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Comparative analysis of air pollution of Delhi and Raipur city

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ABSTRACT

Air pollution is a challenging problem globally and the complete globe is facing the hazard caused by it. The level of air pollution of Raipur city is increasing day by day and it will soon reach the current scenario of Delhi. Our project deals with the collection of data of various components of air pollution year wise of Delhi and Raipur and analysis the rate of growth of pollution level in Raipur. This study highlights the identification of emission sources, action plan, and control option to bring the healthy environment. The present study gives a description of air quality index for Raipur city. Major parameters considered for AQI computation are SPM, RSPM, NO_X, and SO_X. Play principal role governing AQI.AQI for Raipur is in very poor and unhealthy zone with high value. Raipur being the capital city runs a larger number of vehicles with higher population contributing higher environment loading and finally high AQI. The climatic conditions, industrial and mining activity and vehicular activity of the locality are mostly responsible for high AQI in Raipur.

Keywords: *Air quality index, Higher environment loading, Identification of high emission sources.*

1. INTRODUCTION

Specific Air pollution 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 capital Raipur that has earned the undesirable achievement of being among seventh top polluted cities in the world higher position than Delhi, in the eleventh spot—but the only consolation is that the situation of air pollution here is better than Gwalior, Allahabad, and Patna according to World Health Organization (WHO) report.

This is for the second consecutive time that WHO is urban air quality data base figures puts Raipur on highly polluted cities map. In 2014, WHO stated that Raipur was the third worst city in India and city found its way in the list of top 20 polluted cities in the world.

Raipur has overshadowed Delhi earlier by the label as a most polluted city(according to 2014 studies)-ranking seventh in the list of top 20 most polluted cities in the world with 144 micrograms per cubic meters recorded in $PM_{2.5}$ levels while comparing with Delhi its ranks was eleventh on the list.

In Raipur the organic carbon's structure percentage in atmosphere is 30% -33% which is double than other cities of Chhattisgarh and is which takes the city to another hazardous stage of health illness, like chronic asthma, respiratory and skin diseases.

Chhattisgarh has recorded 100 percent 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, less rain, were also add to favorable outcome for disease. Such result indicates pollution is a serious issue in Raipur with theses unlikeness change in opposite trend of further worsening. This is worse than Delhi because their recovery has been started due to strong public awareness, pressure from upper court and other factors we need to be implement similar factors in Raipur too. Air pollution is the most serious problem of Raipur and Delhi. The major pollutants are taken for our study are- $PM_{2.5}$, PM_{10}, SO_2, NO_2.

2. PURPOSE OF THE STUDY

In summer, soil and road dust can contribute about 26% to PM10 and PM2.5. 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. The estimated PM10 emission from road dust is over 65 tons per day. Similarly soil from the open fields gets airborne. In summer, vehicular pollution contributing source to PM2.5 and PM10 in winters. 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 (LDO) and high speed diesel (HSD) of sulfur content of 500 ppm or less in boilers or furnaces, if not already being used. 19 percent share in the pollution of the atmospheric air in Raipur is due to the emission by the Urla and Siltara sponge and power plants.

Rapid increase in temperature of Raipur city and effect of pollution has created an adverse effect on health of humans.

2.1 Comparative Study

For comparative analysis for air pollution by using incremental increase method to locate pollution growth rate that can be increasing or decreasing progressively, which depends upon whether the average of the incremental increases in the past is positive or negative. The pollution for future years is calculated by adding the mean arithmetic increase to the last known pollution level as in the arithmetic increase method, and adding to this the average of incremental increases, once for first year, twice for second and so on.

3. OBJECTIVE

The Primary objectives of the study are:

- Study the Air Pollution Data for various locations in Raipur to identify patterns of spike in Air Pollution levels with respect to various monitored parameters
- Identification of the Metrological factors that relates with the air pollution levels for the respective locations of Raipur city and explore the possibility of developing a Predictive Model for predicting the level for key pollutants like PM 2.5 ,PM10 , NO_2 and SO_2.

4. METHODOLOGY

For our analysis we have selected two sites - Collectorate parisor and Jai stambh chowk for Raipur city and RK PURAM site for Delhi city, where maximum value of AQI obtained. This sites is selected because these site are at centre of city, due to transportation consequences. In this paper, we have analysed data of various years from 2013 to 2017.Graph shows the increasing rate of pm 10 which is the main component of the pollution. Prediction is done by the line graph of the data result for future year.

5. RESULT

By comparing result of Raipur and Delhi we found that PM10 and PM2.5 are the major pollutant that are in severe condition and need to take serious action to reduces their level

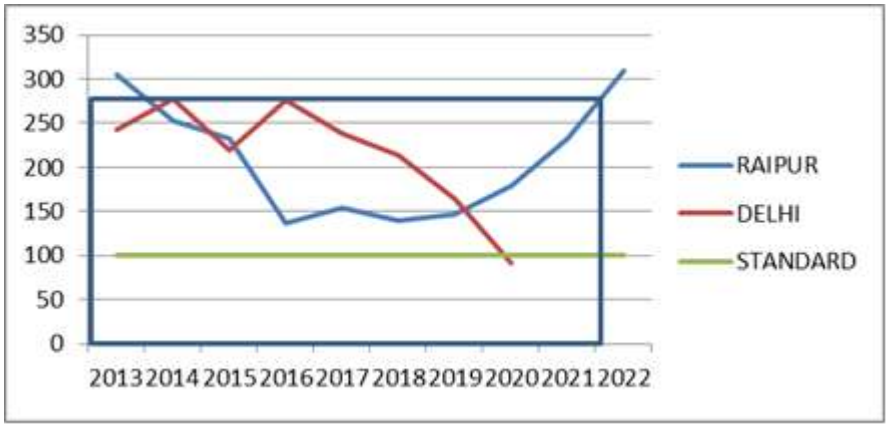

Figure A: Line Graph of Pm_{10} Result Analysis (showing PM_{10} level which is exceeding the sever level)

By these graph we conclude that, in 2013 the PM10 is higher in Delhi city due to it belongs to one of the metro and developed cities and leads to facing many health hazards .After these sudden increasing of pollution, Delhi government taken many measures like even odd policy on vehicles, enhancing parking fees by four-time, banning the entry of truck in cities etc. By these actions graph gradually decreases. But in Raipur city, due to initial development of Raipur city, the pollution level increases gradually from the year 2013 to 2015. The high implementation of industries and transportation facility increases the contamination of PM 10 pollutants

in the air. If these growth of air pollution increases continuously without any serious action or measures, one day soon the Raipur city reaches the level of Delhi city.

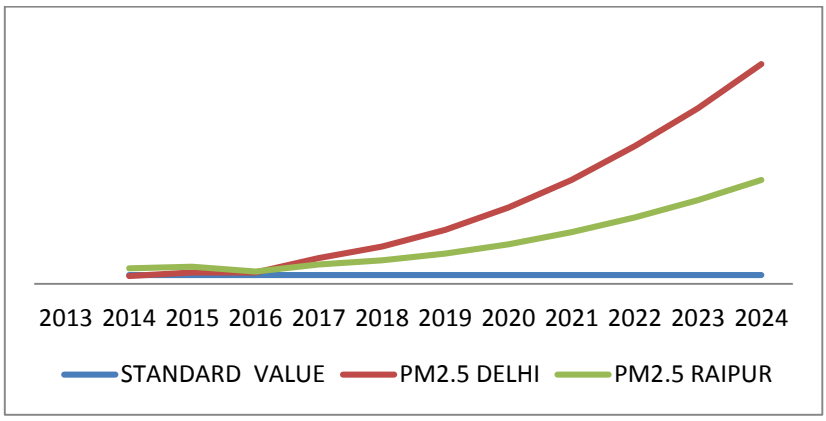

Figure B: Line Graph of PM2.5 Result Analysis (showing PM2.5 level which is exceeding the sever level)

While the PM2.5 level is keep on increasing in both 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 and burning of forest and garbage burning led immense increase in PM2.5. Immediate action (above given solution) need to be taken to improve the PM2.5 condition

NO_2 and SO_2 - studying the NO_2 and SO2 level shows that they are under standard level .so they are not creating environment problem.

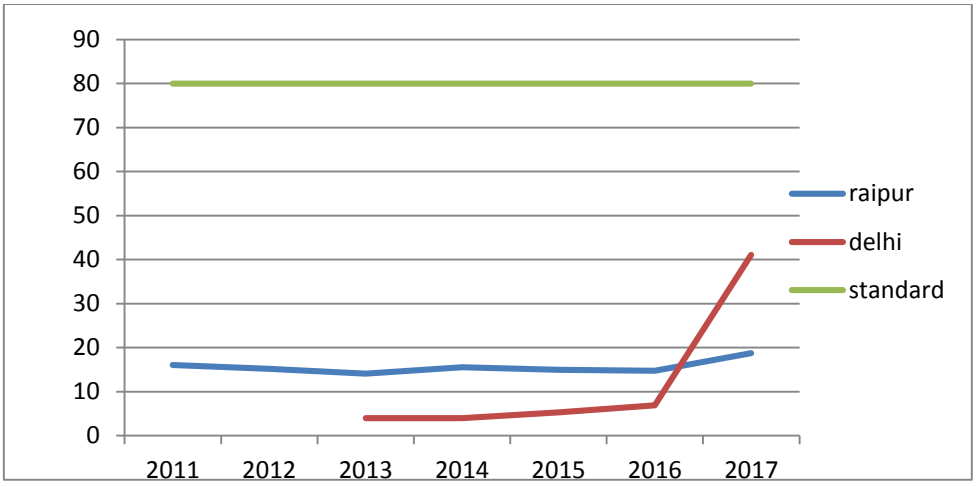

Figure C: Line Graph of NO_2 Result Analysis (showing NO_2 level which is satisfying the minimum level)

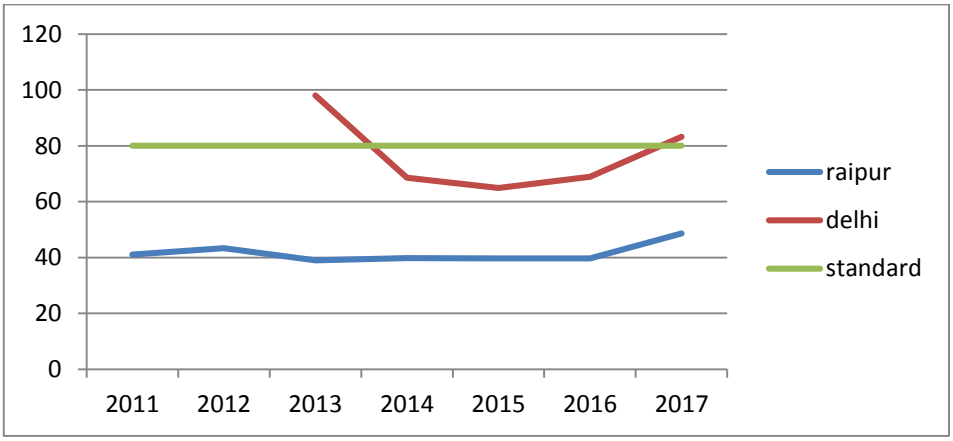

Figure D: Line Graph of SO_2 Result Analysis (showing NO_2 level which is satisfying the minimum level)

6. CONCLUSION

From analyzing the data of PM10, we have concluded Raipur will reach the severe condition after 5 to 6 year that is almost (2022-2023)and PM2.5 are dangerously increasing rapidly .If we are not taking a stand towards the pollution of Raipur today, its no time that we will face the same condition as Delhi was on 2013.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.

7. REFERENCES

[1] SA Rizwan et.al"Air pollution in Delhi: Its Magnitude and Effects on Health" Indian Journal of Community Medicine/Vol 38/Issue 1/January 2013.
[2] Dr. Sadhana Chaurasia, et.al "Study On Air Quality Of SKS ISPAT AND POWER Ltd. RAIPUR (CG)" Asian Journal of Science and Technology Vol. 4, Issue 04, pp.048-050, April, 2013.
[3] Krishan Pal,et.al"Increasing Pollution Status in Raipur City Due To Mechanization and Urbanisation." International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 3, Issue 6, November 2014.
[4] Ms.Aishwarya Paradkar1,et.al "Research Report Of DELHI Air Pollution"International journal of science technology and management Vol.No.5,Issue no.3,March 2016.
[5] Ajay V. Ahirwar* et.al"Monitoring of Ambient Air Particulate Matter during Diwali Festival at an Urban Industrial Area in Eastern Central part of India "IJCTA, 10(07),2017, pp. 103-109© International Science Press
[6] PUBLIC HEALTH FOUNDATION OF INDIA "Ambient Air Pollution and Public health: A call to Action".
[7] DhananjayGhei,et.al "Estimates of air pollution in Delhi from the burning of firecrackers during the festival of Diwali" No. 223 06-Feb-2018
[8] Prashant Kumar,b,et.al,"New Directions: Air pollution challenges for developing megacities like Delhi." doi: 10.1016/j.atmosenv.2015.10.032.
[9] Central Pollution Control Board Website: www.cpcb.nic.in
[10] National Air Quality Index by CPCB
[11] Centre for Science & Environment website: www.cseindia.org
[12] The Energy and Resources Institute (TERI) website: www.teriin.org
[13] International Research Journal of Earth Sciences, Review Paper "Emissions from Crop/Biomass Residue Burning Risk to Atmospheric Quality".
[14] Atmosphere, review paper "A Study on the Use of a Statistical Analysis Model to Monitor Air Pollution Status in an Air Quality Total Quantity Control District", by Edward Ming-Yang Wu 1 and Shu-Lung Kuo 2.
[15] "Emission of Air Pollutants from Crop Residue Burning in India" by Niveta Jain, Arti Bhatia, Himanshu Pathak, Centre for Environment Science and Climate Resilient Agriculture, Indian Agricultural Research Institute, New Delhi-110012, India
[16] "Identifying pollution sources and predicting urban air quality using ensemble learning methods" by Kunwar P. Singh a,b, Shikha Gupta a,b, PremanjaliRaia,b. Atmospheric Environment Journal.
[17] Brief Industrial Profile of Raipur District Carried out by M S ME-Development Institution, Raipur (Ministry of MSME, Govt. of India.)
[18] Report on SPM CHARACTERIZATION For HEAVY METALs CONCENTRATION on Study Area. 12 SOER (Status of Environmental Report)
[19] Preston, Samuel H. "The Effect of Population Growth on Environmental Quality." Population Research and Policy Review, vol. 15, no. 2, 1996, pp. 95–108., www.jstor.org/stable/40230088..
[20] Shen, Thomas T. Industrial pollution prevention. Berlin: Springer, 2015. Print.
[21] The Air Pollution Knowledge Assessment (APnA) City Program Clearing the air with datablsssair.com/what-is-pm-2-5.htmL
[22] timesofindia.indiatimes.com/city/raipur/Soon-e-rickshaws-to-hit-roads-in-Raipur/articleshow/55662656.cms
[23] BREATHING CLEANER AIR Ten Scalable Solutions for Indian Cities A self-organized task force report for the World Sustainable Development Summit, New Delhi, October 6, 2016 Task-Force Chairs: V. Ramanathan, I. H. Rehman& S. Sharma

