**Syllabus subtopic:**

- Conservation, Environmental Pollution and Degradation, Environmental Impact Assessment.

**Prelims and Mains focus:** about the new device and its significance in forecasting air quality

**News:** A team of researchers, with **funding from the Earth Sciences Ministry (MoES)**, has devised a **system capable of almost accurately tracking variations in air quality in Delhi** during events of biomass burning and correspondingly issuing **timely forecasts up to 72 hours in advance.**

**Background**

Every year between October and December, the air quality over Delhi drops to dangerous levels, triggering respiratory-related illnesses and hitting visibility.

**About the new device**

- The newly-devised **air quality prediction system** is an **upgrade over the one operated by MoES**, which mainly detects the presence of PM2.5 dust particles.

- A **team of Pune-based scientists**, led by Indian Institute of Tropical Meteorology (IITM), along with those from Savitribai Phule Pune University (SPPU), Centre for Development of Advanced Computing (C-DAC), and researchers from Indian Institute of Science (IISc), Bangalore, and National Centre for Atmospheric Research, USA, have **jointly worked on it.**

- Using the **three-dimensional Variational Data Analysis (3DVAR)** devised by the group, the **variations in PM2.5 level were tracked and validated during two winter seasons between 2017 and 2019.**
Why is predicting air quality in advance difficult?

- Predicting air quality in advance over any region is difficult due to the direct link between local weather and the concentration of chemical gaseous matter that mix with the air.

- Still, large uncertainties are present in the prediction of atmospheric aerosols and locating the emission inventories, and limited understanding in the formation of secondary aerosols, among other factors.

- Chemical data is needed in model assimilation, which has been found to provide better outputs in terms of real-time forecasts. Chemical data assimilation can boost operational weather forecast as the variability of PM2.5 over Delhi was found to be very large. Local weather also plays a major role in accurate forecast of PM2.5, which has high levels of uncertainties due to wind speeds at surface and inventory chemicals.