

1. The severity of air pollution over Northern India is primarily due to the inherent geographical disadvantages that the region faces. Critically examine. (250 words)

Answer:

Background:-

- According to latest WHO report 14 of the 15 worst cities with respect to air pollution were from north India.

Severity of air pollution in North India:-

- In 2014, the WHO listed Delhi the worst in the world in terms of particulate matter (PM) 2.5, 30 times less than the width of human hair, and most hazardous.

General Reasons:-

- **Burning of crop residue:-**
 - One of the main reasons of increasing air pollution levels in Delhi is crop burning by the farmers in these states. Farmers burn rice stubbles in Punjab, Haryana and Uttar Pradesh. It is estimated that approximately 35 million tonnes of crop are set afire by these states.
- **Dust from construction debris:-**
 - Large scale construction is another culprit that is increasing dust and pollution in the air.
- **Vehicle exhaust:-**
 - Vehicular emission is increasing the hazardous effects of air pollution and smog.
 - Rapid increase in pollution sources due to urbanisation.
- Proliferation of industrial units using extremely dirty fuels without pollution control
- Extensive use of solid fuels for cooking
- Enormous problem of waste mismanagement and big dust impacts.
- Over-population only adds up to the various types of pollution.
- Investing less on public infrastructure is another reason of air pollution. In India, investment in public transport and infrastructure is low which leads to congested roads, and hence air pollution.

Geographical disadvantages:-

- Indo-Gangetic plains are sandwiched between the Himalayas and the Vindhyas and are home to more than 600 million people with winds blowing from north-west to east, especially in winter, which carry pollutants from other regions.
- As the winter season sets in, dust particles and pollutants in the air become unable to move. Due to stagnant winds, these pollutants get locked in the air and affect weather conditions, resulting in smog.
- **Meteorology:**
 - Temperature inversions and stable wind conditions are characteristic features of winters in North India. While calm wind conditions prevent the dissipation of

pollutant emissions, the temperature inversion layer tends to trap pollution, thereby increasing the observed pollutant concentrations.

- **Wind convergence zone:**

- The Indo-Gangetic plain is essentially landlocked. The Himalayas prevent polluted air from escaping to the north creating the so called “valley effect”.
- Other studies have pointed out that the formation of low pressure troughs across this region causes winds to converge, resulting in trapping of local, as well as pollution from outside.

- **Loose Alluvial Soil:**

- The Indus-Ganga belt is the world’s largest stretch of uninterrupted alluvium deposits. As fertile as alluvium is, it is composed of loose unconsolidated particles. Thus, dry alluvial soil significantly contributes to wind-blown dust.

- **Seasonal variation of particulate matter composition:**

- Studies that have been carried out for the cities situated in the Indo-Gangetic basin point out that the relative proportion of dust exceeds the contribution from anthropogenic sources.
- Dust accounts for 40 per cent of total PM10 in summer, it accounts for only 13 per cent in winter.
- Widespread dust events are a common phenomenon in the northern part of the country during summers. There is no denying the fact that wind-blown dust contributes significantly to the pollution problem.

- This region does not have the advantage of a coastline.

Way forward:-

- International experiences :-
 - Think regionally, but act locally. Beijing, Shanghai and other Chinese cities have demonstrated that where there is the political will, there is a way to tackle air pollution.
- More efficient means of treating crop residue are needed
- Replace smoky chulhas with efficient models
- Cracking down on construction debris and polluting thermal power stations
- Restricting the number of vehicles and switching to mass public transport in cities
- While local-level policy and technological interventions are certainly the call of the hour, a national-level integrated plan needs to be put in place.

PRACTICE QUESTIONS

Answer the following Questions

1. Bommai case is one of the most quoted verdicts in the country’s political history. Discuss its verdict and its implications. (250 words)
2. Discuss Koppens climate classification scheme and also discuss its limitations. (250 words)