

STUDY ON AMBIENT AIR QUALITY MONITORING FROM GOVT POLYTECHNIC COLLEGE TO GUTTUR ROAD IN HARIHARA CITY

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Abstract - Air pollution is one of the most serious public health and ecological concerns in most developing countries. The primary purpose of this study was to explore into the concentrations of air pollutants and forecast the air quality index in chosen regions in Harihara. The analysis focused on important pollutants such as suspended particulate matter (SPM), sulphur dioxide (SO₂), and nitrogen dioxide (NO₂). Residential, commercial and traffic, sensitive, and industrial zones were chosen based on vehicle density. Its readings were acquired over a two-month period at five separate sites. In the months of April and May, the intensity of air quality in A K Colony is 42.025 and 42.896 g/m³. This number showed that the location's potential health impact is Minimal Impact. The intensity of air quality on Guttur road is 36.503 and 35.313 g/m³ in April and May, respectively. This number showed that the location's potential health impact is Minimal Impact. In April and May, the intensity of air quality in the Shivamogga circle is 60.438 and 61.625 g/m³. This result indicates adequate contamination, and the potential health consequence of this area is minor respiratory irritation for sensitive persons. Finally, in the months of April and May, the intensity of air quality in Harapanahalli (Mahatma Gandhi) Circle is 126.150 and 128.365 g/m³. This rating indicates that the area is considerably polluted. The potential health impact of this site includes breathing discomfort for persons with lungs, asthma, and heart problems. In April and May, there is a reasonable amount of air pollution.

Key Words: SPM, NO_x, SO_x, PM_{2.5}, PM₁₀, Air pollutants, AQI and AQM.

1. INTRODUCTION

Air pollution is contamination of indoor or outdoor environment by any toxic chemical, physical or biological agent that modifies the natural indication of the atmosphere. Air pollution is consisting of toxic chemicals or particles in the air that harm the human health, and animals, and plants. It also damages buildings. Environmental pollution is common challenging in both developed and developing nations. Presents years' large amount of toxic waste are produced into the atmosphere from the overproduction of goods increasing and burning of the fossil fuels to produce the power needed to support industrial domiciliary activities.

1.1 Air Pollution Problem in India

Polluted air has a huge influence on human vitality, agricultural practices, climate change, and as a result of the adverse consequences of air pollution, which has surpassed water pollution and nuclear contamination as the sixth biggest cause of death. Out of these, over 35000 fatalities occur in the national capital, Delhi, with the remaining 15000 deaths occurring in each industrial region, despite the fact that practically all of the attention is focused on the national capital, causing other cities and towns to suffer. Ghaziabad, Punjab, Patna, Raipur, Agra, and other cities are also suffering as a result of the widespread threat of pollution. Almost all cities are suffering from an increase in the concentration of suspended particle matter (SPM) in the air. Only a few cities in India can be emphasized where Air Quality Monitoring (AQM) has begun, resulting in improved air quality, but the majority of impacted places are small and medium-sized towns that suffer from a tremendous surge in pollution in a highly severe way.

1.2 Objectives of the Case Study

- Examine the Suspended Particulate Matter (SPM) Monitoring in sites spanning from Government Polytechnic College to Guttur Road during the months of April and May.
- Examine the levels of gaseous pollutants like as SO₂ and NO₂ that were observed in place from Government polytechnic college to Guttur road in the months of April and May.
- Comparison of SPM to National ambient air quality limits and gaseous contaminants such as SO₂ and NO₂.
- To investigate the intensity of Air Index of few chosen site spanning from Government Polytechnic College to Guttur Road.

1.3 Observation of Air Quality

The values of air salient features are pollution intensity in the air, and they often pertain to outdoor air. The values are established for a variety of purposes. Several organizations, including the WHO, the EU, and the USEPA,

have proposed criteria. These criteria are typically but not always identical, despite the fact that they are offered for the same goal. Certain time, unit, and statistical metrics must be averaged for any statically standards. Without this, there will be no difference in foundation for some specific criteria, rendering it ambiguous.

Table 1:- Typical Characteristics of NAAQS

Sl. No	Areas	Time weighted Average	SPM	SOx	NOx
1	Industrial	Annual Average	360	80	80
		24-Hours	500	120	120
2	Residential and Commercial	Annual Average	140	60	60
		24-Hours	200	80	80
3	Sensitive	Annual Average	70	15	15
		24-Hours	100	30	30

2. MATERIAL AND METHODOLOGY

2.1 Study Area

Harihara, one of the most prominent taluks in Davanagere, is located on the banks of the Tungabhadra river, 14 kilo-meters from Davanagere. Harihara is 14.52°N latitude, 75.8°E longitude, and 539 meters (1768 feet) above sea level. According to the 2011 census, the population of Harihara is 254,170 people. The fast expansion of urban regions and industrial areas causes pollution; several industries are located in and around Harihara. Harihara also supports the primary industry base. These businesses emit a considerable quantity of pollutants into the environment, affecting the health of humans and others.

2.2 Parameters Considered

Harihara is a large industrialized and urbanized transportation city, with a growing population and a growing number of transportation vehicles such as buses, cars, bikes, and so on. In this city, the three parameters are Sulphur dioxide (SO₂), nitrogen dioxide (NO₂), and suspended particulate matter (SPM). Nitrogen dioxide (NO₂) is already prevalent in the atmosphere.

2.3 Instrument Used

High volume sampler are the basic instruments used to observe the quality of environs air. It is wide spread use all over the world to count the air contaminating in the stretch such as Industrial, Residential, Commercial and Sensitive. An instrument called a high volume air sampler is used to gather

TSP exemplar. The HVAS draws a large amount of air through a pre-weighed filter for 24 hours. Dividing the mass by volume of air exemplar gives the concentration of TSP.

3. RESULTS

The air attribute monitoring of various locations in and around Harihara city is covered in this chapter. The concentrations of primary pollutants such as SPM, SO₂, and NO₂ were measured. Tables and graphs are used to explain the results of the investigation. Based on the facts and outcomes, documented discussions were undertaken.

Table 2:- Pollution Concentration During the Summer Season in the Month of April

SL.no	Locations	SPM	SOx	NOx
1	Govt. Polytechnic college	61.520	12.5	20.841
2	Shivamogga Circle	168.820	35.000	42.525
3	Harapanahalli Circle	518.833	40.000	55.360
4	A K Colony	101.800	25.800	34.340
5	Guttur	104.53	52.500	50.225

Table 3- : Pollution Concentration During the Summer Season in the Month of May

SL.no	Locations	SPM	Sox	NOx
1	Govt. Polytechnic college	61.800	13.250	20.830
2	Shivamogga Circle	172.530	32.530	43.640
3	Harapanahalli Circle	532.364	39.725	55.385
4	A K Colony	104.133	26.290	35.008
5	Guttur	101.866	52.762	49.917

Table 4 - : Result of AQI in Recognized Locations in the Months of April and May

SL.no	Locations	AQI Values in April	AQI Values in May
1	Govt. Polytechnic college	57.552	58.466
2	Shivamogga Circle	60.438	61.625
3	Harapanahalli Circle	126.150	128.365
4	A K Colony	42.025	42.896
5	Guttur	36.503	35.313

3.1 Results of The Quality of Air Index(AQI)In

The Months of April and May

The levels of air quality finding to assess the level of air pollution at each site throughout the months of April and May. The result of intensity of air quality experiment done in the Government Polytechnic College in the months of April and May. This values are 57.552 and 58.466 $\mu\text{g}/\text{m}^3$. This values indicate that the air is satisfactory contaminated possible health impact of this location is Minor breathing discomfort to sensitive people. The result of A K Colony intensity of air quality is 42.025 and 42.896 $\mu\text{g}/\text{m}^3$ in the months of April and May. This values indicated good possible health impact of this location is Minimal Impact. The Result of intensity of air quality in Guttur road is 36.503 and 35.313 $\mu\text{g}/\text{m}^3$ in the months of April and May. This values indicated good possible health impact of this location is Minimal Impact. The result of intensity of air Quality in Shivamogga circle is 6.438 and 61.625 $\mu\text{g}/\text{m}^3$ in the months of April and May. This values indicate satisfactory contaminated and possible health impact of this location is Minor breathing discomfort to sensitive people. And finally Harapanahalli (Mahatma Gandhi) Circle at intensity of air quality is 126.150 and 128.365 $\mu\text{g}/\text{m}^3$ in the months of April and May. This values indicatemoderately polluted possible health impact of this location is Breathing discomfort to the people with lungs, asthma and heart diseases. All has tolerable level of air contamination in the months of April and May.



Chart-1: Correlation with certain Regions Intensity of Air Quality in the Months of April and May

4. CONCLUSIONS

The main aim of this study was to investigate the concentrations of air contaminants and to Analyze the intensity of air quality around the selected sites in Harihara city. The investigation was conducted with reference to major pollutants like as SPM, SO_x, NO_x. As per AQI AK colony location found as Good and listed in Green zone with the values of 42.025 $\mu\text{g}/\text{m}^3$ and 42.896 $\mu\text{g}/\text{m}^3$ in the month of

April and May months respectively. As per AQI Guttur location found as Good and listed in Green zone with the values of 36.503 $\mu\text{g}/\text{m}^3$ and 35.313 $\mu\text{g}/\text{m}^3$ in the month of April and May months respectively. As per AQI government polytechnic college location found as Moderate and listed in Yellow zone with the values of 57.552 $\mu\text{g}/\text{m}^3$ and 58.466 $\mu\text{g}/\text{m}^3$ in the month of April and May months respectively. As per AQI Shivamogga Circle location found as Moderate and listed in Yellow zone with the values of 60.438 $\mu\text{g}/\text{m}^3$ and 61.625 $\mu\text{g}/\text{m}^3$ in the month of April and May months respectively. As per AQI Harapanahalli Circle location found as unhealthy for sensitive groups and listed in Orange zone with the values of 126.15 $\mu\text{g}/\text{m}^3$ and 128.365 $\mu\text{g}/\text{m}^3$ in the month of April and May months respectively. From above results we can conclude that the locations chosen are safe and within the permissible limits with referring AQI.

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