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A Review on Assessment of Ambient Air Quality of Hoshangabad and Itarsi of M.P.

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Abstract*:* *The study reveals that the level of air pollution is rapidly increasing. The reason for this is migration which results into growth of urbanization and transportation and the reason for this is industrialization ultimate the result is more pressure on the atmosphere. Due to emission various gases, this adversely affects the human health, plants and animals. According to this study some of the impacts on air making it pollute are those from mining areas, burning crop Residues and other household activities. These all result in the increased level of oxide of sulphur (SO_x), volatile organic compounds (vocs) , oxide of Nitrogen (NO_x) and ozone(O_3). The study tell that the people who are directly exposed to and affected due to air pollution are traffic crop occurs road, shopkeepers, rickshaw pullers, public Transpiration employees as well as the residents closed to busy roads. as a result of this they are prone to lungs diseases*

Keywords: Ambient Air Quality; Air pollution; Urbanization; Transportation; Sulphur; Nitrogen; Ozone; Traffic; Gases; Industrialization

I. INTRODUCTION

Air pollution has emerged as a serious environmental and health concern in developing nations over the past few decades . Several man-made and natural factors, such as industrialization, urbanization, agricultural burning, volcanic eruptions, forest fires, etc., have resulted in declining air quality around the world. 80% of global cities and 98% of cities in middle-income nations exceed the suggested air quality standards Increased air pollution causes economic losses, impaired visibility, and climate change at a much faster rate, which leads to more extreme weather calamities and millions of premature deaths every year The situation is almost identical in the case of India, which has witnessed exceptionally poor air quality due to rapid population growth, haphazard urbanization, and industrialization over the last few decades . The country, which is home to 22 of the top 30 most polluted cities in the globe, owes 17.8% of all its deaths to ambient air pollution.Due to the rise in early mortality related to air pollution, attention has been drawn to the effects of anthropogenic fine particulate matter ($PM_{2.5}$) on human health . $PM_{2.5}$ particles can enter the lungs and travel deep into the respiratory system, resulting in respiratory and cardiovascular conditions such as shortness of breath, a runny nose, sneezing, coughing, and irritation of the eyes, nose, throat, and lungs. According to studies, daily $PM_{2.5}$ exposure has been linked to an increase in emergency room visits, deaths, and hospital admissions . Children, the elderly, and those with lung and heart issues are more vulnerable to the negative effects of $PM_{2.5}$. Air pollution may be a risk factor for obesity in people with a higher body mass index (BMI). These health impacts have motivated scientists and government authorities to continuously monitor air pollutant levels and develop air pollution forecasting models.Indian air quality standards are the standards set by the central pollution control board of india (cpcb) that is applicable nationwide. AQ standard in Indian under the authority of the air (peventaion and control of pollution) act 1981 India central pollution control board sets national ambient air quality standards and is responsible for both testing air quality and assisting government in planning to meet such standard.

II. LITERATURE REVIEW

Gokulet al.(2023) presented $PM_{2.5}$ prediction for Hyderabad city using various machine learning models viz. Multi-Linear Regression (MLR), decision tree (DT), K-Nearest Neighbors (KNN), Random Forest (RF), and XGBoost. A deep learning model, the Long Short-Term Memory (LSTM) model, was also used in this study. The results obtained

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were finally compared based on error and R^2 value. The best model was selected based on its maximum R^2 value and minimal error.

CM, Arun Muraliet al.(2023) assessed and quantified the impact of meteorological, hydrological, and agricultural drought events from 2001 to 2017 over two large states of India (i.e., Maharashtra and Madhya Pradesh) using multi-temporal earth observation data at a finer resolution of 1 km.

Dangayachet al.(2023) monitored the impact of COVID-19-induced lockdown and unlock down phases on the air quality of Jaipur city, Rajasthan, India by assessing the change in ambient air quality during pre-COVID-19 (January 2018–December 2019) and COVID-19 (January 2020–December 2021) phases by evaluating air quality parameters (PM_{10}, $PM_{2.5}$, NO_2, O_3, Benzene and o-Xylene) using ground station data.

Sicardet al.(2023) presented that Ground-level ozone (O_3), fine particles ($PM_{2.5}$), and nitrogen dioxide (NO_2) are the most harmful urban air pollutants regarding human health effects. Here, we aimed at assessing trends in concurrent exposure of global urban population to O_3, $PM_{2.5}$, and NO_2 between 2000 and 2019. $PM_{2.5}$, NO_2, and O_3 mean concentrations and summertime mean of the daily maximum 8-h values (O_3 MDA8) were analyzed (Mann-Kendall test) using data from a global reanalysis, covering 13,160 urban areas, and a ground-based monitoring network (Tropospheric Ozone Assessment Report), collating surface O_3 observations at nearly 10,000 stations worldwide. At global scale, $PM_{2.5}$ exposures declined slightly from 2000 to 2019 (on average, − 0.2 % $year^{-1}$), with 65 % of cities showing rising levels. The highest O_3 MDA8 increases (>3 % $year^{-1}$) occurred in Equatorial Africa, South Korea, and India.

Badidaet al.(2023) presented short term and long-term health impacts of ambient air pollutants focussed in LMICs. We evaluated Total Non-accidental mortality, Respiratory Mortality, Stroke Mortality, Cardio-vascular Mortality, Chronic Obstructive Pulmonary Disease (COPD), Ischemic Heart Disease (IHD) and Lung Cancer Mortality in LMICs particularly. Random Effects Model was utilised to derive overall risk estimate. Relative Risk (RR) estimates per 10 $\mu g/m^3$ was used as input for model. We also found statistically significant positive associations between pollutants and Cardiorespiratory and Cardiovascular morbidity.

Ravindraet al.(2023) examined the effect of air pollution on patient's hospital visits for respiratory diseases, particularly Acute Respiratory Infections (ARI). Outpatient hospital visits, air pollution and meteorological parameters were collected from March 2018 to October 2021. Eight machine learning algorithms (Random Forest model, K-Nearest Neighbors regression model, Linear regression model, LASSO regression model, Decision Tree Regressor, Support Vector Regression, X.G. Boost and Deep Neural Network with 5-layers) were applied for the analysis of daily air pollutants and outpatient visits for ARI. This study gives insight into developing machine learning programs for risk prediction that can be used to predict analytics for several other diseases apart from ARI, such as heart disease and other respiratory diseases.

Filonchyket al.(2023) presented the effectiveness of government policies to reduce emissions. It was found that emission of pollutants from the country's energy sector has been steadily declining, with annual emissions of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) decreasing from the US electric power sector between 1990 and 2020 by 93.4% and 84.8%, respectively, and carbon dioxide (CO_2) by 37% between 2007 and 2020.

Aheret al.(2022) quantified the changes in the pollutants level in the ambient air of Madhya Pradesh during COVID-19 induced 21 days lockdown. The data of 16 continuous ambient air quality monitoring stations (CAAQMS) for six pollutants, namely $PM_{2.5}$, PM_{10}, SO_2, NO_x, CO, and Ozone for pre-lockdown (1–21 March 2020) and lockdown (25 March-14 April 2020) period was compiled and appropriate statistical analysis was done.

Trushnaet al.(2022) onducted environmental monitoring and health assessment in residential areas near viscose rayon and associated chemical manufacturing industries. Sociodemographic and anthropometric information, relevant medical and family history, and investigations including spirometry, electrocardiogram, neurobehavioral tests, and laboratory investigations (complete blood count, lipid profile and random blood glucose) will be conducted.

Sharmaet al.(2022) Air Quality Index and concentration trends of six pollutants, i.e. $PM_{2.5}$, PM_{10}, NO_2, SO_2, CO, and O_3 were analysed for National Capital Territory of Delhi, India for three periods in 2021 (pre-lockdown: 15 March to 16 April 2021, lockdown: 17 April to 31 May 2021 and post-lockdown: 01 June to 30 June). Data for corresponding periods in 2018–2020 was also analysed.

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Natarajan presented an overview of the scientific attempts pertaining to the evaluation of impacts of air pollution and other meteorological changes on the historical monuments in India in the context of the global scenario. It is observed that seasonal fluctuations in the outdoor climate and increased human activities in the vicinity of the museums have plausible impacts on the immediate changes in the indoor air quality.

Moret al.(2022) analyzed spatial variation of pollutants, ambient air quality data of 23 continuous ambient air quality monitoring stations were divided into three zones based on ecology and cropping pattern. The study could help to understand seasonal variation in ambient air quality and the influence of factors such as crop residue burning in the IGP region, which could help to formulate season-specific control measures to improve regional air quality.

Praveenet al.(2022) presented the variation in air pollutants (i.e., $PM_{2.5}$, PM_{10}, NO_2, and SO_2) profile between Christmas and new year celebrations in 2019, 2020, and 2021. It can be seen that the concentration of selected air pollutants shows a substantially higher concentration in celebration periods in all reported years. The results indicate that air pollutants values are always higher than permissible limits.

Sharma et al.(2022) presented the first comprehensive analysis of government air quality observations from 2015–2019 for PM_{10}, $PM_{2.5}$, SO_2, NO_2 and O_3 from the Central Pollution Control Board (CPCB) Continuous Ambient Air Quality Monitoring (CAAQM) network and the manual National Air Quality Monitoring Program (NAMP), as well as $PM_{2.5}$ from the US Air-Now network. We address inconsistencies and data gaps in datasets using a rigorous procedure to ensure data representativeness.

Kuldeepet al.(2022) assessed the air pollution scenario in the post lockdown phase in the seven major metropolises of Rajasthan, namely, Jodhpur, Alwar, Jaipur, Kota, Pali, Ajmer, and Udaipur, in the recent pandemic year 2020. The air pollution scenario is determined with the help of the Air Quality Index (AQI) and the concentration level of $PM_{2.5,}$ PM_{10}, NO_2, and SO_2. This study reveals that most cities of Rajasthan are violating India's national ambient air quality standards (NAAQS). It is found that Jodhpur is on rank first in terms of pollution levels, followed by Alwar, Jaipur, Pali, and Udaipur. The pollution level was higher before the lockdown period then reduced to a certain level due to restricted activities in lockdown. The pollution level is not rapidly increased after lockdown due to rainfall from the southwest monsoon. Winter season consists of higher concentration levels of pollutant and higher than before lockdown period.

Yadavet al.(2022) studied the impact of the judicial prohibition in Delhi to improve air quality, a comprehensive and comparative analysis was conducted over two consecutive years, namely 2015–2016 (when no significant regulations on the sale or usage of firecrackers were imposed) and 2017–2018 (when radically different regulations were implemented). Data on PM_{10}, $PM_{2.5}$, NO_x, and CO were analysed, and their trends and levels with various regulations in place were compared. In 2017, the concentrations of PM_{10}, $PM_{2.5}$, NO_x, and CO were reduced by 50%, 50%, 71%, and 64%, respectively, compared to 2016. However, in 2018, there was an increase of 32% in PM_{10} and $PM_{2.5}$ concentrations, as well as a 25% increase in CO concentrations, with the exception of NOx, which decreased to 25% on Diwali day. The data was also examined in conjunction with the entire timeline of the various court rulings and regulations imposed in Delhi.

Balamadeswaranet al.(2022) presented improvements of nitrogen dioxide (NO_2) during the COVID-19 lockdown in India. This research has been done using both the open source data sets taken from satellite and ground based for better analysis. For the satellite-based analysis, the Sentinel 5 Precauser's Tropospheric NO_2 from the European Space Agency and for the ground-based numeric data sets from Central Pollution Control Board (CPCB) has been used. During the COVID-19 disease, outbreak the world has set in quarantine and as an overcome air quality improved in Asian countries after national lockdown, the average NO_2 rates plummeted calculated by 40–50%. Similarly, it dramatically decreased in Asia during the COVID-19 pandemic quarantine period.

Markandeya et al.(2021) investigated seasonal variations in air pollution levels in Lucknow and assess the ambient air quality of the city together with highlighting the health impacts of major pollutants like PM_{10}, $PM_{2.5}$, SO_2, NO_2, Pb, Ni and aerosols from 2010 to 2019. The maximum and minimum values of PM_{10}, $PM_{2.5}$, SO_2, NO_2, Pb and Ni were found to be 270.75 and 122.45 $\mu g/m^3$, 124.95 and 95.52 $\mu g/m^3$, 25.60 and 8.05 $\mu g/m^3$, 75.65 and 23.85 $\mu g/m^3$, 0.66 and 0.03 $\mu g/m^3$ and 0.07 and 0.01 ng/m^3, respectively

Gautamet al.(2021) studied the differences in the air quality index (AQI) of Delhi (DTU, Okhla and Patparganj), Haryana (Jind, Palwal and Hisar) and Uttar Pradesh (Agra, Kanpur and Greater Noida) from 17 February 2020 to 4

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May 2020. The AQI was calculated by combination of individual sub-indices of seven pollutants, namely $PM_{2.5}$, PM_{10}, NO_2, NH_3, SO_2, CO and O_3, collected from the Central Pollution Control Board website. The AQI has improved by up to 30–46.67% after lockdown.

Pandeyet al.(2021) The present study deals with the impact of the pandemic outbreak of COVID-19 on the ambient air quality in the capital city of India. Real-time data were collected from eight continuous ambient air quality monitoring stations measuring important air quality parameters (NO_2, PM_{10} and $PM_{2.5}$). Results revealed that the city's air quality had improved significantly during the lockdown period due to COVID-19 outbreak.

Naqviet al.(2021) examined the impact of lockdown on the air quality index (AQI) [including ambient particulate matter (PM_{10} and $PM_{2.5}$), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), and ammonia (NH_3)] and tropospheric NO_2 and O_3 densities through Sentinel-5 satellite data approximately 1 d post-lockdown and one month pre-lockdown and post-lockdown. Our findings revealed a marked reduction in the ambient AQI (estimated mean reduction of 17.75% and 20.70%, respectively), tropospheric NO_2 density, and land surface temperature (LST) during post-lockdown compared with the pre-lockdown period or corresponding months in 2019, except for a few sites with substantial coal mining and active power plants. We observed a modest increase in the O_3 density post-lockdown, thereby indicating improved tropospheric air quality. As a favorable outcome of the COVID-19 lockdown, road accident-related mortalities declined by 72-folds.

Dhanvijayet al.(2021) An observational research methodology, a cross-sectional research design was used to perform this analysis. Probability purposive sampling technique was used to collect data from autorickshaw drivers based on the health effects of air pollution and its prevention utilizing structured questionnaires.

Duttaet al.(2021) analyzed the trend and pattern of air pollution of three Indian megacities: Delhi, Kolkata, and Chennai in a spatio-temporal frame using a comparative approach. To develop the air pollution scenario, air-quality data have been collected from the Central Pollution Control Board and also the State Pollution Control Board of respective cities. Four major pollutants (PM_{10}, $PM_{2.5}$, NO_2, and SO_2) have been selected to develop the air-quality index (AQI) from the period of 2017 to 2020. The meteorological parameters have been used to correlate with AQI. Moreover, exceedance factor has been calculated to analyze the level of pollution in comparison to the national standards. The results demonstrate that Delhi and Kolkata are most affected by air pollution. The seasonal distribution shows that higher concentrations of pollution were found during the winter season. The results of this analysis will be helpful in the assessment of air pollution and to investigate the way out through proper policies.

Pandeyet al.(2021) estimated exposure to ambient particulate matter pollution, household air pollution, and ambient ozone pollution, and their attributable deaths and disability-adjusted life-years in every state of India as part of the Global Burden of Disease Study (GBD) 2019. We estimated the economic impact of air pollution as the cost of lost output due to premature deaths and morbidity attributable to air pollution for every state of India, using the cost-of-illness method.

Duttaet al.(2021) explores the impact of epidemic prevention and control actions on air quality for five different periods of COVID-19 outbreak in Delhi, India. The study found that under the epidemic control measure during 11 May–19 June 2020, the average concentrations of atmospheric air pollutants PM2.5, PM10, NO2, and CO were reduced to 42.15 µg m–3 , 128.68 µg m–3 , 27.31 ppb, and 0.83 ppm respectively, and were 73.85%, 46.48%, 63.43%, and 50.18% lower than the pre-COVID-19 level of January 2020, respectively.

Bherwaniet al.(2021) proposed to identify the air quality in the region and its relation with COVID-19-affected people in metropolitan cities of India during COVID-19 lockdowns using a geographical information system (GIS), where over 90% of commercial and industrial sites and 100% school and colleges were closed. The study outcomes highlight the areas encountering high levels of pollution under the pre-lockdown scenario and have seen a higher number of cases. The relation is most evident for $PM_{2.5,}$ which is responsible for respiratory disorders and is the place of attack of SARS-CoV-2.

Tabindaet al.(2020) presented details on sensors/systems available for AQ assessment, monitoring, and management. First, we had gone through the published literature based on special keywords including AQM, Particulate Matter (PM), Carbon Mono-oxide (CO), Sulfur di-Oxide (SO2), and Nitrogen di-Oxide (NO2) among others, and identified the current scenario of research in AQ management.

Garget al.(2020) focused on monitoring of different cities as per traffic volume and flow. Air quality monitoring was conducted on hourly basis to determine the major parameters; i.e. PM_{10}, NO_x, SO_2, CO by using fixed station for 8 h from 1:30 pm to 9:30 pm. All the measuring values were then compared with the National Environment Quality Standards (NEQS) and Air Quality Index (AQI).

Dandotiyaet al.(2020) investigate spatial and monthly variation as well as the role of episodic events in ambient air quality in Delhi, including the 'Great Smog' month of November 2017. Monitoring of air pollutants (particulate matter (PM_{10}, $PM_{2.5}$, PM_1) and nitrogen dioxide (NO_2)) was carried out at three distinct locations of Delhi from April 2017–February 2018. The concentration of NO_2 was measured using a modified Jacob and Hochheiser method and PM was measured using a GRIMM aerosol spectrometer.

Hama **et al.(2020)** presented reports on a study conducted to determine the concentration of SO_2 and NO_2 in various urban residential zones in an urban area of Gwalior City. The aim of this study was to examine the spatiotemporal variations of gaseous air pollutants at four sites in the Gwalior urban area. The concentrations of NO_2 and SO_2 were systematically monitored according to national ambient air quality guidelines provided by Central Pollution Control Board, India. Among the various finding, this article documents that concentrations of gaseous pollutants were most elevated in commercial and high traffic areas.

Mahatoet al.(2020) presented the limitations of publicly available data, its utility to determine pollution sources across Delhi-NCR and establish seasonal profiles of chemically active trace gases. We obtained the spatiotemporal characteristics of daily-averaged particulate matter (PM_{10} and $PM_{2.5}$) and trace gases (NO_X, O_3, SO_2, and CO) within a network of 12 air quality monitoring stations located over 2000 km^2 across Delhi-NCR from January 2014 to December 2017.

Sathishet al.(2020) Air pollution has happened to be one of the mounting alarms to be concerned with in many Indian cities. COVID-19 epidemic endow with a unique opportunity to report the degree of air quality improvement due to the nationwide lockdown in 10 most polluted cities across the country. National Air Quality Index (NAQI) based on continuous monitoring records of seven criteria pollutants (i.e. common air pollutants with known health impacts e.g. PM_{10}, $PM_{2.5}$, CO, NO_2, SO_2, NH_3 and O_3) for a total of 59 stations across the cities, satellite image derived Aerosol Optical Depth (AOD) and few statistical tools are employed to derive the outcomes. NAQI results convey that 8 cities out of the 10 air quality restored to good to satisfactory category during the lockdown period.

Navinyaet al.(2020) studied the distribution pattern and characteristics of MPs found in the body of the clam *Donax cuneatus* and its environment in order to understand the possible relationship between the MP concentration in the environment (water and sediment) and that in the clam's body. Samples of *D. cuneatus* were collected from the coast between Vembar and Periyathazhai in Tuticorin district along GoM. MP concentrations range from 0.6 to 1.3 items/g (wet weight) in clams, 10–30 items/l in water, and 24–235 items/kg in sediment. Small-sized clams contain the highest concentration of MPs.

Beiget al.(2020) assessed MERRA-2's $PM_{2.5}$ results by comparing them with ground-based measurements conducted at 20 stations across the Indian region between 2015 and early 2018. Our analysis shows that MERRA-2 generally underestimates the $PM_{2.5}$ in terms of both the mass concentration and the number of exceedance days. While the Central Pollution Control Board (CPCB) measured exceedances of the national ambient air quality standards (NAAQS) on 34% of the days, MERRA-2's prediction was only 11%, and its estimate of the annual average $PM_{2.5}$ concentration across all of the sites was also negatively biased, by ~27 $\mu g\ m^{-3}$. Correlations of 0.96 and 0.6 were found between the estimates and the measurements for the monthly and the daily averaged concentrations, respectively; these numbers can be dramatically improved by applying a simple bias correction. Overall, our evaluation reveals that MERRA-2's raw estimates of $PM_{2.5}$ on a monthly time scale or longer are helpful in long-term air quality studies.

Sembhiet al.(2020) quantified the share of biomass burning in deteriorating Delhi's air quality during 2018 using the SAFAR chemical transport model that has been validated with dense observational network of Delhi. The impact of biomass burning on Delhi's PM2.5 is found to vary on day-to day basis (peaking at 58%) as it is highly dependent on transportation pathway of air mass, controlled by meteorological parameters from source to target region. Comprehending the multi-scale nature of such events is crucial to plan air quality improvement strategies.

Beiget al.(2020) presented combine air quality modelling of fine particulate matter ($PM_{2.5}$) over IGP cities, with meteorology, fire and smoke emissions data to directly test this hypothesis. Our analysis of satellite-derived agricultural

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fires shows that an approximate 10 d shift in the timing of NW India post-monsoon residue burning occurred since the introduction of the 2009 groundwater preservation policy. For the air quality crisis of 2016, we found that NW Indian CRB timing shifts made a small contribution to worsening air quality (3% over Delhi) during the post-monsoon season.

Yadav et al. (2019) investigated the ambient atmospheric pollution using comprehensive monitoring and analyses of the air pollutants, their statistical behaviors, and estimation of the role of transportation mode for the evacuation of coal in two different coalfield areas. The meteorological parameters such as temperature, humidity, wind speed, and wind direction were collected together with particulate matters, gaseous pollutants and trace metals. The potential contributors were analyzed using principal component analysis.

Deepet al. (2019) The variations in the ambient concentrations of particulate matter (SPM and PM10PM10) and gaseous pollutants (SO2SO2 and NO2NO2) at Clock tower (CT), Rajpur road (RR) and Inter State Bus Terminal (ISBT) station in Dehradun city, Uttarakhand, India are analysed for the period of 2011–2014. Mean concentrations are observed to be higher during pre-monsoon season as compared to the winter and monsoon. PM10PM10 and SPM concentrations with maximum values of 203±23203±23 and 429±49μg m−3429±49μg m−3, respectively, during winter, are found to exceed the national standards by factors of 2 and 3. Winter-time elevated pollution in Dehradun is attributed to the lower ventilation coefficient (derived from Era interim model fields) and minimal precipitation. Nevertheless, the SO2SO2 and NO2NO2 levels are observed to be within the criteria notified by the Central Pollution Control Board (CPCB), India. Correlation analysis shows profound impacts of the meteorology and local dynamics on the observed variations in observed trace species.

Begumet al. (2019) Air pollution in Dhaka has drawn the attention of the government and the public over the past several decades, especially upon the discovery of Pb in the air. As a result, several policy interventions have been implemented to improve the air quality. Sampling for fine airborne particulate matter ($PM_{2.5}$, PM with an aerodynamic diameter < 2.5 μm) has been conducted at a semi-residential site (AECD) in Dhaka since December 1996 using a GENT sampler. The retrieved samples were analyzed for their mass, black carbon (BC), and elemental compositions, and the resulting data set was analyzed for source identification via the Positive Matrix Factorization (PMF) technique.

Braueret al. (2019) compared the density of India's monitoring network with that of comparator countries and find large differences. For example, given the ~200 $PM_{2.5}$ monitoring sites in operation during the 2010–2016 period, we find that India's monitor density of ~0.14 monitors/million persons (1 monitor for every 6.8 million people) is well below that of other highly populated countries such as China (1.2 monitors/million persons), the USA (3.4 monitors/million persons), Japan (0.5 monitors/million persons), Brazil (1.8) and most European countries (2–3 monitors/million persons).

Dobhalet al. (2019) To address these gaps between India and monitor densities of comparator countries will require 1600–4000 monitors (1.2–3 monitors/million persons) at an estimated capital (annual operating) cost of US $212–540 ($106–270) million. Even at these densities, only relatively basic information on common air pollutants at high temporal, but limited spatial, resolution would be available. Small-scale variability in air pollution levels within urban areas would not be well-characterized, nor would there be information on chemical constituents useful for evaluating and improving simulations and forecasts, or for characterizing source contributions.

Dobhalet al. (2019) The ambient air quality of Jalna city has been assessed by using air quality index (AQI). For determining AQI the ambient air concentrations of air pollutants viz. SO2, NOx, RSPM and NRSPM were monitored at residential and industrial sites for one-year period. The monthly, seasonal and annual AQI values determined at both residential and industrial sites indicated that the overall air quality at residential and industrial sites during the study period was comparable with not too much variations.

Purohitet al. (2019) explored pathways towards achieving the NAAQS in India in the context of the dynamics of social and economic development. In addition, to inform action at the subnational levels in India, we estimate the exposure to ambient air pollution in the current legislations and alternative policy scenarios based on simulations with the GAINS integrated assessment model. The analysis reveals that in many of the Indian States emission sources that are outside of their immediate jurisdictions make the dominating contributions to (population-weighted) ambient pollution levels of $PM_{2.5}$. Consequently, most of the States cannot achieve significant improvements in their air quality and population exposure on their own without emission reductions in the surrounding regions, and any cost-effective strategy requires regionally coordinated approaches. Advanced technical emission control measures could provide NAAQS-compliant air quality for 60% of the Indian population. However, if combined with national sustainable development strategies, an additional 25% population will be provided with clean air, which appears to be a significant co-benefit on air quality (totaling 85%).

Yatawaraet al. (2019) study attempted to assess and correlate the use of corticolous lichens with atmospheric SO_2 and NO_2 in such an ecosystem in Sabaragamuwa Province in Sri Lanka. Nine sampling locations, each having three subsampling sites with 162 *Mangifera indica* and *Cocos nucifera* trees, were selected for the study. The coverage and frequency of lichens found on selected trees were recorded by 400-cm^2 grids and identified using taxonomic keys. SO_2 and NO_2 levels at each site were determined by "Ogawa" passive air samplers. Data of lichen diversity were used to formulate the index of atmospheric purity (IAP). The environmental parameters related to lichen colonization were measured using standard methods. Data were analyzed using MINITAB 17.

Sahuet al. (2019) measured the gaseous and particulate pollutants and compute the air pollution index (API) at four representative sampling stations (Budharaja, Modipara, Sakhipara and Kacheri) based on the guidelines of Central Pollution Control Board (CPCB), New Delhi. The gaseous pollutants were analyzed by passing them through their respective absorbing reagents, while the particulate pollutants were studied gravimetrically for a period of 1 year (August 2015–July 2016) with a frequency of twice per week.

Masihet al. (2018) The sampling of BTX was performed by using a low-flow SKC Model 220 sampling pump equipped with activated coconut shell charcoal tubes with a flow rate of 250 ml/min for 20–24 h. The analysis was in accordance with NIOSH method 1501. The efficiency of pump was checked weekly using regulated rotameters with an accuracy of ±1%. The samples were extracted with CS_2 with occasional agitation and analyzed by GC-FID.

Manjuet al. (2018) air pollutants were measured in an urban city of Coimbatore, Tamil Nadu, Southern India, during 2013 to 2014 based on season and location, and the influence of meteorological factors. Air pollutants (PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, and O_3) across eight locations including industrial, residential, traffic, and commercial areas were assessed. The results showed that PM_{10}, $PM_{2.5}$, and CO were the most serious pollutants and their average concentrations ranged from 65.5 to 98.6 μg/m^3, 27.6 to 56.9 μg/m^3, and 1.58 to 8.21 mg/m^3, respectively, among various locations.

Shaddicket al. (2018) A Bayesian hierarchical model was developed to estimate annual average fine particle ($PM_{2.5}$) concentrations at 0.1° × 0.1° spatial resolution globally for 2010–2016. The model incorporated spatially varying relationships between 6003 ground measurements from 117 countries, satellite-based estimates, and other predictors.

Ugyaet al. (2018) This research is aimed at monitoring and evaluating pollution of ambient air resulting from anthropogenic emissions. Methods: Particular matter samples were collected for 24h at four different sites daily using a high volume air sampler for the period of two years (March 2015-March, 2017). The determination of SO2 and CO in the sample was done using spectrophotometric method.

Dadhichet al. (2018) presented the evaluation of air quality in different wards of Jaipur city. Geo-spatial and geo-statistical techniques were utilized to estimate the seasonal and temporal variations (2004–2015) of gaseous and particulate pollutants. Data of six fixed monitoring stations was collected from Central Pollution Control Board (CPCB) and Rajasthan Pollution Control Board (RPCB) and the relationship between air quality and local weather parameters were also analyzed for the Jaipur city. It was found that SPM and PM_{10} is the major contributor to the deterioration of air quality in Jaipur city, while NO_X and SO_2 concentrations were below the CPCB standards. Results show that the concentrations of the air pollutants are high in winter and summer in comparison to the monsoon.

Hariramet al. (2018) estimated the impact of dust load generated by a TPPs to plant's dust retention capacity and pollution resistances (APTI and API). The observed ambient air quality index (AQI) showed that the surroundings of TPPs are in the severe air pollution category. Observed AQI was greater than 100 in the surrounding area of TPP.

Begumet al. (2018) Samples of the fine and coarse fractions of airborne particulate matter (PM) were collected using a 'Gent' stacked filter unit in a semi-residential area of Dhaka, Bangladesh from December 1996 through September 2015. The site is located at the Atomic Energy Centre, Dhaka University Campus that is a relatively low traffic area. Many policies have been implemented during this period to clean the air of Dhaka. Among them, bans on leaded-gasoline and two-stroke engines were implemented, and a policy regarding green technology for brick burning is in progress.

Patelet al. (2018) Clean air is a basic requirement of living organisms. But now-a-days, due to the unplanned growth, development and vehicular boom, the air has become polluted. Pollutants of major public health concern includes, particulate matter, carbon monoxide, ozone, nitrogen dioxide and sulphur dioxide, which can pose a serious threat to human health. In the present study, prime air pollutants (PM10, PM2.5, SO2 and NO2) were estimated at seven stations of Dahej area.

Haqueet al. (2018) analysis of ambient air quality in Kolkata was done by applying the Exceedance Factor (EF) method, where the presence of listed pollutants' (RPM, SPM, NO_2, and SO_2) annual average concentration are classified into four different categories; namely critical, high, moderate, and low pollution. Out of a total of 17 ambient air quality monitoring stations operating in Kolkata, five fall under the critical category, and the remaining 12 locations fall under the high category of NO_2 concentration, while for RPM, four record critical, and 13 come under the high pollution category.

Thakuret al. (2018) identify air pollution trend in Bengaluru and investigate the factors contributing towards it. Data for analysis has been obtained from state pollution control board website and has been used without any modification. Three criteria pollutants measured regularly and for longest period of time, sulphur dioxide (SO2), nitrogen dioxide (NO2) and respirable particulate matter (PM10) have been investigated for air quality analysis.

Nandanet al. (2018) focused on air quality assessment of 13 different industries in Uttarakhand. Four major air pollutants, i.e. respirable suspended particulate matter (RSPM), Sulphur dioxide (SO_2), suspended particulate matter (SPM) and Nitrogen dioxide (NO_2) were considered for the assessment. Assessment of the collected data shows that air quality parameters meet the set standards by CPCB suggesting good industrial practices. Suggestions to industries, to ensure sustainable development, are also given in the paper.

Dattaet al. (2018) Present study was conducted in two office buildings and one educational building in Delhi during pre-monsoon. CO_2, $PM_{2.5}$ and VOCs were measured inside each building at every 5 min interval between 9:30 AM and 5:30 PM for 5 days every week. The average CO_2 concentration in both office buildings (1513 ppm and 1338 ppm) was recorded much higher than the ASHRAE standard. Ductless air-conditioning system couple with poor air-circulation and active air-filtration could be attributed to significantly higher concentration of $PM_{2.5}$ in one of the office buildings (43.8 µg m^{-3}).

III. LITERATURE REVIEW SUMMARY

The study reveals that the level of air pollution is rapidly increasing. The reason for this is migration which results into growth of urbanization and transportation and the reason for this is industrialization ultimate the result is more pressure on the atmosphere. Due to emission various gases, this adversely affects the human health, plants and animals. The study tell that the people who are directly exposed to and affected due to air pollution are traffic crop occurs road, shopkeepers, rickshaw pullers, public Transpiration employees as well as the residents closed to busy roads. as a result of this they are prone to lungs diseases .Although the government has taken up various measures to prevent and control air pollution like the use of vehicles 15 years old has been banned, the use of Diesel, vehicles has been reduced considerable electrostatic precipitators have been added to chimneys of industries to prevent emission of particulate matters in the environment. The other way to reduce the pollution is to adopt the alternate sources of energy like renewable source of energy to reduce pollution. Air pollution and air quality which was measured in the city of Bhopal indicates PM10 and PM25 which was beyond the permissible limit but so2 and NOx were always below the permissible limit all the sampling sites in both month. The 60% of air pollution in the Indian cities ids due to automobile exhaust emission .this has lead to increase in air pollution index value. The study conclude that the Benefits of the step taken up by the government of nation centre of Delhi during the last 10 years reflect in the readings but is not all more needs to be done to reduce the level of air pollution the participation of people is very important to make a considerable reduction in the level of air pollution. The factor responsible for pollution need to be addressed various job approach should be created even in the remote area so that the migration of people in the urban areas may be checked because it ultimately result into in different forms. The study guided us that unchecked urbanization industrization . and population explosion have give birth to acuteenvirment pollution in Tamil Nadu. It is general belive that sewage treatment plant are only enough to control pollution.

Plant play an important role in monitoring and maintaining the ecological balance this can be seen by the study which was undertaken to access the ambient air quality and to see the amount variations in the content of ambient air pollutants (SPM,RSPM, SO_2 and NO2) by seeing the impact on roadside plants and taking into consideration sum of its epidermal characteristic form polluted areas like- Increase number of stomata, Increase number of epidermal cells per unit area,. Decrease Length and width of stomata guard cell and epidermal cell. These characters could be used in the bio monitoring of urban air quality. Studies were done on some trees species to judge roadside pollution. The psychological response of Few economically important tree species like mango (magnifier Indicia), some parameters of indication includes:1. Chlorophyll amount 2. PH 3. Relative water contain 4. Ascorbic acid. Significant change in all these parameters in leaf sample of mango plant of Roadside plantation will help us to deter mine the pollution level of urban roads.

According to this study some of the impacts on air making it pollute are those from mining areas, burning crop Residues and other household activities. These all result in the increased level of oxide of sulphur (SO_x), volatile organic compounds (vocs) , oxide of Nitrogen (NO_x) and ozone(O_3). Concentration of atmospheric trace metal associated with Respirable particulate matter (pm10)and air pollution index (API)which reveals about the metals which one going beyond their permissible limits leads to the harmful Effect in air. some of these metals includes -Zinc, Sulphur ,Nickel, Lead. These metals lead to the respiratory disease which may lead to serious problems. C Respirable dust sample (RDS) were used for the monitoring of particulate matter at all the location at an approximate height of 1.5 from ground level. Pollutions adverse effect on human health, property ,Trade and commerce, plant species and animals is increasing day to day. Urban air pollution is a serious problem in both developing and developed countries(Li,2013), Plants that are constantly exposed to environmental pollution are heavily affected. Effect of air pollution on health 1.Respiratory disease 2.Decrease lung function 3.Effect on nervous system 4.Heart disease 5.Premature death 6.Effect on cardiovascular function 7.Cancer

IV. CONCLUSION

It is believed that the air pollution has more harmfull impacts on human life than that of pollution by water and land. The Air Quality Monitering (AQM) is essential to asses levels of air quality and impact on health. Since more cost is envolved in setup of AQM station many developing cities lack of having AQM stations. The harmful impacts of air pollution on human health which is generally cause due to exponential growth in the number of vehicles, contributing to almost 50% of pollution, construction activities, paved and unpaved road dust, domestic pollution and the increased use of diesel generator sets. Concentration ranges for the different pollutant can be calculated through an Exceedence Factor.Going through the report which have a study of air pollution trends over Indian megacities and their local to glow our implication reveals that in India megacities(Delhi ,Mumbai and Kolkata) collectively have greater than 46 million population and prosperity resulting in the Rapid Environment Degradation. Megacity pollution outflow plumes contain high level of SO_2 , NOx and particulate matter. More population more urbanization more pollution(Air, water).

REFERENCES

[1] Gokul, P. R., Aneesh Mathew, Avadhoot Bhosale, and Abhilash T. Nair. "Spatio-temporal air quality analysis and PM2. 5 prediction over Hyderabad City, India using artificial intelligence techniques." Ecological Informatics 76 (2023): 102067.

[2] CM, Arun Murali, V. M. Chowdary, Mohit Kesarwani, and Neeti Neeti. "Integrated drought monitoring and assessment using multi-sensor and multi-temporal earth observation datasets: a case study of two agriculture-dominated states of India." Environmental Monitoring and Assessment 195, no. 1 (2023): 1.

[3] Dangayach, Ruchi, Mayank Pandey, Deepak Gusain, Arun Lal Srivastav, Ronak Jain, Brij Mohan Bairwa, and Ashutosh Kumar Pandey. "Assessment of Air Quality Before and During COVID-19-Induced Lockdown in Jaipur, India." MAPAN (2023): 1-11.

[4] Sicard, Pierre, Evgenios Agathokleous, Susan C. Anenberg, Alessandra De Marco, Elena Paoletti, and Vicent Calatayud. "Trends in urban air pollution over the last two decades: A global perspective." Science of The Total Environment 858 (2023): 160064.

[5] Badida, Pavanaditya, Arun Krishnamurthy, and Jayapriya Jayaprakash. "Meta analysis of health effects of ambient air pollution exposure in low-and middle-income countries." Environmental Research 216 (2023): 114604.

[6] Ravindra, Khaiwal, Samsher Singh Bahadur, Varun Katoch, Sanjeev Bhardwaj, Maninder Kaur-Sidhu, Madhu Gupta, and Suman Mor. "Application of machine learning approaches to predict the impact of ambient air pollution on outpatient visits for acute respiratory infections." Science of The Total Environment 858 (2023): 159509.

[7] Filonchyk, Mikalai, and Michael P. Peterson. "An integrated analysis of air pollution from US coal-fired power plants." Geoscience Frontiers 14, no. 2 (2023): 101498.

[8] Aher, Satish Bhagwatrao, Subroto Nandi, Gondru Ramesh, Dharma Raj, Lokesh Patel, and Rajnarayan Tiwari. "Effects of COVID-19 lockdown on ambient air pollution in Madhya Pradesh, India." International Journal of Environmental Studies 79, no. 3 (2022): 401-416.

[9] Trushna, Tanwi, Vikas Dhiman, Satish Bhagwatrao Aher, Dharma Raj, Rajesh Ahirwar, Swasti Shubham, Subroto Shambhu Nandi, and Rajnarayan R. Tiwari. "Environmental monitoring and health assessment in an industrial town in central India: A cross-sectional study protocol." Plos one 17, no. 6 (2022): e0264154.

[10] Sharma, Gautam Kumar, Ankush Tewani, and Prashant Gargava. "Comprehensive analysis of ambient air quality during second lockdown in national capital territory of Delhi." Journal of Hazardous Materials Advances 6 (2022): 100078.

[11] Natarajan, Narayanan, Mangottiri Vasudevan, Senthil Kumar Dineshkumar, Sivakkumar Shiva Nandhini, and Pandiyan Balaganesh. "Effects of air pollution on monumental buildings in India: An overview." Environmental Science and Pollution Research 29, no. 20 (2022): 29399-29408.

[12] Mor, Sahil, Tanbir Singh, Narsi Ram Bishnoi, Santosh Bhukal, and Khaiwal Ravindra. "Understanding seasonal variation in ambient air quality and its relationship with crop residue burning activities in an agrarian state of India." Environmental Science and Pollution Research 29 (2022): 4145-4158.

[13] Praveen Kumar, Roshini, Cyril Samuel, Shanmathi Rekha Raju, and Sneha Gautam. "Air pollution in five Indian megacities during the Christmas and New Year celebration amidst COVID-19 pandemic." Stochastic Environmental Research and Risk Assessment 36, no. 11 (2022): 3653-3683.

[14] Sharma, Disha, and Denise Mauzerall. "Analysis of air pollution data in India between 2015 and 2019." Aerosol and Air Quality Research 22, no. 2 (2022): 210204.

[15] Kuldeep, Kuldeep, Porush Kumar, Pawan Kamboj, and Anil K. Mathur. "Air Quality Decrement After Lockdown in Major Cities of Rajasthan, India." ECS Transactions 107, no. 1 (2022): 18479.

[16] Yadav, Shailendra Kumar, Rajeev Kumar Mishra, and Bhola Ram Gurjar. "Assessment of the effect of the judicial prohibition on firecracker celebration at the Diwali festival on air quality in Delhi, India." Environmental Science and Pollution Research (2022): 1-13.

[17] Balamadeswaran, P., J. Karthik, Ruthra Ramakrishnan, and K. Manikanda Bharath. "Impact of COVID-19 outbreak on tropospheric NO2 pollution assessed using Satellite-ground perspectives observations in India." Modeling Earth Systems and Environment 8, no. 2 (2022): 1645-1655.

[18] Markandeya, Pradeep Kumar Verma, Vibhuti Mishra, Neeraj Kumar Singh, Sheo Prasad Shukla, and Devendra Mohan. "Spatio-temporal assessment of ambient air quality, their health effects and improvement during COVID-19 lockdown in one of the most polluted cities of India." Environmental Science and Pollution Research 28, no. 9 (2021): 10536-10551.

[19] Gautam, Alok Sagar, Nikhilesh Kumar Dilwaliya, Ayushi Srivastava, Sanjeev Kumar, Kuldeep Bauddh, DevendraaSiingh, M. A. Shah, Karan Singh, and Sneha Gautam. "Temporary reduction in air pollution due to anthropogenic activity switch-off during COVID-19 lockdown in northern parts of India." Environment, Development and Sustainability 23 (2021): 8774-8797.

[20] Pandey, Mayank, M. P. George, R. K. Gupta, Deepak Gusain, and Atul Dwivedi. "Impact of COVID-19 induced lockdown and unlock down phases on the ambient air quality of Delhi, capital city of India." Urban climate 39 (2021): 100945.

[21] Naqvi, Hasan Raja, Manali Datta, Guneet Mutreja, Masood Ahsan Siddiqui, Daraksha Fatima Naqvi, and Afsar Raza Naqvi. "Improved air quality and associated mortalities in India under COVID-19 lockdown." Environmental pollution 268 (2021): 115691.

[22] Dhanvijay, Roshani, and Savita Pohekar. "Assessment of Auto-Rickshaw Drivers Knowledge Regarding the Effects of Air Pollution on Health and Its Prevention." Journal of Pharmaceutical Research International (2021): 20-26.

[23] Dutta, Shrabanti, Subrata Ghosh, and Santanu Dinda. "Urban air-quality assessment and inferring the association between different factors: A comparative study among Delhi, Kolkata and Chennai megacity of India." Aerosol Science and Engineering 5 (2021): 93-111.

[24] Pandey, Anamika, Michael Brauer, Maureen L. Cropper, Kalpana Balakrishnan, Prashant Mathur, Sagnik Dey, Burak Turkgulu et al. "Health and economic impact of air pollution in the states of India: the Global Burden of Disease Study 2019." The Lancet Planetary Health 5, no. 1 (2021): e25-e38.

[25] Dutta, Abhishek, and Wanida Jinsart. "Air quality, atmospheric variables and spread of COVID-19 in Delhi (India): an analysis." Aerosol and Air Quality Research 21, no. 3 (2021): 200417.

[26] Bherwani, H., S. Gautam, and A. Gupta. "Qualitative and quantitative analyses of impact of COVID-19 on sustainable development goals (SDGs) in Indian subcontinent with a focus on air quality." International Journal of Environmental Science and Technology 18 (2021): 1019-1028.

[27] Tabinda, Amtul B., Haider Ali, Abdullah Yasar, Rizwan Rasheed, Adeel Mahmood, and Anum Iqbal. "Comparative assessment of ambient air quality of major cities of Pakistan." Mapan 35 (2020): 25-32.

[28] Garg, Anchal, and N. C. Gupta. "The great smog month and spatial and monthly variation in air quality in ambient air in Delhi, India." Journal of Health and Pollution 10, no. 27 (2020).

[29] Dandotiya, Banwari, Harendra K. Sharma, and Nimisha Jadon. "Ambient Air Quality and meteorological monitoring of gaseous pollutants in urban areas of Gwalior City India." Environmental Claims Journal 32, no. 3 (2020): 248-263.

[30] Hama, Sarkawt ML, Prashant Kumar, Roy M. Harrison, William J. Bloss, Mukesh Khare, Sumit Mishra, Anil Namdeo, Ranjeet Sokhi, Paul Goodman, and Chhemendra Sharma. "Four-year assessment of ambient particulate matter and trace gases in the Delhi-NCR region of India." Sustainable Cities and Society 54 (2020): 102003.

[31] Mahato, Susanta, and Krishna Gopal Ghosh. "Short-term exposure to ambient air quality of the most polluted Indian cities due to lockdown amid SARS-CoV-2." Environmental Research 188 (2020): 109835.

[32] Sathish, M. Narmatha, K. Immaculate Jeyasanta, and Jamila Patterson. "Monitoring of microplastics in the clam Donax cuneatus and its habitat in Tuticorin coast of Gulf of Mannar (GoM), India." Environmental Pollution 266 (2020): 115219.

[33] Navinya, Chimurkar D., V. Vinoj, and Satyendra K. Pandey. "Evaluation of PM2. 5 surface concentrations simulated by NASA's MERRA version 2 aerosol reanalysis over India and its relation to the air quality index." Aerosol and Air Quality Research 20, no. 6 (2020): 1329-1339.

[34] Beig, Gufran, Saroj K. Sahu, Vikas Singh, Suvarna Tikle, Sandeepan B. Sobhana, Prashant Gargeva, K. Ramakrishna, Aditi Rathod, and B. S. Murthy. "Objective evaluation of stubble emission of North India and quantifying its impact on air quality of Delhi." Science of The Total Environment 709 (2020): 136126.

[35] Sembhi, H., M. Wooster, T. Zhang, S. Sharma, Nimish Singh, S. Agarwal, H. Boesch et al. "Post-monsoon air quality degradation across Northern India: assessing the impact of policy-related shifts in timing and amount of crop residue burnt." Environmental Research Letters 15, no. 10 (2020): 104067.

[36] Yadav, Manish, Satya Prakash Sahu, and Nitin Kumar Singh. "Multivariate statistical assessment of ambient air pollution in two coalfields having different coal transportation strategy: a comparative study in Eastern India." Journal of Cleaner Production 207 (2019): 97-110.

[37] Deep, Amar, Chhavi P. Pandey, Hemwati Nandan, K. D. Purohit, Narendra Singh, Jaydeep Singh, A. K. Srivastava, and Narendra Ojha. "Evaluation of ambient air quality in Dehradun city during 2011–2014." Journal of Earth System Science 128 (2019): 1-14.

[38] Begum, Bilkis A., and Philip K. Hopke. "Identification of sources from chemical characterization of fine particulate matter and assessment of ambient air quality in Dhaka, Bangladesh." Aerosol and Air Quality Research 19, no. 1 (2019): 118-128.

[39] Brauer, Michael, Sarath K. Guttikunda, K. A. Nishad, Sagnik Dey, Sachchida N. Tripathi, Crystal Weagle, and Randall V. Martin. "Examination of monitoring approaches for ambient air pollution: A case study for India." Atmospheric Environment 216 (2019): 116940.

[40] Dobhal, Bhagwansing S., Ravindra P. Shimpi, and Mazahar Farooqui. "Evaluation of Ambient Air Quality of Jalna City (MS), India." International Journal of Research and Review 6, no. 12 (2019): 341-351.

[41] Purohit, Pallav, Markus Amann, Gregor Kiesewetter, Peter Rafaj, Vaibhav Chaturvedi, Hem H. Dholakia, Poonam Nagar Koti et al. "Mitigation pathways towards national ambient air quality standards in India." Environment international 133 (2019): 105147.

[42] Yatawara, Mangala, and Nalika Dayananda. "Use of corticolous lichens for the assessment of ambient air quality along rural–urban ecosystems of tropics: a study in Sri Lanka." Environmental monitoring and assessment 191 (2019): 1-14.

[43] Sahu, C., and S. K. Sahu. "Ambient air quality and air pollution index of Sambalpur: a major town in Eastern India." International Journal of Environmental Science and Technology 16 (2019): 8217-8228.

[44] Masih, Amit, Anurag S. Lall, Ajay Taneja, and Raj Singhvi. "Exposure levels and health risk assessment of ambient BTX at urban and rural environments of a terai region of northern India." Environmental pollution 242 (2018): 1678-1683.

[45] Manju, A., K. Kalaiselvi, V. Dhananjayan, M. Palanivel, G. S. Banupriya, M. H. Vidhya, K. Panjakumar, and B. Ravichandran. "Spatio-seasonal variation in ambient air pollutants and influence of meteorological factors in Coimbatore, Southern India." Air Quality, Atmosphere & Health 11 (2018): 1179-1189.

[46] Shaddick, Gavin, Matthew L. Thomas, Heresh Amini, David Broday, Aaron Cohen, Joseph Frostad, Amelia Green et al. "Data integration for the assessment of population exposure to ambient air pollution for global burden of disease assessment." Environmental science & technology 52, no. 16 (2018): 9069-9078.

[47] Ugya, Adamu Yunusa, and Tijjani Sabiu Imam. "Assessment of ambient air quality resulting from anthropogenic emissions." AMERICAN JOURNAL OF PREVENTIVE MEDICINE 2, no. 1 (2018): 1-7.

[48] Dadhich, Ankita P., Rohit Goyal, and Pran N. Dadhich. "Assessment of spatio-temporal variations in air quality of Jaipur city, Rajasthan, India." The Egyptian Journal of Remote Sensing and Space Science 21, no. 2 (2018): 173-181.

[49] Hariram, Manisha, Ravi Sahu, and Suresh Pandian Elumalai. "Impact assessment of atmospheric dust on foliage pigments and pollution resistances of plants grown nearby coal based thermal power plants." Archives of environmental contamination and toxicology 74 (2018): 56-70.

[50] Begum, Bilkis A., and Philip K. Hopke. "Ambient air quality in Dhaka Bangladesh over two decades: Impacts of policy on air quality." Aerosol and Air Quality Research 18, no. 7 (2018): 1910-1920.

[51] Patel, Jagrutiben Arunkumar, Bhavesh I. Prajapati, and Viralben Panchal. "Assessment of ambient air quality and air quality index (AQI) in Dahej Area, Gujarat, India." Nature Environment and Pollution Technology 16, no. 3 (2017): 943.

[52] Haque, Md Senaul, and R. B. Singh. "Air pollution and human health in Kolkata, India: A case study." Climate 5, no. 4 (2017): 77.

[53] Thakur, Amrita. "Study of ambient air quality trends and analysis of contributing factors in Bengaluru, India." Oriental journal of chemistry 33, no. 2 (2017): 1051-1056.

[54] Nandan, Abhishek, S. M. Tauseef, and N. A. Siddiqui. "Assessment of Ambient Air Quality Parameters in Various Industries of Uttarakhand, India." In Materials, Energy and Environment Engineering: Select Proceedings of ICACE 2015, pp. 279-290. Springer Singapore, 2017.

[55] Datta, Arindam, R. Suresh, Akansha Gupta, Damini Singh, and Priyanka Kulshrestha. "Indoor air quality of non-residential urban buildings in Delhi, India." International Journal of Sustainable Built Environment 6, no. 2 (2017): 412-420.