

CAUSES OF CLIMATE CHANGE

① NATURAL : - volcanic eruption ,

- Ocean current
- Orbital change by the earth ,
- Solar variation , etc

② HUMAN ACTIVITIES :

- Industrial Revolution ,
- Large scale use of Fossil Fuels ,
- Global warming caused by human ,
- Deforestation ,
- Excessive fertilizer used for agriculture ,
- Ozone layer Depletion ,
- Acid Rain , etc

CLIMATE CHANGE :

WEATHER : Atmospheric activity over a short ^{time} period like cold winter, hot spell etc.

CLIMATE : is the 'average weather' of an area.

i.e. the sum of weather events averaged over decades (at least 30 years).

climate change : is the long-term shift in weather patterns in a specific region or globally.

1. Global warming :

The ^{long-term} increase in the avg. global temperature of the earth due to the build-up green house gases.

2. Ozone layer depletion : Dobson Unit : measures

The thinning of ozone layer (lowering the concentration of ozone) in the stratosphere is called ozone layer depletion or ozone hole.

- First detected over Antarctica in 1950.

In 1990 it was also confirmed over Arctic.

- ~~It is~~ ^{seen} Maximum depletion during each spring (October) time.

- Antarctica > Arctic

3. ACID RAIN :

Long-term statistical expression of short-term weather.

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IMPACTS

① ON HUMAN COMMUNITIES:

- Increase death from heat and disease.
- Spread of disease (tropical) vector borne disease.
- Increase photochemical smog.
- Increase water pollution.
- " Respiratory disease or allergens.
- Disruption in food supply.
- Increase migration.

② ON BIODIVERSITY:

- Loss of habitats.
- Extinction of some species.
- ~~of~~ Increased death.

change in composition of species

③ ON AGRICULTURE:

- Change in crop yields.
- Increase crop diseases, pests and weeds.
- Irrigation demand increase.
- Shift in food growing areas.

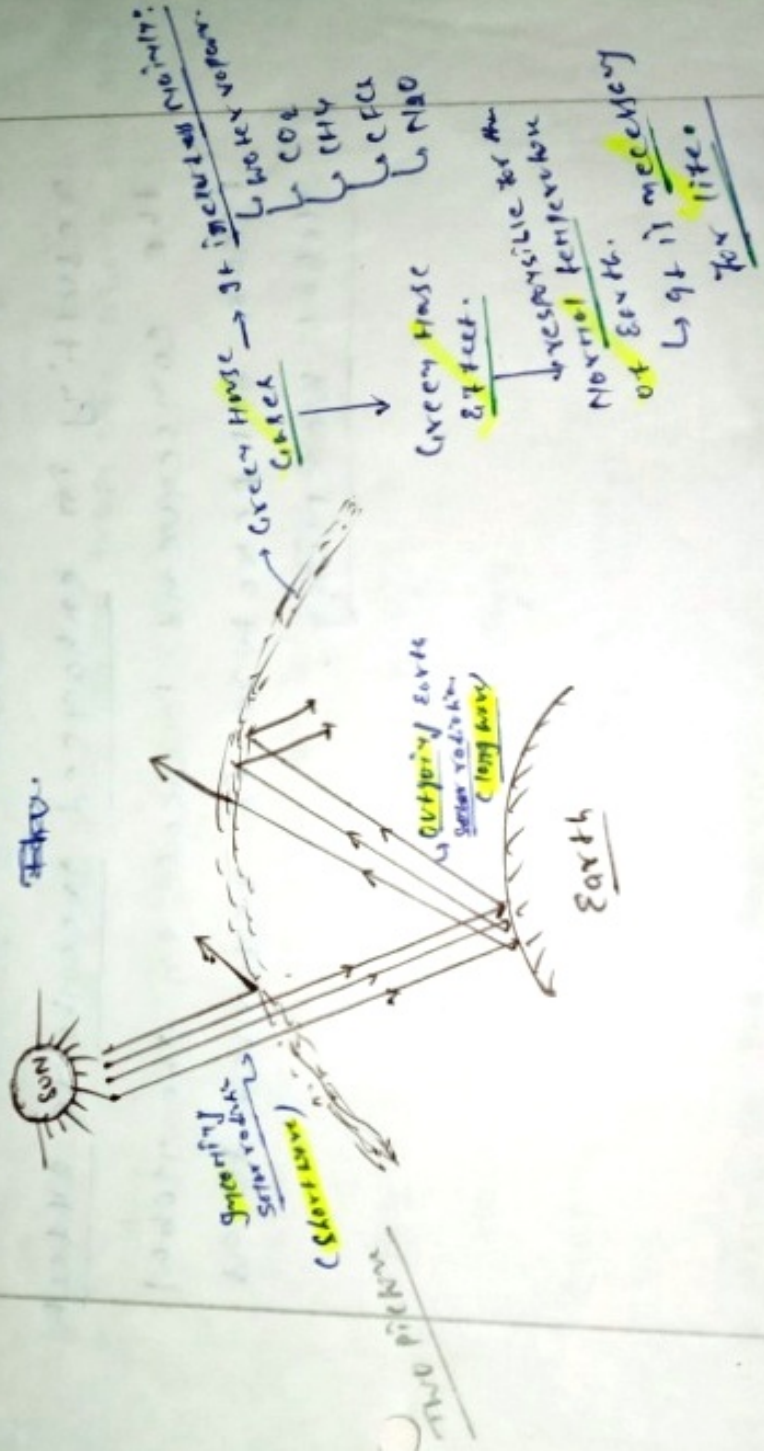
④ ON GLOBAL ECONOMY:

- Agribased industries affected.
- ~~less~~ Slowdown economic growth.
- Increase income inequalities between countries.

Greenhouse effect:

The atmosphere cover around the earth acts like a window glass pane. It allows most of the solar radiation to enter right up to the earth's surface, but does not allow the long-wave radiation emitted by the earth to escape in space.

Green house gases, normally present in the atmosphere, radiate part of this radiation back to the earth.



Thus, the atmosphere green house gases forming a blanket over the earth, control the escape of heat from the earth's surface to outer space so as to keep it warm and hospitable. This phenomenon is referred to

as greenhouse effect.

↳ Importance of green house effect;

- Without it, the global average temperature of earth's surface would have been -20°C;

Unlike the current 15°C. For example,

The moon has no atmosphere and has a temperature of -153°C, which is too cold to support any life.

Unfortunately, the human activity has been making the blanket of green house gases (and) thinner, resulting in enhanced greenhouse effect. The consequent increase in the global mean temperature is referred to as global warming.

Q.18 - Ozone hole. (19/18)

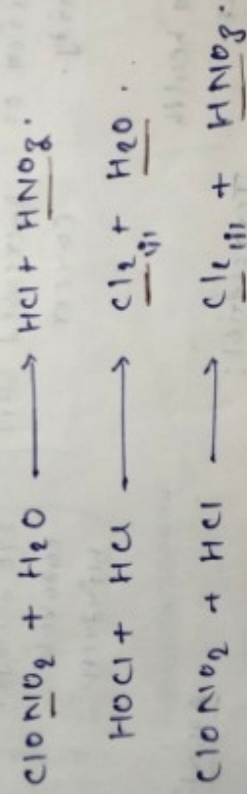
Ans:- Each year for the past few decades during the southern Hemisphere spring, chemical reactions involving chlorine and bromine cause ozone in the southern polar region to be destroyed so rapidly and severely that level falls below 200 Dobson Unit (D.U.). This depleted region is known as the "ozone hole".

* DISCOVERY: The ozone hole was first discovered in 1985 over Antarctica and above Arctic in 1990 with help of Nimbus-7 satellite.
- Maximum average (September - October) ozone hole area of ozone hole was found in 2006 which is 27 million of km². In 2012 its area was 18 million of km².

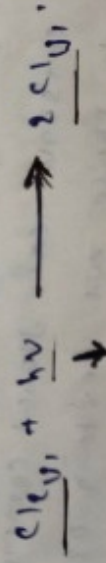
* CAUSES OF OZONE HOLE:-

In the Antarctic winter, the polar vortex traps air above the pole and form polar stratospheric clouds (PSCs)

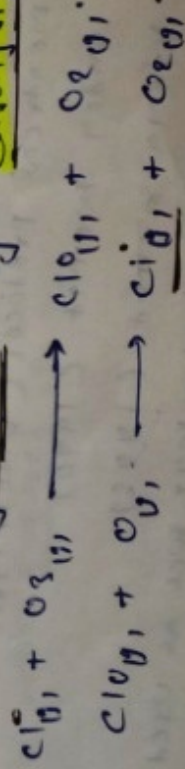
Reaction takes place on the surface of PSCs such as -



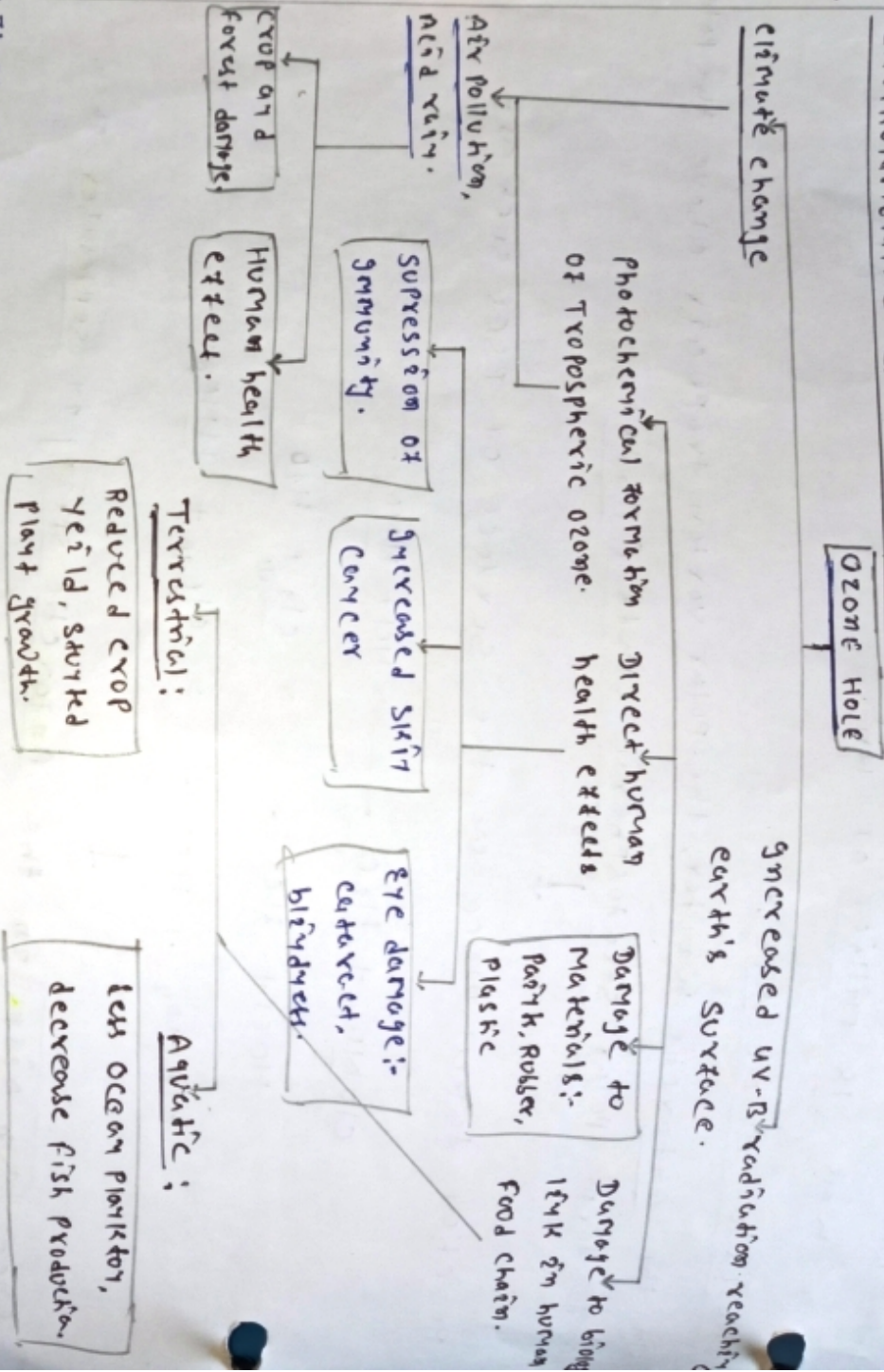
Once sun rises in the Antarctic spring in September. Then,



Chlorine atom destroys ozone by catalytic destruction process-



ENVIRONMENTAL EFFECTS OF OZONE HOLE.



→ Thus, due to its global consequences. global communities through its various protocol decided to phase out certain ozone depleting substances.

For eg. → - Montreal protocol (UNEP, 1987)

- London summit (1990)
- Vienna summit (1995)
- Alternative technology, such as used by Japan.

GRAND

⑩ Q: ACID RAIN.

Acid rain is any form of precipitation with high levels of Nitric acid and Sulphuric acid.

PH of acid rain is less than 5.6 (PH of normal rain water). It is a classical example of secondary pollutant.

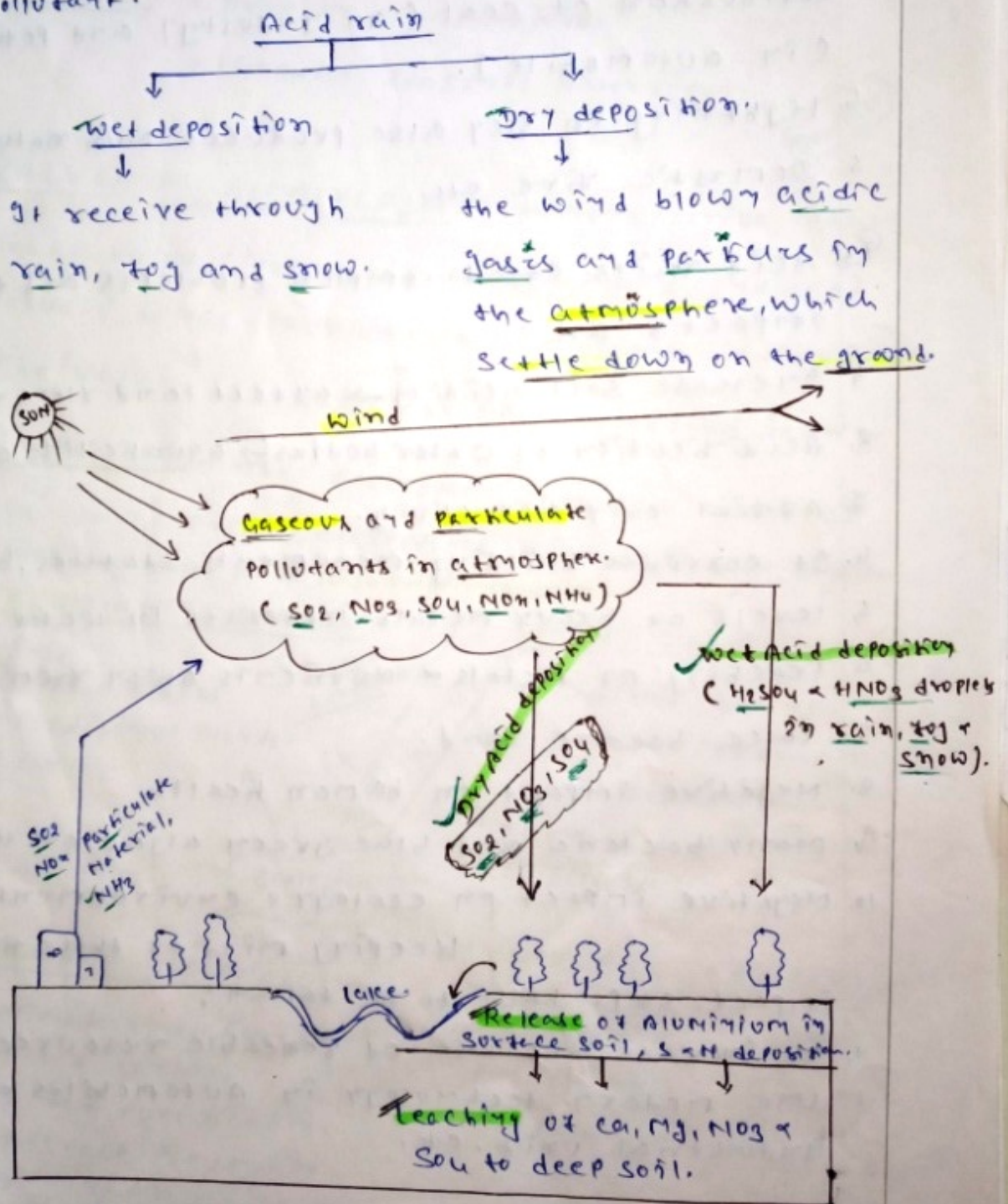


Fig: Dry & Wet deposition.

Q → Most acid rain is caused by human activities.

Important causes are:

1. Burning of fossil fuels, especially diesel.
2. Oil refineries released SO_2 .
3. NO_x , VO_x and SO_2 are produced during the combustion of coal (in industry) and petroleum (in automobile).
4. Lightning in sky also produces NO_x naturally.
5. Domestic fire etc.

Q → Acid rains create complex problems and their impacts are:

1. Increase soil acidity → affect land flora & fauna.
2. Acidification of water bodies → aquatic life affected.
3. Affect crop productivity.
4. It corrodes building, monuments, statues, bridges etc.
5. Levels of heavy metals increases in water.
6. Leaching of metals & nutrients away from soil.
7. Lacc become dead.
8. Negative impact on human health.
9. Many bacteria and blue green algae are killed.
10. Negative impact on ecology & environment, etc.

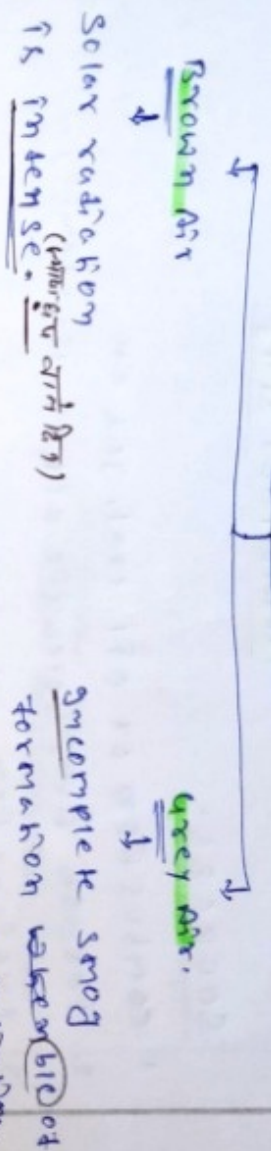
Keeping mind of these negative impact, steps have to be taken:

1. To increase the use of renewable resource.
2. Use modern technology in automobiles and industrial unit, etc.

Q:-

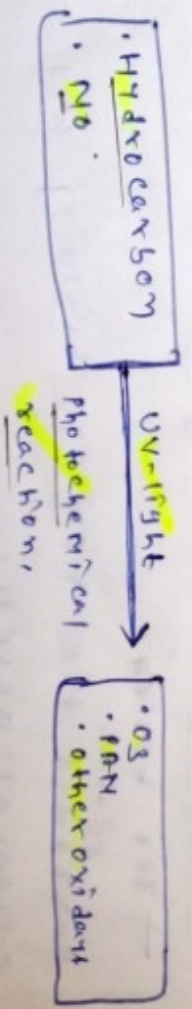
Ans:

Photochemical smog. (ग्रीन आर अर पॉल्यूशन)
 It is highly oxidising secondary air pollutant.
 It is formed in the congested metropolitan cities where warm conditions and intense solar radiation are present.
 It is often called as grey air.

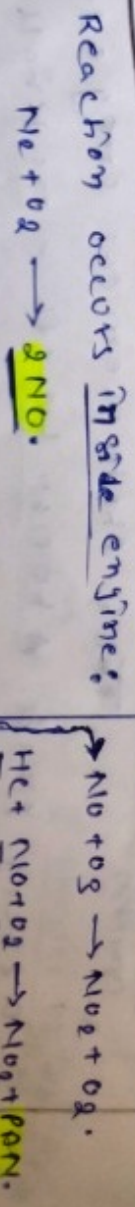


Composition:

- Ozone (ओजोन) (oxidising agent)
 - Peroxyacetyl nitrate (PAN)
 - Non-halogenated organic compounds.
 - Volatile organic compounds.
- Formation:
- Automobile exhaust contains HC and NO and these play an important role.



Photochemical reaction:



EARTH SUMMIT

- It was a major United Nations conference held in Rio de Janeiro from 3-14 June in 1992.
- 160 → United Nations conference on ENV. & development (UNCED), Rio conference.
- Achievement: ① An agreement on the climate change convention which in turn led to the Kyoto protocol and Paris agreement.
- ② Not to carry out any activities on the lands of indigenous peoples that would cause ENV. degradation.

RESULTED DOCUMENTS:

1. Rio Declaration on ENV. and Development.
2. Agenda 21.
3. Forest Principles.

IMP. legally binding Agreements were opened for signature:

1. Convention on Biological Diversity (CBD)
2. Framework convention on climate change (UNFCCC)
3. United Nations convention to combat Desertification

UNFCCC:

- an international env. Treaty adopted on 9-May-1992.
- enter into force → 21-March-1994.
- obj: "TO stabilize Green House Gas concentrations in the atm. at a level that would prevent dangerous anthropogenic interference with climate system".
- country signed → 165, party: 1

CONVENTION ON BIODIVERSITY (CBD)

- Multilateral environmental agreement.
- came into force: 29 Dec. 1993.

22-May-1992
adopted

obj:

1. Conservation of Biological diversity.
2. sustainable use of biodiversity.
2. Fair and equitable sharing of benefits arising from genetic resource.

- Signed → 193, Party → 196 States

KYOTO PROTOCOLS

international Treaty adopted on ~~11 Dec~~
11th Dec. 1997.

- Effective on = 16 Feb 2005 (At least 55 states)

- Obj: To reduce green house gas emissions to a level at least 5% below the 1990 level by the commitment period 2008-2012.

grip → It is applied to the six GHGs:

- CO₂
+ CH₄

- Nitrous oxide (N₂O).

- Hydrofluorocarbons (HFCs),

- Perfluorocarbons (PFCs).

- Sulphur hexafluorides (SF₆).

- ended: 31 Dec 2012.

KYOTO PROTOCOL EXTENSION: (2012-2020)

Doha Amendment:

drafted → 8 Dec. 2012.

Effective → NOT in force.

↳ condition: Ratified by 199 state (3/4th 198)

present → 139 state

MONTREAL PROTOCOL

An international Treaty on the reduction and elimination of CFC's and other ozone depleting substances.

- Signed: 16 Sept. 1987.
- Effective: 26 Aug. 1989.

JMP. → Vienna convention for the protection of ozone layer, signed in 1985.

RAMSAR CONVENTION:

international Treaty for the conservation and sustainable use of wetlands.

- signed: 2 Feb. 1971 at Ramsar city in Iran.

• World Wetland day → 2 Feb.

Ramsar sites → 235 (World) - May 2018
→ 27th (India).

Chemical weapons convention:

- It is, an arms control treaty, an international governmental organization based in the Hague (Netherlands).

Signed → 13 Jan - 1993.

Effective → 29 April - 1993.

Aim → To eliminate an entire category of weapons of mass destruction by prohibiting the development, production, acquisition, stockpiling, retention, transfer or use of chemical weapons by state parties.

Note India is signatory but has not ratified it.

UNEP:

United Nations Env. Programme (UNEP)

- It is a United Nations Agency. It was founded as a result of the UN conference on the Human Environment (Stockholm conference) in 1972.

Head Quarter: Nairobi, Kenya.

- Its activity cover a wide range of issues regarding the atmosphere, marine and terrestrial ecosystems, environmental governance and Green Economy.

- OMEP has also been active in funding and implementing environment related development projects.

CITES

The convention on International Trade in Endangered species of Wild fauna and flora:

- HQ: Washington, D.C

- Effective: 1 July 1975.

- It is an international agreement b/w governments.

Aim: To ensure that international Trade in specimens of wild animals and plants does not threaten their survival.

WILDLIFE PROTECTION ACT, 1972

- This act provides protection of wild animals, birds and plants and matters connected with them with a view ~~to~~ to ensure the ecological and environmental security of India.
- It has six schedules which give varying degree of protection.
- This act constitutes →
 - National Board for Wildlife
 - National Tiger Conservation Authority.
- This act notified five kinds of protected areas:
 - Sanctuaries.
 - National Parks.
 - Conservation Reserves.
 - Community Reserves.
 - Tiger Reserves.

Env. Protection Act, 1986 :

- After the Bhopal gas Tragedy, the Govt. of India enacted the environment Protection Act of 1986.
 - The purpose of the Act is to implement the decisions of the United Nations Conference on the Human Environment.
 - The decisions relate to the Protection and improvement of the human environment and the prevention of hazards to human beings, other living creatures, plants and the property.
- THIS Act empowers the Centre to "take all such measures as it deems necessary".

THE AIR (PREVENTION AND CONTROL) ACT 1981:

- Parliament enacted this act to implement the decision taken at United Nations Conference on the Human Environment in June 1972.

- Obj: To improve the quality of Air and to prevent, control and abate air pollution in the country.

- Important provisions:

1, Empowered the authority of central and state boards to include air pollution

control.

3, All industries operating within designated air pollution control areas must obtain permit from the state boards.

In The Act. grants power to SPERB and to test equipment and to take the sample for the purpose of analysis.

4. The 1988 amendment act empowered SPERB and CPERB to close a deteriorating industrial plant.

5. The 1987 amendment introduced a act extended the act to include noise pollution.

NANAMI GANGA PROGRAMME

- It is an integrated conservation mission, approved by the union government in June 2014.
- Budget: Rs. 20,000 crore.
- Objective: Effective abatement of pollution, conservation and rejuvenation of National River Ganga.
- Main pillars:
 - Sewerage Treatment structures.
 - River-surface cleanliness.
 - Afforestation.
 - Industrial Effluent monitoring.