Smog in North India

Why in news?

According to scientists, North India can tackle smog using eco-friendly farm practices from the South.

What is a smog?

- **Smog**= Smoke + Fog
- **Photochemical smog**- It is called as a *Los Angeles smog* which is produced when sunlight reacts with nitrogen oxides and at least one volatile organic compound (VOC) in the atmosphere.
- Sunlight hits these chemicals, thus forming airborne particles and ground-level ozone or smog.
- **Sulphurous smog** -It is called as *London smog* which is caused by the high concentration of sulphur oxides in the atmosphere

Type of ozone	About
Stratospheric ozone	It is high above the Earth, acts as a barrier that protects humans and the environment from excessive amounts of solar ultraviolet radiation.
Ground level ozone	It is trapped near the ground by heat inversions or other weather conditions, it causes the respiratory distress and burning eyes associated with smog

What are the causes of smog in North India?

- **Stubble burning**- The tight window between rice harvesting and wheat planting compels farmers in Punjab and Haryana to resort to burning stubble urgently.
- It produces large amounts of smoke and particulate matter that travel to nearby regions.
- **Urbanisation**- Industries in Delhi and other cities emit pollutants such as sulphur dioxide, nitrogen oxides, and volatile organic compounds that react with sunlight and form smog.
- **Dust-** Construction activities, road dust, and desert storms generate fine dust particles that reduce visibility and worsen air quality.
- **Waste incineration**- Burning of garbage and biomass in open dumps and landfills releases toxic gases and smoke into the air.
- **Fireworks-** During festivals such as Diwali, people burst crackers and fireworks that produce smoke and metal particles that add to the pollution.
- **Vehicle emissions**- The increasing number of vehicles on the roads, especially diesel

ones, emit carbon monoxide, nitrogen oxides, and particulate matter that contribute to smog.

- **Temperature inversions-** These are layers of air in which *temperature increases with height*, instead of decreasing as usual.
- This prevents the vertical mixing of air and traps pollutants near the surface.
- **Topography-** The shape and features of the land, such as mountains and valleys, affect the flow and distribution of cold and warm air.
- This can influence the formation and strength of temperature inversions and the direction of wind currents.
- **Wind speed and direction**- The speed and direction of the wind can affect the transport and dispersion of pollutants.
- Low wind speeds and unfavourable wind directions can result in the accumulation of pollutants over the region.



What are the consequences of smog?

- **Poor air quality-** Central Pollution Control Board (CPCB) data show the average *Air Quality Index (AQI)* over the past few days has been consistently above 450 (hazardous category).
- **Health problems**- It can cause or aggravate various health problems such as respiratory diseases, eye irritation, heart disease, birth defects, and reduced growth.
- **Loss of biodiversity**- Smog can inhibit photosynthesis, thereby damaging crops and forests.
- **Climate change**- Smog can also affect the climate by altering the radiative balance of the Earth.
- **Economic losses**- It can reduce the productivity, increase the health care costs, and lower the quality of life.
- **Cultural damage**- A thick layer of smog has engulfed the Mughal era monument *Taj Mahal* leading to discolouration, causing damage to its marble surface and the growth of algae in its walls.

What can be done to tackle smog?

- **Eco-friendly farming practices**- Indo-Gangetic Plain (IGP) of North India can reduce its smog problem by adopting practices like mulching and nitrogen-fixing that are used in the *Cauvery basin* of south India.
    - **Mulching**- It involves covering the soil surface with organic or inorganic materials that can help turn the stubble into natural manure and enrich the soil.
    - **Nitrogen fixing**- It involves growing plants that can convert atmospheric nitrogen into plant-available forms thus reducing the need for chemical fertilizers.
- **Alternate crop patterns**- Encourage farmers to shift away from rice and wheat cultivation and grow alternative crops with less stubble output.

References

1. Down To Earth- India can tackle smog in North India
2. NASA- Hazy November in Northern India

