion of ecosystem mineral cycle.

→ They are also called as micro consumers or saprobs or saprophits or saprotrops (sapros means rotten)
→ Ex - Bacteria & fungides.

Dt - 21.09.19

Energy flow in the eco-system :-

→ Energy is needed for every biological activity.
→ Solar energy is transformed in to chemical energy by a process of photosynthesis
→ This energy is stored in plant tissue & their t/f in to chemical energy by a process of photosy mechanical & heat during metabolic activities.
→ In the biological world the energy flows from sun to plants & then to all heterotropic organism like animals man & other nightro organisim i.e from producers to consumers.
→ 1% of the total sunlight falling on the green plants is utilised in photosynthesis. which is sufficient to maintain all life on this earth.
→ there is no 100% flow of energy from producers to consumers.
→ some energy is always loss to environment.

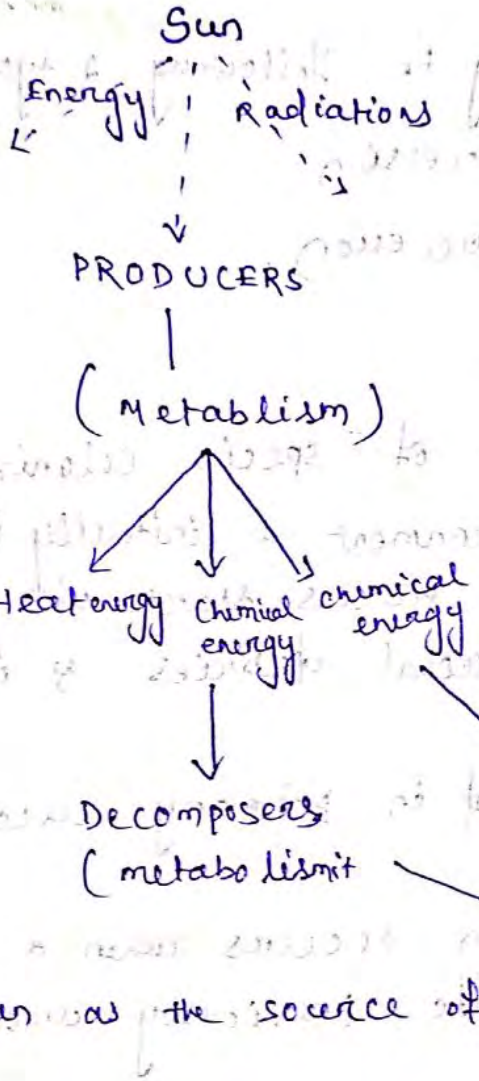
1st law of thermodynamics :-

Law states that energy be can neither be created nor be destroyed but it can be transformed from one form to another.

2nd law of thermodynamics :-

→ This law states that energy transformation involved degradation or dispation of energy from a concentrate to a dispersed from.

↳ we have seen dicipation of energy occcers at every trophic level.
↳ there is loss of 90% energy & only 10% is transfered from one trophic level to the other.



Ecological Succession :-

↳ Biotic communities are not static, they change with time.
↳ this change can be understood on several levels.
↳ changes take place continously in the community structure, organisation, the associated animals & the environment at a place in the course of time, this fenomenon is called "ecological succession".

↳ The rate of successional change is rapid initially & gradually it slows until a point of dynamic equilibiricum is reached & the community is more or less stable.

↳ A complete succesion is called a "SERE".

↳ The succession may be following 2 types :-

i) Primary succession

ii) secondary succession.

i) Primary succesion :-

↳ It is the process of specis colonization & replacement in which the environment is initially (vertically) free of life i.e the process starts with base rock or river delta or glacial debries & it ends when climax is reached.

↳ The SERE envolved in primary succession is called "PRE-SERE".

↳ Primary succession occurs when a community begins to developed on a site previously unoccupaid by living organisim.

ii) Secondary Succesion :-

↳ The term secondary succesion refers to community development on location or sites previously occupied by well developed communities.

↳ It occurs where a community has been disrepted & the surface is completely or largly devoid of vegitation.

↳ It may be due to earthquake, fire or even clearing of forest by man.

↳ In each case organisim modify the environment in a way that allow once species to replace another.

↳ The SERE involves in secondary succession is called "SUB SERE".

Hydro SERE (HYDRACH) :- The succession which starts in the aqueatic environment.

MESO SERE (MESARCH) :- The succession when begin in an area which is an intermediate type with adiqeate moisture is called MESARCH.

XERO SERE (XERACH) :- The succession when starts in dry habitat having min^m amount of moisture such as rocks, dry deserts etc are called XERACH.

LITHO SERE :- The succession initiating on rocks.

PSAMMOSERE :- Succession initiating on sand.

HALO SERE :- succession initiating on saline water or soil.

Autotropic Succesion :-

It is characterised by early & conitinued dominace on autotropic organisim like green plant.

Hetretopic succesion :-

It is characterised by early dominace of hetrotrop such as animal, bacteria, fungi etc.

Autogenic Succession :-

In some cases the replacement of one type of community by another is due to modification of the environment by community themselves is called Autogenic succession.

ALLOGENIC SUCCESSION:-

In some cases if replacement is largly due to forcess other than the effects of communities on the environment it called ALLOGENIC SUCCESION.

Food change:-

Dt-30.09.19

FOREST ECO-SYSTEM:-

→ Ground 40% of land is occupied by forest. But in India it is 1/10.

→ In India protical rain forest are found in western ghathe, Andamans, North-east Himalaya.

→ So these have maxm bia diversity.

→ The different components forest eco system are

Abiotic Components:-

→ These are the inorganic & organic substances present in the soil & atmosphere.

→ In addition to the mineral present in the forest we find the dead organic debries.

Biotic components:-

The living organisim present in the food chain occcur in the following order.

Producer:-

→ These are mainly trees that so much ~~pesis~~ spesis divercity & greater degree of starticatio. specially in tropical moist deciduous forest.

→ In northern conniferous forest nedalle leafe evergreen tree, specially the spruces, firs pines are found with poor development of shrubs & herb layes.

→ Deciduous forest is greatly modified by man & much of it is replaced by cultivated & forest edge communities.

→ Thus trees are of diffierent kinds depending upon the kind of forest.

→ Besides trees shrubs & ground vegetation are also presen-.

Consumers :-

Primary Consumers :-

↳ These are the herbivores that include the animals feeding on tree leaves as ants, flies, beetles, leafhoppers, bugs etc.

↳ Many of the larger herbivorous vertiprates like moose, snow shoe are found on gro broad leaf developmental community.

↳ Similarly some animal like elephant, dear, Nilagai, mole, flying foxess, fruit bats etc are grazing

Secondary Consumers :-

These are the carniverous like snake, birds lizards, fox etc feeding on herbivoars.

Terti

These are the top carniverous like lion, tiger etc. that it carnivores of secondary consumer level.

Decomposers :-

These are wide verity of micro organisim like bacteria (bacillus), clostridium, csdumons, fungi, specis like aspergillus, caprinus, pulipurose, fusaricum, trichoderma.

Rate of decomposistaion in tropical & subtropic forest is more rapide than that in the temperate one.

Aquatic eco-system:-

↳ More than 70% of land is covered by water. The important aquatic ecosystems are:

Marine (ocean) ecosystem:-

↳ The marine environment of seas & ocean is large occuping 70% of the earth surface.
↳ Eeach ocean indeed represents a very large & stable eco-system.
↳ Oceans play & important role in regulating meaning geochemical & hydrological cycle, there by regulating the earth's claimate

Producers:-

↳ These are autotrophs which are mainly the phytoplankton they traps radiant energy from sun through there figments.
↳ A number of macroscopics sea weeds (brown, & red) are also come in this catagories
↳ There in the disting zone are different depth on the water.

Consumers:-

These are hetrotropics macro consumers being dependent for there nutritions on the primary producers.

The herbivores like crustacions, molluscs fishes etc which feed directly on producers are called primary consumers.

The carrivores fishes like shad, herring etc feeding on herbivrons are called

secondary consumers.

The top carnivores fishes like cod, haddock halibut etc that feed on secondary consumers are called tersiary consumers.

Decomposers :-

The microves active in the decay of dead organic matter are mainly bacteria some fungaile.

Pond ecosystem :- Dt-15.10.19

→ Ponds are small bodies of water in which the litoral (costal) zone is relatively large & the limnetic & profundal reasons are small or absent

→ Ponds may refound it's most reasons of adiquait rainfall.

→ They are continuesally ring form as a body of standing water where organic material aqumulate

Abiotic components :-

→ Apart from heat, light, the basic inorganic & organic compound elements are water, CO_2, oxygen, calcium, nitrogen, phosphorus, Amino acid etc.

Biotic components :-

Producers :-

These are autotrophic, green plants & bacteria.

They fix radiant energy & with the help of minerals from the water & mud form complex organic substance like carbohydrates,

protine & lipids.

i) Macrophytes :-

→ these are mainly rooted large plants which includes smartly or completely summersed, floating hydrophytes.

→ Ex are :- Nymphel, shgittaria, hydrola, Utricular, Azolla, sylvinya.

Phytoplankton :-

These are like Ulothrics, spidogyra, Kladofloara, oedogonium etc.

Consumers :-

Most of the consumers are herbivors, ecept insects & some large fish.

Primary consumers :-

These are herbivores also know as primary macro consumers kidding directly on living plants.

secondary consumers :-

These are carnivours like insects & fish which feed on primary consumers (herbivours) like zoo plankteroop.

Terticiary Consumers :-

These are some large fish which feed on smaller fishess.

Decomposers :-

These are micro consumers which absorbs only a fraction of the decompose matter.

They decompose organic matter both producers as well as consumers in simple forms.

Thees they play an important role in returns of mineral elements again to pond.

Marine or Ocean eco system :-

The marine environment of sea & ~~ocean is~~ large

Estuaries :-

↳ Estuaries derive from the word "aestus" means tide.

It is a semi enclosed costal body of water which thees a free connection with the open sea.

It is thees strongly affected by tidal action & with in it sea wate is mixed with fresh water

Not all rivers open in to estuaries some simply discharge their run of in to the ocean.

Estuaries differ in size safe & volume of water flow.

Estuaries could be considered as transition zones bet' the fresh water & marine habitats

physico chemical acpects on estuaries:-

Current & salainity both are important here.

Estuarine currents result from the interaction of an one direction stream flow which varries with season & rain fall with oscilation ocean tide & with wind.

The salainity varrey bets. 0.5 to 0.35 %.

The water table in the estuarie flacuate regularly as like that of river & the temp. also fluctuate.

The seasonal & tidal cycle cause changes in nutrient consentration in the estuary.

Biotic community of estuary:-

The reason of estuaries as classified into upper, middle, lowere reaches increasing range of salainity & the mouth with salainity nearly equal to the sea.

The animals inveting the estuarine reason has been classified in to 2 types:-

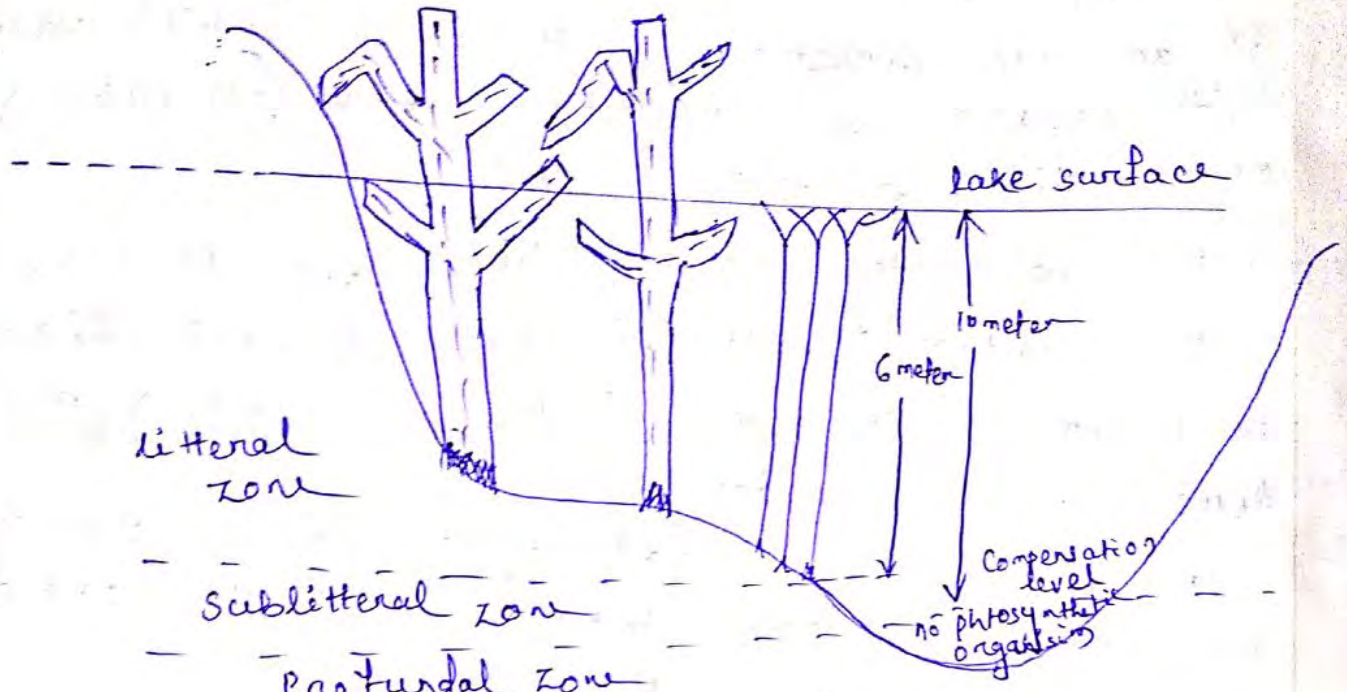
(i) Oligohaline (0.5% to 5%.)

(ii) Mesohaline (5% to 18%.)

It has also reported an abandance of phyto-planktonic several species of dytous synedra, naricula etc & blue green algilike microcystis, oscillatoria etc

In short the estuarine ecosystem is a complex & interesting one.

Lake ecosystem:-



(Different zone of a deep fresh water lake)

→ Lakes are inland depression containing standing water.

→ They varry is size & depth.

→ In lake there are 3 to 5 well recognised horizontal zones.

Littoral zone:- Shallow water near the shore forms this zone which contains upper warm & oxyla oxygen reach circulating water layer.

Sublittoral zone:- It extends from rooted vegitation to the non circulating cold water with poor oxygen content.

Limnetic zone:- It is the open water zone away from the shore.

profundal zone:- It is the deep water area benith limnetic zone. It is beyond the depth of effective light penitration

Abyssal zone:- It is found only in deep lakes since it begins at about 2000 meter from the surface

physico chemical properties of lake:-

↳ Lakes have the tendency to become thermally statified during summer & winter to undergo definite seasonal periodicity in depth.

↳ Light too penitrips only to a certain depth depnding on terbidity.

Biotic Community of lake:-

Organism depending on different leayers are found.

Neuston:- These including floating plant such as dock weeds & many types of animals. Animals are called epineustone while other incleeding insects called hyponeustone.

planktones:- These are small plants & animals whose power of locomotion is very limited. shorter zoo plank tons are very active called as nekto planktones

Nekton:- These animals are swimmers.

Bethos:- These includes the organism living at the bottom of the water mass.

Streams:-

↳ Biotic community in streams is quite different from that of pond.

→ More streams in the visinity of urban area are polluted.

→ Streams are fresh water aquatic system where water current is a measurd controlling factor.

Stream Communities:-

→ Stream generally exhibits 2 measure habitats i.e
(i) Rapid & (ii) pools

→ Some with in the catagories the type of the bottom whether sand, pebbels, clay, bed rock is very important in determining the nature of communities & population density.

→ Current is the measure factor for rapid but had bottom may offer favaourable surfaces for organisims.

→ Benthic invertibrates have higher density in rapid but ~~clas~~ claws, burrowing. Odanata & ephemeroptera are more abandant in pools.

→ Planktons are at the mercy of the current - organisim in rappids & in lesser extend in pools.

BIODIVERSITY AND ITS CONSERVATION dt- 17/10/19

↳ Biological diversity means the variability among living organisim from all sources.

↳ The verity & variability among living organisim & the ecological complexess in which they occurs is called biodiversity. i.e biodiversity is a property of living system.

↳ Biological diversity of total verity of life on our planet.

↳ Total number races, verity or species i.e the some total of various types of microes, plants, animals present in a system is record as biological diversity or biodiversity.

Genetic, specis & ecosystem diversity:-

↳ Biodiversity is usually analized at 3 levels i.e species, genetic & eco system.

Diversity of biotic community & eco systems:-

↳ Depending largly upon the availibility of abiotic resources & condition of the environment an ecosystem develops it's own characteristics community of living organisim.

↳ A small pond constitutes, a eco system & possesses a set of flora & fauna different from a river which is another type of ecosystem.

↳ Different types of forest, grassland, lakes, ponds, rivers, etc represent diverse ecosystem is with a characteristics biotic community.

Diversity of species composition with in a community:-

→ The biotic components in an eco system may be composed of a few species only or a large number species of plant, animals & microves which react & interact each other & with the abiotic factors of the environment.

→ The richness of species in an ecosystem is usually records are species diversity.

Diversity of genetic organisation with in a species:-

→ With in a species there are often found a no of verity or races or strains which slightly ~~river~~ defter from each other in 1, 2 or a no of character such as shape, shine, quality of their product, resistance to insects, paste & dieses, abilety to with stand adverse condition of environment.

→ These differencess as due to slight variation in their genetic organisation.

→ This diversity of in genetic make up of a species is referred to as genetic diversity.

Biogeographicall classification of India:-

→ India is one of the 12th mega biodiversity countries in the world.

→ The country is divided in to 10 biogeographic Reasons.

→ The wide verity in physical features & climatic condition have resulted in a diversity of ecological habitats like forest, grass lands

wait lands, costals, marine ecosystem & deserts.

→ Biogeographically India is situated at the trijunction of 3 realms namely aphro-tropical Indo-malaican & palio-arcpic realms & therefore has characteristics elements each of them.

→ This assembles of 3 distings realms makes the county rich & unique in biological diversity.

→ with only 2.4% of the land area, India accounts for 7-8% of the recorded species of the world.

→ Following 13 biogeographical reasons have been identified in India.

i) Himalaya
ii) The Desert
iii) Deccan periscula
iv) Malabari
v) Andaman Islands
vi) Nicobar Islands
vii) Gangetic planes.
viii) Laccadive Islands
ix) Maldivel chagoas Islands
x) Western Ghats
xi) Burmal Bangalian Forest
xii) Marine coast
xiii) Coromodal Mahanandigan

Dt - 18/10/19

Values of Biodiversity :-

↳ Biodiversity is a valuable natural resource for the survival of ~~pt~~ mankind.

↳ Man has domesticated a no of economically important plants & animal species.

↳ Many plants & animals including wild life are of very important for human being.

↳ They can be used directly or indirectly to have consumptive, Productive, social, Ethical, Aesthetic & option values

Consuntive value :-

↳ Most of the developing contries obtained fuel wood from forest.

↳ Still more than 1500 million people cook their food by burning wood.

↳ About 1000 million cubic meters woood is used for fuel across the groove.

↳ Various tribal socities fully depend on forest for their habitation & lively food.

Productive value :-

↳ Bamboos, grasses, canes, essential oils, taning materials, dyes, gums, resions, drugs, spices, soap substitude, rudrakhya, Lak, honey wax, tosser, mahua seeds, mahua flowers & other seeds are forest products have their high commercial values.

↳ In addition to these various herbs & animal body parts are sold in commercial market both at national & International levels.

↳ Some benifits like water quality, recreation, education, Scientific reserch, regulation of climate etc are indirect values to biodiversity that provide economic advantages to the people without consumption of the resource.

Social values:-

↳ Social value is one of the instrumental values.
↳ The biodiversity has disting social value attached with different societies.
↳ Goods & services provided by ecosystems to our society include:
(i) Provision of food, fuel & fibre
(ii) Provision of shelter & building materials
(iii) Purification of air & water.
(iv) De-toxification & De-composition of waste.
(v) Generation & renewable of soil fertility including
(vi) Nutrients cycles.
(vii) Stablization & moderation of earth climate.
(viii) Live stock braiding, medicines & other products.
(ix) Maintance of genetic resources as key input to our society

Ethical values:-

↳ Ethical or religious value are also one of the indirect values of biodiversity.
↳ The Ethical & religious value of biodiversity is rooted in the understanding that humanity is a part of the nature & we are just one species among others.
↳ All species have an inherent right to exist.
↳ Future generation also have an inherent write to know them & to have the choice of using them or not.
↳ Religious is also have a ~~right~~ significant impact on our attitude to our nature resources.

Aestetic value:-

↳ The Aestetic value of biodiversity has been expressed in many ways through Art, poetry, songs, litreture, music & dance.
↳ Forests are closely link with our religious & culture.
↳ Human roll has great eviousnary attachment with forest has our ancestors lived in forest.
↳ Many type of trees are worshiped by hindus in all over India & tribal socities also i.e pipple, tulsi, banyan etc.

→ Some animals like cow, is worshiped by hindus.

Option values:-

→ Biological resources exist in this biosphere are very important for human beings.

→ The option value biodiversity suggest that any species may proof to be a miracles species.

→ Option value is indirect to human society at some point in near future.

Biodiversity at Global national & local level:-

Biodiversity at Global level:-

→ It is estimated that their exist 5 to 30 millions species of leaving forms on our earth & of their only 1.5 millions have been identified which includes 3 lakhs species of green plants & fungi, 8 lakh species of insects, 4000 species of vertibrates & 3,60,000 species of micro organisms.

→ The data related to different species in different parts of the world are different.

* For example:- Approximately 2 lakh species of plants are in south America.

→ Precipitation & temp as among the most important determinants of diversity.

Estimated no. of species world wide:-

Taxonomic Group	No. of species
Bacteria	3600
Blue green algi	1700
Fungai	46983
Bryophytes	17000
Gymnosperms	750
Anagiosperms	2,50,000
Insects	7,50,000
Sponges	5000
Cuscecies	9000

Mallases → 38000
Fishes → 50,000
Amfibians → 19,056
Reptiles → 6,300
Birds → 9036
Mamals → 4008

Biodiversity at National levels:-

→ India is located in south Asia bet^n latitudes 6° & 38° N & langitude 69° & 97° E.

→ The Indian subcontinent extending over a total geographical area of about 3029 million hectors is bounded by Himalay's in the north, the Bay of Bengal in the East, the Arabian sea in the west & Indian Ocean in the South.

→ The wide verity in phisical feature & climatic situation have resulted in a diversity of ecological habitats.

→ This richness in biodiversity is due to immense variety of climate & altitudinal condition coupled with varries ecological habitats.

Number of recorded

FLORA

Taxon	no. of species
Bacterial	850
Algal	2500
Fungi	23000
Lichers	16000
Bryophyta	2700
Pteridophyta	1022
Gymnosperms	64
Angiosperms	17000
Total	48736

FAUNA:-

Protozoans	2577
Porifera	519
Cnidaria	237
Ctenophora	10
Platyhelminthes	1627
Nematoda	2350
Rotifera	310
Kinorhyncha	10
Gastrotricha	88
Acanthocephala	110
Sipuncula	38
Mollusca	5042
Echiura	33
Annelida	1093
Onychophora	1
Arthropoda	57525
Phoronida	3
Bryozoa	170
Entoprocta	10
Brachiopoda	3
Chaetognatha	30
Echinodermata	765
Hemichordata	12
Fishes	2546
Amphibians	204
Reptiles	428
Birds	1228
Mamalas	372
Total	526,188

Based on available data

Biodiversity at local level:-

↳ The biodiversity at local level can be well understand by demarketting plants, places, zones, rich in biodiversity.

↳ This can be understand as compositional i.e. rich in plants & animals of same habitats & genetic make up.

↳ The local biodiversity is studied on following lines.

(i) Richness of species at a given place.

(ii) Physical characteristics of habitat & vegitation in particular area.

(iii) Change in species composition across different habitats

(iv) Local diversity based on climate, Geographical, ecological & other processes responsible for creation

(v) Rate of change across radient & conditions.

↳ It is said that environmental variables are responsible for diversity but temprature play an important role if affective biodiversity of an area. Thus local areas are well affted in a hetrogenous & homogeneous habitats.

2 Hotspots of Biodiversity:-

The most thrated of on all biologically rich areas are called hotspot.

Threads of Biodiversity:-

↳ One of the major threat to biodiversity is space, food & raw material for expanding human & plant establishment.

↳ The following major causes & issues related to threads to biodiversity.

i) Habitat loss

ii) Poaching of wildlife

iii) Man wild life conflicts.

(i) Habitat loss :-

→ Habitat loss due to human activity & other disturbances well known factor.

→ Varrying human disturbance are changing ecosystem & are thus threating the bio-diversity.

→ Due to habitate degradation & loss wild population becomes more volnerable to predactures & deases.

→ This is especially true for wild life which suffer due to habitat loss & fragmentation.

→ Habitat loss is instailment so that the habitate is divided in to small & scattered fetchs i.e habitat fragmentation.

(ii) Poaching of wild life :-

→ Poaching is another threat to wild life.

→ As an anxic period Hunters, collectors & smugglers are the major threats to the no. of species including in dangered species.

→ They collected furies, Hides, Horns, tusks & some living speciments, herbal products are smuggled.

5th chapter

ENVIRONMENTAL POLUTION Dt - 19.10.19

Air pollution:-

Air pollution may be defined as the presence in the outer atmosphere of one or more contaminants or combination there of in such quantities & of such duration, may tened to be injurious to human, plant or animal life or property or which non regionably interfear with the comfortable enjoyment of life.

Causes of Air pollution:-

The air pollutants may be classified in different ways.

Imp (1) According to Origin:-

i) Primary pollutants which are directly emitted in to the atmosphere are found as CO, NO_2, SO_2 & hydrocarbone all these are primary pollutants.

ii) Secondary pollutants which are derive from the primary pollutants due to chemical or auto chemical reaction in the atmosphere.

Ex - Ozone, peroxy-acyl nitreate (PAN), Photochemical smug etc.

(2) According to chemical composion:-

(i) Organic pollutants. Ex - hydrocarbone, haldihides, ketones, Amines & alcohalls.

(ii) Inorganic pollutants. Ex - carbone compounds such as:- Co & carbonates, Nitrogen compounds such as:- NOx, NO_3, suphar compound:- H_2S, SO_2, SO_3 & H_2SO_4.

Hallogen compound:- HF, HCL & metallic floride.

Oxydising agent:- O_3

(iii) Inorganic particle such as fly ash, sillica, asbestus, dust from transport, mining, metalogical & other industrial activities.

According to state of matter:-

(i) Gaseous pollutant which get mixed with the air & don't normally setelout.

Ex - CO, NOs & SO_2

(ii) Particulate pollutants which comprise of finally divided solids on liquids & often exist in coloidal state as Aerosol..

Ex:- Fumes, smoke, mist, fog, smog, dust & sprays

Effect of Air Pollution:-

Damage to material:-

↳ The material may be affected by air pollutant include metal, building material, rubbers, paper, textile, leather, glass, dyes, enamails, surfacecoating

↳ The types of possible damage to these material by air polution includes corrosions, deposition, abrasion, direct & indirect chemical attak etc.

↳ The intensity of damage depends upon factor such as moisture, temperature, sunlight, air moment & the nature & concentration of the pollutant.

Damage to vegitation:-

↳ Air pollutant such as sulphar dioxide, HF, smog, oxidant like ozone, ethiline from auto mobiles, Nox, clorine & herbisides exhust toxic effect from vegitation.

↳ The damage usually manifest in the form of visual injury such as chlorotic making, banding, silvering, bronzing of the undersidle of the leaf.

↳ Retardetion of plant growth may occurs in some cases.

Damage to farm animals :-

→ Arsenic, lead, florides are the main pollutants which cause damage to life stock.

→ These air borne contaminant accumulate in vegitation & poisition the animal when they eat the contaminated vegitation.

→ cattle & sheep are particularly susceptable to florida toxicity which may cause florosis of teeth & bone.

→ Life stock near smelting & other industrial operation suffer from arsenic posionic with simtoms like saliation, thirst, liver necroxis, inflaration and depresation of central nervous system.

→ Lead poisionic occurs in horses and other animals with symtoms such as lethargic, gastri.. paralicis & breathing troubles.

Darkning of sky & reduction in visibility :-

→ Sky darkning may because by heavy smoke & fog or by dust strome.

→ The reduction in visibility may be dice to smoke & fog & industrial fumes which contaiat particulates in the size range of 0.4 to 0.9 micrometer that scatter light.

→ The intensity of these effect depends upon the particle size, the angle of the sun, aresol density, thickness of the air, wind speed, humidity.

Effect on human health & human activity :-

→ Air pollution can effect health of workers with in the industrial premisses causing sickness, absenteeism & drop in production.

→ However appart from the effect on industrial workers, air pollution also affects larger segments of general population.

→ Epidemiological & toxicological studies indicate a link betn air pollution & respiratory condition like chronic bronchetes, asthma, pulmonary diesss & lungs cancer.

→ Irritation of nose, eyes & throat & bad odours, due to air pollutant cause annoyance, allergy & other health hazards.

Control measure of Air pollutant :-

The following are the general methods of air pollution control :-

(i) Controlling the air pollution at source
(ii) Site selection / zoning
(iii) controlling air pollution by device on equipments or process modification
(iv) Air pollution control by growing vegitation
(v) Air pollution control by fuel selection & utilization

(i) Controlling of air pollution at source :-

→ Modifing the process in such a way that pollutants don't form atall beyond the permissible limit.

→ Before release the pollutants they should be reduce to tolerable level by methods equipment to destroy, alter & trap.

→ This step can also be done in 2 ways first is that we should select the raw material in such a way to release min pollutant.

→ The substiments may also be used if needed.

→ Secondly use suitable fuels avoiding sulpher content.

→ Equipment alteration such as the use vented tanks should be avoided & for industry new furnesses & modified equipment should be used.

ii) Site selection on zoning :-

↳ To installed the industries site selection is important. which result in the production of single source of pollution.

↳ control measures based on the knowledge of the mechanics of the atmosphere is called zoning.

↳ while setting the factories the metrological & micrometrological condition should be considered.

iii) Controlling air pollution by devices on equipments on process modification :-

Methods .. equipment used in control gaseous pollutants

For gaseous pollution the following methods are

* absorbtion
* adsorbtion
* combustion
* Cold trapping y condenser

*absorbtion :- scrubbers are mostly used for the removal of gaseous pollutants which use suitable liquid as absorbant to remove or modified one or more of the pollutants.

*Adsorption :- → Here the gaseous effluents are passed through consolid absorbant taken in suitable containers.

↳ the efficiency of adsorition depends upon the surface area for unigate of the absorvent.

Pollutants	Absorbant	Adsorbants
NOx	H_2O & liquid HNO_3	silica gel, corrosive geolights
HF	H_2O & NaOH	Porous pellets of sodium chloride, lime stone
H_2S	Ethanol amines, ferrol, sodium alanine, soda ash, etc.	iron oxide
SO_2	water, alkaline H_2O, alluminium sulphate, sulphites of barium, calcium, sodium	alkaline, limestone, dolomite

Controlling of air pollution by growing vegitation

→ planting of trees is very helpful in reducing air pollution.

→ Trees should be planted all around the sources in order to reduce the spreading of air pollution from pollutant coming out from the industry or source.

Air pollution control by fuel selecting & utilization:-

Fuel should be selected in such a way that combostion gives more efficiency & less polluting gases.

Incomplete combostion of hydrocarbon fuel should be avoided.

Water pollution:-

The water i.e feed for drinking is called poatable water.

Characteristics of portable water are

→ It should be colour less, odour less & test less.
→ Freefrom terbidity & other suspended impurity.
→ Freefrom germs, bakteria & other pathogenic organisiom.
→ Should n't containt toxic deserved impurities such as heavy metal, pestiscide etc.
→ Should have pH in the range of 7 to 8.5.
→ It should be moderately soft having hardness 50 - 100 ppm (parts per million)

Causes of water pollution:-

The various type of water pollutant are :-

oxygen demanding waste:-

→ These include domestic & animal sewage, biodigradable organic compound & industrial wastes from food processing plants, meat processing plant, slaughter house, paper & pulp meals, tanarise, etc.

→ All these waste under go degradation & decomposision by bakteria activities in presence of disolved oxygen.

→ This results in rapid depletion of disolve oxygen from the water which is harful to aquatic organisim.

→ The optimum desolve oxygen in natural water is 4-6 ppm which is essential for supporting

aquatic life.

→ Any decrease in this desolved oxygen value is an index as pollution.

Deses causing wastes :-

These include pathogenic micro organisms which may enter the water along with swells & other waste & may easi cause tremendes damage to public health which cause dangerious water bur diseases. such as cholera, tif. , disenerty, polio, infectious hepatities, etc.

Synthetic organisim compound :-

These are the man made material such as sythetic pestisides, synthetic detergent, food additives, insectisids, Harmaceutical biproduct, plastics, etc.

Most of these chemical are potential toxic to plant animals & human.

Sweages & agricultural run off :-

Sweage & run off agricultural land supply plant neutrient which may simulate the growth of algi & other aqeatic weeds in the reciving water body, which degrade the value of the water body.

Oil :-

Oil pollution may take place because of oil leel from carbo oil tanker on the seas, or leakage from oil pipe line crossing water waste from reseaver.

Oil pollution result in reduction of light transmission through surface water there by reducing photosynthesis by marine plants.

Effect of water pollution:-

Some important effects of various types of water pollutant are

i) Tannery effluents contains several consitituents which are deleterious, irrespective off the factod that where they are discharge in to river, stream, land or sea.

ii) It impacts persistance dall brownish colour to the reciving water causing esthetic & other problems described earlier.

iii) Highly repulsive odour is impacted to the receiving water by the dekave consitituent like proteins, amino acids.

iv) The acidic or alkaline effluents are corosive to concreate & metal pipes.

v) Excess ossicl in the effluents is also corosive & is unsuitable for irrigation.

vi) The effluents may contains pathogenic bacteria

vii) The dissolved chromium with toxied to pesic & aquatic life.

viii) The suspended solid interfere with the photosynthetic activities aquatic flora.

ix) Radio active isotopes are toxics to life form.

Control measures of water pollution:-

↳ Scitific techinics are necessary to be adopted for the environmental control of catchment areas of rivers, lakes, ponds & streams.

↳ Industrial plants should be based on recycling operation.

↳ The possible reuse or recycle of treated sewages effluents & industrial ways should be intacites & encorage.

↳ Instead of throughing waste in to the water, the recycling should be done for better use.

↳ Minm ; appropriate quantity & concentrasion of fertilizers, pestisides & insectesides should be used because excess will cause pollution.

Frequent plant should be concentrated & govt. should also help by funding for domestic, sewages & industrial effluence.

water resources should be used in the best possible economic ways.

To conduct seminar & traing courses for helping those who are directly or indirectly engaged in water management & water pollution control.

Govt. should encourage people to participents in reserch program like disposal of so else & industrial effluence

Local authorities, industrial list, govt. official with public participation should coordinate to find different ways to control water pollution

Soil Pollution:-

Causes of soil pollution:-

→ Soil pollution differs from water pollution & air pollution because the pollutant remains in direct contact with the soil for relatively longer period & hence alter the chemical & biological properties of the soil.

→ The hazardous chemical can also enter the human food chain from soil or water plants.

→ The measure sources of metallic contamination of soil is include mining, smelting, sludge, fertilizer, pesticides, etc.

→ Metal such as Cd, Pb, Hg, Ni, Mo, Cr, etc are toxied to plant & animal life.

In discriminate dumping of industrial waste & municipal waste leads to the leaching & seepage of toxic substances in to the soil & pollution of ground water.

as generated from thermal power plants industrial waste discharged in to streams or dumped in to the surrounding land, mining waste non-biodegradable organic pollutants, industrial sludges, heavy metal cause serious soil pollution problems etc.

commercial & domestic urban waste such as plastic metal cans, glasses, waste paper, fiber, rubber etc contribute to soil pollution.

Effects of soil pollution :-

→ Soil pollution was originally defined as the contamination of the soil system by considerable quantities of chemical or other substances resulting in the reduction of it's fertility or productivity with respect to the qualitative & quantitative yield of the crops.

→ Soil pollution is receiving greater attention due to it's direct impact on public health.

→ The measure effects of various types of pollutants are

i) Effect of modern agricultural practice :-

a) Synthetic fertilizers :-

These are employed to increase the soil fertility & crop productivity.

These fertilizers concentrate the essential nutrients in top soil layer however the soil enriched by chemical fertilizer can't support the microbial flora which are so essential to enrich the humus that health in plant growths.

Excessive & indiscriminate use of chemical fertilizer may result in the reduction of crop field.

b) Pestisides :-

Pestiside pose potential hazard to animals, human & aquatic life.

They also caused the deleterious effect on soil fertility & crop productivity.

Pestisides applied to crops are unittened in the soil in considerable quantities.

They entered in the cyclic environmental proces such as absenvation by soil litching by water & contaminate both lithosphere & biosphere

Pestisides including orbisides, fungisides & rodentiside are persistant pollutants.

Pestiside may enter the food change & poles serious health hazards.

Some of them under go metapolic transformation & they are degradation product are even more dangerous than their respective parent compound

some of the pestisides are carsinogenic while their metapolic product too are toxic.

Effect of Industrial effluents:-

Solid, liquid & gaseous chemical from various industries like paper, iron, fertilizer automobile, steel, ~~plastic~~ pestisides, tanneries, coal based thermal power plants etc. contain a verity of pollutants such as toxic heavy metals solvents, detergents, plastics, suspended particu & non biodegradeable chemicals.

If there not properly treated are source & give rise to water, air & soil pollution.

Fly ash resulting from coal based thermal power plant is one of the alarming & continuously increasing source of soil pollution leading to degradation of soil.

(iii) Effects of urban waste :-

Millions tonns of urbah waste are produced every year from critically polluted cities.

The in adiquetly treated or untreated sewage not only pose serious health hazards but also pollute soil & decrease it's fertility & productivity.

some soild waste clogging of ground water filter.

Suspended matter present in sewage can act as a blanket on the soil & interfear with it's productivity.

Control measures of soil pollution :-

The various approches to control soil pollution are

implementing stringent & proactive pollution control program.

Lunching extensive afforesttation & community forestive program.

Implementing deterent measure against deforestation.

Banning the use of highly toxic & resistant synthetic chemical pesticide.

Encouraging use of bio pestisides in place of toxic chemical pestisides.

Impacting informal & formal public awarness programe to educate large no of people regarding the health hazard & undesireable effects of pollution.

Effective treatment of domestic sewage by suitable biological & chemical method & adopting modern methods of sludge disposal.

Industrial waste have to be properly treated bef sources.

Municipal waste have to be properly collected & segregated scientifically.

Avoiding excessive use of chemical fertilizer & insectisides & providing more organic manures to the field.

*Marine Pollution :-

when marine water is polluted it affects the animal & other food chain components.

Sources of marine pollution :-

Rivers are the main source of marine pollution. They carry waste in their drainage & joins the sea or ocean. The drainage includes sewage slows, industrial effluents detergents agrow chemical, plastic

, metal scraps etc.

Catchment area like India & other countries, many big cities & industries are situated along the post lines. Large amount of waste from vortails & other human activities, sewages from corporation & industries are mixed in sea water.

Ships which carry toxics substances lubricating oil, paints, heavy oil, fuels, some time by accident or by leakages pollute the marine water. testing of automic weapons, space air craft, missiles & other radio active wastes when dumbed in seas causes marine pollution.

Marine pollution also caused by oil drilling in seas, trawling activities & heat release from industry etc.

Effects of Marine pollution:-

Oil is most dangerous pollutants when afloat on sea or mixed with water is a great threat to marine life specially fish birds, invertibrates, algi.

Oil at sea also affect sensitive flora & fauna, phytoplanktons, zoo planktons & other animals.

plastic & plastic material when dumped in to sea animal take it through their foods in stomach which causes ulcer & reduces

hunger.

Marine pollution the effect of food change in sea. serious diseases like cancer are the caused when affected sea food are taken by human beings.

Heavy metals, factory material, mineral oil, acids & other biocides are also measure threats to marine life when mixed with sea water.

major effect thing is a heavy loss of economy after getting polluting animal & chemicals from marine.

Control measure of marine pollution:-

Dumping of oil, hazardious & toxics substances, radio active lab biproducts in to sea should be banned or should be properly treated before dumping.

Draiage, sewage sludge, effluents from industries should not be discharge in to the river which joins sea.

Developmental activities on costal areas should be minimize.

Toxics pollutants from industries & treatment plants should not be discharge in to sea.

Nuclear explosions & other nuclear activities in sea should be minimized.

Oil drilling should not be allowed in coastal areas.

Ships & boats should have certain facilities for reds

Effective major should be developed to check the leakage in ships & oil tankers.

Noise pollution :-

The tongue may be defined as unwanted sound at a wrong time & a wrong place.

sources :-

Prolong of a loud sound is generally considered as noise which is mostly caused because of industries, vehicles, aeroplane, etc.

Although noise is undesirable it should be meaningful or meaning less ; meaningful noise is generally needed for inviting attaintion or expecting a consequent response such as a cry of baby or a streamy by a person for health.

On the contrary irresponsible or meaning less noise is disturbing & anoying.

Dt - 28.10.19

Effects of noise :-

Physiologically effects :-

At high levels of about 150 dB, imediate permanent hearing emparement may be caused.

At sound level in the range of 120 to 150 dB effects on respriority system, dizziness, disorientation, loss of physical control, other physiological changes resulting from stress, nausia & vomating may be caused.

Local sound can cause ~~&~~ increased ~~expretion~~ of many hermons in turn trigger various effect such as increase of blood sugar level, supresion of immunity steten decreasing the efficiecy of liver to detoxified blood.

Sycologically effects :-

Local contineous noise reduces the working efficiency, interfer the communication, increase the frequency of error which may at time cause accident.

Noise reduces the mental capability.

Noise has sycologically effect on humans ranging from mid distress to complete disorder

Noise interfears with deep sleeps & interupts sleeps.

Because slep is important to ~~emo~~ inotional stability, Noise may contribute to distress & inotional disturbance.

Noise also aggrivates many existing psycological condition & metal illness.

Hearing loss :-

Prolonged exposers to loud noise can cause temporary or permanent loss of hearing.

People working in noisy places such as industrial establishment, factory etc often suffer from temporary loss of hearing.

very loud, sudden & impulsive noise are capable of causing aquiet damage to auditory system & permanent loss of hearing.

Other health effect of noise pollution :-

Noise affect the cardiovascular system also.

loud noises tend to decrease the o/p of blood from heart which results in decrease heartbeat-rate.

changes in breathing amplitude have been reported due to sudden & impulsive noises.

High noise may cause headache, irritability & fatigue.

Control measures of noise Pollution :-

Reduction of noise at the source of it's origin :-

Often a little precasion can reduce much of the nuisance caused by loud noise.

This can be achived by replacement of noisy rattling devices or machines with quiter once.

Noise table can be reduce effectively by

replacement of noisy & rattling parts, providing better cushioning to check the vibration, proper oiling & greasing to ensure smooth running & using effective silencers.

Application of sound proofing techniques :-

Sound waves are absorved by porous material such as perforated seeds & other objects.

Sound barriers plays around the source of origin of local noises drastically reduce the intensity of sound on the other side of the obstracle.

Keeping residencial locality free of noisy industries:

Reciderncial locality should be established away from noisy industries, busy highways, aerodrums.

This shall curb much of nuisance caused by noise pollution.

Enectaquiment of scrtrict lagistation & it's effective complains :-

we most of the countries including our own, legal frame work against noise pollution has been developed.

However in most of the cases little efforts are made to enforce these rules & regulations effectively.

Noise control method in Industrial plants:-

Excessive noise is produce from various types of machine, petrol & diesel engine, electric motors, construction side equipment, pumps & pumping system, compressed air system, air distribution system etc.

It is always advantageous, economical & effective to identify the noise sources & noise problems right in the design & execution stages & incorporate the necessary noise control measures rather than attending to the problems at the latter stage.

Thermal Pollution:-

The term thermal pollution has been used to indicate the detrimental effects of heated effluents discharge by various powerplants.

Addition of excess of undesirable heat to water or environment which makes it harmful for living organism.

Sources of thermal pollution:-

Nuclear powerplants:-

Nuclear powerplants, including drainage from hospitals, institutes, nuclear experiment & explosions, discharge a lot of unutilised heat & trapped radio nuclides in to the near by water streams.

Heated effluents from powerplant are discharge at 10°c higher than the ambient receptor & seriously affect the aquatic

Coal fired power plants :-

Some thermal power plants ultimately discharge effluents having temp difference of 15°C between effluent & water body.

The thermal power plant utilise coal as fuel & they constitute measure source of thermal pollutants.

The heated coil are cooled with water from near by lake or river & discharge the hot water back to the respective water body & thein by increasing the temp. of the water body.

The heated effluents decrease the dissolved oxygen contain of the water which result seen killing of aquitic organisms.

Industrial effluents :-

Industries generating electricity like coal as fuel & nuclear power thermal plant require hege amount of cooling water for heat removal.

Other industries like textiles, paper & pulp as well as sugar also release heat in water but to a much lesser extend.

Hydroelectric power:-

The generation of hydroelectric power sometimes results in -ve loading in water systems.

Apart from electric power industries, various factories with cooling contribute to thermal loading.

It has been reported that about 18% more heat is given to cooling ponds in nuclear power plants than any other plant of equivalent size.

Domestic sweage:-

The muncipal sweage normally has a higher temp than reciving water.

The discharge water not only rases the steam temp. to a measureable extered but also create numerous diliterious effect on aquatic biota which measures major the decrease containt of disloves oxygen. dems

Dt-29.10.19

Effects of thermal pollution:-

Reduction in desolved oxygen:-

Consentration of desolve oxygen decrease with increase in temp of water.

Ex:- The desolve oxygen containt is 14.6 ppm in water at a temp of 32° F. & 6.6 PPM at 64° F.

Change in water properties:-

A rise in temp. changes the physical & chemical properties in the water.

The vapour pressure increase sharply while the viscocity of water decreases.

Increase in toxicity :-

The rising temp increases the toxicity of the poision present in water.

A 10° c rise in temp. doubles the toxic effect of potasium cianite while an 30°c rise in temp. tripples the toxics effect of o-xylene causing massive motality of fish.

Interferenca with biological activities :-

Temp is considered to be of vital importance to physiology, metapolysim & biochemical process is controlling respiratory rates, dication, excretion & overall development of aquatic organism.

The temp changes totally disturb the eco system.

change in metaboliic rate :-

Fishes show a marked rise basal rate of metaboligin with temp to the lithal point.

The respiratory rate, oxygen demand, food intake & swimming in fishes increase.

Increase vulnerability to deases :-

Activities of several pathogenic micro organism are assisted by high temp.

Hot water causes bacteria deseases in certain fishes such that they felt to developed x above critical temp.

Undesirable changes in algi population :-

The life in an eco system is greately influenced by the algal growth.

Excess nectrients from the wash out water

cause an excessive algal growth with consequent acceleration of eutrophic & other undesirable changes.

Bio chemical oxygen demand :- (BOD)

when the temp of stream carrying biodegradable organic matter rises, the intensified action of aquatic organism causes BOD to be accomplished at a lower temp.

when the temp of stream carrying biodegradable organic matter rises, fish death may occur.

Control of thermal pollution :-

Heat must be removed from the condensed falling water prior to their disposal in to water bodies.

The measure principles involved in the process of heat losses are

i) Conduction
ii) Convection
iii) Radiation
iv) Evaporation

Neuclear Hazards :-

Hazards means dangerous to human being or show by external source.

This external source is from environment.

Sources of nuclear hazards :-

The 2 main sources of radio active neuclear pollu are natural & man made.

Natural :-

The natural sources of radio activity are consist mainly of the cosmic radiation recivied from the space. & the naturally occurring radio isotop

present in the

Another source of natural radiation is the presence of radio nuclides in the lithosphere, hydrosphere & atmosphere.

All the elements above atomic no 82 (lead) are radio active in nature & emit a variable quantity of radiations.

The most abundant naturally occuring radio nuclidites on the earth at Uranium, thorium, Potasium - 40.

Man made source:-

Man causes radio active pollution by testing of nuclear wepones, establishment of nuclear power plant mining & refining of protonium, thorium & preparation of radio active isotope.

Nuclear weapons:-

Testing of nuclear arms comprises.

→ The used of uranium 235 & plutonium 239 for fission.

→ Hydrogen & lithium are fission material.

Huge clouds of fine radio active particles & gases are throwns off in the environment & are carried away a distance are by wind.

Atomic reactors & Nuclear fuels:-

At almost all stages of the nuclear fuel cycle liquid, gaseous & solid radio active waste are released having a tremendous potential to contaminate the environment.

Radio active Isotopes:-

Radio active isotopes & their compounds find wide uses in scintific research institution containing varying amounts of radio active material.

when this waste water reaches different water sources such as rivers, streams, lakes etc. a cause serious water pollution.

Radio active Iodine & phosphorus also enter the food chain to water & may finally reach man through fish eating.

Other sources:-

During ~~the~~ different medical treatment, varying consentration & variation enter the human body for instant.

Exray & theraphy for cancer patient often includes radium & other isotope radiation.

Effects / Hazards associated with Radio active pollution

No physical, chemical & biological process can influence the process of radio active emission.

Most of the radiations have a high penitrating power. Thick seeds of hill, cement concreate walls etc can't contained them.

They can easily penitrate to deep seated organ & cause injury.

A no of radio active isotopes have a very long half life i.e almost more than thousand of years. This make this radio active waste almost a permanent hazard for the biosphere.

Nucleick acid (DNA & RNA) effectively absorve these radiations. which causes carsinogenic, mutagenic effects.

Like any other element, radio active isotopes are also absorved, accumulated by bio magnifies thousand of times.

Thus the entire food chain becomes contaminated organisim. at higher tropics table may therefore recive a highly concentreated socra of radio active material through their food supply.

There is no other way to dispose of these hazardus waste except to store them for thousands or millions of year away from living organism.

Even the safest burial places for radio active waste which represent the based of humans efforts have shown signs of radio active effect.

Control:-

Control of natural radio active pollution may not be possible.

Out of all the sources, only artificial radio activity is the scope of intervention, where ever controls can be thought off.

Radio active pollution can be controlled by strict enforcement of laws & safty measures.

The low or high lable waste have premendes capacity to pollute the environment.

As low lable waste are often produce in large quantity, their containment is not possible.

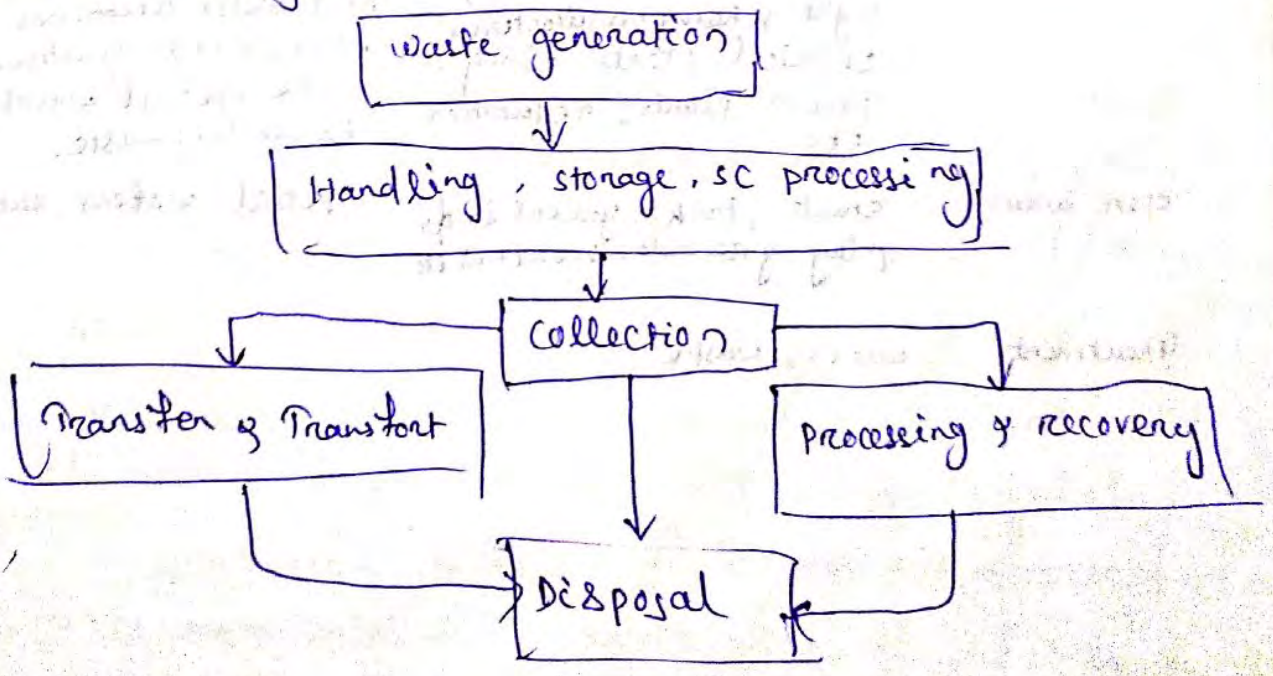
They are subjected to a treatment for removal of radio activity. & then discharged in to water bodies or land in usual ways.

High lable waste on the other hand can't be disposed freely in the environment but have to be concerned contaiment & stored out of the rich of human environment

Imp Solid waste mangement :-

Any material i.e thrown away or discharged as useless & unwanted by human or animal activities is considered as solid waste.

The mangement of waste is the fundamental concern of the activities encompassed in solid waste management.



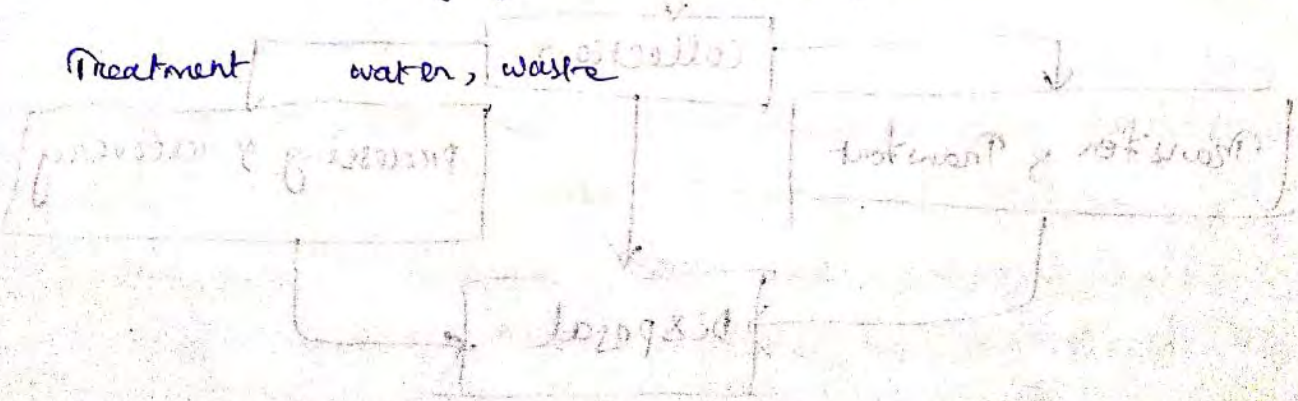
Sources of solid waste:-

Sources of solid waste can be classified into following categories.

i) Racidencial
ii) Commercial
iii) Municipal
iv) Industrial
v) Open areas
vi) Treatment plants
vii) Agriculture
viii) Hazardous waste construction ~~sites~~.

Residential	single family & multi family houses low medium & high ris aparents etc.	Food wastes, rubbish, ashes, special wastes.
Commercial	Restaurant, markets, stores, hotels, institutes, office, jworkshops etc.	Food wastes, rubbices, ashes demolitions & construct wastes, special wastes.
Industrial	construction, fabrication, light & heavy manufactoring, chemical plants, mining, power plants, deducation etc.	Food useles, rubbibes, ashe demolitions & construction waste special wastles, hazardous waste
open areas	sheets, Parks, vacant lands, play grounds, beaches etc.	special wates, rubbish

Treatment water, waste



Effects of solid waste:-

The accumulation of waste at any place is a bad & nasty situation.

Verities of micro organisim like bacteria, fungi, vairouses, worms, etc creep in to the accumulated waste & start it's decomposition. Later on they grow & increase in no.

various types of germs dereloped in the waste. They rich us through air, water & food.

Most of the infectious deases like cholera, dirrhoea, dihidration etc spread in this ways.

Air pollution, water pollution & soil pollution are caused due to the accumulation of different types of the waste.

waste material when accumulated here & there disturbs the drainage system.

Decomposing waste rich under grouned contaminate under ground water & soil.

Improper disposal of solid waste produce fouls smell & breede various types of insects.

Control measures of urban & industrial waste:

waste management in the collection, transport processing disposal of waste material so as to reduce there effect on local environment & community.

Method of solid waste disposal:-

Physical removabal:-

It is generaly done by manual activity like collection of waste & serting out in to reusable, decomposiable & non decomposible then disposal become easy.

Dumping:-

Transfer of solid way from aplace of collec to the site of disposal is called dumping. corporation & muncipal bodies collect on dum them on some suitable & [illegible] site located far away from human habitatio

Compaction & bailing:-

The solid waste are often spread on a plane & hard surface & latter pressed by buldozer which is called compaction. These compacted layer are rolled & piled, This called bailing.

Scanned with CamScanner

Now such compacted & baled solid way are easy to handle.

3-R (Reduce, Reuse, Recycle) of solid waste:-

Reduce:-

We should reduce the household waste by using mass parts of the goods.

When we purchases the thing avoid polythin & heavy packages.

Hazardous waste can be controlled by reduction at source.

Gaseous waste are generally reduce & remove to combustion, absorvetion, adsorvetion technic.

Reuse:-

After selecting the waste (which can be reuse after proper treatement).

some of the waste materials can be reuse after washing.

Furniture, cloths & other repairable article should be reuse after repair instead of throughing.

Recycling:-

Drainage system are associated with sweage treatment device that controlliz ed toxic effect of sweage before releasing it to the local water system.

with the help of following processes recycling of waste occurs.

i) sweage treatment (setting, neutralization, pulverisation, composting)

ii) Sanitary land filling (scientifically treated)

iii) Thermal process (burning under controlled conditions)

N.B:-

Burning in the presece of air incinration
& absence of air pyrolises.

Dt - 31.10.19

Role of an individual in prevention of pollution:

An individual can do the following safety measure to prevent the pollution.

i) Once should start first in the field on environmen ourness the protect from pollution.

ii) Once should go place to place to teach the lesson of ourness & prepare volunters.

iii) Give the message to save environment through papers, adds, magazines, TV & radio.

iv) To promote for plantention & conservation of forest to organise seminar on the subject-related to pollution.

v) Ourness is very effective in childhood so onces to go to the school, organise rallies to teach the lesso, on environment.

vi) World forest day, world environmental day & other source function should be organise from general ourness.

Population growth should be reduce.
One should use & promote mass (public) transport system.
One should discourge the use of chemical fertilizer insectiside & pestisides but should encourage the use of biofertilizers.

Desarster management:-

Flood:-

Floods are one of the very few well recorded natural feronenan, the catastropic damages caused by them attracted focused attaintion in recent decades.

With increasing population pressure & acilirated economic developement, the adverse effect of floods are being increasingly felts now.

Floods caused greeate distreated wherever they damage crops, properties & endanger lives

Adverse effect of floods:-

Apart from the causuality, injuries & disablement, many section of the populati get affected by the floods.

Croped area get summersed, eroded & strewn with stone leading to loss of crop production & conrequentional disruption.

Many houses are destroy completely & oth area damaged.

damage & loss to public & private utility as well as industrial disruption occurs

Breakdown of economic activity occurs with corresponding loss of wells.

Preparedness :-

Desirestered preparedness would be defined as the detailed planning for the prompt & efficient response immediately as soon as the antisipted event materialisest.

This effort to be very comprehensive inclusive of public education & awareness campen, provision for the issue of timely warning, development of orderly evacuations plans & preparation for providing the evacuees with food, clothing & selter on emergency bases.

The moment the desirsten strikes will also mark the start of the emergency response period.

The immediate onsite responses are of contrary action of local residence but their effectiveness should be improved by their advance training.

Earthquake :-

Earthquake are considered to be one of the most dangerious & destructive natural hazards The commencement of these phenomenon is usually sudden with little or no warning. It is not yet possible to predict earthquak

& to make prepartion damage & colaps of building & other manmade structure.

Actually earthquake consist of a sudden sering (vibration) of ground caused by distrubances in the earth crossed.

An earthquake generate a set of horizental & vertical vibration of the ground which are randonce in character.

Impact & effect :-

Tippical impact & effects of earthquake desinters are :-

i) loss of life
ii) Injury
iii) Damage to & destruction of property
iv) Disroption of production
v) Distroption of life style
vi) loss of livelyhood.
vii) Disrouption if essertial services.
viii) Damage to national infrastructure & distroption to administressive & organisaral system.
ix) Nationdl econonic loss
x) Sociological & shycological after effect, et

Cyclones :-

Cyclones are one of the most destructive natural hazards in the tropics & are responsible for deaths & destruction of more than any other natural calamities.

Cyclones bring with them extreamly violent winds heavy rain causing floods & strong tides causing costal destruction

Effects :-

Seviour tropical cyclones are responsible for large casualities & considerable damage to property & agriculteural crops.

The destruction is confined in the costal district & the max^m destruction begin with in 100 km from the center of the cyclone.

Principal dangers from the cyclones are extreamly strong wind potential rain & high storm tides.

Heavy rainfall & floods cum in order of devastation.

They are often responsible for much loss of life & damage to property.

The collapse of building, falling of trees, flying debries, air craft accidents & desease from contaminated food stream

water in the post cyclone periode also contribute to loss of life & destruction of property.

Preparedness:-

prepairedness means major with govt organisation, community & individual to respond reapidly & effectively to desinster situations.

The preparedness majors include the formation of vaiable desizester mitigation plans.

It would consist of a plan of action to be implemented on the received of the cyclone alert message from cyclone warning center.

A cyclone alert is issued generally 48hours before the possibility of the area being affected.

The identification of strong buildings which would withstand the fury of the storm is an important segment of the action plan.

The safe storage of non-perisable food, other essential needs, adequate collection of drinking water or medicine have to be made.

Land slides:-

Often it is not realised that a large part of India consist of mountainous terrain.

land slides affect the remotely located often isolated, small community in villages on regions of the country where external assistance takes time to rich.

Many times the information about the occurance such events and the damaged on ten days to nich to discrit & state headquaters.

Because of these regin landslide assume the status of measure natural desicters even though affected area & population ~~of though~~ may be rather small.

Relief & Rehabilitation :-

Essentially the relief states comprises the following

i) Serch & reskeed
ii) Medical assistance to the injure.
iii) Desposal of the dead
iv) Food & water
v) Emergency selter for the homeless
vi) Opening of access road if block & restoration of communication channels.
vii) shycological councelling of the servivor who have lost their closed relative.
viii) Repair of houses & facilities.
ix) Technical & finacial assistant to restart economic activity to restore regular work & income.

x) Reconstruction to proper planning.