EFFECT OF GLOBAL WARMING AND PREVENTIVE MEASURES

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Abstract:

Increase in temperature of earth atmosphere is known as Global warming. Global warming is a national and international issue now-a-days. It was one of the topics of discussion even in Earth Summit at Rio de Janeiro in June 1992. Main cause of warming of earth atmosphere is carbon emission in the form of carbon dioxide as well as other greenhouse gases like methane, chlorofluorocarbons etc from industries, vehicular traffics, refrigeration systems, air conditioning etc. To meet the needs of rising population, industries are producing more products, vehicles and luxurious items which in turn are releasing more greenhouse gases that result reduction in forest cover. In this world of modernization and development, it is not possible to stop emissions. However, efforts can be made to control and minimize the emissions by the measures like (a) by discouraging consumption and (b) by raising funds for sustainable development.

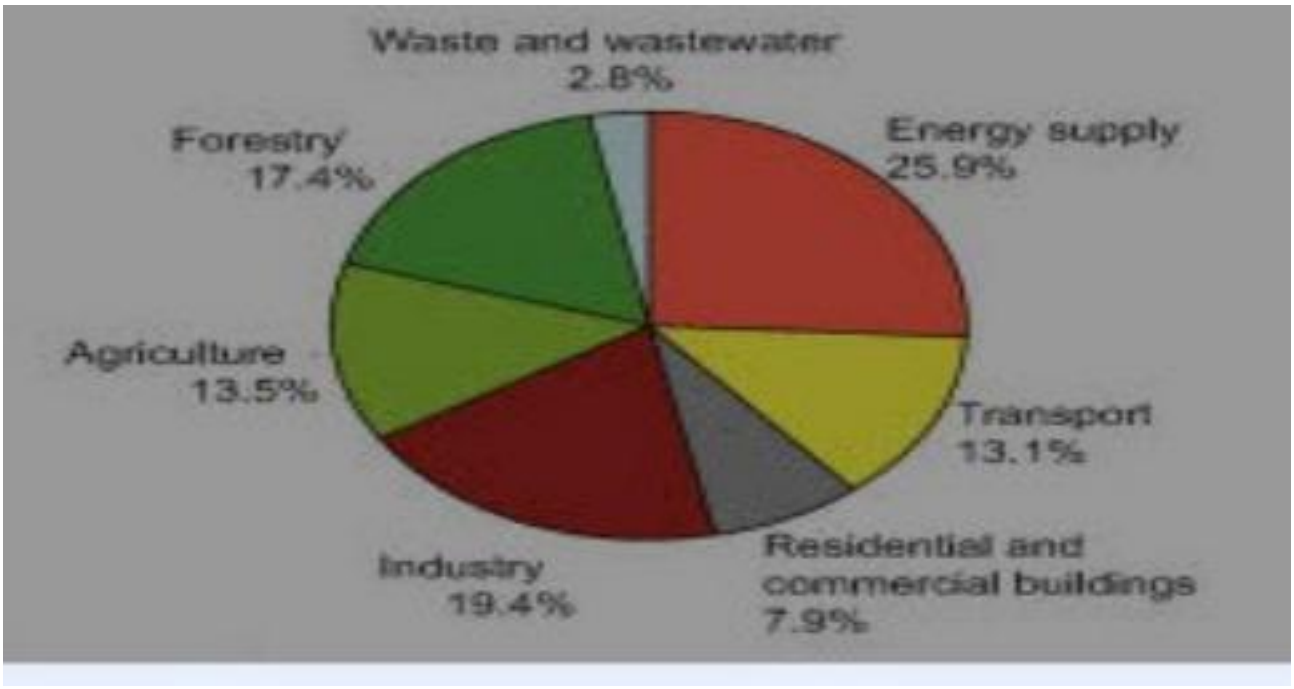
It is expected that carbon emission will reach 13 billion ton by 2030 if present rate of consumption continues. This is quite alarming as it may lead to melting of glaciers resulting in unprecedented flood and rise in sea level and submerging of some low lying lands. Global warming leads to sudden change in climate conditions, drought as well as excessive rains due to El-nino and La-nina as well as domino effects. Therefore, it is essential to find alternate ways of energy resources which cause no emission like use of solar energy, wind energy, tidal energy and storm or earthquake energy if feasible.

Growing more trees i.e. forestation reduces the temperature of atmosphere due to consumption of carbon dioxide as well as transpiration. It would be useful if carbon dioxide is consumed at the source, for instance, it may be converted to calcium carbonate by absorbing in lime water which may be used for other purposes. Growing of planktons (microscopic sea organisms) also uses carbon dioxide as they soak up large amount of carbon dioxide. Carbon dioxide may be absorbed in water which may be passed through bioreactors containing a series of screens coveredwith

livingalgae which in presence of sunlight absorb carbon dioxide to make food. The algae may be used toincrease fertility of soil.

Introduction:

A gradual increase in overall temperature of earth as well as earth's atmosphere generally attributed to greenhouse effect [GHE] caused by increase in levels of carbon dioxide and chlorofluorocarbons [CFCs] and other pollutants is known as global warming. Contribution from different areas towards global warming is shown in following diagram:



Numerous gases from industries are one of major cause'sindustrial pollution which is one of the reasons of global warming:

Carbon emissions are from burning of fossil fuels or from deforestation which otherwise go to earth. This is a type of greenhouse effect. Earth's climate is generally influenced upto six miles of earth's atmosphere. According to UK meteorological office's report by Hadley centre of climate prediction and research global warming will become double by next century. Even if greenhouse gases [GHG] emissions are cut by 60-70% there will be temperature increase by one degree/30 yrs. Intergovernmental panel of climatic change [IPCC] reported that warming over land would be 89% faster than over sea.Highest emission scenario can result in six degree increase in temperature over land by 2100 AD.

Above statistics reveals global warming is a national and international challenge now-a-days. It's crucially is evident by the fact that it was a topic of discussion even in Earth Summit at Rio de Janeiro in 1992.

Causes of Global Warming:

Main causes of global warming are carbon emissions in the form of carbon dioxide and other GHGs like methane and CFCs from industries, vehicles and refrigeration systems and air-conditioners. Following picture indicates towards vehicular pollution which contributes to global warming:

- To meet the needs of increase in population there is mushroom growth of various industries which are manufacturing more and more products, vehicles as well as luxurious items which in turn are emitting more and more GHGs that are resulting in reduction of forests which is a sort of indirect greenhouse effect and hence a cause of global warming.
- Besides, excess of water vapours in atmosphere also cause greenhouse effect as they can absorb and reradiate Infra-Red Radiations. These IR-radiations cause greenhouse effect.
- Carbon dioxide is a GHG because it is polyatomic, therefore, it has internal vibrational modes [IVM] unlike diatomic gases nitrogen and oxygen which lack IVM. This is the reason why later inspite of being in large excess do not heat environment. But, Carbon dioxide absorbs IR-radiations and reradiate them leading to heating of environment.
- Ozone layer depletion by ultra- violet radiations from sun as well as for other reasons is also responsible for global warming.
- Sulphur dioxide pollution and particulate matter in atmosphere contribute indirectly to global warming.

Important greenhouse gases which cause global warmingare:

- Carbon dioxide [CO_2]
- Methane [CH_4]
- Chlorofluorocarbons [CFCs]
- Trifluoromethylsulphurpentafluoride [SF_5CF_3]
- Water vapours [H_2O]
- Methane hydrates

Carbon Dioxide:

Major GHG carbon dioxide is in 30% excess which is extremely significant and we are responsible for this. Fossil fuel combustion and changes in ratios of different carbon isotopes in atmospheric carbon dioxide are consistent with anthropogenic emissions. Today level of carbon dioxide in atmosphere has reached to the extent it has not been for last 50 million years. 1/3 increase in the level of carbon dioxide has been due to electricity generation by fossil fuels; another 1/3 increase is because of transport and remaining 1/3 may be attributed to other reasons. Electricity generation, transportation and heating for manufacture of cement piles up approximately 22 billion tons of carbon dioxide in atmosphere/year.

Effect of Global Warming:

Increase in carbon dioxide level started about 1900 AD; but it actually happened in 1800 AD through deforestation in North Eastern America and other parts of world to increase industrialization. Since then temperature of atmosphere is rising except in 1950 which was a cool year. Few of the harmful side effects of global warming are:

- **Rising of Sea Level**: At present rate of carbon emission temperature is rising 1 degree per 30 yrs. and sea level 1 meter per 100 years which may lead to submerging of some low lying areas.
- **Melting of Ice Caps**: Loss of habitat is prevailing near poles; hence polar bears are endangering due to shortening of their feeding seasons as ice peaks are shortening which is attributed to global warming.
- **Melting of Glaciers**: Melting of glaciers is also increasing sea level.

- **Vanishing of Animals**: Animals other than polar bears are prevailing due to habitat change at different places.
- **Natural Calamities due to Climatic Change**: With temperature there is increase in short lived extreme high water events like storms. Larger waves of storms can destroy costal defences and increase flooding. They may bring Tsunami which is attributable to temperature difference in sea.
- **Loss of Forests**: With global warming soil and vegetables may stop absorbing carbon and start emitting carbon by 2050 due to respiration of plants in warmer soil; a consequence may be loss of forests because of dry conditions.
- **More Droughts**: High temperature means more droughts. In Spain more than 506000 hectares of forests went into flames due to severe droughts. In Indonesia approximately 800000 hectares of land burnt in 1998.
- **El-nino and La-nina Phenomena**:
  (1) El-ninorefers to warming of tropical pacific basin every third or seventh year resulting in weak trade winds. It is accompanied with swing in atmospheric pressure between east and west Pacific known as southern oscillation. These phenomena are collectively known as ENSO. El-nino results in severe droughts. In India summer monsoon drought occurred 23 times and rain fall deficiency was 1.0 SD.
  (2) La-nina, the little sister of El-nino is a counter current emerging after El-nino has exhausted. It reverses extremely dry conditions prevailing after El-nino and results in extra rain fall. La-nina means little girl brought record rain fall in Australia in 1998-99. With La-ninathere is increase in western pacific temperature resulting in extreme evaporation and hence heavy rain.
- **Domino Effect**: Global warming not only brings about climatic change but also life forms which cause a number of other things. This effect is known as domino effect.
- **Diseases**: Global warming is responsible for some tropical diseases. For example:
  - It increases chances of tropical illness like dengue fever. Temperate regions bordered on subtropical areas have greater chances of this disease. Chances of malaria also increase.
  - More carbon dioxide means pollen of ragweed's which increases problems of allergy sufferers.

- **Traffic Problems**: Climatic changes as well as weather changes due to global warming interfere with traffic also.
- **Bleaching of Corel Reefs**: Due to warming of sea and carbonic acid formation by carbon dioxide 1/3 of Corel reefs have damaged.
- **Loss of Plant and Animal Kingdom:** Warming of sea results in loss of planktons, hence, life of sea urchins, sea lions, killerwheels etc. have been affected.

Preventive Measures for Global Warming:

In Modern development oriented world it is difficult to stop C- emissions completely. But efforts can be made to minimize it. Discouraging consumption and raising funds for sustainable development may help in this direction. Few preventive measures to control global warming directly or indirectly are discussed below:

- Alternative and recyclable sources of energy may be tapped like solar energy, wind energy, tidal energy which cause no C-emissions. Research may be done to investigate flood energy, earthquake energy etc. if feasible.
- Growing more trees reduces temperature of atmosphere due to consumption of carbon dioxide through photosynthesis. They also reduce temperature through transpiration.
- It would be useful if carbon dioxide is consumed at source. For instance, it may be converted into calcium carbonate by absorbing in lime water which may be used for other purposes.
- Carbon sequestration technology may be used. C-sequestration involves capture of carbon dioxide in ground, ocean or by plants and sea organisms which absorb more of it. Disadvantage of this technique is it increases pH of soil or water.
- Stimulation of terrestrial ecosystem also absorbs carbon dioxide.
- In sea planktons may be grown which absorb carbon dioxide to make food. These planktons may be used to increase fertility of soil.
- Carbon dioxide can be used to increase performance of concrete, thus greenhouse problem may be tackled through this measure too.
- Green Chemical principles should be followed in Chemistry and Industry.

- Most important of all is to motivate people to change their attitude for adopting environment friendly attitude to solve problems of environment.

Global warming is threat to environment and existence of life on earth. Therefore, every effort should be made to contain it.

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