

Comparative Studies of Air-Pollution of Major Cities of Rajasthan, India

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Abstract: *The presented paper is described the air pollutions in six major cities in Rajasthan. Maximum pollutants are found under the prescribed limit but in some cities PM2.5 and PM10 found alarming level. It is increased due to increasing the industrialisation in these cities and reducing the forest and rain. The underwater level also decreased due to harnessing the water in the industries. Therefore, it is required to be aware of the population of Rajasthan to reduce the pollutants from the environment. It is possible only by increasing plantation and some other major things which are discussed in this paper.*

Keywords : EPA, NRDC

1. Introduction

Air pollution refers to the release of pollutants into the air that are unfavorable for human health and the globe as a whole. The Clean Air Act authorizes the U.S. Environmental Protection Agency (EPA) which is recognized by whole world to protect public health by regulating the emissions of these harmful air pollutants. The NRDC has been leading authority on this law since its establishment in 1970. [1]

EPA has collaborated with Indian Government on a wide range of environmental topics like, improving air quality, combating climate change, building strong institutions and legal structures, and cleaning up E-waste. This collaboration has supported environmental outcomes from enhanced air and water quality to enhanced enforcement capacity. [2]

EPA has also engaged with India to support science-based air pollution control strategies in Indian cities like Delhi, Noida, Mumbai, Chennai, Bangalore, Chandigarh and Pune. From 2003 to 2010, EPA helped demonstrate technologies aimed at reducing air pollution, these are managing air quality and reduce vehicle emissions from diesel buses and two-cycle engines. This work has done with the cooperation of Indian Ministry of Environment and Forests and Government of Delhi, U.P., the State of Maharashtra, the Municipality of Pune, as well as other partners. In this regards the consumption of Fuel is reduced and the pollution from the vehicles are also reduced drastically. During with the visit of Obama, President of America in January 2015, the United States and India pledged to cooperate on climate and clean energy. In one example through which eagerly India's participation in EPA's AIR Now-International program, which informs the public about the quality of the air they breathe in real time. [2]

The Environmental Law Institute and National Law School of India University combinedly published a handbook on "Enforcing Hazardous Wastes Rules in India: Strategies and Techniques for Achieving Increased Compliance," in April 2014 with the support of EPA. The handbook provides the tools and rules re-

garding hazardous waste for the officials in India who are seeking to increase local compliance. [3]

Delhi Government has also closed those industries which have not fulfilled the EPA norms in Delhi and the norms are strictly followed by the pollution control board. According to the Ambient Air Pollution (AAP) report of 2014, Delhi had highest concentration of PM 2.5 pollution level which is highest in the world, followed by Beijing. [5]. In the month of October to December it was a serious cause for breathing and the high level of particular matters which increasing the lung cancer problems. The CO level also increased by 6000 mg/cubic meter which is much above of the safe level of 2000 mg/cubic meter in Delhi. The air quality index is also increased by 121 as per the report of Ministry of Earth Science India.

The air pollution creates breathing problem when it increases from the safe level. Therefore, Rajasthan Pollution Control Board (RPCB) implants pollution control measuring equipment at some places in Rajasthan, by which we can see the pollution control level at these places at any time. The study is carried out to compare the pollution level in morning time between 10 to 11 AM. The study is very valuable for the researchers for future research in the field of air pollution.

2. Material and Methods

The under material and methods includes the site selection, observations and result and discussions.

2.1 Site selection

The selected sites have higher population density than the other places and including bigger industrialization. When the Industries in Delhi, Indore and other polluted cities were closed by Pollution Control Board, then mostly industries shifted to Bhiwadi, Alwar, Jaipur, Ajmer and Udaipur on NH-8 and Kota & Jodhpur directly connected to rail and Pali for colouring industries. The RPCB have implanted the online pollution measuring equipment's on these sites. So, the observation can easily be done from the website of pollution control board. These places are indicated by bullets in the map of Rajasthan in Fig. 1.

2.2 Observations

The observations can be collected from central pollution control board (CPCB) website [6]. From this site, the prescribed limit and the observation of all six sites of Rajasthan are collected on particular day (March 04, 2018) at 11:15 AM. These are shown in table 1 as below, and one site (Jodhpur) data are shown in Fig. 2.

3. RESULT AND DISCUSSIONS

Air pollutants like Oxides of Nitrogen, sulphur and carbon along with ozone, ammonia, PM2.5 and PM10 are collected and fitted according to the selected site in Table 1. The clarification of the pollutants level is also explained by Fig. 3. It is stated that Nitric oxide, Nitrogen di oxide, Oxides of Nitrogen, sulphur di oxide, ozone and ammonia are found under the prescribed limit for all locations. The minimum pollution is observed in Udaipur city. As per the criteria of particulate materials the higher to lower pollution limit for all six cities is shown by: The PM2.5 level is observed higher than the prescribed limit in Jodhpur, Jaipur, Pali, Ajmer and Alwar. In conventional way the PM10 level is found higher than the prescribed limit in only Jodhpur and Pali.

4. CONCLUSIONS

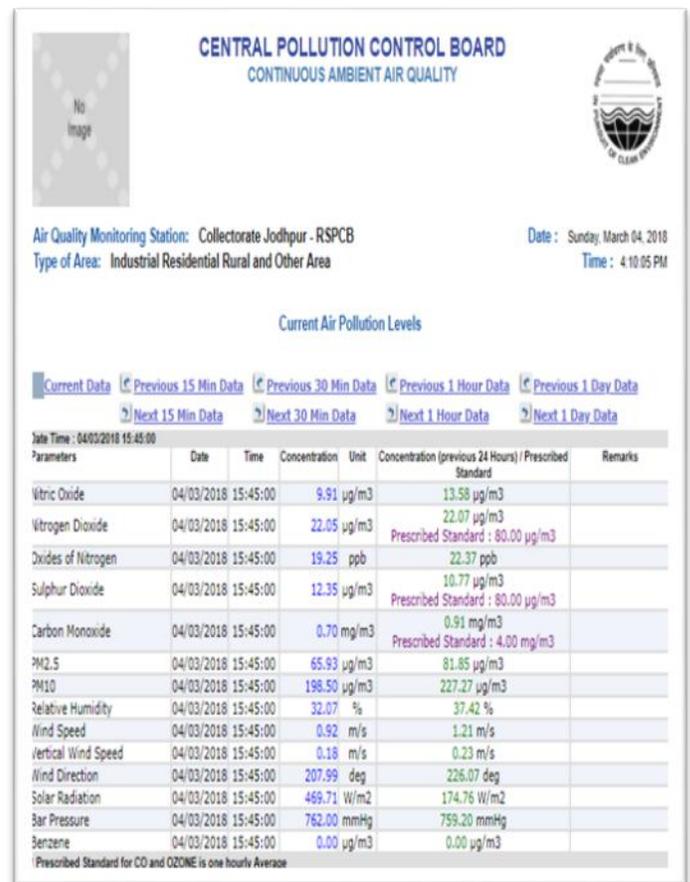
As we know any city of Rajasthan is not coming under the ten top polluted cities in India. The ten polluted cities are Kanpur, Gaziabad, Muradabad, Delhi, Agra, Patna, Lukhnow, Noida, Gurgaon and Rohtak, [7]. But thousands of industries are shifted from these cities to Rajasthan so that the pollution level somehow increases. PM 2.5 and PM 10 is not under the prescribed limit in some cities and that's why dusty atmosphere is observed in these areas. The higher PM may cause of lungs cancer, so it is required to control the limit by using the pollution control equipment's in the industry as well as household. National Disaster Management Authority (NDMA) has issued some guidelines to protect oneself against the hazardous impacts of smog and pollution as follows given by [4]

- ✚ Don't step out or pamper in outdoor activities during early morning and evening hours due to "severe" levels of air pollution in the city.
- ✚ Try to stay indoors. Go out when it's bright and sunny.
- ✚ Circumvent stepping out if you have breathing difficulty.
- ✚ Avoid smoking. Do not burn garbage.
- ✚ Drink adequate amount of water as it helps in flushing toxins from the body.



“Figure 1. Selected major Cities in Rajasthan for Comparative study for particular day”

[<http://www.cpcb.gov.in/caaqm/mappage/frmrajasthan.aspx?statID=23>]



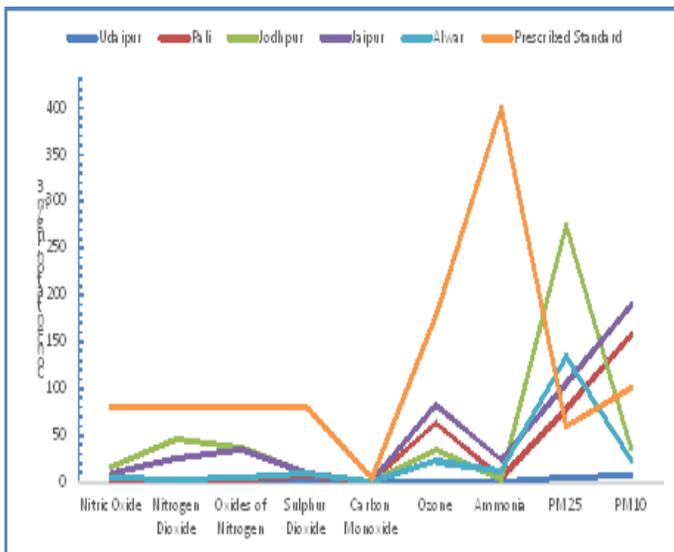
“Figure 2. Current Air Pollution level of Jodhpur [6]”

Table:1 Pollutant level at different places in Rajasthan

	Ashok Nagar, Udaipur	Indira Colony, Pali	Jodhpur	Ajmer	Adarsh nagar Jaipur	Alwar	Prescribed Standard For 1 hour
Parameters	Concentration, $\mu\text{g}/\text{m}^3$						
Nitric Oxide	0.28	2.72	16.33	8.45	8.37	5.44	80
Nitrogen Dioxide	0.45	1.22	45.25	22.12	26.53	2.34	80
Oxides of Nitrogen	0.21	3.94	36.83	27.32	34.91	4.33	80
Sulphur Dioxide	1.13	8.31	10.28	11.12	10.19	9.11	80
Carbon Monoxide	0.21	0.32	0.64	0.67	0.37	0.44	4
Ozone	0.01	63.2	34.65	73.18	83.46	22.33	180
Ammonia	1.01	4.48	3.44	25.36	24.35	12.76	400
PM2.5	4.67	77.46	274.3	76.11	104.85	67.22	60
PM10	6.77	158.43	36.74	4.3	189.86	23.87	100

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“Figure 3. Pollutants of different cities in Rajasthan”