Environment KOL CLASS-5

Date 24/06/2020

Adverse impact of global warming

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1. Rise in Sea level → it is mainly due to two reasons

1> Melting of Polar ice

2> Thermal expansion of Ocean.

Every year the sea level is enhancing by 1-2 mm and it is a big concern in the coastal areas where 30% of the world population resides. melting has taken place more in the Arctic region when compare to antartica due to the presence of a huge sea ice cover near Antartica which is less in the case of Arctic region and acts as insulator.

Antartica itself is devided into three main region

(i) Western Sheet

(ii) Peninsular Anatartica

(iii) Eastern Sheet

more than 80% of melting has taken place from the western sheet where the sea ice cover is less.

from Peninsular Anatartica the LARSEN Ice shelf started to calve out raising concerns for rising in sea level.

melting in the Arctic region was responsible for development of new sea routes. reducing distance among Nations. The Arctic Council was established under the Ottawa Declaration of 1995. for development of Arctic region and consist of 8 members US, Russia, Norway, Sweden, finland, Denmark, Canada and Iceland. It also has 27 permanent observers which includes India.

30 % of Oil and gas reserves of the world are confined to the Polar region.

2. # Erratic Rainfall

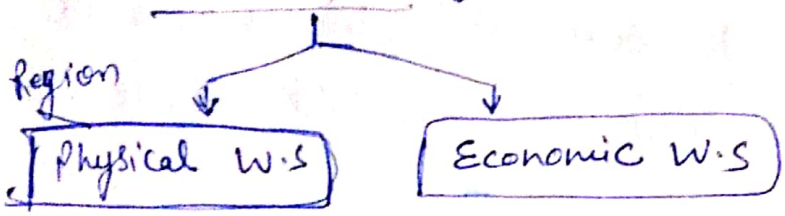
Due to global warming the temp of troposphere is enhancing but that of the stratosphere is getting reduce and as such due to widening of temperature between the two layer erratic formation of cloud take place which results in uneven rainfall. Enhancing the frequency of floods & Drought. water Deficit scenario can be of two types ——

1. Water stress → where per capita availability of water is less than 1700 cubic meter.

2. Water Scarcity → where the per capita availability of water is less than 1000 cubic meter.

Water stress — 1700 cubic meter ↓

Water Scarcity — 1100 cubic meter ↓



Water Scarcity can be of two type.

Physical Water Scarcity
If the source of water is not available.

Economic Water Scarcity - When the source is available but either it happens to be contaminanted or Saline in nature. and as such to get pure water there would be a high incurrence of cost.

Floods and Drought are two major disaster of India for which interlinking of River Project has been proposed.

The Concept of Interlinking of River Project was given in 1950s by then then Water Resources Ministes of India Dr. K.L. Rao.
This Project has three main Component

1. River Ganga Component → waster of this river would be lifted through pumping near Patna and through a Canal supplie to the watershed Area between

supply

Narmada and Son Rivers in Madhya Pradesh. from this area water would be directed through canals to seasonals rivers of southern india where no pumping would be required as it would be under the influence of gravity.

2. River Brahamputra Component

Water of this river would be diverted near DHUBRI (Assam) and through a canal supply to River Ganga near farrakha Barrage in West Bengal. But this canal would have to pass through Bangladesh.

3. National Water Grid System

This component was proposed by Dr. Arthur Cotton a British engineer before independence. There are two parts of it.

(i) Himalayan Rivers Component in which perennial rivers of northern india would be linked each other.

(ii) Penninsular Rivers Component where seasonal rivers of southern India would be linked each other.

both these component should be joined near Mahanadi.

Impediments

1. The cost of the project is very high but it can be constructed in phases.
eg- Ken-Betwa link

2. According to scientist it would be influencing the monsoon cycle of India. As the drainge of fresh water in Bay of Bengal would be reduced and fresh water evaporates very easily when compare to saline water.

3. At least 50 Canals would be established under this which would pass through protected area and would be detrimental for local ecology.

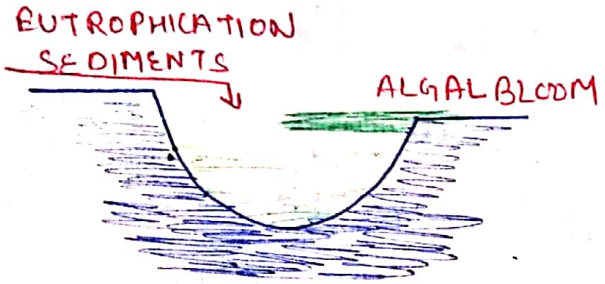
4. We donot have agreement with Bangladesh pertaining to this project.

5. A large of people would be displaced and their rehabilation would be another concern.

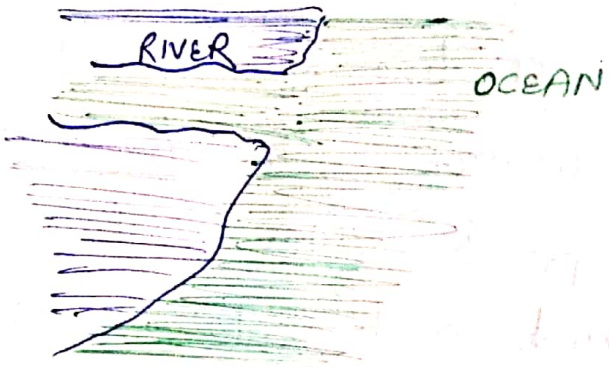
6. Water is a subject of state list but if the states are dissatisfied, they can go to the Supreme court which would delay the Project.

#3. Expension of Dead Water Zones

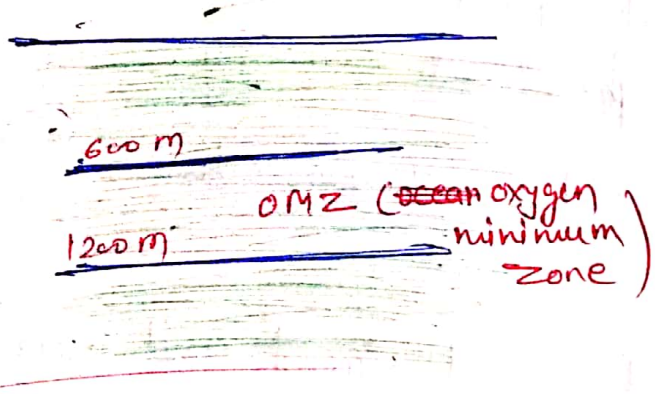
1. TERRESTRIAL DWZ



2. COASTAL DWZ



3. DWZ OF OCEAN



Dead water zones are water bodies in which the dissolved oxygen level have reduced they are of three main types.

1. Terrestrial Dead Water Zone which would be formed in lad due to depositions of sediments. The process through which sediment gets deposited in lake and not only is responsible for filling of lakes (Ageing) but also enhancing it nutrient content is

referred to as Eutrophication.
Algae present in the lake derived nutrient from sediment to grow in large number this phenomena is called Algal Bloom. They are not able to withstand their weight and they submerged where they are decomposed by saprophytic bacteria. utilising the dissolved oxygen resulting the formation of DWZ. Algaes are also responsible for release of toxins. which can also reduce the dissolved oxygen level.

2. **Coastal DWZ** A similar kind of DWZ would be form in the coastal area where the main agencies for sediment deposition would be the river. The best example of such Dead Water Zone is the Mexico Coast. as corn cultivation takes place on a large scale in mexico where there is widespread use of fertilizer.
In these coastal area due to Algal bloom the color of water turns Red as toxics are released by algaes

3. **DWZ in the Midst of Ocean**

In the middle of ocean from a depth of 600m to 1200m a natural DWZ called oxygen minimum zone is present.

Due to global warming when temperature enhancing the dissalution rate of oxygen is water would be reduced which results in expansion of DWZ which would be best witnessed in the midst of ocean. It results in the migration of fish community and in this content it is said that Jelly fish migrate to the coastal areas resulting in Jelly fish bloom. which disrupts the coastal ecosystem.

1.

Oceanic Acidification

Oceans are regarded as large carbon sinks. as $\frac{1}{3}^{th}$ of CO_2 which present in the atmosphere due to fossile fuel combustion is absorbed by the ocean and utilised by the phytoplankton. if excess amount of CO_2 absorbed by the ocean due to enhance CO_2 level this excess amount of CO_2 would combined with water to form carbonic Acid which is the main reason behind oceanic acidification although other factors includes the fertilizer waste,
the cement industry waste etc.

Due to oceanic acidification coral bleaching takes place.
In this case not only the Reefs turn pale but the greater implication of coral bleaching is

that the density of ZOOXANTHALLAE declines as the photosynthetic pigment present in them gets reduce. Due to it the biodiversity of that region would be affected and ecological productivity reduced. Ex → Great Barrier Reef (Australia). Mischief Reef (South China Sea)

Due to global warming VIBRIO Genus bacteria would grow in large number in aquatic bodies which would be responsible for disease like Cholera.

Due to global warming crop production would be reduced as a suitable temperature is required for the cultivation of any crop. but on the other hand the positive impact of global warming is that crop production would enhance, due to enhance level of Co_2 in atmosphere more of it would be absorbed by plant photosynthesis enhancing ecological productivity this phenomena is called Co_2 fertilisation effect.

Due to it the carbon content of the soil would be enhancing and to maintain the carbon nitrogen ratio more nitrogen would be fixed to the soil from atmosphere. This enhances the fertility of the soil and according to agricultural scientist of India the production of rice and wheat has enhanced the global warming.

But this may be a short lived impact only but if the temp continous to enhance crop production could reduce.

⇒ GLOBAL COOLING

It occurs due to three main reasons.

1. Nuclear Winter
2. Valcanic Erruption
3. Forest fires

The hypothesis of Nuclear winter was given by two scientist "Paul Crutzon & John Birks" but it became reality in 1945 when US Tested its atom bomb in new mexico and subsequently that yeas in Hiroshima & Nagasaki.

When Nuclear explosion takes place in an area radioactive debris would be emitted which would obstruct solar radiation because of which winter like situation would prevail in absence of Solar radiation photosynthesis would be reduced and also Oxygen regeneration. This would also affect the radiation balance of the earth.

2. Volcanic Erruption

These eruption are not only responsible for emission of shoots but oxides of carbon, nitrogen and Sulphar. forming a layer in atmosphere obstructing Solar radiation temperature would be reduced not only due to this but also through enhanced Albedo performed by the acids.

3. Forest fires

The debris emitted by forest fires would also obstruct solar radiation.

⇒ GLOBAL DIMMING

According to Australian Scientist industrial emissions are not only responsible for enhancing the level of green house gases. but also pumping tiny particles in atmospheres which are hygroscopic in nature due to which the cloud cover over the area would enhanced, when solar radiation would strike it, it would reach to the surface of earth of different direction. Draining each and every part of the plant and enhancing the photosynthesis.

As a result the excess amount of CO_2 present in atmosphere would be utilized and oxygen regeneration would enhance. This would be conducive for survival.

Associated Contemporary Terms

1. CARBON BUDGET (CARBON COMMONS) / CARBON SHARE / CARBON JUSTICE

The

According to the Paris Declaration (COP-21st, 2015). temperature enhancement of earth should be less than 2°c by the end of this centuary.

The base temperature for this purpose is the temp. of earth 400 years back the pre industrilization temperature. CARBON budget is the same total of emission which includes the emissions of the path (400 yrs back – 2015). plus the emission of future. So that the target of Paris Declaration is met.

It is also referred to as Carbon Commons. But 3/4th of Carbon budget has already been utilised till 2015. and out of the 1/4th remaining each and every nation would be allocated its Carbon share and in this context the term Carbon Justice has been given as developing nations are ---- aspiring for more carbon share.

The IPCC report tabled at Paris discussion stated that why the world can not afford temperature enhancement beyond 1.5°C?

This report has been questioned by Nations like US, S. Arabia, Australia and they are questioning the loopholes in the finding.

The real concern is the pathway suggested by IPCC for this purpose which calls for elimination of coal from power generation by the year 2050 and also drastic reduction in the use of oil and gas.

2. Climate Justice