



ENVIS NEWSLETTER



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STATUS OF AMBIENT AIR QUALITY

&

AIR QUALITY INDEX OF U.T OF PUDUCHERRY FOR THE YEAR 2016

***Bulletin of Ambient Air Quality Under
National Ambient Air Quality Monitoring Programme
(NAMP) -Manual monitoring system***

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Introduction:

The atmosphere of Earth is a layer of gases surrounding the planet Earth that is retained by Earth's gravity. Air is mainly composed of Nitrogen and Oxygen (99% by volume) and other gases including water vapor contribute to about 1%. Rapid urbanization and industrialization has added other elements/compounds to the pure air and thus caused the increase in pollution. In order to prevent, control and abate air pollution, the Air (Prevention and Control of Pollution) Act was enacted in 1981. According to Section 2(b) of Air (Prevention and Control of Pollution) Act, 1981 'air pollution' has been defined as 'the presence in the atmosphere of any air pollutant.' As per Section 2(a) of Air (Prevention and Control of Pollution) Act, 1981 'air pollutant' has been defined as 'any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment'. Therefore, ambient air quality standard is developed as a policy guideline that regulates the effect of human activity upon the environment so that pollutant emission into the air can be regulated.

National Ambient Air Quality Standards (NAAQS)

The objectives of air quality standards are:

- To indicate the levels of air quality necessary with an adequate margin of safety to protect the public health, vegetation and property.
- To assist in establishing priorities for abatement and control of pollutant level.
- To provide uniform yardstick for assessing air quality at national level.
- To indicate the need and extent of monitoring programme.

The MoEF & CC has notified the revised National Ambient Air Quality Standards notified on November 2009. The same can be viewed at http://cpcb.nic.in/National_Ambient_Air_Quality_Standards.php

Protocol of measurement and Interpretation

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

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 adequate reason to institute regular or continuous monitoring and further investigation.

National Ambient Air Quality Monitoring Programme

The ambient air quality is monitored at 593 locations in 249 cities, towns and industrial areas across 28 States and 5 Union Territories by CPCB in association with the concerned State Pollution Control Boards and Pollution Control committees for UTs for SO₂, NO₂ and PM₁₀ under National Air Monitoring Programme (NAMP). Puducherry Pollution Control Committee is carrying out manual ambient air quality monitoring at Six locations in the U.T. of Puducherry under the 'National Air quality Monitoring Programme' (NAMP) of Central Pollution Control Board (CPCB).

Sl. No.	Location Name	Location Type
1	Local Administrative Department Building (LAD), Suffren Street, Puducherry.	Residential area
2	Dept of Science Technology and Environment Building (DSTE), Anna Nagar, Puducherry.	Commercial area
3	Electricity Department, Mettupalayam Industrial Estate (PIPDIC), Puducherry.	Industrial area
4	B.Ed. College, Nehru Nagar, Karaikal	Residential area
5	Govt. Tourist Home, Kovilpathu, Karaikal	Commercial area
6	Puducherry Power Corporation Limited (PPCL) Polagam, T.R. Pattinam, Karaikal	Industrial area

Objectives of NAMP

- To determine status and trends of ambient air quality;
- To ascertain whether the prescribed ambient air quality standards are violated;
- 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.

Parameters monitored under NAMP:

Under NAMP three criteria pollutants viz. PM_{10} (Particulate Matter having an aerodynamic diameter less than or equal to $10\ \mu m$), Sulphur dioxide (SO_2) and Nitrogen dioxide (NO_2) were identified for regular monitoring at all locations.

Source and Health Effects

Particulate Matter(PM_{10}):

Particulate matter is treated as primary pollutant, if it is in the same form chemical form in which it is emitted into the atmosphere. The primary particulate matter includes windblown dust such as road dust, fly ash, soot etc. Particulate matter is called secondary pollutant, it is formed by chemical reactions in the atmosphere. Secondary pollutant particulate matter include sulphates, nitrates etc. Numerous scientific studies have linked particulate pollution exposure to a variety of problems including increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing, decreased lung function; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Environmental effects of particulate matter include visibility reduction, aesthetic damage etc.

Sulphur dioxide (SO_2):

Sulphur is present in raw materials such as coal, crude oil, ore. Sulphur dioxide is formed when coal, crude oil are burnt. The diesel driven vehicles are specific source of sulfur dioxide generated during combustion process. Effects of SO_2 include respiratory illness, visibility impairment, acid rain and aesthetic damage.

Nitrogen Oxide (NO_2):

Nitrogen oxides are formed when fuel is burned at high temperature. Sources of nitrogen oxides includes vehicles, industrial processes that burn fuel. Oxides of nitrogen along with VOCs results in formation of ground level ozone, which can trigger serious respiratory problems, crop damage.

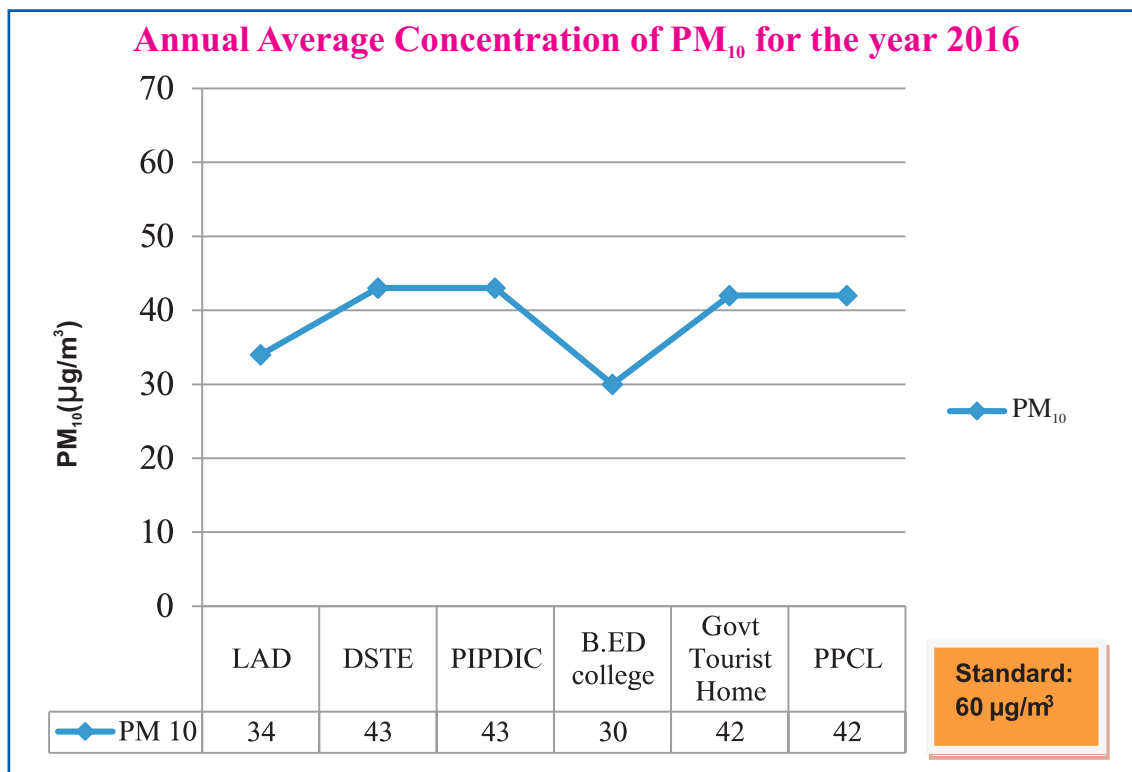
Methods of Measurement:

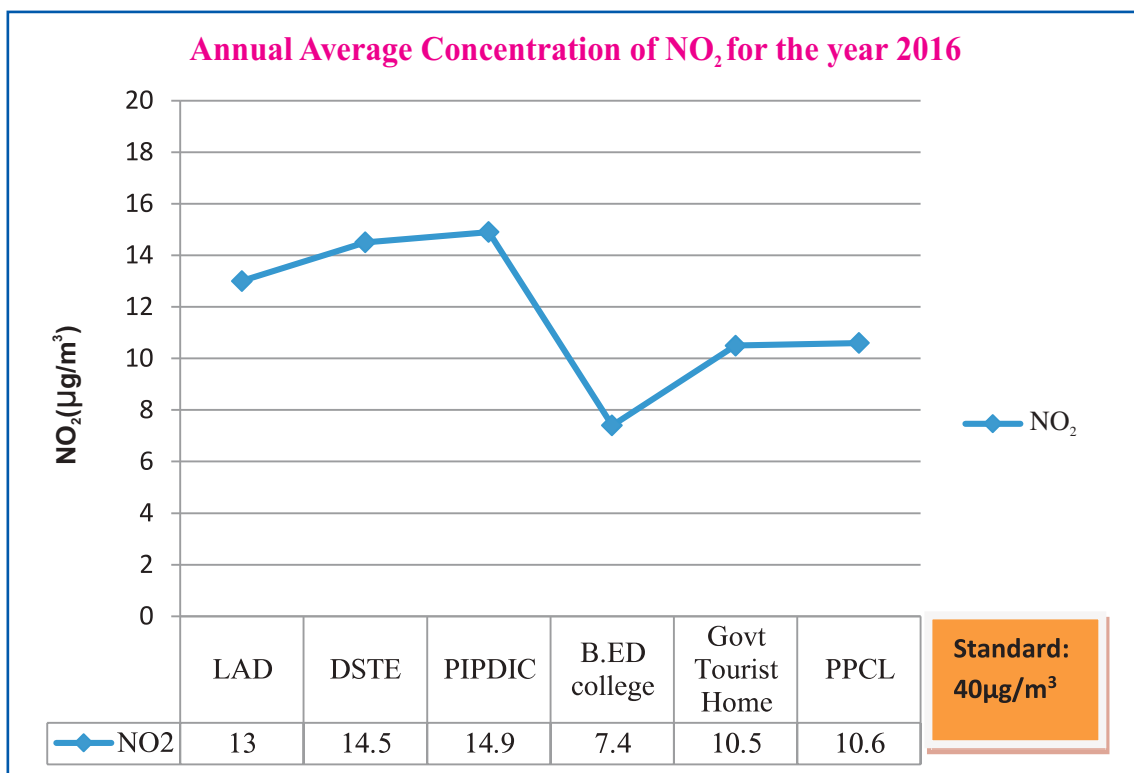
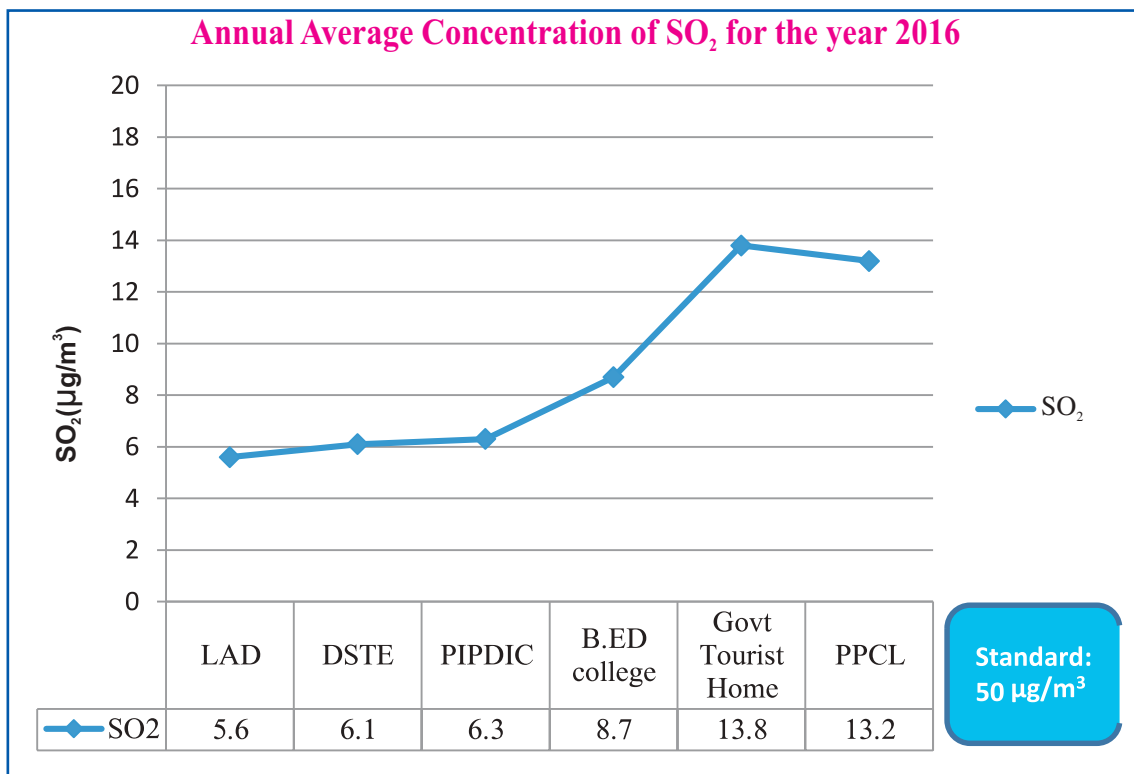
Sl. No	Air Pollutant	Method of measurement
1	Particulate Matter – PM ₁₀ (size less than 10 microns)	Gravimetric
2	Nitrogen dioxide	Improved West and Gaeke method
3	Sulphur di Oxide	Modified Jacob and Hochheiser

Status of Air Quality

Annual Average concentration of pollutant for the year 2016 in six locations in the U.T of Puducherry

Sl. No	Location	Pollutant in µg/m ³		
		PM ₁₀	SO ₂	NO ₂
1	LAD	34	5.6	13
2	DSTE	43	6.1	14.5
3	PIPDIC	43	6.3	14.9
4	B.Ed college	30	8.7	7.4
5	Govt Tourist Home	42	13.8	10.5
6	PPCL	42	13.2	10.6
STANDARD		60	50	40





Observation and Results:

- The monitoring result reveals that the annual average concentrations of the pollutants in all the six National Air Quality Monitoring locations are within the prescribed standard limits.
- Annual average concentrations of Respirable Suspended Particulate Matter in the ambient air monitored in all the six locations are in the ranges from 30-43 (µg/m³).
- Annual average concentration of Respirable Suspended Particulate Matter measured in all the six locations

are within the prescribed standard limit of $60 \mu\text{g}/\text{m}^3$.

- The monitoring result reveals that the annual average concentrations of the pollutants viz., SO_2 & NO_2 in all the six National Air Quality Monitoring locations are within the prescribed standard limits.
- The levels of all the pollutants are within the prescribed National Ambient Air Quality Standards. There is no deviation in concentration of during last few years. The following are some of the reason for low level of pollution.

The following are some of the reason for low level of pollution :

- The PPCC is not favoring in establishing highly polluting industry in Puducherry, there by taking precautionary steps for reducing the pollution potential from these industries.
- The existing industries are advised to provide suitable air pollution control devises in the unit to contain the emission from the process and also been advocated to install online emission monitoring systems.
- Promotion of use of LPG as domestic fuel instead of burning coal, Wool & Cow dung etc.
- In addition to this the proximity of the Bay of Bengal, it has excellent dilution effects due to sea and land breezes which reduces pollution levels.

Air Quality Index:

Air Quality Index is a tool for effective communication of air quality status to people in terms, which are easy to understand. It transforms complex air quality data of various pollutants into a single number (index value), nomenclature and colour.

There are six AQI categories, namely Good, Satisfactory, Moderately polluted, Poor, Very Poor, and Severe. Each of these categories is decided based on ambient concentration values of air pollutants and their likely health impacts (known as health breakpoints). AQ sub-index and health breakpoints are evolved for eight pollutants (PM_{10} , $\text{PM}_{2.5}$, NO_2 , SO_2 , CO , O_3 , NH_3 , and Pb) for which short-term (upto 24-hours) National Ambient Air Quality Standards are prescribed.

Based on the measured ambient concentrations of a pollutant, sub-index is calculated, which is a linear function of concentration (e.g. the sub-index for $\text{PM}_{2.5}$ will be 51 at concentration $31 \mu\text{g}/\text{m}^3$, 100 at concentration $60 \mu\text{g}/\text{m}^3$, and 75 at concentration of $45 \mu\text{g}/\text{m}^3$). The worst sub-index determines the overall AQI.

Status of Air Quality Index

Status of Category-wise numbers of AQI in the UT of Puducherry for the year 2016.

AQI Category	AQI	Colour Code	Number of AQI Values in different category		Pollutant-wise number of AQI values in AQI category	Possible Health Impacts
			No of AQI Values	% of AQI Values	PM_{10}	
Good	0- 50		467	82.5	467	Minimal Impact
Satisfactory	51 - 100		99	17.5	99	Minor Breathing discomfort to sensitive people
Total AQI Values			566	100	566	

Note:- One observation means one AQI Calculated for daily ambient air quality data at one station

National Air Quality Index

AQI	Possible Health impacts
Good (0-50)	Minimal Impact
Satisfactory (51 - 100)	Minor Breathing discomfort to sensitive people
Moderate (101 - 200)	Breathing discomfort to the people with lung, heart disease, children and older adults
Poor (201 -300)	Breathing discomfort to people on prolonged exposure
Very Poor (301-400)	Respiratory illness to the people on prolonged exposure
Severe (>400)	Respiratory effects even on healthy people

Overall summary:

The calculated AQI values for 24 hourly average concentrations are categorized as good to Satisfactory for the year 2016 at all the six location. The Prominent parameter is PM₁₀. The AQI value calculated for the two cities for PM₁₀ showed 82.5 % of AQI value i.e. 467 AQI values in the U.T of Puducherry out of total 566 AQI values revealed good air quality 17.5 % of AQI value i.e. 99 AQI values showed satisfactory air quality .

Conclusion:

The overall AQI can give clear view about ambient air and the report reveals that PM₁₀ is mainly responsible to determine the air quality which can be easier for a common man to understand. The PM₁₀ concentration in the Puducherry and Karaikal region is sourced predominantly from the anthropogenic activity, which may be due to the increase in vehicle movement, road dust etc.

Broad guidelines for Public/Citizens:

AQI is an initiative intended to enhance public awareness and involvement in efforts to improve air quality. People can contribute by maintaining vehicles properly (e.g. get PUC checks, replace car air filter, maintain right tyre pressure), following lane discipline & speed limits, avoiding prolong idling and turning off engines at red traffic signals. In addition to above, during severe or very poor AQI, people should minimize travel; avoid using private vehicles and instead use public transport, bikes or walk, and carpool.

Reference:

This report is prepared based on the National Air Quality Index of CPCB under Manual monitoring system for National Ambient Air Quality Monitoring Programme and National Ambient Air Quality Monitoring series.

http://www.cpcb.nic.in/FINAL-REPORT_AQI.pdf

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