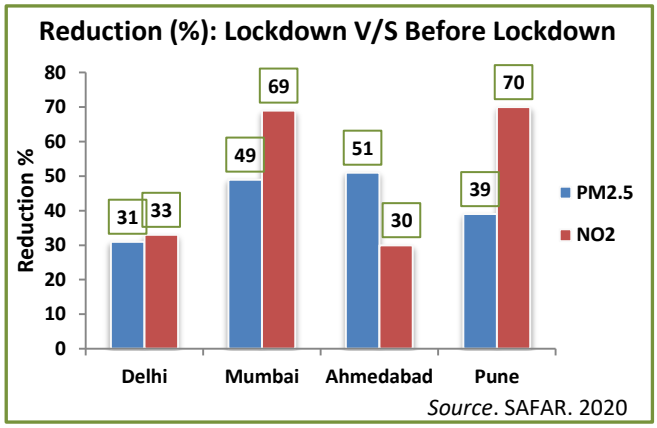
Pollution | Waste Management | Water Resources | Climate Change | Smart Cities

Linkage between Pollution and COVID-19 Mortality. According to a recent study by the Harvard University T.H. Chan School of Public Health, there is a large overlap between causes of deaths of COVID-19 patients and the diseases that are affected by long-term exposure to fine particulate matter. The results of the study suggest that long-term exposure to air pollution increases vulnerability to experiencing the most severe Covid-19 outcomes. Similar conclusions on the link between high mortality and the level of air pollution in northern Italy have been drawn by the Aarhus University in a recent study published in "Environmental Pollution". The evidence builds upon previous research during the 2003 SARS outbreak. Another study by University of Verona and Stanford School of Medicine study has found a statistical correlation between highly-polluted areas and Covid-19 infections in Italy, which is among the worst-hit countries by the pandemic. The study, which is yet to be published, has concluded that cities and provinces, where coarse particulate matter (PM 10) exceeded standards for over hundred days a year, were found to be associated with a three-fold higher risk of the disease.

Air Quality. Less vehicular movement and industrial emissions due to the lockdown has led to a sharp dip in pollution levels across several cities and towns A recent report published by Swiss company IQAir, looking at 10 key global cities that normally suffer from high levels of pollution Los Angeles, New York City, London, Madrid, New Delhi, Mumbai, Sao Paulo, Wuhan, Seoul and Rome — found a significant fall in nearly all locations. The report compared measurements from ground-based monitoring stations regarding PM2.5, the small inhalable particles emitted by various sources, including vehicles.

The lockdown has started showing its positive effect on air quality across India as big cities like Delhi and Mumbai see pollution levels drop by around 40-50%, according to data received from a European satellite system. Transport pollution levels declined by three-fourth across Mumbai and Pune between March 24 and April 25 (lockdown period), as compared to the period between February 20 and March 20, according to an analysis published by the System of Air Quality Weather Forecasting and Research (SAFAR). The month-wise comparison of air quality levels for four cities – Mumbai, Delhi, Pune and Ahmedabad – also revealed that the highest reduction was witnessed in nitrogen dioxide (NO2) levels for Pune at 70%, followed by Mumbai (69%). Delhi and Ahmedabad recorded a 33% and 30% decline in NO2 levels. Average NO2 concentration fell from 23 parts per billion before lockdown month to 7 ppb during lockdown for Mumbai, and 24 ppb to 7 ppb for Pune.



A study undertaken from February 22 to March 21 and from March 22 to April 21, by CPCB, showed that the levels of nitrogen dioxide and carbon monoxide fell by 5% and 43% over pre-lockdown levels. Amid the lockdown, Haryana has witnessed a drastic dip in stubble burning this wheat harvesting season. There is a reduction by around 74 per cent in cases. As stubble burning cases are trickling, the northwestern states are banking on the looming health emergency caused by COVID-19 to dissuade farmers from lighting up agricultural remnants this kharif season.

Visakhapatnam Gas Leak. The government has emphasised that a clear protocol and check list needs to be drawn up to ensure there is no mishap of the kind seen in Visakhapatnam where at least 11 people died and more than 800 hospitalised following a massive styrene gas leak at a LG Polymer plant that opened after 45 days. The National Disaster Management Authority (NDMA) has issued detailed Guidelines for restarting industries after the lockdown and the precautions to be taken for the safety of the plants as well as the workers. The Union environment ministry is set to bring out a safety protocol for reopening of units and industries after being closed for over a month during the national lockdown in the wake of the gas leak tragedy in Visakhapatnam.

Sources. Covid-19 Air Quality Report, IQAir, April 22, 2020 | The Times of India, April 22, 2020 | The Hindu, April 23, 2020 | Hindustan Times, April 30, 2020 | Science Daily, April 6, 2020 | Business Standard, May 3, 2020 | The Economic Times, May 4, 2020 | Hindustan Times, May 5, 2020 | The Economic Times, May 8, 2020 | The Times of India, May 10, 2020| The Times of India, May 13, 2020 | SAFAR – India, 2020

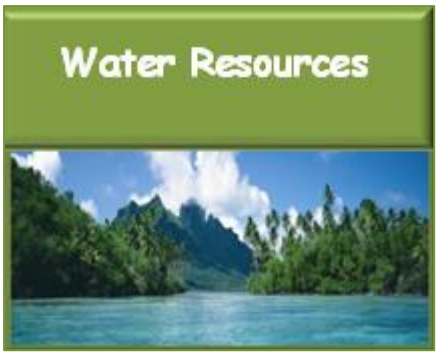
Waste Disposal. Safe disposal of bio-medical waste is crucial to control COVID-19. The rise in medical waste and its collection without adhering to safety protocols is risking the lives of thousands of sanitation workers who work for little pay and often without any protection or training to handle such hazardous material. The ability of India's healthcare facilities to handle the rise in waste quantities anticipated from the COVID-19 outbreak is a cause for concern. Several states have witnessed a surge in bio-medical waste. Seven states lack Common Bio-Medical Waste Treatment Facilities in Ahmedabad, COVID-19 related waste peaked to 8422 kg per day on May 4 from 82 kg on March 24. In Gurugram, the biomedical waste increased from about 400 kg per day on April 18 to 800 kg per day on May 8.

- **Common Bio-Medical Waste Treatment Facilities**
  200 (in operation); 28 (under installation)
- **Captive Incinerators operated by Health Care Facilities**
  120

Regulations. The Central Pollution Control Board (CPCB) has issued the Guidelines for Handling, Treatment and Disposal of Waste generated during Treatment, Diagnosis and Quarantine of Covid-19 Patients. Under the guidelines, isolation wards in hospitals have to maintain separate colour-coded bins for the segregation of waste. A dedicated bin, labelled 'Covid-19', needed to be kept in a separate, temporary storage room and should only be handled by authorised staff. Separate deployment of sanitation workers in these wards for biomedical waste management was also recommended. The board also asked for a record of the waste generated in isolation wards.
The Karnataka State Pollution Control Board has tightened rules for incineration of waste from hospitals and residences of the quarantined individuals, by reducing the maximum number of hours for disposal from 48 to 24.

Technology. An IIT-incubated start-up has developed a smart bin system called 'AirBin' to prevent the spread of Covid-19 through waste generated at hospitals, clinics, public places and quarantine zones. The system developed by Indian Institute of Technology (IIT)-Madras enables remote monitoring of waste accumulation levels through smart phone. The system can be retrofitted on to existing garbage bins on nearby poles, walls or the bin lids.

Sources. Rajya Sabha Unstarred Question, 17 March 2020 | CPCB, 18 March 2020 | Bloomberg, 9 April 2020| Mint, 9 April 2020 |The Economic Times, 21 April 2020 | Deccan Herald, 22 April 2020 | Deccan Chronicle, 27 April 2020 | The Times of India, May 1, 2020 | The Times of India, May 9, 2020 | Mint, May 13, 2020



Groundwater levels. The closure of industries and commercial establishments due to the lockdown has improved the groundwater level in Bengaluru. Water levels in the borewells in Electronics City increased by 67 metres (219 feet) to 90 metres (295 feet). The HSR Layout borewell showed an improvement of 2.1 metres (6.88 feet).

Water Quality. According to CPCB, the lockdown in the wake of Covid-19 has not significantly reduced pollution in the Ganga water quality. Biological Oxygen Demand and Chemical Oxygen Demand -- both indicators of the amount of oxygen necessary to break down organic and inorganic pollution -- showed "insignificant reductions.

According to CPCB, there was notable improvement in water quality in the Yamuna. With major pollutants like industries shut down and minimum human interference, there are noticeable signs that two of Bengaluru's polluted lakes, Varthur and Bellandur, are getting healed naturally.

Sources. The New Indian Express, April 22, 2020 | Deccan Herald, April 26, 2020 | The Hindu, April 28, 2020

CO_2 Emissions. According to the IEA's Global Energy Review, global energy-related carbon dioxide emissions are set to fall by almost 8% in 2020, reaching their lowest level since 2010 due to declines in coal and oil use. This would be the largest decrease in emissions ever recorded – nearly six times larger than the previous record drop of 400 million tonnes in 2009 that resulted from the global financial crisis.

There is no evidence of a direct connection between climate change and the emergence or transmission of COVID-19 disease. However, climate change may indirectly affect the COVID-19 response, as it undermines environmental determinants of health, and places additional stress on health systems, says WHO.

India's CO2 emissions have dropped for the first time in over 40 years. The fall in emissions is a result of economic slowdown and growth in the renewable energy sector.

> India's CO2 emissions fell by an estimated 15% during the month of March and are likely to have fallen 30% in April.

Sources. Newsroom, WHO, April 22, 2020 | Press Release, IEA, April 30, 2020 | World Economic Forum, May 13, 2020

Health Care. The Integrated Command and Control Centres designed for the Smart Cities Mission have been converted into war rooms for real-time data monitoring and to provide the latest information through a central dashboard. These centres in around 50 cities have been repurposed as war rooms, and have been helping the civil administration cater to the needs of health care, logistics and lockdown monitoring in real time. Smart cities were designed with inbuilt emergency healthcare support in the modules. The command centres have been designed keeping emergency scenarios and that can be used with some customisation for battling COVID-19. Features of the command centres including data analytics and AI can be leveraged with additional pandemic data from the health ministry.

Leveraging the smart infrastructure, Smart Cities are developing predictive analytics using heat maps and taking action in monitoring the movements (using geo-fencing) as well as periodic health status. The Bhopal Smart City has activated start-ups from its incubation centre, BNeST, to come up with innovative solutions in their respective fields of specialisation.

Sources. Press Information Bureau, April 7, 2020 | Hindustan Times, April 8, 2020 | Express Computer, April 12, 2020

States like Maharashtra, Tamil Nadu, Kerala, Uttar Pradesh, Madhya Pradesh, and Rajasthan are using the Integrated Command and Control Centres for:

- CCTV surveillance of public places
- GIS mapping of COVID-19-hit areas
- GPS tracking of health care workers