EIACP NAGALAND

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Editorial

One of the greatest environmental threats to global public health is Air Pollution. According to UNEP, approximately 7 million people die prematurely each year due to air pollution which causes one in nine deaths worldwide. Approximately 90% of the world's population is exposed to air pollution at some point. Air quality is closely linked to climate change and the ecosystem.

Air quality plays a vital role in the health, safety, and security of humankind and the ecology. With the increase in urbanization and industrialisation, the air quality is deteriorating that poses threat to the survival of many species, health and our environment.

Improving our air quality will bring health, development, and environmental benefits. Therefore, the first step for an effective action plan to tackle the threat of air pollution is to monitor the air quality followed by identification of the sources. Collection, analysis, compiling of data and comparing it with the available permissible standards will help the citizens, government and policymakers to understand the magnitude of the problem and how far the present level of emissions has risen as compared to the permissible limits. Comparing data over the years will also help in understanding the trends in pollution levels and whether improvements are being made or if the condition is deteriorating and taking steps to control it accordingly.

This issue highlights the ambient air quality level for the year 2022 and 4 (four) years comparison of 11 (Eleven) manual monitoring stations in two districts of Nagaland i.e. 7 (seven) stations at Dimapur and 4 (Four) stations at Kohima, as monitored and compiled under the National Air Monitoring Programme (NAMP) by the host organization.

EIACP (Environmental Information, Awareness, Capacity building and livelihood Programme) is a project of the Ministry of Environment Forests and Climate Change, Govt. of India

EDITORIAL TEAM:

AIR POLLUTION:

Air Pollution is the presence of harmful, toxic or poisonous substances suspended in the air which makes the air unhealthy for human beings and the ecosystem. The air Act of Govt. of India (amendment 1987) defines air pollution as “air pollution means any solid, liquid or gaseous substances present in the atmosphere in such concentrations that may tend to be injurious to human beings or other living creatures or plants or property or enjoyment”. Air pollution is caused by a combination of gaseous and particulate pollutants such as carbon dioxide, methane, and nitrogen dioxide emitted from point sources such as factories and motor vehicles that burn fuel. Major public health concerns pollutants include particulate matter, carbon monoxide, ozone, nitrogen dioxide and sulfur dioxide.

Particulates are made up of soot, dust or smoke particles, which are measured by particulate yardstick called Respirable Suspended Particulate Matter (RSPM). The size of these pollutants is very tiny which is less than 10 microns in diameter. RSPM is generally classified into PM 10 (diameter 10-2.5 microns) and PM2.5 (under 2.5 microns). PM10 affects the upper respiratory tract from the nose and windpipe, whereas PM2.5 affects the lungs and air passage the most. The smaller the particles, the deeper they enter the lungs and bloodstreams unfiltered, causing permanent DNA mutations, heart attacks, respiratory disease, and premature death.

Some common sources of air pollution are vehicle exhaust, road dust, factories, forest fires, agricultural activities, open waste burning, dumping of waste, burning of fossil fuels etc.

WHO data show that almost all of the global population (99%) breathe air that exceeds WHO guideline limits and contains high levels of pollutants, with low- and middle-income countries suffering from the highest exposures. Air Pollution affects children more than adults due to higher concentrations of polluted air in their systems per body size. Seniors, pregnant women, people who exercise outdoors, people with chronic lung/heart diseases, and diabetes patients are also hugely affected. Some of the major illnesses related to air pollution are stroke, heart disease, lung disease, lower respiratory diseases (such as pneumonia), and cancer. High levels of fine particles also contribute to other illnesses, like diabetes, can hinder cognitive development in children and also cause mental health problems.

The harmful impacts of Air Pollution on the environment are depletion of nutrients in the soil, harm to forest cover, the decline in the oxygen content in oceans, introduction of toxins, and heavy metals in the food chain, causes harm to old monuments, and sculptures due to acid rain and also contribute to climate change.

National Air Quality Monitoring Programme (NAMP):

Measuring and understanding air pollution provides a sound scientific basis for its management and control. A systematic air monitoring network helps to determine whether pollutants level violate ambient air quality standards so that strategies, technologies and regulations can be adopted to achieve the necessary reduction in pollution. It can also help in recording the rate of progress towards attaining the ambient air quality standard or show that the standard has been achieved.

The National Air Quality Monitoring Programme (NAMP) was started during the year 1984-85 by the Central Pollution Control Board at the National level and gradually the number of air monitoring stations increased throughout the country. The ambient air quality monitoring network involves the measurement of a number of air pollutants at different locations in the country. Air quality

monitoring requires proper selection of pollutants, selection of locations, frequency and duration of sampling, sampling techniques, infrastructural facilities, and power and operation maintenance. The areas selected for monitoring are based on high traffic density, industrial growth, human population and its distribution, emission source, public complaints, land use patterns etc.

Ambient air quality monitoring is carried out throughout the Nation under National Air Quality Monitoring Programme (NAMP).

The objective of the monitoring programme is as follows:

- To determine the status and trend in ambient air quality;
- To ascertain whether the national ambient air quality standards are violated or not;
- To identify non-Attainment cities;
- To obtain the knowledge and understanding necessary for developing preventive and corrective measures;
- To understand the natural cleansing process undergoing in the environment through pollution dilution, dispersion, wind-based movement, dry deposition, precipitation and chemical transformation of pollutants generated.

The monitoring of meteorological parameters such as wind speed and direction, relative humidity and the temperature was also integrated with the monitoring of air quality.

The monitoring of pollutants is carried out for 24 hours (4-hourly sampling for gaseous pollutants and 8-hourly sampling for particulate matter) with a frequency of twice a week, to have 104 observations in a year.

AMBIENT AIR QUALITY MONITORING FOR THE YEAR 2022

Under the National Air Quality Monitoring Programme (NAMP), there are 11 (Eleven) MANUAL monitoring stations in Nagaland i.e. 7 (seven) stations at Dimapur and 4 (Four) stations at Kohima with a 1 (one) Continuous Ambient Air Quality Monitoring Station (CAAQMS) at Kohima.

Under this programme, three air pollutants are monitored and analyzed viz., Nitrogen dioxide (NO_2), Sulphur dioxide (SO_2) and Respirable Suspended Particulate Matter (RSPM). The monitoring of air pollutants is carried out for 24 hours (4 hourly sampling for gaseous pollutants (NO_2 & SO_2) and 8 hourly sampling for Particulate Matter (RSPM) twice or thrice a week.

AMBIENT AIR QUALITY OF DIMAPUR CITY

Under the National Air Monitoring Programme (NAMP) there are 7 (seven) monitoring stations at Dimapur. The Board has been regularly monitoring the air quality of Dimapur city under NAMP at 7 stations.

Table: Monitoring stations under the NAMP programme in Dimapur city.

Sl. No.	Station Name	Station Code	Station Type
1	Bank Colony (BC)	317	Residential
2	Dhobinala (Db)	448	Commercial
3	NPCB Office	1003	Residential
4	Tenyiphe	1004	Commercial
5	Nagarjan	1005	Residential
6	Viola Colony	1006	Residential
7	Burma Camp (BRC)	1007	Commercial

The table below represents the monthly average concentration data for all the monitoring stations with regard to particulate matter.

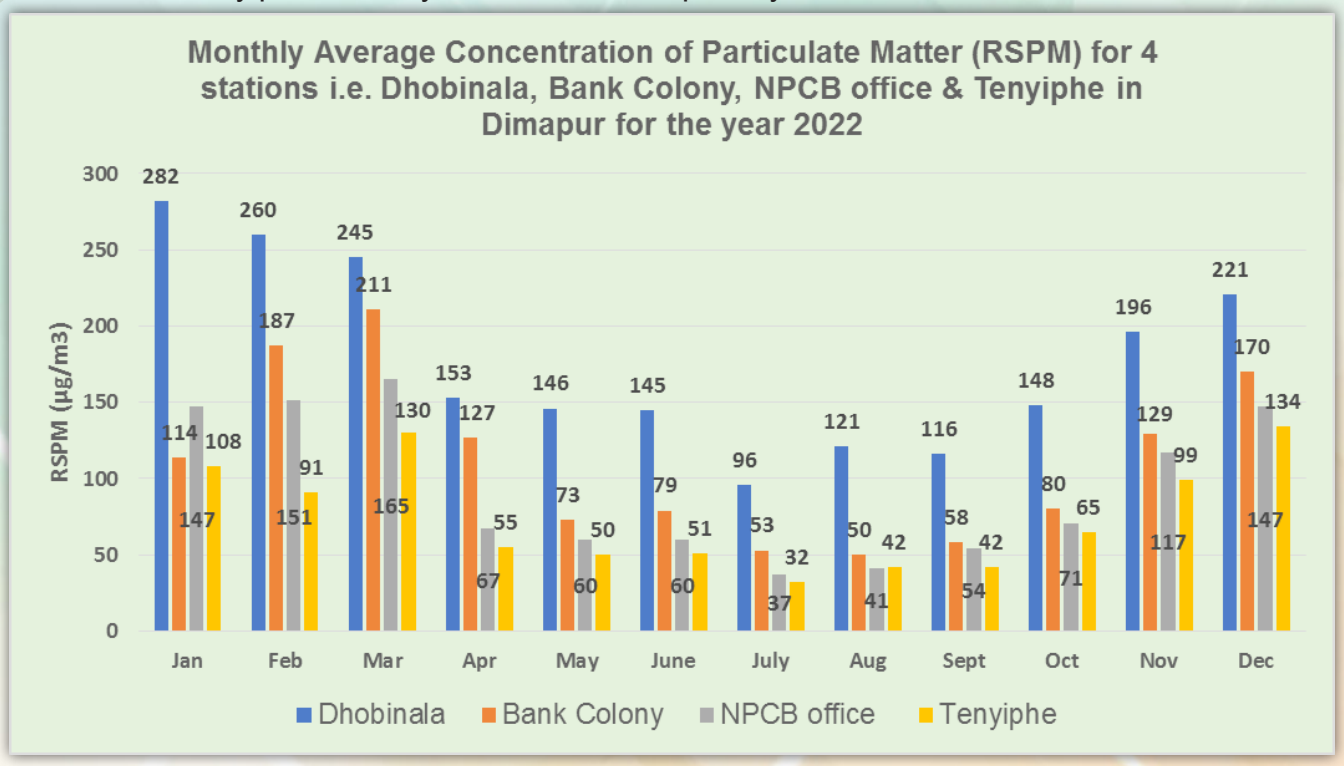
Table: The Monthly Average Concentration and Annual Average concentration of Particulate Matter (RSPM) for all the stations in Dimapur for the year 2022

Sl. No	Month of the year 2022	Name of NAMP Station RSPM (µg/m^3)						
		Db (448)	BC (317)	NPCB office (1003)	Tenyiphe (1004)	Nagarjan (1005)	Viola (1006)	Burma Camp (1007)
1	January	282	114	147	108	166	102	160
2	February	260	187	151	91	162	137	210
3	March	245	211	165	130	170	180	325
4	April	153	127	67	55	105	71	153
5	May	146	73	60	50	72	56	161
6	June	145	79	60	51	50	48	189
7	July	96	53	37	32	38	26	66
8	August	121	50	41	42	57	34	84
9	September	116	58	54	42	51	39	91
10	October	148	80	71	65	80	66	100
11	November	196	129	117	99	108	109	136
12	December	221	170	147	134	155	153	199
	Annual average	**177**	**111**	**93**	**75**	**101**	**85**	**156**

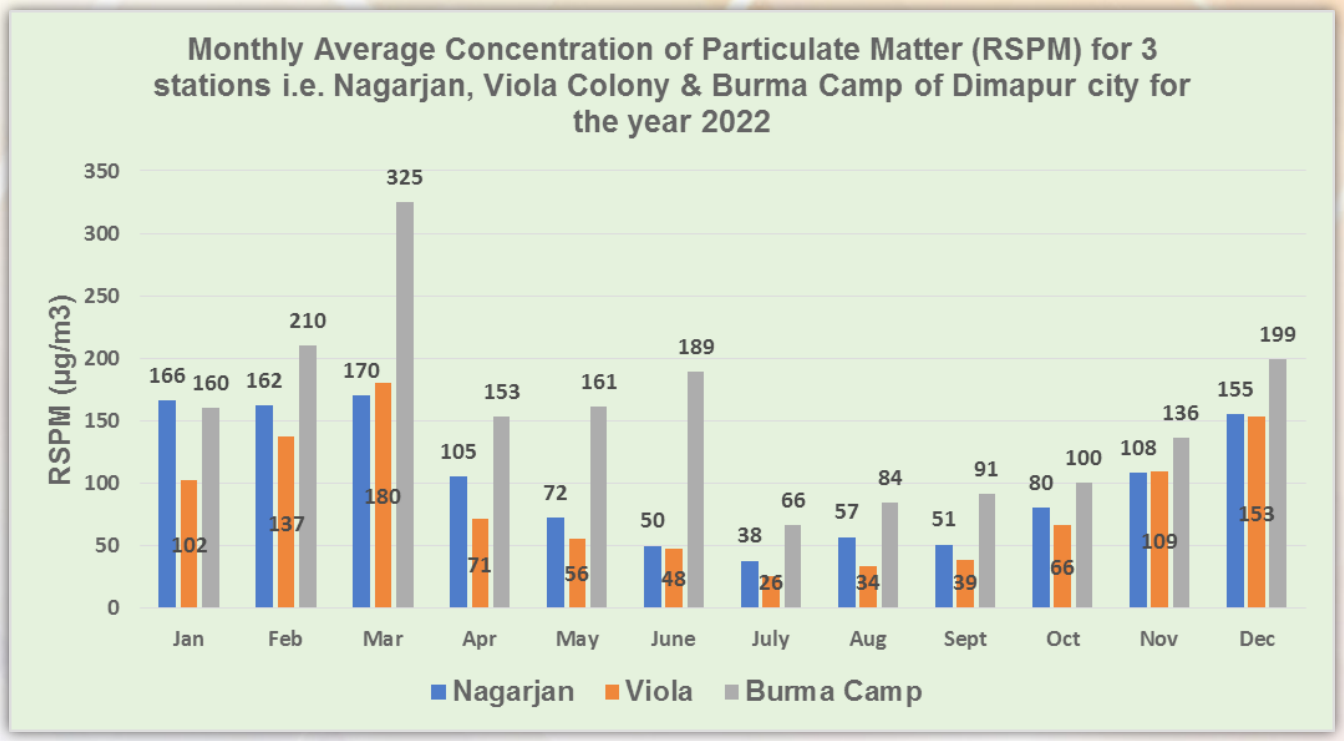
As per the monitoring carried out, the gaseous pollutants i.e. Nitrogen dioxide (NO_2) and Sulphur dioxide (SO_2) are within the prescribed national standards (Below Detectable Limit) in all the monitoring stations.

However, Particulates matter i.e. Respirable Suspended Particulate Matter (RSPM) is recorded beyond the permissible limit in most of the cases in all the monitoring stations. Compared with all the stations the highest monthly average concentration of RSPM was recorded at Burma Camp Station which is located in the Commercial area in the month of March at a value of 325 µg/m^3, while the lowest was recorded in the month of July with a value of 26 µg/m^3 for the station of Viola Colony which is located in a residential area.

Graph: Monthly Average Concentration of RSPM of the 4 stations i.e. Dhobinala, Bank Colony, NPCB office & Tenyiphe for the year 2022 of Dimapur city:



Graph: Monthly Average Concentration of RSPM of the 3 stations i.e. Nagarjan, Viola Colony & Burma Camp for the year 2022 of Dimapur city:



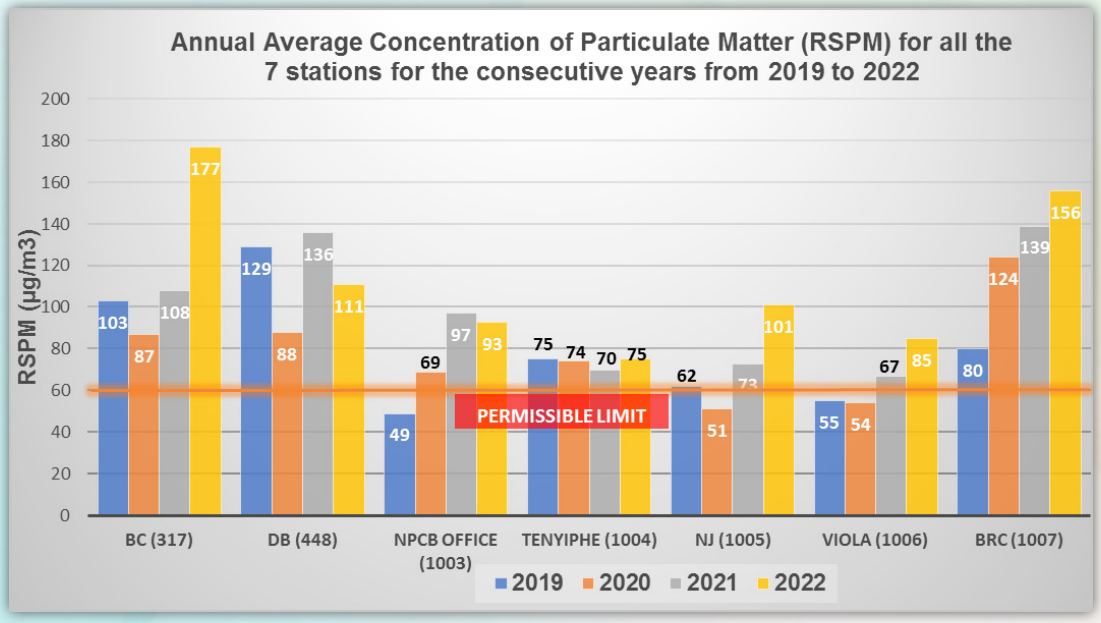
Annual Average Concentration:

The annual average concentration of Particulate Matter (RSPM) at all seven monitoring stations is illustrated in the table given below.

Table 3: Comparison values of Annual Average Concentration of Particulate Matter (RSPM) for all the stations for the consecutive years from 2019 to 2022.

Years	BC (317)	Db (448)	NPCB office (1003)	Tenyiphe (1004)	NJ (1005)	Viola (1006)	BRC (1007)	NAAQS for Residential, Rural and other Area
2019	103	129	49	75	62	55	80	60 µg/m3 (Annual)
2020	87	88	69	74	51	54	124	
2021	108	136	97	70	73	67	139	
2022	177	111	93	75	101	85	156	

The concentration levels of particulate matter (RSPM) in almost all the monitoring stations exceeded the prescribed National Ambient Air Quality Standards (NAAQS 2009). The table illustrated above shows that there has been a fluctuation in the Annual Average Concentration as the years go by and the air quality is deteriorating in most of the stations which can be better illustrated in the graph shown below.



AMBIENT AIR QUALITY OF KOHIMA CITY:

Under the National Air Monitoring Programme (NAMP) there are 4 (Four) manual monitoring stations and 1 (One) Continuous Ambient Air Quality Monitoring Station (CAAQMS) at Kohima. The Board has been regularly monitoring the ambient air quality in all the monitoring stations. However, two stations namely Upper Midland and High School Junction station started operation only from the month of August 2021

Table: Monitoring stations under the NAMP programme in Kohima city.

Sl. No.	Station Name	Station Code	Station Type
1	Below NST Office	609	Residential
2	PWD Junction	610	Commercial
3	High School Jn	1089	Commercial
4	Upper Midland	-	Residential

Table: The Monthly Average Concentration and Annual Average concentration of Particulate Matter (RSPM) for all the stations in Kohima for the year 2022

Sl. No	Month	Name of NAMP Station RSPM (µg/m^3)			
		Opp. NST Office (609)	PWD junction (610)	Upper Midland	High school Jn (1089)
1	January	85	109	70	112
2	February	90	115	78	126
3	March	97	116	85	135
4	April	76	76	65	97
5	May	51	43	53	70
6	June	48	43	50	61
7	July	35	32	36	56
8	August	45	40	38	61
9	September	39	39	40	61
10	October	67	58	49	83
11	November	94	65	49	102
12	December	103	105	75	135
	Annual average	**69 µg/m^3**	**70 µg/m^3**	**57 µg/m^3**	**92 µg/m^3**

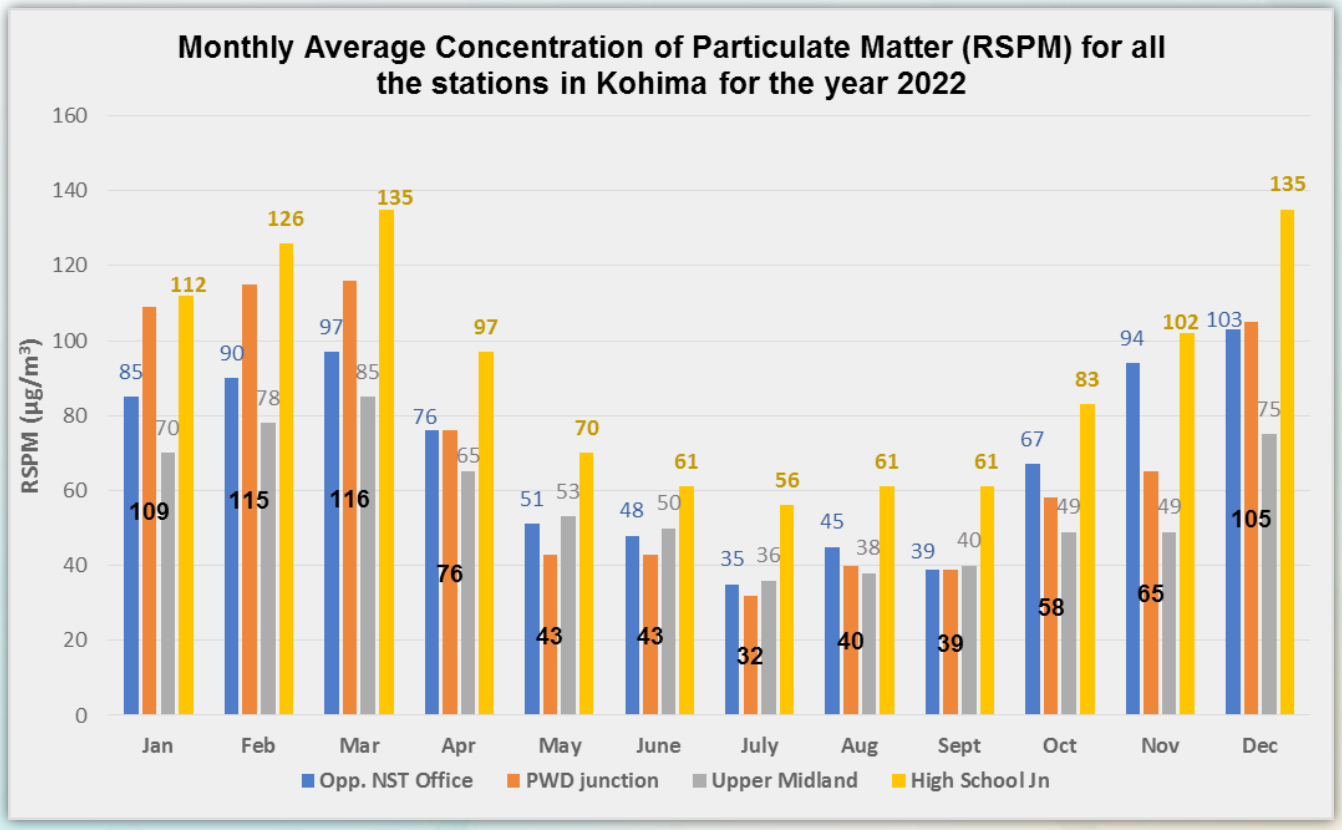
As per the monitoring carried out in the year 2022, the Gaseous pollutants i.e., Nitrogen dioxide (NO_2) and Sulphur Dioxide (SO_2) are within (Below Detectable Limit) the national standards in all the four monitoring stations i.e., Opp. NST Office, PWD Junction, Upper Midland and High School Junction.

The particulate matter (Respirable Suspended Particulate Matter) as compared with the gaseous parameter is of concern as during the dry seasons it records beyond the permissible limit.

As per the monitoring carried out, it has been observed that the monthly average concentrations with the highest concentration were observed for High School Junction during the month of March and December with a value of 135 µg/m^3 as it falls in a commercial area.

Whereas, the least concentration value was observed for the station at PWD Junction with a value of 32 µg/m^3 in the month of July.

A graph illustrating the monthly average concentration of Respirable Suspended Particulate Matter (RSPM) for all the stations i.e., opp. NST Station, PWD Junction, Upper Midland and High School Junction is given below:



Annual Average Concentration:

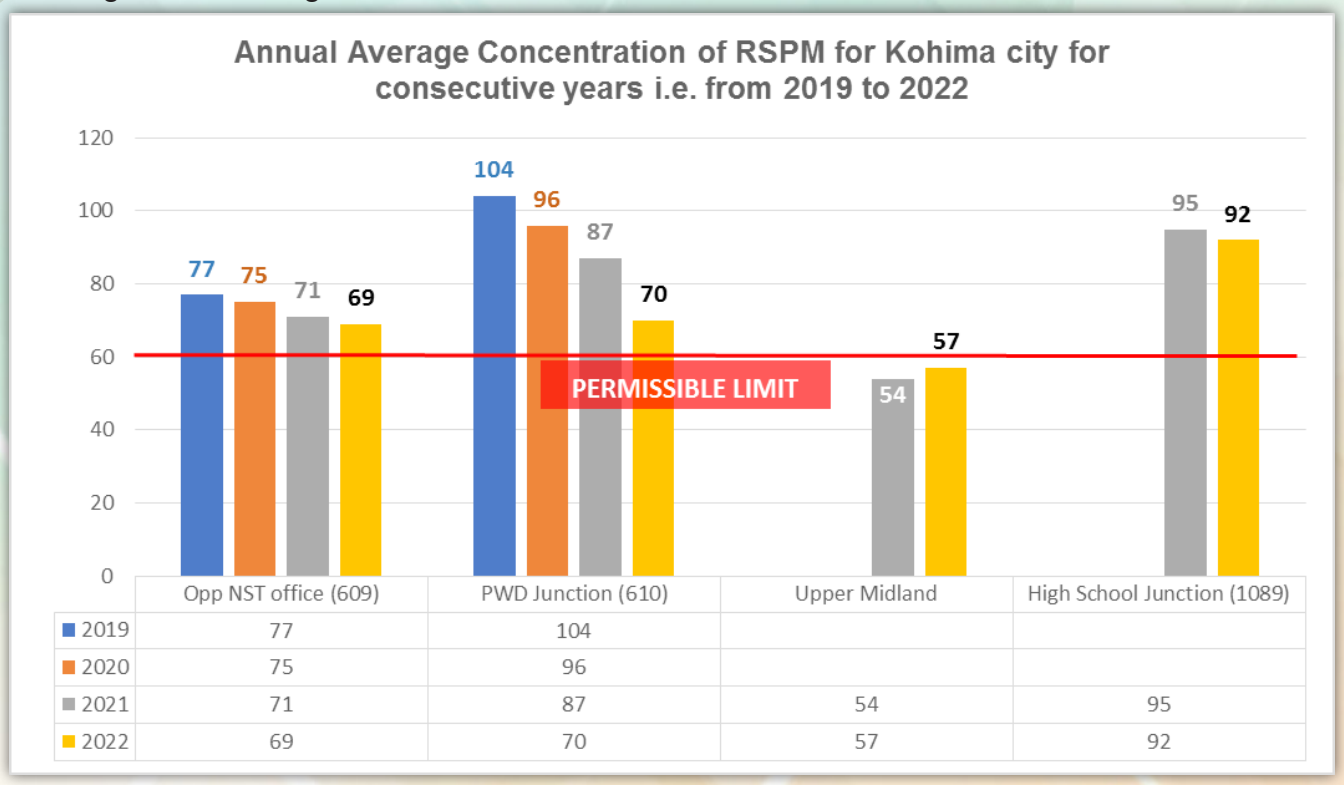
The Annual Average Concentration of Particulate Matter (RSPM) at the 4 (four) monitoring stations is illustrated in the table given below:

Table 3: Comparison values of Annual Average Concentration of Particulate Matter (RSPM) for four stations for the consecutive years from 2019 to 2022.

Years	Opposite NST Office (609)	PWD Junction (610)	Bayavu	High School Jn (1089)	NAAQ Standards for Residential, Rural and other Areas
2019	77	104	NA	NA	60 µg/m³
2020	75	96	NA	NA	
2021	71	87	54	95	
2022	69	70	57	92	

NA-non installation of station.

A Graph illustrating the Annual Average Concentration of Particulate Matter (RSPM) for both two monitoring stations are given below:



It has been observed that the ambient air quality is improving in all four stations as compared to the consecutive last 4 years. However, the two stations Upper Midland and High School Junction started monitoring ambient air quality only in the year 2021.

National Ambient Air Quality Standards (2009)

Pollutants	Time-weighted average	Concentration in Ambient Air	
		Industrial, Residential, Rural and Other Areas	Ecologically Sensitive Area (notified by Central Government)
Sulphur Dioxide (SO2), µg/m3	Annual*	50	20
	24 hours**	80	80
Nitrogen Dioxide (NO2), µg/m3	Annual*	40	30
	24 hours**	80	80
Particulate Matter Size less than 10µm) or PM10, µg/m3	Annual*	60	60
	24 hours**	100	100
Suspended Particulate Matter (SPM), µg/m3	Annual*	140***	70
	24 hours**	200***	100

* Annual Arithmetic mean of a minimum of 104 measurements in a year at a particular site taken twice a week 24 hourly at the uniform interval.

** 24 hourly 08 hourly or 01 hourly monitored values, as applicable shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.
*** The values under industrial area for Suspended Particulate Matter (SPM) is 360 µg/m^3 (Annual Average) and 500 µg/m3 (24 Hourly)

Note: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered.

Sources of Air Pollution and Way Forward:

In Nagaland State, the major sources of air pollution are road dust from poorly maintained roads, filling of potholes with mud, stones which generate dust during the dry season, vehicular exhaust which is further enhanced by traffic congestion, burning of waste, emissions from small scale industries and construction and demolition activities.

Open burning of waste is a major contributor to air pollution. Citizens should take care not to throw or burn their waste in open public spaces. The authorities had banned the burning of waste and as such, segregation of waste should be practised at the source of waste generation and handed over to authorized agencies for proper disposal of waste. Citizens should also abide by the Solid Waste Management Rules. Notification regarding the ban of open burning of waste as per section 15 of the Solid Waste Management Rules, 2016 had already been published in the local dailies by the Nagaland Pollution Control Board and other concerned authorities in the state.

Vehicles are a major contributor to air pollution. Their exhaust contains particulate matter, Carbon Monoxide (CO), and Nitrogen dioxide (NO_2) which contribute to global warming as greenhouse gases heat the planet and deplete the ozone layer. Using Public transport or carpooling wherever possible and either walking or using bicycles for local or short commutes will help the environment in the long run.

The unorganised and haphazard expansion of the settlement areas increases urbanization causing deforestation, and climate change leading to environmental degradation. Trees play a very important role in our lives as they provide us with the oxygen we breathe and absorb carbon dioxide which is a greenhouse gas and a major contributor to global warming. Therefore, planting trees or afforestation and protecting the existing trees should be encouraged.

Segregation of waste from the household level and taking care of the waste should be practised diligently in order to control air pollution and also solid waste management. Excessive usage of single-use plastics, dumping of domestic waste on the roadsides, littering of streets and roads by pedestrians, throwing waste on the roads and highways from moving vehicles, and dumping of waste containing non-biodegradable waste such as plastics into drains are such practices which contribute to various pollution.

While the various stakeholders and departments like the Municipal/Town Council, Forest Department, Urban Department, Transport Department, District Administration, Traffic Police, Department of Industries and Commerce, Public works Department, and Nagaland Pollution Control Board work to combat air pollution in Nagaland, it is also the responsibility of the citizens to make the right choices and play their part in dealing with air pollution.

Duties and Responsibilities to control overall Air Pollution:

Air Quality Control Measures:

- Regular cleaning of the roads and removal of silt from roads.
- Regular sprinkling of dusty road through tankers
- End-to-end pavement to be taken up in all the identified traffic corridors and junctions.
- Restrict storing of building materials along major traffic corridors and highways.
- Transportation of construction materials like sand, soil, stone chips etc in the covered system.
- Restrict the timing of entry for heavy commercial vehicles within the city limit.
- Proper management of the traffic system to avoid air pollution.
- Intensify the public transport system with cleaner fuel.
- Identification for provision of plantation to have green cover wherever possible.
- Usage of LPG instead of burning firewood or coal.
- Use of prohibited DG set is legally punishable
- Ban the usage of festive firecrackers.

Solid Waste Management Measures:

- Strict enforcement of ban on open burning of municipal solid waste, Biomass, Plastic etc.
- Cover movement of vehicles carrying solid waste, construction materials, etc

Increase Public Awareness:

- The public needs to be aware of the use of public transport and the fact that all vehicles have their engines stopped at traffic signals.
- The use of firecrackers is legally prohibited.
- Every industrial unit has to take all mitigation measures to prevent air pollution and establish the unit as per the guidelines given by the competent authority.
- The use of prohibited DG sets is legally punishable.

National Clean Air Programme (NCAP):

The Ministry of Environment, Forest and Climate Change launched the National Clean AirProgramme (NCAP) on 10th January 2019 as a national-level strategy advising the actions for reducing the levels of air pollution at the city and regional levels in India. The goal of NCAP is to meet the prescribed annual average ambient air quality standards at all locations in the country in a stipulated timeframe (long-term). Target is for the reduction of 20-30% of PM 2.5 and P.M 10 concentration by 2024.

The objective of NCAP is:

- To ensure stringent implementation of mitigation measures for prevention, control and abatement of air pollution.
- To augment and evolve effective and proficient ambient air quality monitoring network across the country for ensuring a comprehensive and reliable database and
- To augment public awareness and capacity-building measures encompassing data dissemination and public outreach programmes for inclusive public participation and for ensuring trained manpower and infrastructure on air pollution.

Activities undertaken by various Departments/stakeholders under the National Clean Air Campaign (NCAP) of Nagaland:

- Cleaning of road and sprinkling with water the dusty road.
- Purchase of one vacuum road sweeping machine, Manual sweeping Machine and ancillary

items and water tanker for road watering to control dust.

- Improvement of roads and construction of Cement concrete shoulder.
- Setting up of new air monitoring stations at Kohima.
- Creation of green belts in the city area and Urban Greening along vertical gardens.
- Procured 2 sets of mobile pollution testing machines installed in a vehicle for the non-attainment cities of Kohima and Dimapur where mobile pollution testing will conduct in and around the jurisdiction.
- Remediation /maintenance of Dumping site.
- Capacity building.
- Setting up of public grievance portal.
- Public awareness activities are an important aspect of providing information to the general public. Various departments have carried out awareness activities providing information to the community, schools, colleges, etc on the various environmental issues and their related impacts on human life and the environment.
- For public awareness, a video clip on clean air was created and circulated.

WALL POSTERS FOR PUBLIC AWARENESS AT KOHIMA

PUBLIC AWARENESS PROGRAMME AT DIMAPUR

All queries and feedback regarding this newsletter can be sent to:
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