Mains Practice Question

Q. Explain the formation and characteristics of winter smog in the context of India. What strategies would you recommend for mitigating and controlling winter smog in Indian metropolitan areas? (250 words)

01 Nov, 2023 GS Paper 3 Bio-diversity & Environment

Approach

- Begin with a brief introduction of winter smog.
- Discuss the formation and characteristics of winter smog.
- Suggest the strategies for mitigating and controlling winter smog.
- Conclude Suitably .

Introduction

Winter smog is a seasonal air pollution phenomenon, marked by the buildup of pollutants in the lower atmosphere, resulting in a hazardous fog during winter months. According to a study by the **Indian Council of Medical Research**, severe air pollution like smog was responsible for 1.67 million deaths in India in 2019,

Body

It is primarily formed by the following factors:

- **Weather Conditions:** During the winter, meteorological conditions create temperature inversions, where a layer of warm air traps colder air near the ground. This prevents the dispersion of pollutants, leading to the accumulation of smog.
- **Pollution Sources:** The major sources of winter smog include vehicular emissions, industrial emissions, construction activities, and the burning of solid fuels for heating and cooking. These emissions release pollutants like fine particulate matter (PM2.5), nitrogen oxides (NOx), and volatile organic compounds (VOCs) into the atmosphere.
- **Crop Residue Burning:** Agricultural regions surrounding metropolitan areas often burn crop residues during the post-harvest season (stubble burning in NCR region), contributing significantly to the smog problem.

Characteristics of winter smog in India include:

- **Visibility Reduction:** Winter smog reduces visibility, leading to hazardous driving conditions and potential accidents.
- **Respiratory Health Issues:** It poses significant health risks, particularly for individuals with respiratory conditions. The fine particulate matter can penetrate deep into the lungs and cause respiratory illnesses.
- **Environmental Impact:** Smog can harm the environment by damaging crops, forests, and aquatic ecosystems. It can also contribute to global climate change.

Strategies for Mitigating and Controlling Winter Smog in Indian Metropolitan Areas:

- **Encourage the Use of Public Transport:** Implementing a congestion charge for private vehicles during peak hours is an effective way to reduce traffic congestion and encourage the use of public transport or carpooling.
- **Drones for Pollution Control:** The use of drones to identify and disperse pollution hotspots is a proactive approach to managing air quality.
- **Cap-and-Trade for Industrial Emissions:** A cap-and-trade system sets a limit on industrial emissions and promotes a market-driven approach to reducing pollution.
- **Vertical Gardens:** Vertical gardens are an aesthetically pleasing and environmentally beneficial addition to urban areas.
- **Crop Residue Management:** Implement and promote sustainable alternatives to crop residue burning.
- **Air Quality Monitoring:** Enhance air quality monitoring systems to provide real-time data for better decision-making and timely implementation of control measures.
- **Rewards for Low-Carbon Lifestyles:** By providing incentives like points or vouchers or tax benefits for eco-friendly behaviors such as using public transport or carpooling, people are more likely to make environmentally conscious choices, reducing their carbon footprint.

Conclusion

Controlling winter smog in Indian metropolitan areas is a complex and multifaceted challenge. Effective solutions require a combination of regulatory measures, technological advancements, public awareness, and collaborative efforts between governments, industries, and communities.