Status of National Ambient Air Quality of Karaikal City, Puducherry



CENTRAL POLLUTION CONTROL BOARD
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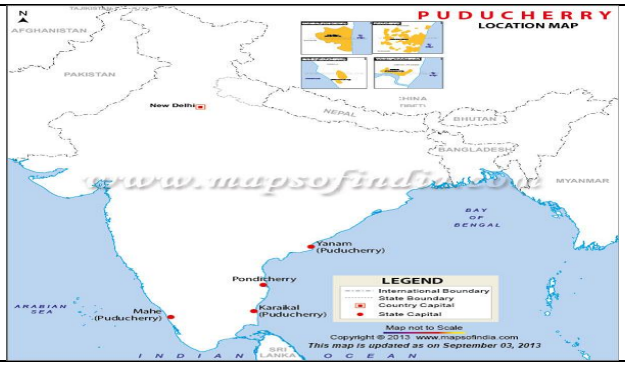
1. ABOUT KARAIKAL CITY

State	Puducherry
Location	Latitude: 10°55′00″ N and Longitude: 79°49′59″ E
Area	161 Sq.km
Elevation	8 m (26 ft)
Population	Around 2, 00,222according to 2011 census.
Climate	Karaikal is a district of Puducherry UT and is situated between Nagappattinam and Tiruvarur Districts of Tamil Nadu State. The climate of Karaikal is tropical wet & dry and experiences tropical maritime type of climate with small daily range of temperature and moderate rainfall. The minimum temperature in winter is around 10 degrees Celsius and in summer the maximum temperature is around 50 degrees Celsius. Karaikal gets most of its rains between October to December and Annual average rainfall is around 126 centimeters.
Geography	Karaikal town is about 16 km north of Nagappattinam and 9 kms south of Tarangambadi and is the district headquarters. Karaikal district is made up of one Municipality and five Commune panchayats viz. Karaikal, Kottuchcheri, Nedungadu, Tirunallar, Niravi and Tirumalarajanpattinam respectively. The region is occupied by alluvium consisting of sands and clays. Brick clay, kankar, sea shells, garnet sands, oil are some of the minerals found in this region.
Industries	The Rural Industrial Estate, Kottucherry, Karaikal was established in the year 1968 over an area of 7.66 acres of the land. The main industries located in this area are Spinning Mill, Gas Power plant, Ceramics, Steels, Chemicals, alloys etc., Karaikal Port (MARG) is being operational at Vanjoor Village.
Air Quality Stations	03(Residential, Residential & Commercial and Industrial)
Location of Karaikal City	

2. DETAILS OF NAMP STATIONS

The Karaikal city has three NAMP stations and it is maintained and regularly monitored by Puducherry Pollution Control Committee (PPCC).The stations are located at B. Ed College (PKCE), Nehru Nagar, (SC-784)covering Residential areas, Govt. Tourist Home, Kovilpathu, (SC-785)covering Residential and commercial areas and M/s Puducherry Power Corporation Ltd. complex, Polagam, (SC-786) covering Industrial area. The monitoring of these stations is carried out by PPCC, 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. The parameters monitored are Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), Particulate Matter (PM_{10}), and SPM.

3. DATA FOR AIR QUALITY INDEX (AQI) CALCULATION

The PPCC on request has sent the NAMP stations data for the month of September 2015 for three stations. This data is used for preparing the AQI for three stations. The parameters monitored at these stations are Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), Particulate Matter (PM_{10}) and SPM. Only three parameters such as Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2) and Particulate Matter (PM_{10}) are considered for calculation of AQI.

4. CALCULATION OF AIR QUALITY INDEX (AQI)

The AQI is calculated as following:

- The data received from the PPCC was in 4 – hourly concentration for SO_2 and NO_2 and 8 – hourly for PM_{10} parameters. It was converted into 24-hourly average concentration.

- The Sub-indices for individual pollutants were calculated using its 24-hourly average concentration value and health breakpoint concentration range.

- The formula used for calculation of Sub-indices is:

  Ip= [{(IHI - ILO)/ (BHI -BLO)} * (Cp-BLO)] +ILO
  Where

BHI = Breakpoint concentration greater or equal to given concentration
BLO = Breakpoint concentration smaller or equal to given concentration
IHI = AQI value corresponding to BHI
ILO = AQI value corresponding to BLO; subtract one from ILO, if ILO is greater than 50

AQI = Max (Ip) (where; p= 1, 2... n); denotes n pollutants

- The NAMP data received from the PPCC was fed into the AQI calculator prepared in the Microsoft Excel sheet and the value of Sub-indices and AQI was calculated.

5. RESULT

Since manual stations measure PM_{10}, it was suggested that for manual station AQI for past days can be calculated as long as PM_{10} or $PM_{2.5}$ is measured. It was proposed that for manual station, AQI is reported for at least three parameters and one of them should be PM_{10} or $PM_{2.5}$ possibly on a week basis.

AQI has been calculated for the month of September 2015 for monitoring stations B. Ed College (PKCE), Nehru Nagar, (SC-784), Govt. Tourist Home, Kovilpathu, (SC-785)and M/s Puducherry Power Corporation Ltd. complex, Polagam, (SC-786).

B. Ed College (PKCE), Nehru Nagar, (SC-784)

AIR QUALITY INDEX (AQI)					
SUB INDEX				**AQI**	
Date/Month	**NO_2**	**SO_2**	**PM_{10}**		
3/9/2015	6	6	22	22	GOOD
7/9/2015	6	6	18	18	GOOD
10/9/2015	7	8	21	21	GOOD
14/9/2015	7	7	30	30	GOOD
17/9/2015	6	7	29	29	GOOD
21/9/2015	9	11	31	31	GOOD
24/9/2015	10	12	33	33	GOOD
28/9/2015	9	10	24	24	GOOD

Govt. Tourist Home, Kovilpathu, (SC-785)

AIR QUALITY INDEX (AQI)					
SUB INDEX				AQI	
Date/Month	NO2	SO2	PM10		
1/9/2015	10	14	27	27	GOOD
4/9/2015	11	13	33	33	GOOD
8/9/2015	8	9	20	20	GOOD
11/9/2015	10	15	20	20	GOOD
15/9/2015	11	18	36	36	GOOD
18/9/2015	15	21	26	26	GOOD
22/9/2015	15	26	30	30	GOOD
25/9/2015	13	13	21	21	GOOD
29/8/2015	13	16	35	35	GOOD

M/s Puducherry Power Corporation Ltd. complex, Polagam (SC-786)

AIR QUALITY INDEX (AQI)					
SUB INDEX				AQI	
Date/Month	NO2	SO2	PM10		
2/9/2015	11	13	30	30	GOOD
5/9/2015	17	23	35	35	GOOD
9/9/2015	12	16	27	27	GOOD
12/9/2015	11	14	28	28	GOOD
16/9/2015	15	18	33	33	GOOD
19/9/2015	15	22	44	44	GOOD
23/9/2015	12	12	27	27	GOOD
26/9/2015	11	17	34	34	GOOD
30/8/2015	16	24	47	47	GOOD

From the above interpretation of AQI for Karaikal city, it can be seen that all the three parameters are falling under Good category and hence meeting the National Air Quality Standard.