



## An Impact of Environmental Air Pollution on Human Being during Covid-19 Pandemic Lockdown in Pune Municipal, Maharashtra

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### Introduction:-

Whenever economy develops, the pollution is increased. Economic development shows increasing standard of living of human beings but at the same time increasing pollution is harmful both physically and mentally for human beings. So both subjects are very important and sustainable development is the only solution.

Without making distance and caring for self and others we all are not safe. This is because our environment /surrounding situation is much unsecured economically, socially, politically, physically, mentally, environmentally. The percentage of persons below the Poverty Line in 2011-12 was estimated as 25.7% in rural areas, 13.7% in urban areas and 21.9% for the country as a whole. As per the Maharashtra state specific Poverty Lines for 2011-12, states monthly per capita (Rs.) and Rural Urban area is respectively of 967 and 1,126

Pune city population 2011,

Pune Metropolitan	Total	Male	Female
Population	5,057,709	2,656,240	2,401,469
Average Literacy	89.56%	92.47%	86.35%
Sex ratio	904		

Pune Metropolitan Areas are Dehu, Dehu road, Kirkee, Pimpri and Chinchwad Pune and Pune.

In above mention places, there is slum area and it's very difficult to maintain distance and cleaning for self and family. The main reason behind this is economic backwardness. There is no surety for job, less income, big family size, no education, traditional thinking and caste discrimination. This picture we can see in city area. Another picture is that few people are rich and their income is high, like politicians, doctors, engineers, lawyers, teachers, businessman, filmy stars etc. So they have big opportunity for getting good private hospital, good doctors, good residential places. They know how to care for self from others also.

In rural area which is not much developed compared to urban area, no proper educational facilities are available. Also people are not willing to get basic education from school and college. There is low agricultural cultivation, farms are totally dependent on nature. People have insufficient infrastructure, strong superstitions, etc and another side is feudal (Jamindar).

Our country is developing very slow, growing to become developed one. Science is growing in every field like production, agriculture, service sectors etc. One side is positive growth-development and another side is increasing pollution. It is the introduction of contaminants into the natural environment that causes harmful and adverse effects on living beings. Major forms of pollution include: Air pollution, light pollution, noise pollution, plastic pollution, soil contamination, radio-active contamination, thermal pollution, visual pollution and water pollution.

### Definition of Air pollution:-

"Air Pollution is the release of pollutants such as gases, particles, biological molecules, etc. into the air that is harmful to human health and the environment."

Meaning of Air pollution- A mix of hazardous substances from both human-made and natural sources. The primary sources of human-made air pollution are vehicle emissions, fuel oils and natural gas to heat homes, by-products of manufacturing units and power generation, particularly coal-fuelled power plants, and fumes from chemical production. Nature releases hazardous substances into the air, such as smoke from wildfires, which are often caused by people; ash and gases from volcanic eruptions; and gases, like methane, which are emitted from decomposing organic matter in soils.

### Definition Environmental pollution:-

Environmental Management, 2017

Environmental pollution is defined as "the contamination of the physical and biological components of the earth/atmosphere system to such an extent that normal environmental processes are adversely affected." For example – Covid -19 which has affected adversely the human life physically and mentally.

The restriction on local transport, businesses and industries during pandemic lockdown continued till June, it means there was less air Pollution till June 2020.

Prime Minister Mr. Narendra Modi announced a 21-day lockdown from March 25th to April 14<sup>th</sup> 2020, which was extended to May 3rd later, as the corona virus cases in India were increasing significantly, with Mumbai and Pune being the two of the most affected regions in the country. Both the regions form the backbone of the state's economy as well as play a key role in Indian economic activity as well.

### Objective:-

1. To study the condition of air pollution during Covid-19, in Pune.
2. To study the comparison of air pollution before, in-between and after Covid-19 period.
3. To find the impact of air pollution on economic changes in Pune, Maharashtra.

### Hypothesis:-

1. Positive effect of Covid-19 on environment and reduced air pollution during pandemic lockdown periods.
2. Increased air pollution always has negative effect on human being (physically and mentally).
3. Economy of city/state/country/world is collapsed because of Covid-19.

### Methodology:-

The present information or data is based on secondary data i.e. the internet, books, journals etc.

### Observation:-

The first confirmed case of the corona virus infection was found on 30th January 2020 in the state of Kerala. The affected had a travel history from Wuhan, China. Till today we all are suffering physically and mentally. Our economy is quite collapsed. Every sector, political, social and educational is suffering because of Covid-19. During this period there was pandemic lockdown in India.

#### Condition of air pollution before Covid-19 in Pune:-

Over the past five years, the air quality in the Indian city of Pune has deteriorated significantly. Data collected by the Indian Institute of Tropical Meteorology (IITM) indicates that 2018 was reportedly the second most polluted year since 2013.

By 2018, the average annual concentration of PM<sub>2.5</sub> had increased by about 60% over the past five years – jumping from 29 µg/m<sup>3</sup> in 2013 to 47 µg/m<sup>3</sup> in 2018—exceeding the country's annual national ambient air quality standard for PM<sub>2.5</sub> of 40 µg/m<sup>3</sup>. IITM led continuous air quality monitoring data shows that about 73 days in 2017 exceeded annual pollution standard, increasing to 94 days in 2018.

A recently published analysis of annual air quality trends in Pune by the Urban Emissions Air Pollution Knowledge Assessment (APnA) program<sup>10</sup> demonstrates that air quality in Pune remains an urgent public health issue in the city. That analysis, based on global chemical transport models and satellite monitoring, indicates that annual levels of PM<sub>2.5</sub> air pollution in Pune consistently exceed health-based pollution limits.

The IITM-SAFAR monitors represents the first network in India that continuously monitors and forecast air pollution levels.

#### According to data contribution to different economical sectors in Pune municipal region.

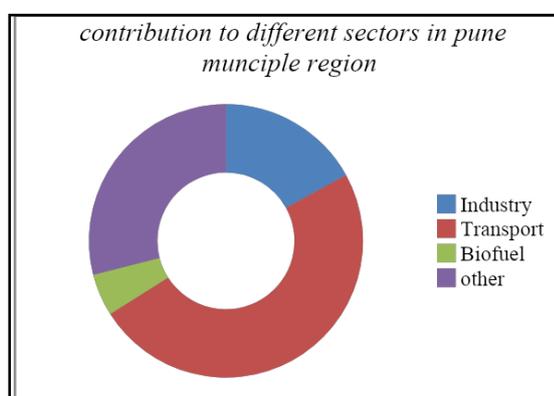


Figure : Relative contributions to PM<sub>2.5</sub> emissions from different sectors in the Pune Municipal Region, 2015. Industry- 29%, Transport- 49% ,Bio fuel-5%, other-17%.

Increasing Industry transport and bio fuel field, shows economic development. Increasing air pollution has inverse effect on human beings.

### **Pune taking efforts for reducing Air pollution**

Pune currently has a total of 15 air pollution monitoring stations across the city, operated by three separate systems. The Maharashtra Pollution Control Board (MPCB) operates a system of five monitoring stations, and IITM (through its System of Air Quality and Weather Forecasting and Research, SAFAR) program operates an additional 10 monitoring stations.

The Pune Smart City Development Corporation also maintains an independent network of 50 environmental monitoring stations, which measure air pollution, temperature, and humidity, noise, and radiation levels.

IITM's emissions inventory relied on a major data collection effort to quantify air pollution sources directly through on-the-ground field surveys and indirectly from reviews of government and industry records.

The Pune Municipal Corporation (PMC) takes the threat of air pollution seriously and is engaged in actions to reduce the health burden of air pollution within the city.

Recently, PMC floated a tender for 500 electric buses and procured 8000 bicycles, with the goal of eventually making 20,000 such cycles available. Pune is also improving street design to include by cycle only tracks under a pedestrian movement policy.

To curb waste burning, Pune has completely banned open dumping.

Pune has also adopted 20 bio-methanation plants that help reduce trash burning and polluting emissions from landfills and generate clean energy. To reduce dust particles generated during construction activities, the PMC is providing ready-mix concrete.

Four of 25 new electric buses used by Pune Mahanagar Parivahan Mahamandal Limited (PMPML) for public transport (Credit: Pune Municipal Corporation).

#### **Air Pollution through traffic (TRAP),**

The elements of human-made air pollution are vehicle emissions: ground-level ozone, various forms of carbon, nitrogen oxides, sulphur oxides, volatile organic compounds, polycyclic aromatic hydrocarbons, and fine particulate matter.

Ozone, an atmospheric gas, is often called smog when at ground level. It is created when pollutants emitted by cars, power plants, industrial boilers, refineries, and other sources chemically react in the presence of sunlight.

Noxious gases, which include carbon dioxide, carbon monoxide, nitrogen oxides (NO<sub>x</sub>), and sulphur oxides (SO<sub>x</sub>), are components of motor vehicle emissions and by products of industrial processes.

Particulate matter (PM) is composed of chemicals such as sulphates, nitrates, carbon, or mineral dusts. Vehicle and industrial emissions from fossil fuel combustion, cigarette smoke, and burning organic matter, such as wildfires, all contain PM.

#### **Air pollution effect -**

Air pollution can affect lung development and is implicated in the development of emphysema, asthma, and other respiratory diseases, such as chronic obstructive pulmonary disease (COPD).

Fine particulate matter can impair **blood vessel function** and speed up calcification in arteries.

NIEHS researchers established link between short-term daily exposure by post-menopausal women to nitrogen oxides and increased risk of haemorrhagic stroke.

According to a National Toxicology Program (NTP), TRAP exposure also increases a pregnant woman's risk of dangerous changes in blood pressure known as hypertensive disorders, which are a leading cause of pre-term birth, low birth weight and maternal and fetal illness and death.

A large study of more than 57,000 women found living near major roadways showed an increased risk for breast cancer due to air pollution.

Occupational exposure to benzene, an industrial chemical and component of gasoline, can cause leukaemia and is associated with non-Hodgkin's Lymphoma.

A long-term study, 2000-2016, found an association between lung cancer incidence and increased reliance on coal for energy generation.

Higher air pollution levels increase short-term respiratory infections, which lead to more school absences.

Children who play several outdoor sports and live in high ozone communities are more likely to develop asthma. Children living near busy roads are at increased risk for asthma. Living in communities with higher pollution levels can cause lung damage.

Women exposed to high levels of fine particulate matter during pregnancy, particularly in the third trimester, may have up to twice the risk of having a child with autism.

#### **Condition of Air pollution during pandemic lockdown of Covid-19:**

Air, water and noise pollution levels declined sharply in Pune during the first phase of the nationwide lockdown. According to findings in the Environment Status Report (ESR) of the Pune Municipal Corporation (PMC), in report PM 10 and PM 2.5, the most harmful air pollutants, have dropped significantly.

"The comparison of PM 10 and PM 2.5 during the period of March 23 to April 14 this year, compared to last year, shows a significant drop. It dropped from 83.09 and 50.18 microgram per cubic metre, respectively, to 60.60 and 37.19, respectively," stated the report, adding that PM 10 levels had dropped by 29 per cent while PM 2.5 levels had dropped by 16 per cent. As per acceptable standards, PM10 levels should be within 60 microgram per cubic metre while PM 2.5 should be 40 microgram per cubic metre.

Nitrogen Oxide, mainly emitted by fuel combustion of **vehicles**, dropped by 57 per cent during the lockdown, as most vehicles stayed off the roads. It had dropped to 6.20 ppb (parts per billion). When compared to the same period in 2019, Nitrogen Oxide levels showed a drop of 67 per cent as, between March 23 to April 14 last year, it was 19.0 ppb. The permissible level of Nitrogen Oxide is 40 ppb.

The lockdown also led to the closure of commercial and industrial units, resulting in no release of by-products or industrial emissions in water bodies, a major source of pollution in Pune. In Mula-Mutha River, which runs across the city, the Biochemical Oxygen Demand (BOD) reduced from 61.61 milligram per litre before the lockdown in March to 32.09 in April, which is close to the permissible limit of 30. A drop of around 50 per cent in BOD was registered as all commercial, private offices, hotels, restaurants and educational institutes were closed, and there was no release of sewage from them.

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**Conclusion:-**

When economic growth-development increases, the pollution also increases. But economic development is positive for human being and air pollution is harmful for human being. Whenever growth-development is increased human health becomes weak physically and mentally.

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**Suggestion:-**

- Every country should apply sustainable development, and then we all are safe in present and future.
- Every country's government should be aware about new research and very careful about it. Every country should be aware about giving licensing and do very street rule for firms and industry. There should be very strong –efficient law system /judiciary system for that.
- Preference should be given to electrical operated vehicles for transportation rather than petrol,diesel,CNG.

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