

Chapter 6

ENVIRONMENTAL QUALITY

1.1 Ambient Air Quality

1.1.1 Probable Sources of Air Pollution

The existing large and medium scale air polluting industries, the traffic volume within the towns, along the highways and on unsurfaced roads are major sources of air pollution in the district. There are 12 industrial estates in the district that have been developed by the MIDC. Most of the air polluting industries belongs to A1 and A2 category having potential air pollution impact area ranging between 7-15 km and 5-7 km, respectively. Vehicular population in Pune district is another major source of air and noise pollution. The total vehicular pollution load in Pune District is about 400 tonnes per day (**Annexure 1: Table 48**).

1.1.2 National Air Quality Standards

In order to control the release of polluting gases into the atmosphere by industries and vehicles, the Central Pollution Control Board (CPCB), New Delhi has formulated certain standards. These standards are varying for different areas based on the sensitivity of that location.

Natural habitats or areas rich in biodiversity and areas of cultural and historical importance as demarcated by the Archeological department, fall under the 'sensitive area' category. As these areas are of national significance, they have to be specifically protected from any kind of pollution.

Areas of human habitation have to be protected and they fall in the 'residential, rural and other area' category. The third category is the 'industrial areas', which in maximum cases are the areas having point source of air pollution. The concentration of ambient air varies for these three categories, as the need for protection of the areas under them is different.

The National Ambient Air Quality standards as prescribed by the CPCB, New Delhi, applicable in the district is given in Table XXVI.

1.1.3 Ambient Air Quality Data

Air quality data of Pune District and the field survey made for ground truthing indicates that the district predominately has high air quality, i.e. it is relatively free of air pollution. However, the observed NO_x and SO₂ levels are on the higher side in most parts of the Pune City due to vehicular pollution and the nearby industrial belt located in Pimpri-Chinchwad. Air quality data from primary sources at Pune city has been given in **Annexure 1: Table 51**.

The table shows that for residential area in the Pune city, the SO₂ and NO_x levels indicate that sensitivity is low to medium while that for the residential area in Bhosari, Tal. Haveli, it is medium. Considering the SPM levels, Pune city falls in the critically sensitive zone and Haveli falls in the medium sensitive zone. For the industrial area at PCMC, the SO₂ level indicates that the sensitivity is low.

In the PCMC area, the industrial zone, the SPM levels are beyond the permissible limit, in the commercial zone, at some locations, the SPM is within permissible limits (**Annexure1**: Table 52). In the residential zone, only some areas have SPM level in the permissible limit.

Table I. National Ambient Air Quality standards

| Pollutant | Time Weighted Average | Concentration in ambient air (µg/m ³) | | |
|--|-----------------------|---|------------------|------------------------------------|
| | | Sensitive Areas | Industrial Areas | Residential, Rural and other areas |
| Sulphur Dioxide (µg/m ³) | Annual * | 15 | 80 | 60 |
| | 24 Hours ** | 30 | 120 | 80 |
| Oxides of Nitrogen as NO ₂ (µg/m ³) | Annual * | 15 | 80 | 60 |
| | 24 Hours ** | 30 | 120 | 80 |
| Suspended Particulate Matter (µg/m ³) | Annual * | 70 | 360 | 140 |
| | 24 Hours ** | 100 | 500 | 200 |
| Respirable Particulate Matter (RPM) of size less than 10 µg (µg/m ³) | Annual * | 50 | 120 | 60 |
| | 24 Hours ** | 75 | 150 | 100 |
| Lead (µg/m ³) | Annual * | 0.50 | 1.00 | 0.75 |
| | 24 Hours ** | 0.75 | 1.50 | 1.00 |
| Carbon Monoxide (µg/m ³) | 8 Hours ** | 1.00 | 5.00 | 2.00 |
| | 1Hours | 2.0 | 10.0 | 4.0 |
| Ammonia mg/m ³) | 24 Hours ** | 0.4 | 0.4 | 0.4 |
| | Annual | 0.1 | 0.1 | 0.1 |

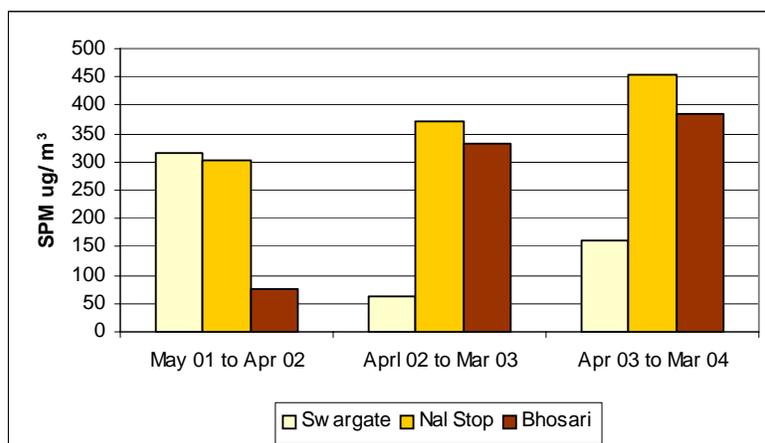
Note: 1. * Annual Arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.
2. ** 24 hourly/ 8 hourly values should be met 98% of the time in a year. However, 2% of the time, it may exceed but not on two consecutive days.

Source: EPA Notification: GSR 176(E), 02 April 1996.

Ambient air quality monitoring carried out at Majur Adda, Yashwantrao Chavan Natya Gruh and University Gate of Pune City by MPCB has been given in **Annexure 1**: Table 53. The data shows that the SPM and NO_x levels are above the permissible standards at Majur Adda. SPM levels at the University Gate exceed the permissible limits.

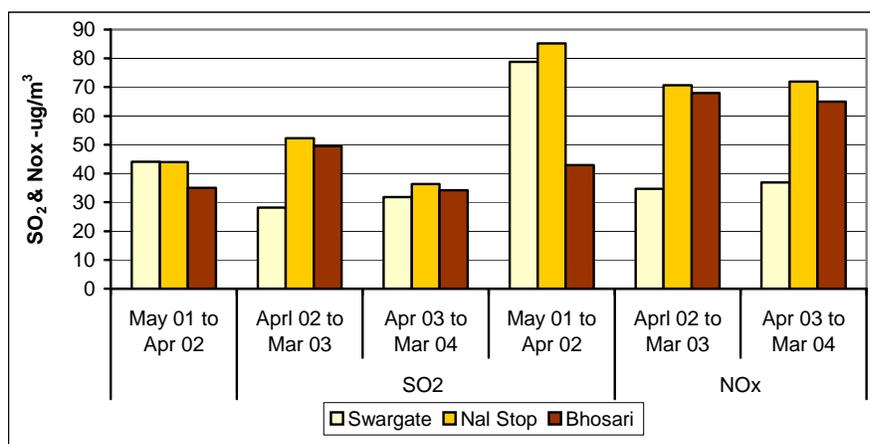
Under the National Ambient Air Quality Monitoring (NAAQM) the air quality in Pune city is monitored for 24 hrs twice a week at Swargate, Nal Stop and Bhosari during May 2001 to March 2004 for SPM, SO₂ and NO_x. Details of air quality during the period are shown in **Annexure 1**: Table 54. The SPM levels for Swargate and Nal Stop exceeds beyond the permissible levels. Levels of NO_x at Nal Stop are beyond permissible limits (Fig.25 and 26). Trend in SPM values for Bhosari show an increase of about 20% from May 2001 to March 2004.

Figure 1. Annual average of SPM at selected locations in Pune



Source: 1. Regional Office, Maharashtra Pollution Control Board, Pune (2002),
2. Ambient Air Quality Data, MPCB, Pune 2002-03

Figure 2. Annual average of SO₂ and NO_x at selected locations in Pune



Source: 1. Regional Office, Maharashtra Pollution Control Board, Pune (2002),
2. Ambient Air Quality Data, MPCB, Pune 2002-03

CPCB has specified area specific standards for noise levels (day time and night time) (Table XXVII). Noise level monitored during the Ganesh festival during 2003 is shown at **Annexure 1: Table 55**. Noise levels at commercial areas in the PCMC are presented at **Annexure 1: Table 56**. It can be observed that the noise levels in all the areas are above the prescribed standard limits.

Table II. Noise Level Standards

| Area Code | Category of area | Limits of dB (A) Leq | |
|-----------|------------------|----------------------|------------|
| | | Day Time | Night Time |
| A | Industrial Area | 75 | 70 |
| B | Commercial Area | 65 | 55 |
| C | Residential Area | 55 | 45 |
| D | Silence Zone | 50 | 40 |

Note: Day Time: 6.00 am to 9 pm, Night Time: 9 pm to 6 am

Source: CPCB, New Delhi

1.1.4 Public Complaints and Field Observations

The field observations and the public complaints received at the Regional Office, MPCB, Pune, has been presented below (Table XXVIII). It depicts problems of air and noise pollution within the Pune City and Chinchwad MIDC area due to movement of traffic as well as due to industrial activities.

Table III. Public complaints regarding air and noise pollution in Pune District

| Name of the area | Complaint received from | Nature of complaint | Investigation / findings | Remarks |
|------------------|-------------------------|--|---|--|
| Pune City | Citizens of Pune | Noise and air pollution caused by vehicles and D.G. sets | Pune city is one of the highly air polluted cities in the country. Emission from 13 lakh registered vehicles is the major source. Frequent power failures have increased the number of D.G. sets which adds to the noise and air pollution. | Action plan for air quality improvement is prepared as per directions of Hon'ble Supreme court, and is being implemented under the supervision of Justice Bhurelal Committee appointed by SCI. |
| Chinchwad MIDC | Citizens of Chinchwad | Air and Noise pollution | The concentration level of SPM, SO ₂ and NO _x are beyond permissible limit. | The reason for this can be attributed to the industrial activities, combined with the movement of heavy vehical traffic within this industrial belt. |

Source: Regional Office, MPCB, Pune.

1.1.5 Air Quality Map

The Air Quality **Map No. 24** provides information about the status of ambient air quality in the district based (**Annexure 1: Table 54**). The map also shows areas where the noise levels are above the permissible limits.

Locations showing air quality have been marked and categorized into high, critical and low. '**High**' air quality constitutes the locations where the concentration of air pollutants is low and well within the prescribed national standards. '**Low**' air quality stands for areas where concentration of air pollutants is below permissible standard limits, but close to the standards, whereas '**critical**' air quality stands for locations with high concentration of air pollutants exceeding the standards. Ambient air quality with respect to SPM, NO_x and SO₂ at different locations in Pune city has been marked. Noise levels at different locations, which are above the permissible limits in Pune city, have been marked in the map.

It can be observed that in Pune City the air quality at NalStop, Swargate and Fursungi over bridge is 'Critical' where as at PCMC and Bhosari is 'low' and at Jog Centre, Shivajinagar is 'High'. The analysis is based on the existing sources of pollution, monitored data through primary surveys and secondary sources, public complaints and observations from the field experiences.

The noise level is observed for various locations during the Ganesh festival at day and night time from 1st Sept., 2003 to 8th Sept., 2003 in Pune city and PCMC area. The details of location, observation time and noise level is given in **Annexure 1: Table 55 and 56**.

1.2 Surface Water Quality

The existing water quality of the District has been assessed based on both primary and secondary data, pollution source inventory (location and their pollution loads), the discharge points, public complaints and field observations.

1.2.1 Probable Source(s) of Water Pollution

i. Industries

In the district, water-polluting industries are located in different industrial estates (**Annexure 1: Table 37**), also number of isolated industries are scattered in urban and rural areas. The downstream location of industries along the water bodies, have substantial stress due to the discharge of effluents from the industries.

ii. Domestic Sewage

The disposal of large amounts of sewage into surface water bodies increases the rate of eutrophication of the water body. It is therefore essential to neutralize the effect of the added sewage. For this, it has to be disposed into flowing water or in case it is disposed into stagnant water bodies, care has to be taken to treat it before it is disposed.

The discharge of sewage from Pune urban agglomeration area in river Mula-Mutha, Pauna & Indrayani has resulted in localized degradation of the river water quality in the river water stretch downstream. The sewage discharge from the other settlements in the district is meager and does not show severe affect on the surface water quality due to large dilution.

iii. Agricultural Runoff

Runoff from agricultural lands after the monsoons washes away fertilizers and pesticides and drains it into the nearest water body. This leads to the pollution of water from chemicals used in the fertilizers. Pune District has the high agriculture landuse area. The total consumption of fertilizers in year 2001-02, 2000-01 and 1999-2000 is 91930 MT, 81161 MT and 88903 MT, respectively (**Annexure 1: Table 46**). Average about 10% of the fertilizers & pesticides consumed are expected to runoff or percolate into surface water bodies or groundwater.

Following agricultural pesticides are commonly used in the district:

Pesticides: Dimethoate, Monocrotophos, Endosulphan, Cypermethrin, Fenvalrate, Decamethrin, Methyl parathion, Methyldemeton, Copperoxychlo, Chloropyriphos, Quinalphos, Carbaryl etc.

1.2.2 Surface Water Quality Standards

The quality of water required for different purposes varies; hence, pollution load allowable is based on the activity or use that the water has to be put to. The water quality criteria as prescribed by CPCB and river water quality standards and regulatory parameters as prescribed by the MPCB and are given in table XXIX and XXX respectively. River water quality regulatory parameters have been discussed under section 3.2.5.

Table IV. Water Quality Standards applicable to River water based on DBU (CPCB)

| River Class | Water Quality Parameters | Designated Best use |
|-------------|---|--|
| A | 1. Total Coliforms (MPN/100ml) 50 or less 2. pH: between 6.5 and 8.5 3. DO: 6mg/l or more 4. BOD (3 days 27°C): 2mg/l or less | Drinking water source without conventional treatment but after disinfection. |
| B | 1. Total Coliforms (MPN/100ml) 500 or less 2. pH: between 6.5 and 8.5 3. DO: 5mg/l or more 4. BOD (3 days 27°C): 3mg/l or less | Outdoor Bathing (Organised) |
| C | 1. Total Coliforms (MPN/100ml) 5000 or less | Drinking water source |

| River Class | Water Quality Parameters | Designated Best use |
|----------------|---|---|
| | 2. pH: between 6 and 9 3. DO: 4mg/l or more 4. BOD (3 days 27°C): 3mg/l or less | with conventional treatment followed by disinfection. |
| D | 1. pH: between 6.5 and 8.5 2. DO: 4mg/l or more 3. Free Ammonia (as N): 1.2mg/l or less | Propagation of fisheries and Wildlife |
| E | 1. pH: between 6.0 and 8.5 2. Electrical Conductivity at 25°C: Max. 2250 µ mhos/cm 3. Sodium Absorption Ratio Max. 26 4. Boron: Max. 2mg/l | Irrigation, Industrial cooling, Controlled Waste Disposal |
| Below E | Not meeting A, B, C, D and E Criteria | |

Source: CPCB, Delhi.

Table V. Water Quality Standards applicable to River water based on DBU (MPCB)

| Parameters | A-I | A-II | A-III | A-IV |
|-------------------------------|---------|---------|-----------------------|-----------------------|
| pH | 6.5-9.0 | 6.0-9.0 | 6.5-8.5 | 6.5-8.5 |
| EC (mhos) | - | - | 1000x10 ⁻⁶ | 3000x10 ⁻⁶ |
| Free CO ₂ (mg/l) | - | - | 12 | - |
| DO (mg/l) >= | 5 | 4 | 3 | 2 |
| BOD (mg/l) | 2 | 5 | 10 | 30 |
| COD (mg/l) | - | - | - | 150 |
| SO ₄ (mg/l) | 400 | 400 | - | 1000 |
| Cl (mg/l) | 600 | 600 | - | 600 |
| Total Hardness (mg/l) | 50 | 500 | - | - |

Source: MPCB, Mumbai.

1.2.3 Surface Water Quality Data

Primary Monitoring: For assessing the surface water quality in the district, data generated by the Regional Office, MPCB, Pune is used. The details have been given in **Annexure 1: Table 57**. The data shows that water from the rivers Pauna, Mutha, Bhima and Indrayani are suitable for drinking purposes at the source (A-I Zone) and further down the water is suitable for agriculture, industrial cooling and processing purposes.

Secondary Monitoring: Water quality monitored by the MPCB under the the program 'Monitoring of Indian National Aquatic Resources' (MINARS) for the years 2002 to 2005 have been given in **Annexure 1: Table 58**. The Coliform count and the BOD levels have gone up at all the locations under study.

The Mula-Mutha river water quality results for seven stations for period of Jan.99 to Jan 2000 show the DO and BOD is low during most of the time (Table 59 at **Annexure 1**).

1.2.4 Public Complaints

Public complaints about surface water pollution registered at Regional Office, MPCB, Pune by Pune and Baramati Taluka residents are given in table XXXI.

Table VI. Public Complaints regarding Surface water Pollution

| Name of Industry | Complaint received from | Nature of complaint | Investigation/ Findings | Remarks |
|--|--|---|---|--|
| M/s. Jubilant Organosis Ltd. at Nimbut (Nira) Tal. Baramati. | Villagers of Nimbut and SDO Baramati. PIL also filed by the villagers. | Pollution of River Nira and smell nuisance problem. | This unit earlier known as M/s. Vam Organosis is taken over in January 1999 by M/s. Jubilant organosis. M/s. Jubilant organosis has a distillery, acetic acid plant, vam plant, ethyl acetate and CO ₂ plants. The unit has 16 old <i>kaccha</i> lagoons for storage of spent wash. They have provided biomethenation followed by two-stage aeration. After treatment it is used for ferti-irrigation or after biomethenation it is used for composting. Due to storage of spent wash in | The villagers have filed a PIL in the high court. The factory has started scrapping / reclamation of old lagoons. Work is in progress. |

| Name of Industry | Complaint received from | Nature of complaint | Investigation/ Findings | Remarks |
|-------------------------------|-------------------------|--|---|---|
| | | | <i>kaccha</i> lagoons, seepages/ percolation takes place. These seepages enter the river through local <i>nallas</i> , and the river gets polluted. Due to storage of effluent in <i>kaccha</i> lagoons and composting activity, foul odour is experienced. | |
| Pollution of River Mula-Mutha | Residents of Pune City | Due to discharge of sewage/ industrial effluent rivers are polluted. | Pune Municipal Corporation generates about 560 MLD domestic effluents. Out of which about 90 MLD is being treated and rest is being discharged untreated into the river. Due to this reason, there has been an increasing incidence of the river pollution. | The Board has filed criminal cases against PMC. PMC has planned to provide STP's, the work of which is in progress. |

Source: Regional Office, MPCB, Pune (2003).

1.2.5 Surface Water Quality Map

Based on the standards, monitored data and field observations, the surface water quality has been categorized into 'High', 'Medium' and 'Low' categories.

'High' water quality areas include those river stretches where the water quality is well within the permissible standards. 'Medium' water quality areas include those river stretches where the quality of water is close to the permissible limits. 'Low' water quality areas include those river stretches where the quality of water is above the permissible limits and the water is highly polluted.

The Surface Water Quality Map (**Map No. 25**) has been prepared on the basis of available data (**Annexure 1:** Tables 57, 58 and 59 respectively).

The points considered for water quality assessment are located downstream of drinking water sources, hence the water quality criteria for Class-C of MoEF have been considered. This holds true for all points except the point at Alandi where river is used for outdoor bathing by pilgrims (Class-B).

1.3 Ground Water Quality

The existing groundwater quality is to be understood to determine to what extent these resources are polluted so that no further deterioration of quality is allowed in the areas that are already polluted.

1.3.1 Groundwater Quality Monitoring

For assessing the groundwater quality in the district, groundwater samples had been collected by the Regional Office, MPCB, Pune. The parameters considered for identifying the groundwater quality are pH, B.O.D., C.O.D., D.O., chlorides, hardness etc. and other specific parameters relevant to a particular place depending on the sources of pollution. The monitored data for studying the ground water quality shows that the ground water quality is well within the standards in most part of the district except Pune city, Haveli, industrial area of Daund, Baramati and Indapur (**Annexure 1:** Table 60).

1.3.2 Source of Pollution

- i. **Industrial:** In the district some of the water polluting industries located in different industrial as well as urban/rural areas, due to seepage of polluted water in to ground cause the ground water pollution.
- ii. **Domestic:** The sewage discharged from various settlements of urban/rural areas and disposal/use of untreated sewage for irrigation percolate in ground causing the ground water pollution.

iii. **Agricultural Runoff:** Heavy use of agricultural fertilizers and pesticides in the district, adds to risk of ground water pollution.

1.3.3 Public Complaints

Public complaints about groundwater pollution registered from the villagers at the Regional Office, MPCB, Pune from Indapur, Daund and Pune city are as below:

Table VII. Public complaints regarding ground water pollution

| Name and Address of Industries | Complaint received from | Nature of complaint | Investigation / findings | Remarks |
|--|---|--|---|---|
| M/s. Ashok Alcochem Ltd., Walchand Nagar, Tal. Indapur | Villagers of Rangaon and SDO Baramati | Pollution of well water and smell nuisance problem | The distillery unit earlier known as Walchand Nagar Industries Ltd is established in 1945. This industry generates 300 m ³ / day of effluent and has provided biomethenation followed by bio-filter for treating the effluent. After treatment, it is stored in <i>kaccha</i> lagoons and part of it is used for irrigation. Due to storage of effluent, well water of nearby area is getting polluted and creating foul smell. | Board has filed the criminal case against the industry. Factory has started scrapping reclamation of old lagoons and stopped storage of spent was in <i>kaccha</i> lagoons. |
| MIDC Kurkumbh | Sarpanch and villagers of village Kurkumbh and Pandrewadi | Pollution of well water and air pollution. | In MIDC Kurkumbh has 105 industries. Out of which 36 industries are partially or fully in operation. It is a chemical zone producing chemicals, oils & dyes. Also, pharmaceuticals and some food industries exist. The large-scale units have their own treatment facilities but small-scale industries do not have full-fledged ETPs. After primary treatment, they discharge effluent into the CETP provided by MIDC. The existing CETP does not give the desired results as per the consented conditions and requires upgradation. For disposal of treated effluent, MIDC has laid down the pipeline up to village Roti. But due to problem in the pipeline and effluent quality they are unable to dispose this effluent at the Roti forestland. As a result, they are discharging in the premises of CETP. Due to which groundwater pollution was observed near the MIDC area. | Villagers of the Kurkumbh have made a complaint in front of the Human Rights Commission, which conducted a hearing. |

Source: Regional Office, MPCB, Pune.

1.3.4 Ground Water Quality Map

The groundwater quality map has been prepared based on the data available with MPCB and in absence of data from GSDA, Pune as same was not made available (**Map No. 26**).

The map depicts the categories and areas of ground water quality. Ground water quality is low at Kurkumbh (Tal. Daund), Walchandnagar (Tal. Indapur), Malegaon (Tal. Baramati), Sanaswadi and Dhok Sangvi (Tal. Shirur). It is 'Medium' polluted at Pandharewadi (Tal. Daund), Sansar (Tal. Indapur), Khrabwadi (Tal. Khed) and Urali Devachi (Tal. Haveli). Since this area is already polluted, it needs to be protected from further contamination. Effluent discharge for land applications should not be allowed in this area.

Annexure 1

SUPPORTING DATA FOR DISTRICT ENVIRONMENTAL ATLAS OF PUNE

Annexure 2

MAPS IN ENVIRONMENTAL ATLAS OF PUNE

