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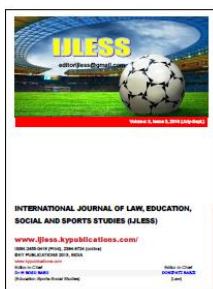
(Law)

Understanding the Air Pollution of Raipur City, Chhattisgarh, India: A Geo-statistical Approach

INDRAJIT MANDAL

Assistant Professor, Department of Geography, Chandidas Mahavidyalaya,
Birbhum, West Bengal, India.
E-mail: indrajit13@gmail.com

RESEARCH ARTICLE



ABSTRACT

Air pollution in Raipur has become a serious threat to the people recently and it is worsening day by day. The run of becoming a developed city is hampering the quality of air for our breathing. The construction activities, industries, transportation, dry soil etc. are the key factors for increasing pollutants level in the air in terms of PM 10, PM 2.5, NO₂ and SO₂. The data analysis of these pollutant concentrations of Raipur city has been done here to show the air quality status. The future and remedial measures of air pollution have been also discussed here.

Keywords: Pollution of Air, PM 10, PM 2.5, NO₂, SO₂, Pollution Level, Health Hazard

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INTRODUCTION

Air pollution is the most serious problem of Raipur city. Its effects have now become responsible for the development of air pollution control strategies and other pollution impact analysis programs; have long been faced with the basic need to understand the relative importance of source impacts. Chhattisgarh's capital Raipur has earned the undesirable achievement of being among seventh top polluted cities in the world according to World Health Organization report. This is for the second consecutive time that World Health Organization in urban air quality data base figures puts Raipur on highly polluted cities in the map. In 2014, World Health Organization stated that Raipur was the third worst city in India. Raipur city found its way in the list of top 20 polluted cities in the world. In Raipur the organic carbon's structure percentage in atmosphere is 30% -33% which is double than other cities of Chhattisgarh. It takes the city to higher level in terms of respiratory problems, chronic asthma, skin diseases etc.

Chhattisgarh has recorded 100% increase in respiratory diseases and cardiovascular diseases in last few decades, due to huge increase in bacterial and allergens concentration in atmosphere. Besides, extreme heat coupled with less rain has made it worse for the human health. Such result indicates air pollution is a serious issue in Raipur city and it has a trend of further decay in future. The major pollutants are taken for my study is- PM₁₀, PM 2.5, SO₂, NO₂.

PURPOSE OF THE STUDY

In summer, soil and road dust can contribute about 26% to PM₁₀ and PM_{2.5}. The silt load on some of the Raipur's road is very high and silt can become airborne with the movement of vehicles, particularly in dry summer season. More than 65 tons per day is the estimated PM 10 emission in the city and soil also contributes the air pollution here. During summer season; the gas emitted from the vehicles in the city contributes the concentration of PM 2.5. Several measures have been taken to control emissions in the industry (including relocation), especially in small and medium-size industries. However, it is recommended industries use light diesel oil and high speed diesel of sulfur content of 500 ppm or less in boilers or furnaces, if not already being used. Reports say that nearly 19% of the total air pollution in the city comes from the Urla and Siltarasponge and power plants. Rapid increase in temperature of Raipur city and effect of pollution has created an adverse effect on health of humans. The pollution for future years is calculated by adding the mean arithmetic increase to the last known pollution level.

OBJECTIVES OF THE STUDY

The Primary objectives of the study are:

- To analyze the Air Pollution Data for various locations in Raipur city to identify patterns of spike in Air Pollution levels with respect to various monitored parameters.
- To analyze the Metrological factors that relates with the air pollution levels for the respective locations of Raipur city.

METHODOLOGY OF THE STUDY:

For my analysis I have selected one site – Collectorateparisor and Jaistambhchowk of Raipur city where maximum value of AQI obtained. These sites are selected because of its location at the center of the city, having transportation consequences. In this paper, I have analyzed data of various years from 2010 to 2016. Graph shows the increasing rate of PM10 which is the main component of the pollution. Prediction for the future year is done with the help of graphical measures from the data like line graph.

RESULTS & DISCUSSION OF THE STUDY:

The statistics of air quality in Raipur suggests that PM10 and PM2.5 are the major pollutant which is severe in nature. Immediate serious action should be taken to reduce their level in the atmosphere.

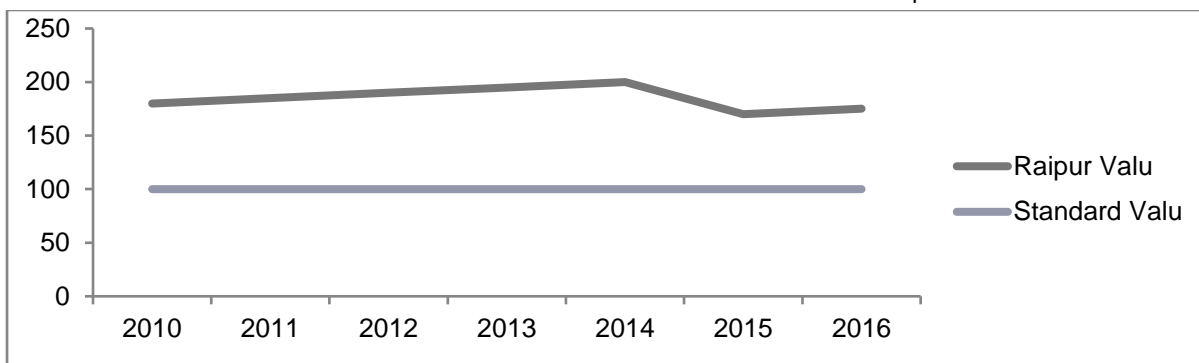


Figure 1: Line Graph of PM 10 in Raipur City (showing that PM10 level is exceeding the critical level)

By these graphs, I conclude that in 2014 the PM10 is higher in normal ranges it belongs to one of the metro and developed cities and leads to facing many health hazards. After this sudden increase of pollution, Raipur government had taken many measures like even odd policy on vehicles, enhancing parking fees by four-times, banning the entry of truck in the city etc. By these actions graph gradually decreases in later period. In Raipur city, due to initial development of the city, the pollution level increases gradually from the year 2015 to 2016. The greater concentration of industries along with transportation facilities is responsible for the increase of PM10 pollutants.

While the PM2.5 level is keep on increasing in the cities due to the race of becoming fastest growing cities activity like construction, locomotive exhausts, other operations that involve the burning of fuels such as wood, heating oil or coal etc. Burning of forest and garbage burning led immense increase of PM2.5. Immediate action needs to be taken to solve the issue and improve the PM 2.5 level in air.

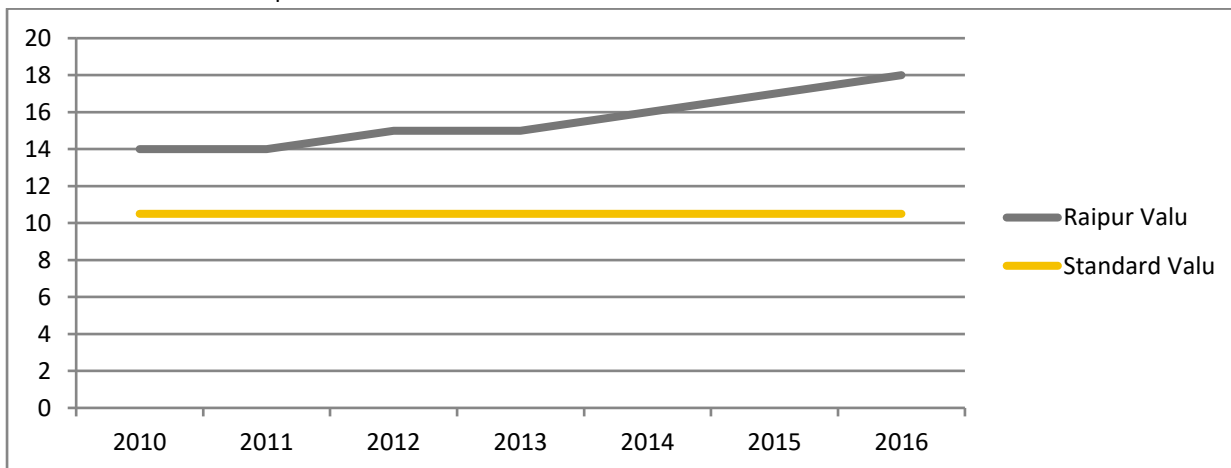


Figure 2: Line Graph of PM 2.5 Result Analysis (showing PM2.5 level which is exceeding the sever level)

Now, the concentration of NO₂ and SO₂ level in the city shows no harm and their level is quite under the critical limit. Therefore, these pollutants are not creating any environmental problem.

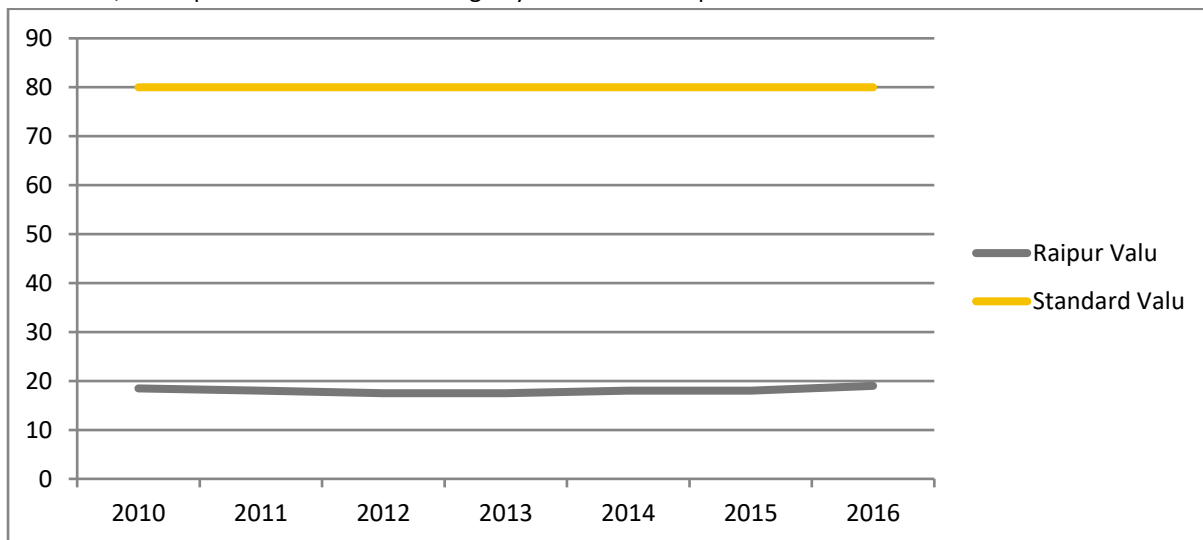


Figure 3: Line Graph of NO₂ Concentration in Raipur City (showing that NO₂ level is quite below the critical level which is satisfactory)

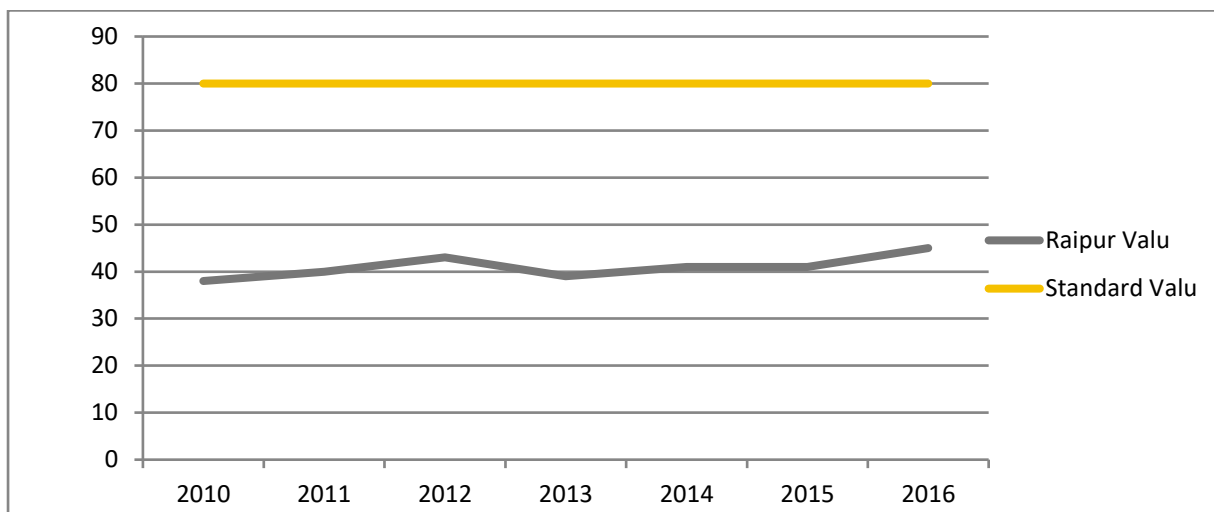


Figure 4: Line Graph of SO₂ Concentration in Raipur City (showing that SO₂ level is quite below the critical limit which is satisfactory)

CONCLUSION:

From analyzing the data of PM₁₀, I have concluded that Raipur will reach the severe condition after 4 to 5 years and as PM_{2.5} are dangerously increasing therefore health illness will be a serious threat here. If we are not taking a stand towards the pollution of Raipur today, it's no time that we will face the dangerous condition in future. E-rickshaw is a simple solution to replace the diesel gas, provision of green cover, use of low Sulfur fuel and modification of normal engine into Bharat VI Standards, use of LPG gas, supercritical technologies must be adopted in power sector, vertical shaft kilns, Hoffman kilns, and tunnel kilns for brick manufacturing, implementing stringent emission in power plants and big industries.

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