COVID-19's impact on India's AQI:

The COVID-19 pandemic and the subsequent lockdowns had a significant impact on India's air quality. To analyze this, we will focus on comparing

AQI levels in major cities before and during the lockdown.

1) Most Polluted Cities:

By analyzing the AQI data, we can identify the most polluted cities in India in recent years. These cities generally have high concentrations of

pollutants like PM2.5 and CO, which are the most influential factors in determining AQI as per our linear regression model.

2) Impact of COVID-19 lockdown on AQI:

To understand the impact of the COVID-19 lockdown on air quality, we can compare AQI levels in major cities before and during the lockdown.

a) Cities with improved air quality:

The stringent lockdown measures led to a reduction in industrial activities, vehicular movement, and construction work. As a result, several

cities witnessed a significant improvement in air quality. The decrease in human activities reduced the emissions of major pollutants like PM2.5

and CO, leading to lower AQI levels.

b) Cities with a spike in AQI levels:

On the other hand, some cities experienced a spike in AQI levels during the lockdown. This could be attributed to various factors like meteorological conditions, local emissions, or changes in the sources of pollution. For example, the lockdown might have led to increased household emissions from cooking, heating, and other indoor activities.

In conclusion, the COVID-19 lockdown had a mixed impact on India's air quality. While some cities experienced a significant improvement in air quality due to reduced human activities, others witnessed a spike in AQI levels. The varying impact highlights the complexity of air pollution and the need for targeted measures to address the issue in different cities.

To implement the analysis, we will follow these steps:

1) Most Polluted Cities:

a. Calculate the mean AQI for each city from 2015-2020.

b. Sort the cities by their mean AQI in descending order.

c. Display the top 10 most polluted cities.

2) Impact of COVID-19 lockdown on AQI:

a. Set a date range for the lockdown period, for example, from 2020-03-25 to 2020-05-31.

b. Calculate the mean AQI for each city before and during the lockdown.

2a. Cities with improved air quality:

a. Identify cities with a decrease in mean AQI during the lockdown compared to before the lockdown.

b. Sort these cities by the difference in mean AQI in descending order.

c. Display the top 10 cities with the most significant improvement in air quality.

2b. Cities with a spike in AQI levels:

a. Identify cities with an increase in mean AQI during the lockdown compared to before the lockdown.

b. Sort these cities by the difference in mean AQI in ascending order.

c. Display the top 10 cities with the most significant spike in AQI levels.