Thematics Journal of Geography

ISSN: 2277-2995
Vol-8-Issue-10-October-2019

A Research Study To Improve The Level Of "Air Pollution" In Meerut City, One Of The Biggest Urban Profile Of National Capital Region

Dr. Kanchan Singh[1]
HOD, Geography Deptt.
Meerut College, Meerut

Dr. Sangeeta[2]
Ph.D. (Geography)

INTRODUCTION

The word Pollution has been derived from the Latin word 'Pollutionem' (meaning to defy or make dirty). Pollutant is a substance, the presence of which causes pollution. The pollutants reach us through the air we breath, the water we drink, the food we eat and the sound we hear. Odum (1971) described Pollution as "an undesirable change in the physical, chemical or biological characteristics of our air, land and water that will harmfully affect human life or that of desirable species, living conditions etc.". There are seven main types of Pollutions in the environment (i) Air Pollution (ii) Water pollution (iii) Land pollution (iv) Industrial Pollution (v) Sewage Pollution (vi) Noise Pollution (vii) Radiation Pollution. This paper deals with the sequence of various acoustical disturbances caused in the wake of Air Pollution in the segments of industrial, commercial and traffic activities; how it would be harmful to the society at large, explaining its insidious effects and the measures to be adopted to contain its adverse and ill-effects against deterioration of the environment.

AIR POLLUTION

Air pollution, both indoor and outdoor, is a significant cause of health problems worldwide. Urban and rural outdoor environments contain infections, allergens, irritants and chemical toxins that can reduce the quality of life and cause disease. Inhaled air pollution is directed at the nose, throat and lungs. The exposed airway allows hazardous pollutants to enter the body and all tissues are ultimately exposed.

Airborne chemicals contaminate food and water. They may be ingested and are also collected in the nose and throat and swallowed, often in mucus that attempts to protect exposed surfaces. Airborne chemicals entering the digestive system include well-known toxins such as pesticides, organophosphate, PCBs, dioxin, arsenic, cadmium, lead, and mercury. In addition, occupational exposures to airborne pathogens can be intense and can cause cancer.

While ambient air pollution is a major concern, indoor air can be more polluted than outdoor air. Building materials and furnishings are a source of volatile chemicals. A decrease in indoor air quality is the result of reduced ventilation and efficient construction practices, sealing homes and office buildings from the outdoor environment

The tolerance for environmental destruction is ancient and human history is littered with civilizations that failed because humans indiscriminately exploited natural resources and spoiled their own nest. Humans

ISSN: 2277-2995
Vol-8-Issue-10-October-2019

adapt easily to deteriorating conditions and will persist in following daily routines even when air pollution is severe, traffic is congested, water and food supplies are at risk, and social order is unstable.

Smoking tobacco remains a personal method of producing air pollution that remains popular worldwide, despite overwhelming evidence that tobacco smoke produces a long list of disabling and fatal diseases. It is estimated that 30% of all fatal cancers could be prevented, if tobacco smoking were eliminated from the list of air pollutants.

The sad part of our current predicament is that all the right ideas for creating a healthy environment have been around for decades and have been clearly articulated in many forms by a host of intelligent people. The right ideas involve unselfish and compassionate behaviour. The right ideas involve long-term planning, conservation and deep commitment to preserving the natural world. Without a healthy natural environment, there will be few or no healthy humans.

Our big environmental problems are built from many small, personal decisions - little mistakes that add up over time. If there is a solution, it will emerge from the collective value of millions of better decisions made by individuals all over the globe. The environmental action plan is to think globally and act locally - it does make sense.

AIR POLLUTION: WHAT WE TEST?

We monitor the following pollutants in ambient air;

1. Suspended Particulate Matter.
2. Respirable Suspended Particulate Matter.
3. Nitrogen Dioxide.
4. Sulphur Dioxide.

METHODOLOGY

Pollutants	**Measuring Method**	**BIS No.**	**Time Average**
SPM (PM100)	Respirable Dust Sampler	IS- 5182(Pt 4) 1973	24 Hr
RSPM (PM10)	Respirable Dust Sampler	IS- 5182(Pt 4) 1973	24 Hr
Sulphur Dioxide (SO2)	Improved West and Gaeke	IS- 5182(Pt 2) 1969	24 Hr
Oxides of Nitrogen (NOx)	Sodium Arsenite	IS- 5182(Pt 6) 1975	24 Hr

HEALTH IMPACT

Major Air Pollutants and Its associated Health Hazards

Name of Pollutant	**Health Impacts**
RSPM	Respiratory Illness, Including Chronic Bronchitis and Asthma; Heart Diseases.
SO_2	Heart Diseases; Respiratory Problems Including Pulmonary Emphysema, Cancer, Eye Burning, Headache, Etc.
NO_2	Lung Irritation, Viral Infection, Airway Resistance, Chest Tightness, Etc.
SPM	Pneumoconiosis, Restrictive Lung Diseases, Asthma, Cancer, Etc.
Benzene	It Causes Immunotoxicity, Carcinogenicity, Asthma, Anemia, Unconsciousness Etc.
Ozone	Impaired Lung Function, Chest Pains, Coughing, Irritation of Eyes, Nose Etc.
CO	CO Poisoning Cause Cherry Lips, Unconsciousness, Death by Asphyxiation Etc.

ISSN: 2277-2995
Vol-8-Issue-10-October-2019

Lead	It Causes Decreased Hemoglobin Synthesis, Anemia, Damage the Nervous And Renal (Kidney) Systems Etc.

AIR QUALITY IN MEERUT CITY

India, an emerging nation must keep the pace of development growth to survive their natives. Meerut is participating in the development growth of India. According to Bureau of Indian Standard, there are four kind of Pollutants such as SPM (Suspended Particulate Matters), RSPM (Respirable Suspended Particulate Matters), SO_2 (Sodium Dioxide) and NO_2 (Nitrogen Dioxide). Our study of Pollution in Meerut city is depended on the above pollutants. We include the different locations (main traffic areas) of Meerut city in the study. The locations are as under;

1. Bhainsali Bus stand (Traffic Area)
2. Railway Road Crossing (Traffic Area)
3. Begum Bridge Crossing (Traffic Area)
4. Hapur Stand Crossing (Traffic Area)
5. Saket Colony (Residential Area)
6. Medical College (Sensitive Area)

Ambient Air Quality Monitoring Station: Railway Road Police Station:

Sl. No.	**SPM/u/m^3**	**SO_2/u/m^3**	**NO_2/u/m^3**
Jan – 2001	746.64	28.03	
Feb – 2001	741.97	26.33	
Mar – 2001	688.41	29.13	
Apr – 2001	645.99	29.81	
May – 2001	589.60	29.13	
Jun – 2001	405.29	26.37	
July – 2001	464.65	21.93	21.40
Yearly Average	**730.46**	**30.43**	**25.84**

Source: TIMES OF INDIA

As far as SPM is concerned, the following average figures for all the locations are below the permissible norm of 200 u/m^3 and show highest order of pollution. This could be attributed to high vehicular pollution, poor riding surface, etc.

AIR POLLUTION AT VARIOUS SURVEYED POINT AT MEERUT CITY

Bhainsali Bus Stand is main bus stand of Meerut city, all Roadways/Government Operated Buses are gone through this bus stand. When we go through the collected data of SPM, RSPM, SO_2 and NO_2 in air at Bhainsali Bus Stand in year 2002, 2004 and 2006, we look a rapid increment in the air pollution in between 2002 to 2004. The SPM level had been more than doubled from 734.28 ug/m^3 to 1648.07 ug/m^3. After 2004, we see a very normal increment in the SPM level from 2004 to 2006. When we see the data of Respirable Suspended Particulate Matter, we see the same pattern as well as SPM level. In 2002 the RSPM level was 235.68 ug/m^3, in 2004 it was 481.78 ug/m^3 and in 2006 the RSPM level was 523.28 ug/m^3. The Sodium Dioxide level in air in 2002, 2004 & 2006 at Bhainsali Bus stand were 14.10 ug/m^3, 15.66 ug/m^3 and 16.56 ug/m^3 respectively. Same growth is shown in the case of NO_2 (Nitrogen Dioxide). In 2002, at Bhainsali Bus

ISSN: 2277-2995
Vol-8-Issue-10-October-2019

Stand the Nitrogen Dioxide level in air was 121.52 ug/m^3, after 2 year, in 2004 the Nitrogen Dioxide Level was 166.11 ug/m^3 and in 2006 that was found 185.09 ug/m^3.
According to BIS the standard level of SPM, RSPM, SO_2 & NO_2 are 200 ug/m^3, 100 ug/m^3, 80 ug/m^3 & 80 ug/m^3 in the traffic area. But at the Bhaisali Bus Stand the pollution level is more than 100% of the standard level. There is significant increment in Air Pollution Level in 2002 -2004.

Railway Road Crossing, the main crossing point of Meerut city, it is very old and having the narrow roads for incomings & outgoings. At this point, the pressure of commuters is most; it is main chouraha of the city. The SPM level in 2002 was 1605.55ug/m^3, RSPM level was 410.35ug/m^3, Sodiun Dioxide level was 12.71 ug/m^3 and Nitrogen Dioxide level was 145.51 ug/m^3. These all were more the standard. Only SO_2 level was below the permissible level. The pollution at Raoilway Road Crossing has been increased by 100 % in the four year from 2002-2004-2006.

Begum Bridge Crossing, there was a significant change in the pollution level. Within four years (2002-2006) the increment of SPM level was from 992.23 ug/m^3 to 1202.85 ug/m^3. Even in first two years, there are shown a rapid change as from 992.23 ug/m^3 to 1150.83 ug/m^3. After 2004, there was some brake on the acceleration of increment of air pollution. The increasing speed was less in comparison of earlier increasing speed.

Saket Colony, a residential area, here the SPM level was 558.84 ug/m^3 and 586.47 ug/m^3 in 2004 & 2006 respectively. These values are too much high and the air of this area is not for healthy breathing.

Medical College come under the sensitive area because there are a lot of incomings & outgoings of patients. This area is one of the most polluted areas in Meerut city. In 2002, Medical was the most polluted area in Meerut as the SPM level was 1110 ug/m^3. After 2002, there was done a lot of work to reduce the pollution level in this area. As 2004 the SPM level was 409 ug/m^3 and in 2006 the SPM level was 470 ug/m^3. But still it is very high in comparison to the standard as 100 ug/m^3 for sensitive areas.

REASONS FOR AIR POLLUTION AT VARIOUS LOCATIONS

There are a lot of reasons behind this unaccepted/unpredicted increment of air pollution. Some of them are as follows;

1. Increment of the usage of personal vehicles.
2. Due to increment of population growth, the conveyance system also be expanded. The result is more vehicles on the road.
3. Operation of Industries in the residential area.
4. The increment of vehicles on the Highways and all vehicles pass over the Meerut City through Delhi road.
5. Industrial Development is not in proper way. There are a lot of SSIs which are located in very high-density population area / residential area. The smoke/gases of those
6. Bhainsali Bus Stand doesn't have much space to operate the large numbers of vehicle's entry & exit. And the roads on the points of entry & exit of the bus stand very narrow, so that all the times, there are Jams, sometimes bus drivers supposed to use the exit gate to fill their vehicle. The drivers keep the engine in running condition when the passengers get their sheets; the result is the increasing pollution.

ISSN: 2277-2995
Vol-8-Issue-10-October-2019

7. Improper traffic signal system is also a main reason of increasing pollution at inter-crossings. Due to improper traffic system, there is slow traffic or jams on the roads or intersections. The result is the running engines without moving.
8. Most of the vehicles on roads are of very old technology.

SUGGESTIONS TO IMPROVE THE QUALITY OF AIR IN MEERUT CITY

1. City Administration should ensure the industrial activities must be out of residential areas. All operational Small-Scale Industries must be relocated to out of the city residential area.

2. Intercity public conveyance must be modernized and should be focused on last mile connectivity to reduce the burden of personal vehicles on roads.

3. Public Transport must be prioritized to Electric Vehicles.

4. All vehicles which must be destined to other locations and just passed Meerut City, must not enter the city area, it should be used bypass roads.

5. All traffic signals must be automated, and the duration of Red & Green Light must be set scientifically and as per traffic survey at different traffic crossing points at different points of time.

6. Old technology vehicles must be removed from roads.

7. Electric vehicles must be promoted in public as well as private domain.

	S.P.M			**R.S.P.M**			**SO_2**			**NO_2**		
Place	**2002**	**2004**	**2006**	**2002**	**2004**	**2006**	**2002**	**2004**	**2006**	**2002**	**2004**	**2006**
Desirable Limit	**(200)**			**(100)**			**(80)**			**(80)**		
Bhainsali Bus Stand (Traffic Area)	734.28	1648.07	1698.74	235.68	481.78	523.28	14.10	15.66	16.56	121.52	166.11	185.09
Railway Road Crossing (Traffic Area)	1605.55	2499.25	2958.54	410.35	574.40	638.29	12.71	20.00	23.89	145.51	232.00	246.40
Begum Bridge Crossing (Traffic Area)	992.33	1150.83	1202.85	234.66	291.15	306.06	11.84	14.67	15.75	90.49	116.00	124.55
Hapur Stand Crossing (Traffic Area)		1464.30	1584.28		435.96	440.34		17.00	17.45		180.00	202.06
Saket Colony (Residential Area)		558.84	586.47		157.09	173.50		05.00	06.87		90.00	105.79
Desirable Limit (Sensitive Area)	**(100)**			**(75)**			**(30)**			**(30)**		
Medical College (Sensitive Area)	1110.53	409.64	470.00	260.86	152.95	155.98	12.30	10.00	10.32	128.70	70.00	75.95

Test results of ambient air quality analysis at different sites in Meerut on request of Janhit Foundation (Local NGO)

REFERENCES:

♦ Ambasat, R.S. (1990) Environment & Pollution, An Ecological Approach, Varanasi

ISSN: 2277-2995
Vol-8-Issue-10-October-2019

- Bhagat, R.B. (1992) Components of Urban Growth in India with Reference to Haryana: Findings from Recent Censuses, Nagarlok, Vol. 25, N. 3, Page 10-14
- Bose A.: India's Urbanisation: 1901-2001, Tata McGrow
- Commission on Urbanization. Vol. 2. (1988)
- Dr. G.P. Shivashankara – "Environmental Impact Assessment of Urban Slums in Bangalore Agglomeration", The ITPI Journal, 5:2 (2008) Page 19-25.
- Dr. R. Ramachandran – "Urbanization And Urban System in India"
- Dr. Savinder Singh – Environment Geography
- http://meerut.nic.in/Health/health_main.htm
- Jha, D.K. – "Crowing in a Crisis: Are we headed far a disaster"
- Maitra A.K.: Managing Urban Environment in India -
- Maitra AK.: Urban Environment in Crisis, New Age
- Mohan R.: Urbanisation in India: Patterns and Emerging
- National Institute of Urban Affairs: Report of the National
- Sutapa Maiti and Praween K. Agrawal - J. Hum. Ecol., 17(4): 277-287 (2005) Environmental Degradation in the Context of Growing Urbanization: A Focus on the Metropolitan Cities of India
- www.gsi.gov.in
- www.maps.google.co.in
- www.mapsofindia.com
- www.meerut.nic.in
- www.surveyofindia.gov.in

