

CHANGING ENVIRONMENT IN KARACHI DURING PANDEMIC SPREAD OF COVID-19

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The world is passing through most turbulent times in wake of the pandemic coronavirus outbreak. With the increasing number of patients and suspected cases, the situation across Pakistan is deteriorating, given the context of insufficient health facilities and resources.

Learning from international experience, the federal and provincial governments have decided a full lockdown in the country. As a result, not only routine livelihood of masses is disturbed, but the situation has led to closure of economic activity.

As the literature suggests, economic activity, specifically industrial production, is directly associated with carbon emissions, environmental degradation which is often measured through Air Quality Index (AQI). The AQI of major cities in Pakistan is improving post immense lock down. This scope of present analysis is restricted to Karachi the largest city and industrial hub of Karachi.

The city has six districts with a population of 16.054 million² (2.36 million households) spread over an area of 3,648 Sq. Kms. The means population density is about 14,791 person per Sq. Km. The city has two ports and hub of large-scale manufacturing. It is raked [29 out of 52](#) most polluted cities in the world.

The change in AQI is the best proxy for valuation of quality of environment. The individual Air Pollutant correspond to $PM_{2.5}$ which refers to concentration of particulate matter of 2.5 microns. These are very tiny particles reduces the visibility and when their concentration is increased, make air to be appear as hazy. For an overall AQI is calculated after incorporating the concentration of particulate matters of various size and monitoring of ozone levels etc.

$$AQI = \max(AQI_{PM_{2.5}}, AQI_{PM_{10}}, AQI_{PM_{O3}})$$

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² Population Census 2017

US Environmental Protection Agency (EPA) regularly publishes the real time historical data 'Pakistan Air Quality Monitor' which reveals important insights about the quality of air, potential health hazards. This paper is considering daily API value corresponds to concentration of $PM_{2.5}$ only.

Table 1. Air Quality Index Scale and Color Legend (US-EPA 2016 Standard)

AQI	Air Pollution Level	Health Implications	Cautionary Statement (for $PM_{2.5}$)
0-50	Good	Air quality is considered satisfactory, and air pollution poses little or no risk	None
51-100	Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
101-150	Unhealthy for Sensitive Groups	Members of sensitive groups may experience health effects. The general public is not likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
151-200	Unhealthy	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects	Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion
201-300	Very Unhealthy	Health warnings of emergency conditions. The entire population is more likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should avoid all outdoor exertion; everyone else, especially children, should limit outdoor exertion.
300 +	Hazardous	Health alert: everyone may experience more serious health effects	Everyone should avoid all outdoor exertion

Source: <https://aqicn.org/scale/> Accessed March 23, 2020.

The Table 1 above presents details of AQI value, corresponding air pollution level, health implications for the society. Karachi being economic and financial hub of the country facing rapid

environmental degradation over time. Due to industrial waste of industries the two major rivers³ of Karachi are merely effluent disposal channels, so is the bad condition of air quality, dust and haze.



Figure 1: Karachi Air Quality Index Summary 2020 and 2019
 Source: <https://aqicn.org/map/karachi/>. Accessed March 23, 2020

POST COVID-19 LOCK DOWN SITUATION OF ENVIRONMENTAL INDEX AND AIR BORNE POLLUTANTS CONCENTRATION IN KARACHI

Figure 1 above presents a comprehensive summary of AQI and corresponding legend of Air pollution levels which shows that post COVID-19 lock down. The AQI index of post lock down in Karachi has significantly improved and lies in a region, which is classified as GOOD AQI index with least pollution.

What is even more interesting, is that there are 30 days with similar AQI values between days from June 2019 to October 2019, although the city was never locked down. Post the COVID-19 episode, there are 4 days with moderate AQI values, however, there are 71 days with almost similar value of AQI in between May 2019 to December 2019.

There can be many reasons, but the two important reasons can be (i) monsoon rains and (ii) industrial slow down and layoffs by many large companies and corporations.

³ River Layari, River Malir

As we are aware that industrial production/economic activity has direct link with environmental degradation, so the above results are corroborating the evidence on ground the negative growth of 8 percent in large scale manufacturing⁴.

Albeit such lockdowns have negative impact on the economy and growth, yet its impact on environment has important insights to offer.

- Environmental degradation and poor air quality in Karachi has direct link with industrial production.
- We do have the Sindh Environmental Protection Agency but unfortunately there is no public policy for abatement against pollution damages.
- Pollution has a societal cost which is transferred from one generation to the other
- Abatement is not a free lunch, government certainly needs money, therefore, the government should design a plan and implement an anti-pollution policy including reduction in carbon emission, carbon tax, carbon permits, market-based instruments etc.
- Industrial production

The COVID-19 pandemic is one the painful episode for entire humanity. Lockdowns are not good, but is the need of the hour. Post lockdown AQI shows and the AQI of 2019 offer important insight about pollution and the level of economic activity. It is therefore recommended that the Government of Sindh should adopt an aggressive anti-pollution policy, to offset the effects of industrial pollution with timely public abatement efforts.

⁴ <https://www.arabnews.pk/node/1606506/pakistan>