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Editorial

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EFFECT OF CLIMATE CHANGE- GLOBAL WARMING

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Global warming is a phenomenon which indicates gradual increase in temperature on or near earth's surface. It indicates that the temperature of the earth is rising slowly but constantly, a phenomenon observed over a few years.

Physiology can play an important role in understanding the mechanism of effects of climate changes like global warming on our ecosystem as well as can suggest changes to prevent deteriorating effects of global warming.

Global warming is due to accumulation of greenhouse gases like methane, carbon dioxide, Chlorofluorocarbon, nitrous oxide, water vapor and fluorinated gases into the earth's atmosphere. These heat trapping pollutants trap the heat by absorbing sunlight and solar radiation, making the atmosphere hotter. This is also called as greenhouse effect.

Causes of global warning:

- Rapid industrial development- As a result of industrial development, harmful emissions from industrial factories have increased temperature by 1-2 degrees than before industrial revolution.
- Deforestation- Rapid deforestation to pave way for urbanization has led to paucity of trees which are main source of oxygen and decrease temperature.
- Vehicles- Using vehicles causes emission of various gases like carbondioxide and other toxins from fossil fuels, leading to temperature imbalance.
- Chlorofluorocarbon (CFC)- Increase in levels of CFC's in the environment causes depletion of ozone layer leading to increase in ultraviolet rays on earth. This leads to increase in temperature on earth.

- Volcanoes- Emissions and eruptions from active volcanoes are one of the largest reasons for global warming.
- Water vapor- As earth's temperature increases, water gets evaporated and stays in the atmosphere leading to global warming.
- Forest fires- These emit large amount of carbon smoke, increasing the earth's temperature.

Changes due to global warming:

- Increase in temperature: Since 1880, earth's temperature has increased by 1 degrees centigrade. Due to this increase in temperature the glaciers are melting leading to increase in sea level affecting the coastal regions adversely.
- Climate changes- Climatic conditions have changed due to global warming. Due to increased temperature, weather patterns are changing leading to increase in disasters like floods, droughts.
- Ecosystem: Due to global warming, an important ecosystem- coral reefs have become fragile. This has led to loss of plant and animal lives.
- Diseases: Certain diseases caused due to changes in patterns of humidity have increased leading to increased morbidity and mortality.

Physiological effects of global warming:

- **Effects on human health¹:** Climate changes in the form of global warming can contribute to humanitarian emergencies and health issues like under nutrition, malaria, diarrhea and heat stress. There is increase in zoonoses and food, water and vector borne diseases as well as mental health issues. 3.6 billion people live in areas which are highly susceptible to climate change. And it has been estimated that climate change can cause 250000 additional deaths per year. These issues are more prevalent in most vulnerable population like women, children, ethnic minorities, older people and those having underlying health conditions.
Increased air as well as water pollution would lead to increase in incidences of allergic conditions like asthma as well as water borne diseases.

Exposure to constant more heat has been associated with negative birth outcomes, increased morbidity as well as mortality in diseases related to cardiovascular as well as renal systems.

Behavioral changes²: Researches have shown that extreme changes in climate especially global warming can lead to increased aggression, violence and antisocial behaviors.

In addition to health issues, global warming can also cause derangement of social and economic conditions and deteriorate functioning of health systems.

- **Effects on aquatic organisms³**: Climate changes in the form of global warming may derange marine ecosystem. Warm surface waters, acidification, deoxygenation can lead to altered basal metabolic rates of marine species, increasing the occurrence and intensity of marine diseases. Ocean acidification causes physiological stress and inhibits growth.
- **Effects on avians/birds⁴**: High temperatures and climate change can have short term as well as long term effects on birds. Short term effects include hyperthermia and dehydration which can even lead to mortality. Intermediate term effects can lead to body mass loss, reduced nestling growth and decreased fitness levels. Long term effects can lead to decline in body mass.
- **Effect on vegetation⁵**: The primary greenhouse gas responsible for global warming is carbon dioxide. Increased carbon dioxide, via partial stomatal closure and increase in leaf areas, amplifies global warming. This vegetation physiological response to increased carbon dioxide affects local climate and can reduce the extent of climate benefits by other ecosystems.
- **Effects on plants⁶**: Prolonged global warming can lead to altered flower nectar and pollen production. This can change floral resource availability and reproductive output of pollinating insects.

Control of global warming:

- ✓ Global warming can be controlled by controlling the causes like release of carbon dioxide and other harmful greenhouse gases. It has been estimated that we must limit global warming to 1.5 degrees Celsius by 2020 to prevent devastating effects of global warming.
- ✓ Reduced emissions of green house gases should be given priority. Use of alternative to fossil fuel should be encouraged.

- ✓ Reducing energy use by using energy efficient appliances like LED light bulbs and minimizing appliances can help.
- ✓ Carbon footprint should be reduced by driving less and instead walking as much as possible. Using public transport instead of individual vehicles is another good way of reducing carbon footprint.
- ✓ Planting more trees, conserving water can modify ecosystem for the benefit of all.
- ✓ Decarbonizing electricity is the need of the hour. Using renewable energy sources like wind, solar for vehicles as well as taking care to reduce carbon prints would be of immense help.

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