Problem Statement –

Since industrialization, there has been an increasing concern about environmental pollution. As mentioned in the WHO report 7 million premature deaths annually linked to air pollution , air pollution is the world's largest single environmental risk. Moreover as reported in the NY Times article, India's Air Pollution Rivals China's as World's Deadliest it has been found that India's air pollution is deadlier than even China's.

Metrological department needs us to identify and rank the districts based on the air quality index. This air quality index is the formula which takes into account various parameters such as presence of Sulphur Dioxide, Nitrogen dioxide etc. The outcome of this will help in updating the Environment policy of the district.

Requestor – Metrological department

Audience - Metrological department, Policy Department India, Pollution Control India

Data-

This data is combined(across the years and states) and largely clean version of the Historical Daily Ambient Air Quality Data released by the Ministry of Environment and Forests and Central Pollution Control Board of India under the National Data Sharing and Accessibility Policy (NDSAP).


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Above is the json excerpt of the data.

Please find the detailed description of all the pollutants captured in this dataset.

Field Name	Field Description
PM2.5	PM2.5 are tiny particles in the air that reduce visibility and cause the air to appear hazy when levels are elevated.
PM10	Particles less than or equal to 10 micrometers in diameter are so small that they can get into the lungs, potentially causing serious health problems.
NO2	Its presence in aircontributes to the formation and modification of other air pollutants, such as ozone and particulate matter, and to acid rain.
NH3	The neutral, un- ionized form (NH3) is highly toxic to fish and other aquatic life.
SO2	It irritates the nose, throat, and airways to cause coughing, wheezing, shortness of breath, or a tight feeling around the chest.
CO	When too much carbon monoxide is in the air, your body replaces the oxygen in your red blood cells with carbon monoxide. This can lead to serious tissue damage, or even death.
Ozone	Ozone is an air pollutant that is harmful to breathe and it damages crops, trees and other vegetation. It is a main ingredient of urban smog.

Based on Indian government guideline below is the breakup.

AQI Category, Pollutants and Health Breakpoints

AQI Category (Range)	PM_{10} (24hr)	$PM_{2.5}$ (24hr)	NO_2 (24hr)	O_3 (8hr)	CO (8hr)	SO_2 (24hr)	NH_3 (24hr)	Pb (24hr)
Good (0–50)	0–50	0–30	0–40	0–50	0–1.0	0–40	0–200	0–0.5
Satisfactory (51–100)	51–100	31–60	41–80	51–100	1.1–2.0	41–80	201–400	0.5–1.0
Moderately polluted (101–200)	101–250	61–90	81–180	101–168	2.1–10	81–380	401–800	1.1–2.0
Poor (201–300)	251–350	91–120	181–280	169–208	10–17	381–800	801–1200	2.1–3.0
Very poor (301–400)	351–430	121–250	281–400	209–748	17–34	801–1600	1200–1800	3.1–3.5
Severe (401–500)	430+	250+	400+	748+	34+	1600+	1800+	3.5+