Monitoring Pollution - Technological Solutions

What is the issue?

- Increasingly, new technologies are making it easier and cheaper to monitor the environment, in India and globally.
- India, now, has to take efforts to pinpoint the specific sources of pollution in real-time and adopt the appropriate technologies for that.

What is the shortfall in approach?

- India has been monitoring air pollution for many years now, but with little effect on pollution levels across India.
- The ambient pollution is being captured by a multitude of monitoring instruments, both by civil society and the government.
- But such monitoring cannot identify the specific sources of pollution.
- So the key monitoring gap is not about pollution in the aggregate, but specific sources.
- It is also difficult to enforce laws on polluters, or to bring to task those in the government not enforcing the laws.

How should monitoring be?

- There are three components of monitoring that need to be achieved - universality, identifiability and timeliness.
- - In a vast country as India there **Universality**are number of units that are unregistered.
- Besides, there are many that are registered but which may not be as polluting units, and yet others may be mis-categorised.
- In other words, the government records cannot be the sole source to decide on the units to monitor, and those not to.
- Monitoring on a large expanse and all point sources is essential for effective action.
- Only this would enable clear differentiation between units that conform to the pollution norms and those that do not.
- **Identifiability** - There has to be a built-in method in the technology adopted, for confirming the initial identification of the polluter, to avoid errors in identification.
- **Timeliness** - Simply installing pollutant-ameliorating equipment does not mean it is being used.

- Floor managers may be using the wrong practices, be lax, or the unit management may find it too expensive to operate, or the input materials may be contaminated.
- So constant monitoring is an essential element of good monitoring.

What is the challenge?

- There are hundreds of coal power plants, tens of thousands of brick kilns, and hundreds of thousands of construction sites.
- Measuring pollution levels at each of these point sources in real time and capturing divergence from the expected norm and making further investigations are quite challenging.

What are the possible technological solutions?

- Remote sensing technologies including those by satellites are a good solution to the limitations in monitoring.
- Satellites can monitor large expanses on a 24x7 basis; industrial chimneys, coal power plants, all units that emit fumes can be imaged at different wavelengths.
- It ensures universal coverage and helps capture pollution points such as unregistered units that are otherwise invisible to the government.
- It can red-flag potentially polluting entities if they diverge any time of the day and night.
- Though these red flags may not constitute proof, it can constantly identify units for further investigation.
- The data could be made available in the public domain as well, beyond government and regulator.
- With public accessibility, independent researchers can build their own algorithms for evaluation of potential polluters.
- It can involve individual experimenters in universities, research institutes or even amateurs towards a cleaner environment as well as can accelerate skill formation in an emerging technology.
- Moreover, economies of scale and scope are both very high with deployment of artificial intelligence.
- Depending on the bandwidths being captured, the same image can be used both to monitor different kinds of pollutants and the varying sources.
- E.g. illegal garbage dumps could be sources of both plastics and methane, both of which can be monitored
- Other possible areas include riverbed sand mining, stone mining, and illegal fishing in “no entry” zones, all of which can be captured by satellites.

Source: Business Standard