



STATUS OF AIR QUALITY WITH SPECIAL REFERENCE TO PARTICULATE MATTER

Patwari J.M and Narkhede R.K.

Department of Environmental Science,
Maharashtra Udayagiri Mahavidyalaya Udgir

Abstract: On Global level air pollution is one of the serious issue. Higher levels of air pollutant putting a pressure on the human health. Among the world India is one of the country that severely affected by air pollution. Out of 50 cities of the world 39 cities of India are facing the problem of Air Pollution. This study has been undertaken to know the status of Particulate matter in the udgir city. Three sampling stations was selected covering all the city. Results are well below the permissible standards. This is present situation. It may increase as the city is coming with Industrial belt at Nagalgaon.

Key Words: Air Pollution, Human Health, Pollutant, Particulate Matter, India.

Introduction

Global industrialization has made it such that air pollution brought on by energy usage and exhaust emissions is a significant environmental issue (Wang et al., 2021b). Fine particulate matter (PM_{2.5}), a significant component of air pollution (Cohen et al., 2017), not only contributes to reduced atmospheric visibility but also raises disease morbidity and death rates (Ansari and Ehrampoush, 2019). Therefore, research on PM_{2.5} source is necessary to uncover resolutions and identify key factors to guide the management of the atmospheric environment and population health protection. Air pollution has become a major problem in India which has huge health and socio-economic adverse impact. It is not restricted only to mega cities. It has spread to small cities, towns and villages. Air pollution poses a multi-faceted risk due to its adverse impact on health. It is the leading contributor of mortality from cardiovascular diseases, stroke, chronic obstructive pulmonary disease and lung cancer. India is one of the most affected countries by air pollution and there are increasing evidences of adverse effects on health due to air pollution. Several studies have shown short and long-term impacts of air pollution on human health.

Air pollution and climate change are major threats to rapidly growing cities in present times. The developing nations like India, which are switching from predominantly rural country to increasingly urban, have to face critical challenges in terms of climate action and sustainable development (Van Duijne, 2017; Singh C. et al., 2021). India is projected to have 53% of the national population as urban population by addition of 416 million urban dwellers by the year 2050 (UNDESA, 2018).

Udgir is a developing taluka of the district Latur, Maharashtra. Day by day urbanization is increasing. There are number of commercial complexes in the city. All the people from nearby by villages are coming for the marketing daily. So the levels of particulate matter must be analysed for the health of the peoples.

Study area:

Udgir is a city with a municipal council in Latur district in the Indian States and territories of India of Maharashtra. It is located in the Marathwada division of the state (one of the divisions of Maharashtra state based on geographical conditions). It is also the headquarters for the Udgir subdivision and Udgir Taluka., the town has achieved remarkable development in various fields like administration, transport, agriculture, education, health, hospitality and entertainment. The town is famous for its agricultural production, education and the historical Udgir Fort. The main occupation of the people of Udgir is agriculture as most of the rural area surrounding Udgir is rainfed and marginal and small farmers make up the rural setting. The soil as a part of Deccan plateau is black basalt soil, rich in humus.

Agriculture-based businesses like pulses (dal) industry, warehouses, cold storage, sugar factories run here. Udgir has around 80 dal (mils) processing units. The population of the town is 2,00,111 according to 2014 census data of which 100,148 are males and 99,963 are females. From 2001 to 2014 the population of Udgir saw an increase of 27.98%. Literacy increased from 74.21% in 2001 to 85.78% in 2011. Udgir has an average literacy rate of 85.78%, which is higher than the national average percentage.

Materials and Methods

There are three sampling stations selected in the udgir city. The sampling stations selected on the basis of Residential, Commercial and Industrial sectors. The high volume Air Sampler is used for the determination of Particulate matter. At the Eight Hour Intervals Particulate Matter has been determined. The average of 24 hours has been calculated and the results are interpreted. In this Respirable suspended particulate matter and Suspended particulate matter has been measured and month wise data prepared.

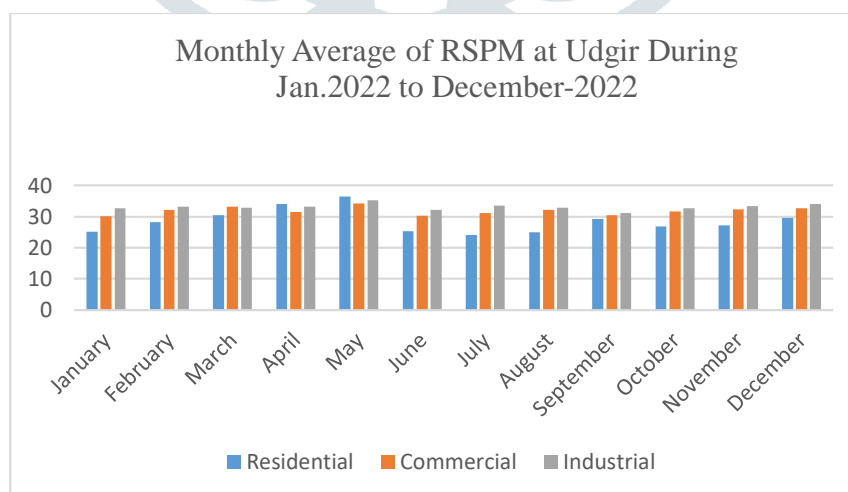
Tables and Graphs

Monthly Average of RSPM at Udgir During Jan.2022 to December-2022

Table:1

Sr.No	Month	Residential	Commercial	Industrial
01	January	25.20	30.10	32.60
02	February	28.30	32.10	33.10
03	March	30.40	33.20	32.90
04	April	34.10	31.50	33.10
05	May	36.50	34.20	35.20
06	June	25.30	30.20	32.10
07	July	24.10	31.20	33.60
08	August	25.00	32.10	32.90
09	September	29.30	30.50	31.20
10	October	26.90	31.60	32.60
11	November	27.20	32.40	33.40
12	December	29.50	32.60	34.00

Figure: -1



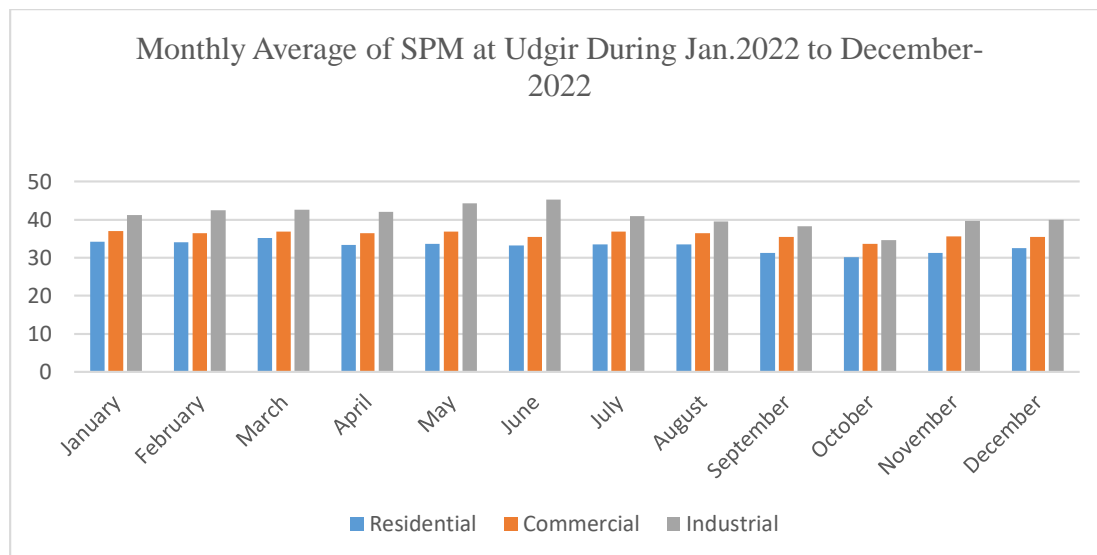
Monthly Average of SPM at Udgir During Jan.2022 to December-2022

Table:2

Sr.No	Month	Residential	Commercial	Industrial
01	January	34.20	37.00	41.20
02	February	34.00	36.50	42.50
03	March	35.20	36.90	42.60

04	April	33.40	36.40	42.00
05	May	33.60	36.80	44.30
06	June	33.20	35.40	45.20
07	July	33.50	36.90	40.90
08	August	33.50	36.40	39.50
09	September	31.20	35.40	38.30
10	October	30.20	33.60	34.60
11	November	31.20	35.60	39.60
12	December	32.50	35.40	40.00

Figure: -2



Results and discussion:

In the present study RSPM was observed maximum at residential site was in may as 36.50 microgram and minimum of 33.50 in July. At commercial site it was observed highest in the month of March as 33.20 microgram and lowest in 30.20 in January. Maximum of 45.20 microgram and 31.20 in September was observed at Industrial site.

In the present Investigation maximum levels of SPM found was 35.20 in march and minimum 30.20 microgram in October at residential site. at commercial site the highest level was observed in the month of 36.90 micro gram and lowest in the month of 33.60 in October. Maximum level was found in the month of June 45.20 and lowest was in 38.30 in September.

Various studies have been conducted regarding air pollution and their associated health impacts for Indian cities such as for Delhi (Gurjar et al., 2010; HEI, 2011; Rizwan et al., 2013; Nagpure et al., 2014); Chandigarh (Gupta et al., 2001); Kolkata (Ghose et al., 2005; Gurjar et al., 2016; Haque and Singh, 2017); Rajasthan (Rumana et al., 2014); Lucknow (Lawrence and Fatima, 2014); Mumbai (Joseph et al., 2003; Maji et al., 2016); Maharashtra (Maji et al., 2016), Agra (Maji et al., 2017); Gwalior City (Dandotiya et al., 2020); Chennai (Jayanthi and Krishnamoorthy, 2006; HEI, 2011). The levels of particulate matter are within permissible standards of CPCB. But increasing urbanization and Industrialization may increase the levels in coming years. So this data will be a baseline data for the future.

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References:

1.K.-L. Wang et al. Spatiotemporal heterogeneity and driving factors of PM_{2.5} reduction efficiency: an empirical analysis of three urban agglomerations in the Yangtze River Economic Belt, China, *Ecol. Indicat.* (2021).

2. M. Ansari et al. Meteorological correlates and AirQ+ health risk assessment of ambient fine particulate matter in Tehran, Iran. *Environ. Res.* (2019)
 3. A.J. Cohen et al. Estimates and 25-year trends of the global burden of disease attributable to ambient air pollution: an analysis of data from the Global Burden of Diseases Study 2015 *Lancet* (2017)
 4. Van Duijne, R. J. (2017). What is India's urbanisation riddle. *Econ. Politic. Weekly* 52, 76–77.
 5. Singh, C., Madhavan, M., Arvind, J., and Bazaz, A. (2021). Climate change adaptation in Indian cities: a review of existing actions and spaces for triple wins. *Urban Climate* 36:100783. doi: 10.1016/j.uclim.2021.100783
 6. UNDESA (2018). 2018 Revision of World Urbanization Prospects.
 7. Gurjar, B. R., Jain, A., Sharma, A., Agarwal, A., Gupta, P., Nagpure, A. S., et al. (2010). Human health risks in megacities due to air pollution. *Atmos. Environ.* 44, 4606–4613. doi: 10.1016/j.atmosenv.2010.08.011
 8. Rizwan, S. A., Nongkynrih, B., and Gupta, S. K. (2013). Air pollution in Delhi: its magnitude and effects on health. *Indian J. Community Med.* 38, 4–8. doi: 10.4103/0970-0218.106617.
 9. Nagpure, A. S., Gurjar, B. R., and Martel, J. C. (2014). Human health risks in national capital territory of Delhi due to air pollution. *Atmos. Pollut. Res.* 5, 371–380. doi: 10.5094/APR.2014.043.
 10. Gupta, D., Boffetta, P., Gaborieau, V., and Jindal, S. K. (2001). Risk factors of lung cancer in Chandigarh, India. *Indian J. Med. Res.* 113, 142–150.
 11. Ghose, M. K., Paul, R., and Banerjee, R. K. (2005). Assessment of the status of urban air pollution and its impact on human health in the city of Kolkata. *Environ. Monitor. Assess.* 108, 151–167. doi: 10.1007/s10661-005-3965-6.
 12. Gurjar, B. R., Ravindra, K., and Nagpure, A. S. (2016). Air pollution trends over Indian megacities and their local-to-global implications. *Atmos. Environ.* 142, 475–495. doi: 10.1016/j.atmosenv.2016.06.030.
 13. Haque, M., and Singh, R. B. (2017). Air pollution and human health in Kolkata, India: a case study. *Climate* 5:77. doi: 10.3390/cli5040077.
 14. Rumana, H. S., Sharma, R. C., Beniwal, V., and Sharma, A. K. (2014). A retrospective approach to assess human health risks associated with growing air pollution in urbanized area of Thar Desert, western Rajasthan, India. *J. Environ. Health Sci. Eng.* 12, 1–9. doi: 10.1186/2052-336X-12-23.
- Lawrence, A., and Fatima, N. (2014). Urban air pollution & its assessment in Lucknow City—the second largest city of North India. *Sci. Total Environ.* 488, 447–455. doi: 10.1016/j.scitotenv.2013.10.106