To Analysis & Assessment of Ambient air quality (GKP)

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Abstract-The industrialization rate has speeded up, especially in the lower-income nations, and so have environmental concerns. The sources of air pollution have multiplied rapidly alongside population increase and economic growth. Consequently, the ambient air quality deteriorates as a consequence of the release of a number of pollutants. Breathing difficulties, coughing, wheezing, and aggravation of cardiac and respiratory diseases are some of the health effects air pollution can bring. Since most people are exposed to it, urban air quality is a big concern. The ambient air quality in the urban residential zone of Gorakhpur is assessed in this study. With the rising rate of industrialization particularly in developing nations, environmental issues have also escalated. Parallely, as the population grows and there is economic development, air pollution sources have increased tremendously. As a result, a variety of pollutants are emitted into the ambient air worsening its quality. The impacts on health of air pollution may be difficulty breathing, wheezing, coughing and exacerbation of any respiratory and cardiovascular conditions. The analysis will reveal the concentration of AQI of the aforementioned gaseous and suspended solid air pollutants and will be matched with the permissible concentration as per the standards provided by CPCB for industrial area and all major precautions can be taken to lessen the concentration level of the air pollutants.

Keywords: Ambient Air Quality, Air Quality Index, AQI Methods, RSPM.

1.INTRODUCTION

Air Quality Index (AQI) is a standardized method of conveying air quality information to the public. It represents air quality in numbers and classifies it into levels (Good, Moderate, Unhealthy, etc.) along with color codes and public health advisories. The AQI enables people to comprehend how air pollution could affect their health and exercise proper precautions.

In India, the Central Pollution Control Board (CPCB) has also evolved a notion of designated best use. Noise can be characterized as an unpleasant and unwanted sound. Exposure to loud noise is indeed irritating and damaging as well. Different scales of noise have been proposed to define in a single value, the reaction of an average human being to a complicated sound composed of different frequencies at different loudness levels. The scale has been developed to weigh different elements of noise based upon the reaction of a human ear. The industrial wastes are regarded as hazardous wastes since they consist of chemical substances that are harmful to plants, animals and human.

2.OBJECTIVE

1.Monitoring and measuring ambient air quality levels in the various zone.
2.The primary function of AQI is to alert the public to the possible health effects of with air pollution and to advise the public individuals on how to protect themselves.

3.STUDY AND DESCRIPTION

A study on the effects of air quality was conducted at the Gorakhpur.
1) Industrial Area
2) Commercial Area
3) Institutional Area
4) Tourist Area
5) Green Zone

Gorakhpur Industrial Developmental Area Authority (GIDA) is situated in up India, Gorakhpur. It is on NH28 Which main city approximately 13km. Here lots of big companies like (steel, fast-food, medical instrument,) to provide quantity to city.

Close to ZEROPOINT is a tourist spot point. It points divert all city vehicle. Many vehicles goes in this area in peak(9-11am) hour vary large traffic density. In this area the air average AQI is moderate in summer monsoon.

NAUSAD is entry point Gorakhpur city junction point of two city Banaras and Lucknow. More traffic density in this area. In peak hour AQI is poor condition but average data calculation between moderate/ poor.

Research on the impact of air quality was performed at the Madan Mohan Malaviya University of Technology (MMMUT), Gorakhpur. MMMUT is situated in Gorakhpur on the state highway connecting Gorakhpur and Deoria.The city gets an average of about 1230 mm rainfall every year. All India Institute of Medical Sciences, Gorakhpur popularly referred to as AIIMS Gorakhpur is a public medical university situated in the Gorakhpur, Uttar Pradesh. It is one of the 20 functional AIIMS in India. Under monitoring the level of various air pollutants in study area are assessed which are utilized for calculating Air Quality Index.

Fig.1(Map study research location in Gorakhpur city)

4.METHODOLOGY

An Air Quality Monitoring System Function

(1) PCB – Platform or Embedded the PCB controls power, processing, and communication. It does analogue to digital output conversion, has BMS (Battery Management System) support, and allows data logging and communication through Wi-Fi, Bluetooth, or LoRa.

(02) Sensors – For Air Quality Detection Sensors pick up pollutants and are calibrated for precision. Automation assists them in adapting to conditions such as temperature and humidity.

(03) Housing – Safeguarding the System The housing provides adequate air sampling for accurate readings. A design for perfection minimizes interference. Weatherproofing shields against environmental deterioration, while a strong structure provides durability.

5. DATA & RESULTS

The results of the assessment of Ambient Air Quality, Noise Level , humidity ,temperature, in industerial, institutional, tourist,Green area are given here.

6. MAP STUDY

(Figure of research location Gorakhpur city)

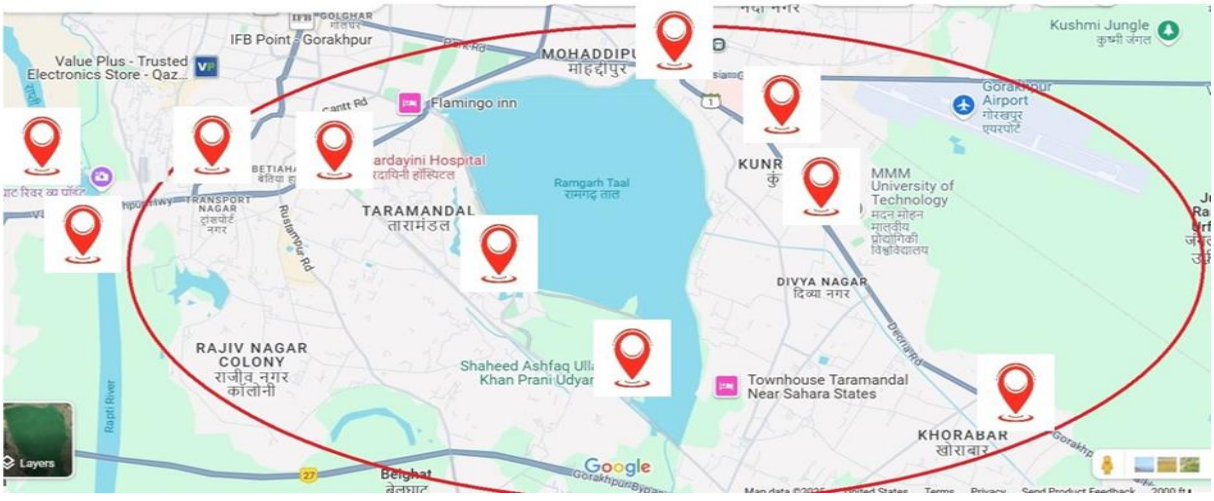


Table no.1

Kipm Gida GORAKHPUR									
DATE	TIME	AQI	PM2.5	PM10	PM1	Temperature	Humidity	Noise	tovc
25-04-25	Morn.	143	73	85	46	25.7	66	58.8	2.127
03-05-25	Even.	90	30	36	22	25	40	45	0.61
Zero-point Gorakhpur									
25-04-25	Morn.	257	107	117	84	35.5	30	71	0.495
27-04-25	Even.	58	35	44	25	33.8	28	37	0.599
Sahjanwa Gorakhpur									
28-04-25	Morn.	337	168	179	108	32.3	43	92	0.593
28-04-25	Even.	329	158	173	117	28.8	52	75	0.553
Nausad Gorakhpur									
29-04-25	Morn.	88	53	66	37	34.5	44	85	0.472
30-04-25	Even.	95	57	70	39	32.2	44	69	0.45
Transport Nagar Gorakhpur									
02-05-25	Morn.	328	156	182	91	20	89	87	0.47
03-05-25	Even.	80	48	64	31	30.8	45	80	0.434
Deoria Bypass Gorakhpur									
02-05-25	Morn.	327	155	178	100	23.3	81	54	0.408
02-05-25	Even.	52	31	36	22	31.6	48	68	0.321
Mohaddipur Gorakhpur									
05-05-25	Morn.	150	75	86	49	31.1	52.2	60	0.634
04-05-25	Even.	47	28	31	20	31.5	48	52	0.411
AIIMS Gorakhpur									
05-05-25	Morn.	177	83	94	53	28.3	59	83	0.776
04-05-25	Even.	55	33	36	24	31.1	46	86	0.311

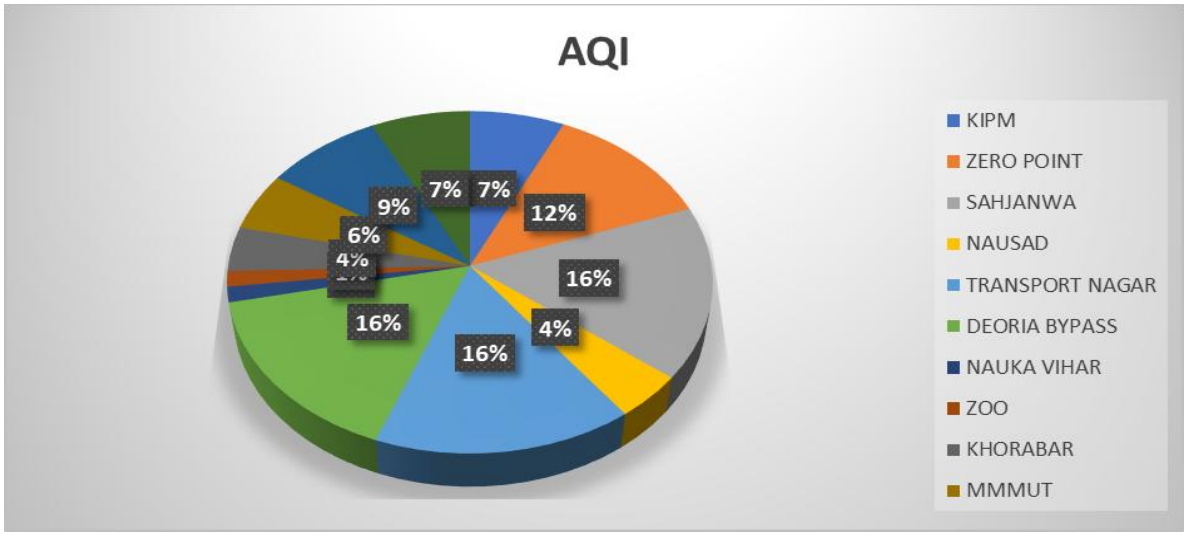
Table no.2

Nauka Vihar Gorakhpur									
DATE	TIME	AQI	PM2.5	PM10	PM1	Temperature	Humidity	Noise	tovc
04-05-25	Morn.	30	18	19	13	30	56	86	0.282
03-05-25	Even.	100	60	62	40	30.5	53	55	0.438
Zoo Gorakhpur									
01-05-25	Morn.	30	18	20	13	26.7	58	79	3.232
02-05-25	Even.	323	150	168	95	31.5	59	66	0.689
MMMUT Gorakhpur									
06-05-25	Morn.	113	64	78	46	28.4	62	69	0.73
06-05-25	Even.	63	38	45	27	32.4	53	71	0.6
Khorabar Gorakhpur									
06-05-25	Morn.	87	52	64	36	30.7	56	72	0.37
06-05-25	Even.	82	49	60	34	29.9	53	57	0.38

(Figure of monitoring AQI of Nausad Gorakhpur)

(Figure of monitoring AQI Zoo Gorakhpur)

CHART OF AQI:

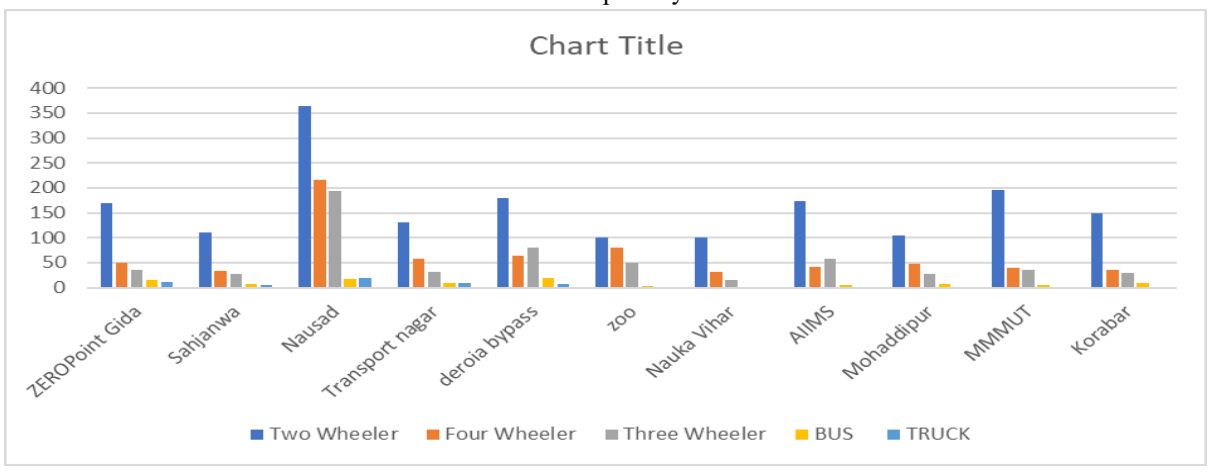


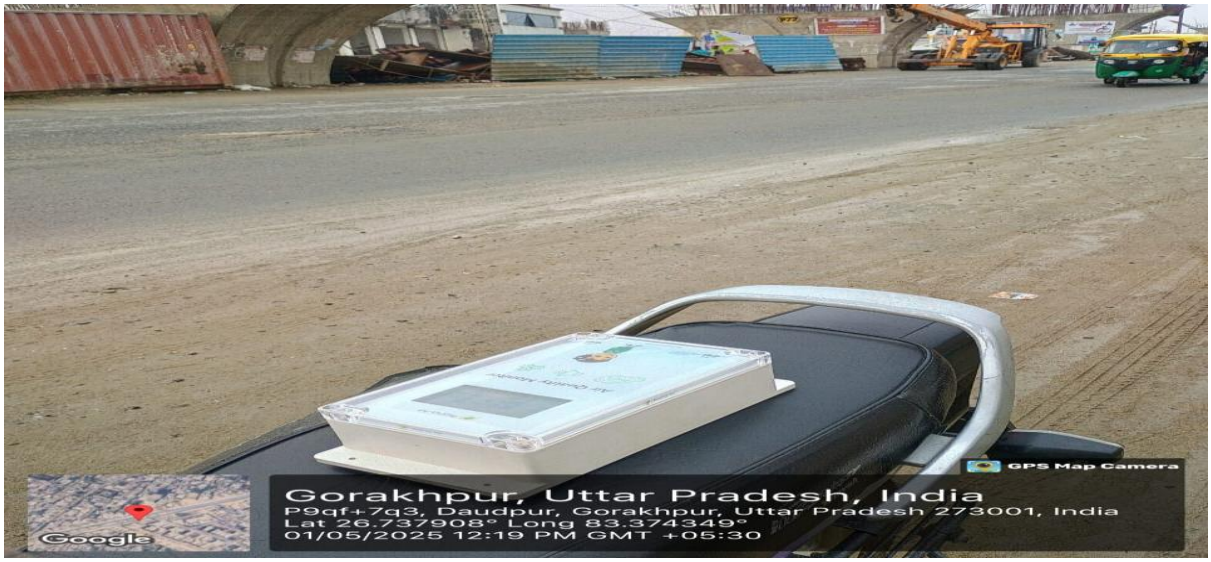
(Figure of Pie chart all location Gorakhpur city)

7.Traffic Volume Calculation

A traffic volume survey is also known as a traffic flow survey or simply a traffic survey. It is defined as the method for establishing the volume of traffic passing on the roadways at a particular stretch during a given time. It is measured in terms of vehicles per minute, hours, and days. The movement of the different vehicle classes needs to be converted into a common vehicle class called the passenger car unit to represent the traffic movement on a road per unit time. Traffic volume varies during the day.

CHART: A Bar of Traffic volume of all location Gorakhpur city





(Figure of traffic volume counting Deoria bypass Gorakhpur)

Table no.3

TRAFFIC VOLUME COUNT							
NAME OF ROAD-		GORAKHPUR TO LUCKNOW ROAD					
DATE FORM-		26/04/25-06/05/2025					
DISTRICT-		GORAKHPUR					
Date	Location	Two-Wheeler	Four-Wheeler	Three-Wheeler	Bus	Truck	Total
26-04-2025	ZEROPoint Gida	170	50	35	15	12	282
28-04-2025	Sahjanwa	110	34	28	8	6	186
29-04-2025	Nausad	364	216	194	18	20	812
01-05-2025	Transport Nagar	130	57	31	10	10	238
01-05-2025	Deoria bypass	180	64	80	20	8	352
01-05-2025	zoo	100	80	50	3	0	233
04-05-2025	Nauka Vihar	100	31	16	0	0	147
04-05-2025	AIIMS	174	42	57	5	0	278
04-05-2025	Mohaddipur	105	47	28	7	0	187
06-05-2025	MMMUT	195	40	35	5	0	275
06-05-2025	Khorabar	150	35	30	9	0	224
TOTAL		1778	696	584	100	56	3214
AADT		161.66	63	53.03	9.09	5.09	274
CONVERSION FACTOR		0.5	1	1	2.2	2.2	
PASSANGER CAR UNIT		86.5	67	54	24.2	13.2	244.9

(Table of traffic volume counting peak hour of all location of Gorakhpur city)

8. CONCLUSION

The regular checking and surveillance of the industries (i.e., small-scale industries) by the authorities to inspect and verify compliance cannot be carried out as the officer concerned is engaged in several administrative tasks. the condition of roads is very poor and chicken-necks at traffic points are leading to heavy vehicle traffic jams.

In addition, GIDA Industrial Area lacks an ideal drainage system and thus becomes waterlogged.

Vehicular pollution is also a significant problem of the city of Gorakhpur and, being an old city, the city's road infrastructure is not ideal for the smooth flow of traffic and requires reinforcement. Increased vehicle numbers and traffic flow caused significant contribution towards air pollution.

9. REFERENCE

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