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Mains Practice Questions

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Q. What do you understand by Black Carbon? Discuss its impacts on the melting of glacier. (150 Words)

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Approach

- Start with explaining about Black carbon.
- Discuss its impacts especially on the melting of glaciers.
- Give a way forward.

Introduction

Black carbon, that often causes glaciers to recede, is emitted in the atmosphere due to incomplete combustion of fossil fuels in motor vehicles and aircraft exhausts, biofuel and biomass.

Body

Black Carbons

- **Black Carbon** is a short-lived pollutant that is the second-largest contributor to warming the planet behind carbon dioxide (CO₂).
 - Unlike other greenhouse gas emissions, BC is quickly washed out and can be eliminated from the atmosphere if emissions stop.
 - Unlike historical carbon emissions it is also a localised source with greater local impact.
 - Black carbon is a kind of an aerosol.
- **General Impacts:** Among aerosols (such as brown carbon, sulphates), Black Carbon (BC) has been recognized as the second most important anthropogenic agent for climate change and the primary marker to understand the adverse effects caused by air pollution.
- **Emission:** It gets emitted from gas and diesel engines, coal-fired power plants, and other sources that burn fossil fuel. It comprises a significant portion of particulate matter or PM, which is an air pollutant.

Impacts of Black Carbon on the Glacier

- It acts in two ways hastening the pace of glacier melt:
 - By decreasing surface reflectance of sunlight.
 - By raising the air temperature.
- Black materials absorb more light and emit infra-red radiation that increases the temperature. So, when there is an increase in black carbon in the high Himalayas, it will contribute to faster melting of Himalayan glaciers
- In the long run, changes in the atmospheric composition of the high Himalayas will affect rain and snow precipitation patterns. Accordingly, natural resources and socio-economic activities of Himalayan communities will also be affected.

- Analysis of the data from weather stations in real time has helped us to know about black carbon concentrations and seasonal variations in the high Himalayas. It has been found that the concentration of black carbon increases in summer months due to varied factors.

Measures to be taken

- In the Himalayas, reducing black carbon emissions from cookstoves, diesel engines, and open burning would have the greatest impact and could significantly reduce radiative forcing and help to maintain a greater portion of Himalayan glacier systems.
- Banning fossil fuels or the introduction of glacier tax can be a deterrent in these high-altitude areas.

Conclusion

Even a minor change of 1 degree Celsius will result in a major decrease in the area under snow cover along Himalayan glaciers, along with a major loss to flora and fauna. Hence, it is imperative to take actions to reduce the black carbon concentration in the region.