

Monitoring, Sampling and Analysis for Ambient Air Quality, Surface Water Quality and Ground Water Quality in Critically/Severely/Other Polluted Industrial Areas of Maharashtra

PIMPRI-CHINCHWAD

Pre-Monsoon (April 2023 to June 2023)



Maharashtra Pollution Control Board

Kalptaru Point, Sion East, Mumbai – 400 022

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ABBREVIATIONS

APHA	American Public Health Association
ASTM	American Society for Testing and Materials
BIS	Bureau of Indian Standards
BLQ	Below the Limit of Quantification
CAAQMS	Continuous Ambient Air Quality Monitoring Station
CEMS	Continuous Emission Monitoring System
CEPI	Comprehensive Environmental Pollution Index
CETP	Common Effluent Treatment Plant
CPA	Critically Polluted Area
CPCB	Central Pollution Control Board
EPA	Environmental Protection Act, 1986
GDP	Gross Domestic Product
MIDC	Maharashtra Industrial Development Corporation
MPCB	Maharashtra Pollution Control Board
NAAQS	National Ambient Air Quality Standard
NWMP	National Water Quality Monitoring Program
SPA	Severely Polluted Area
VOCs	Volatile Organic Compounds
WHO	World Health Organisation
ZLD	Zero Liquid Discharge

1. Executive Summary

Pimpri-Chinchwad was monitored for Ambient Air Quality, Ground and Surface Water quality. Based on the data collected by monitoring, a Comprehensive Environmental Pollution Index (CEPI) Score [as per latest directions 120 of Letter No. B-29012/ESS (CPA)/2015-16 dated 26th April 2016 of Central Pollution Control Board (CPCB)] was calculated. Maharashtra Pollution Control Board (MPCB) has carried out monitoring at CPCB location with the additional location of samplings for ambient air, surface and ground water in consideration with the previous CEPI monitoring and covering the entire CEPI Impact Zone. The pre monsoon monitoring was carried out during the period of April 2023 to June 2023 to assess the ambient air quality, surface water quality and ground water quality.

The Ambient Air Quality stations were identified considering the upwind and cross wind direction in the CEPI impact area. Ambient Air Quality was monitored at eight locations. The concentration of all the ambient air parameters was found well within the limits prescribed in NAAQS 2009, at all locations. Biochemical Oxygen Demand, Total Phosphate, Copper, Total Chromium and Iron are also found above the standard limits in few locations of surface water monitoring. Land index is represented by groundwater in the CEPI. Ground water parameters were found to be within the permissible limits, except Total Phosphate, Iron and Total Chromium when compared with IS 10500:2012 drinking water standards.

Based on the study conducted by CPCB during the period January 2018, the CEPI score of Pimpri-Chinchwad region as per the revised guidelines of CEPI (2016) was 52.16 (Air Index-52, Water Index-6.25 and Land Index-5.25). However, the present study reports aggregated CEPI score of Pimpri-Chinchwad region of pre-monsoon season (June, 2023), the present CEPI score is 48.06 (Air Index-9.88, Water Index-46.25 and Land Index-34.00). The CEPI score is the combination of A, B, C and D factors. Here, C factor represents the health data and D factor represents the initiatives taken by MPCB in the past few years to mitigate the pollution. The regional office of MPCB has taken various initiatives like installation of CAAQMS, CETPs, etc. in the past few years to control and mitigate the air and water pollutants. This has contributed to the factor D, hence reducing the CEPI score of the region over the years

2. Introduction

Industries play a pivotal role in a country's economic development, contributing to GDP growth, job creation, and technological advancement. However, in recent years, the environmental pollution caused by industries has emerged as a formidable challenge for authorities worldwide. The impact of these industrial activities on the environment is severe, affecting the quality of the water we drink, the air we breathe, and the soil that nurtures our plants. Industries releasing untreated wastewater have contaminated drinking water with hazardous substances, posing risks to human, animal, and aquatic life. Exposure to air pollutants has been linked to various respiratory and cardiovascular diseases, particularly in early human life, leading to infant mortality or chronic health issues in adulthood. According to the World Health Organization (WHO), environmental pollution is responsible for an estimated 9 million premature deaths worldwide each year. It also estimates that over 90% of the global population is exposed to air pollution levels that exceed WHO guidelines, causing serious health risks. Around 2 billion people worldwide use drinking water contaminated with faeces leading to infectious diseases such as cholera and dysentery.

Hence, addressing these pollution sources is crucial to achieving significant environmental and health benefits. Additionally, the widespread nature of industrial pollution requires extensive monitoring systems and resources to collect reliable data and assess the full extent of the environmental impacts. The complexities associated with monitoring and identifying pollution sources make it a daunting task for authorities to develop targeted strategies and enforce regulations effectively. Striking a balance between economic growth and environmental protection requires delicate negotiations and innovative policy approaches. Overcoming these challenges demands robust regulatory frameworks, international collaboration, advanced monitoring technologies, and a commitment to sustainable practices from industries and governments alike.

In view of this, Central Pollution Control Board (CPCB) has evolved the concept of the Comprehensive Environmental Pollution Index (CEPI) during 2009-10 as a tool for comprehensive environmental assessment of prominent industrial clusters and formulation of remedial Action Plans for the identified critically polluted areas. Later in 2016, the revised concept of CEPI was formulated by eliminating the subjective factors but retaining the factors which are monitorable CEPI bridges the perceptive gap between experts, public, and government departments by simplifying the complexity of environmental issues. It aims at categorizing critically polluted industrial areas based on scientific criteria, so as to ascertain various dimensions of pollution. This is a combined framework used to evaluate the impacts caused by industrial clusters on the nearby environment, as a numerical value.

The present CEPI study includes Pimpri Chinchwad, situated in is the north western city limits of Pune Maharashtra state, India. Industrialization in Pimpri-Chinchwad started in the year 1954, Pimpri Chinchwad has a rapid growth in terms of industries and most of the major Indian automobile companies and its headquarters were located in Pimpri Chinchwad. The popular automobile industries in Pimpri Chinchwad includes Kinetic Engineering, Tata Motors, Mahindra & Mahindra Ltd, Bajaj Auto

etc., Apart from automobile industries there are many industries in Pimpri Chinchwad, among these one of the industry with rapid growth is software and IT.

The present report is based on the revised CEPI version 2016. The results of the application of the Comprehensive Environmental Pollution Index (CEPI) to selected industrial cluster or areas are presented in this report. The main objective of the study is to identify polluted industrial clusters or areas in order to take concerted action and to centrally monitor them at the national level to improve the current status of their environmental components such as air and water quality data, ecological damage, and visual environmental conditions. The index captures the various dimensions of environment including air, water and land. Comprehensive Environmental Pollution Index (CEPI), which is a rational number to characterize the environmental quality at a given location following the algorithm of source, pathway and receptor have been developed.

3. Scope of Work

The major scope of work includes:

- I. The scope of the present study is to perform three (3) rounds of "Monitoring, Sampling and Analysis for Ambient Air Quality, VOCs in Ambient Air, Surface Water Quality & Ground Water Quality in selected Pollution Industrial Areas (PIAs) of Pimpri-Chinchwad, Maharashtra" with a gap of one or two days. The analysis of the collected samples was carried out by the standard methods (CPCB, BIS, APHA, USEPA).
- II. To Collect health-related data in the CEPI region.
- III. To calculate the Comprehensive Environmental Pollution Index (CEPI) Score as per Revised CEPI-2016 issued by Central Pollution Control Board (CPCB).

The sampling details and frequency of sampling in Ambient Air, VOCs, Surface Water and Ground Water are given in Table 3.1 and Table 3.2 respectively.

Table 3.1 Sampling Details of Pimpri-Chinchwad

Sampling Criteria	Number of sites	Total Sites	Monitoring Parameters
Ambient Air Quality	08	08	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , NH ₃ , O ₃ , C ₆ H ₆ , CO, BAP, Pb, Ni, As
Volatile Organic Compounds (VOCs)	02	02	Dichloromethane, Chloroform, Carbon Tetrachloride, Trichloroethylene, Bromodichloromethane, 1,3-Dichloropropane, 1,4-Dichlorobenzene, 1,3-Dichlorobenzene, 1,2-Dichlorobenzene, 1,2-Dibromo-3-Chloropropane, Naphthalene, Bromobenzene, 1,2,4-Trimethylbenzene, 2-Chlorotoluene, Tert-Butylbenzene, SEC-Butylbenzene, P-Isopropyl toluene, M-Xylene, P-Xylene, Styrene, Cumene 1,2,3-Trichloropropane, N-Propyl benzene, Dibromochloromethane, 1,2-Dibromoethane, Chlorobenzene, 1,1,1,2-Tetrachloroethane, Ethylbenzene, 1,1-Dichloropropylene, 1,2-Dichloroethane, 1,2-Dichloropropane, Trans-1,3-Dichloropropene, CIS 1,3-Dichloropropene, 1,1,2-Trichloroethane, Tetrachloroethylene, 1,3,5-Trimethylbenzene, N-Butylbenzene, 1,2,3-Trichlorobenzene, Hexachlorobutadiene, 1,2,4-Trichlorobenzene, 2,2-Dichloropropane, Dibromomethane, Toluene, O-Xylene, Bromoform, 1,1,2,2-Tetrachloroethane, 4-Chlorotoluene,

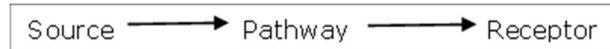
Sampling Criteria	Number of sites	Total Sites	Monitoring Parameters
			1,1-Dichloroethylene, Trans-1,2-Dichloroethylene, 1,1-Dichloroethane, CIS-1,2-Dichloroethylene, Bromochloromethane, 1,1,1-Trichloroethane
Water Quality Monitoring	Surface water 06	06	<p>(i) Simple Parameters</p> <p>Sanitary Survey, General Appearance, Colour, Smell, Transparency and Ecological</p> <p>(ii) Regular Monitoring Parameters</p> <p>pH, O & G, Suspended Solids, DO, COD, BOD, TDS, Electrical Conductivity, Total Dissolved Solids, Nitrite-Nitrogen, Nitrate-Nitrogen, (NO₂+NO₃) total nitrogen, Free Ammonia, Total Residual Chlorine, Cyanide, Fluoride, Chloride, Sulphate, Sulphides, Total Hardness, Dissolved Phosphates, SAR, Total Coliforms, Faecal Coliform</p> <p>(iii) Special Parameters</p> <p>Total Phosphorous, TKN, Total Ammonia (NH₄+NH₃)-Nitrogen, Phenols, Surface Active Agents, Anionic detergents, Organo-Chlorine Pesticides, PAH, PCB and PCT, Zinc, Nickel, Copper, Hexa-valent Chromium, Chromium (Total), Arsenic (Total), Lead, Cadmium, Mercury, Manganese, Iron, Vanadium, Selenium, Boron</p> <p>(iv) Bio-assay (zebra Fish) Test – For specified samples only.</p>
	Ground water 06	06	

Table 3.2 Frequency of Sampling

	Parameter	Round of Sampling	Frequency in Each Round
A	Ambient Air Quality Monitoring		
1.	Particulate Matter (size less than 10 µm) or PM ₁₀	03	3 Shifts of 8 hrs each
2.	Particulate Matter (size less than 2.5 µm) or PM _{2.5}	03	1 Shift of 24 hrs
3.	Sulphur Dioxide (SO ₂)	03	6 Shifts of 4 hrs each
4.	Nitrogen Dioxide (NO ₂)	03	6 Shifts of 4 hrs each
5.	Ammonia (NH ₃)	03	6 Shifts of 4 hrs each
6.	Ozone (O ₃)	03	24 Shifts of 1 hr each
7.	Benzene (C ₆ H ₆)	03	1 Shifts of 24 hrs
8.	Carbon Monoxide (CO)	03	24 Shifts of 1 hr each
9.	Benzo (a) Pyrene (BaP) – particulate phase only	03	3 Shifts of 8 hrs each
10.	Lead (Pb)	03	3 Shifts of 8 hrs each
11.	Arsenic (As)	03	3 Shifts of 8 hrs each
12.	Nickel (Ni)	03	3 Shifts of 8 hrs each
B	Volatile Organic Compounds (VOCs)		
	As mentioned in Table 3.1	03	3 Shifts of 24 hrs each
C	Ground Water		
	As mentioned in Table 3.1	03	01 sample at each round
D	Surface Water		
	As mentioned in Table 3.1	03	01 sample at each round

4. Methodology

The present report is based on the revised Comprehensive Environmental Pollution Index (CEPI) version 2016. The index captures the various dimensions of the environment including air, water and land. Comprehensive Environmental Pollution Index (CEPI) is a rational number, which is used to characterize the environmental quality at a given location. It is three-step process based on the algorithm:



Ambient air stations, Surface water locations and Ground water locations were decided by the respective regional officers. The sampling was done in 3 rounds with an interval of one or two days at each location. Sampling has been done at the potential polluted areas so as to arrive at the CEPI. This will further help the authorities to monitor the areas in order to improve the current status of their environmental components such as air and water quality data, ecological damage and visual environmental conditions.

Methodology for sampling, preservation and analysis have been done according to the CPCB/ EPA/ APHA/ IS/ ASTM standard methods for the samples.

5. Air Environment

For studying the Air Environment of Pimpri-Chinchwad area, monitoring stations were identified considering the upwind and cross wind direction and all 12 parameters as per the notification of National Ambient Air Quality Standards (NAAQS) were carried out.

**Kindly note: Volatile Organic Compounds (VOCs) concentration is not detected in most of the Air samples collected; hence it is not shown in the graphs.*

In Pimpri-Chinchwad eight locations have been monitored of checking the Ambient Air Quality (AAQ). The concentration of all the ambient air parameters was found well within the limits prescribed by NAAQS.

Table 5.1 Details of Sampling Location of Ambient Air Quality Monitoring

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Thergaon Near Puduji Industries	18°62'20.21"N	73°72'27.37"E	25.05.2023	27.05.2023	29.05.2023
2.	Akurdi Near Force Motor	18°65'13.19"N	73°78'37.25"E	25.05.2023	27.05.2023	29.05.2023
3.	MIDC Pimpri Area, Yashwant Nagar Chouk Near Training Hall	18°64'10.96"N	73°81'97.94"E	25.05.2023	27.05.2023	29.05.2023
4.	Pimpri Chinchwad Municipal Corporation	18°62'83.79"N	73°80'33.78"E	25.05.2023	27.05.2023	29.05.2023
5.	MIDC Bhosari Near Amphenol Area Pune	18°61'10.96"N	73°80'33.78"E	26.05.2023	28.05.2023	30.05.2023
6.	Moshi Municipal Solid Waste Disposal Site	18°65'77.29"N	73°85'75.64"E	26.05.2023	28.05.2023	30.05.2023
7.	Charoli Moshi Crusher Area	18°65'79.49"N	73°86'49.35"E	26.05.2023	28.05.2023	30.05.2023
8.	Moshi RR Scrap	18°68'03.20"N	73°83'55.38"E	26.05.2023	28.05.2023	30.05.2023

Table 5.2 Details of Sampling Location of Volatile Organic Compounds (VOCs) Monitoring

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	MIDC Bhosari Near Amphenol Area Pune	18°61'10.96"N	73°80'33.78"E	26.05.2023	28.05.2023	30.05.2023
2.	Moshi Municipal Solid Waste Disposal Site	18°65'77.29"N	73°85'75.64"E	26.05.2023	28.05.2023	30.05.2023

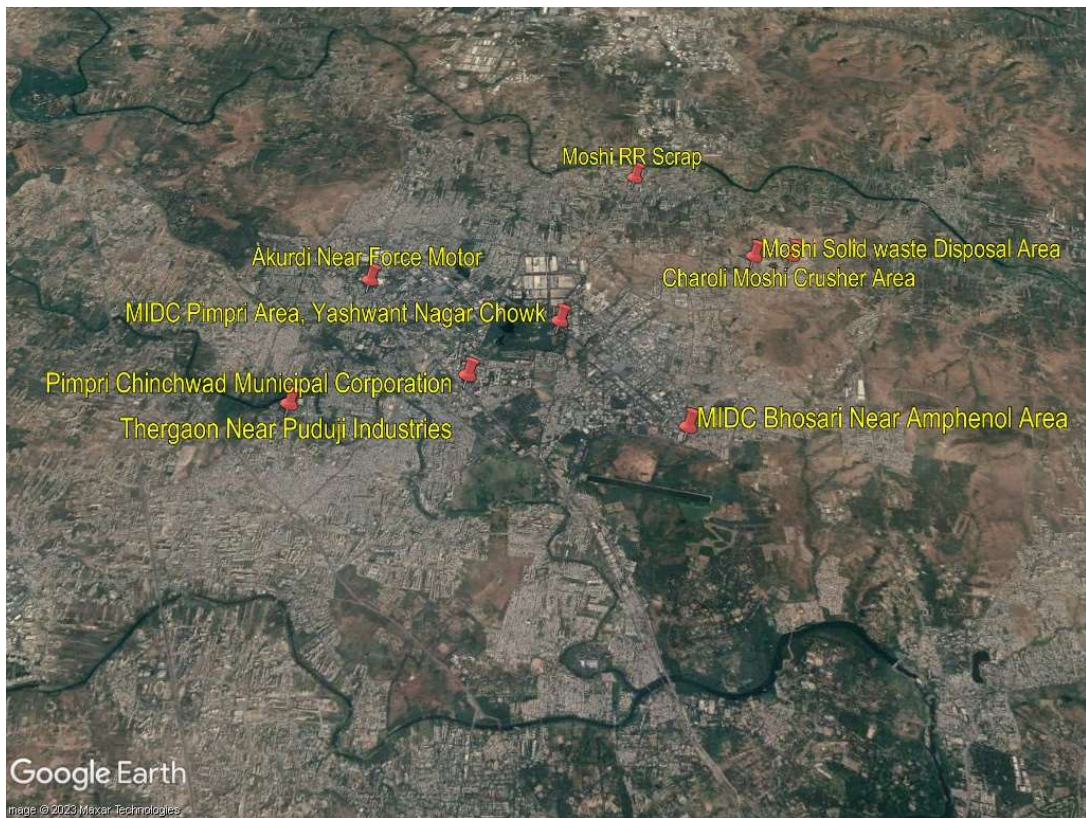


Fig: Geographical Locations of Ambient Air Quality Monitoring

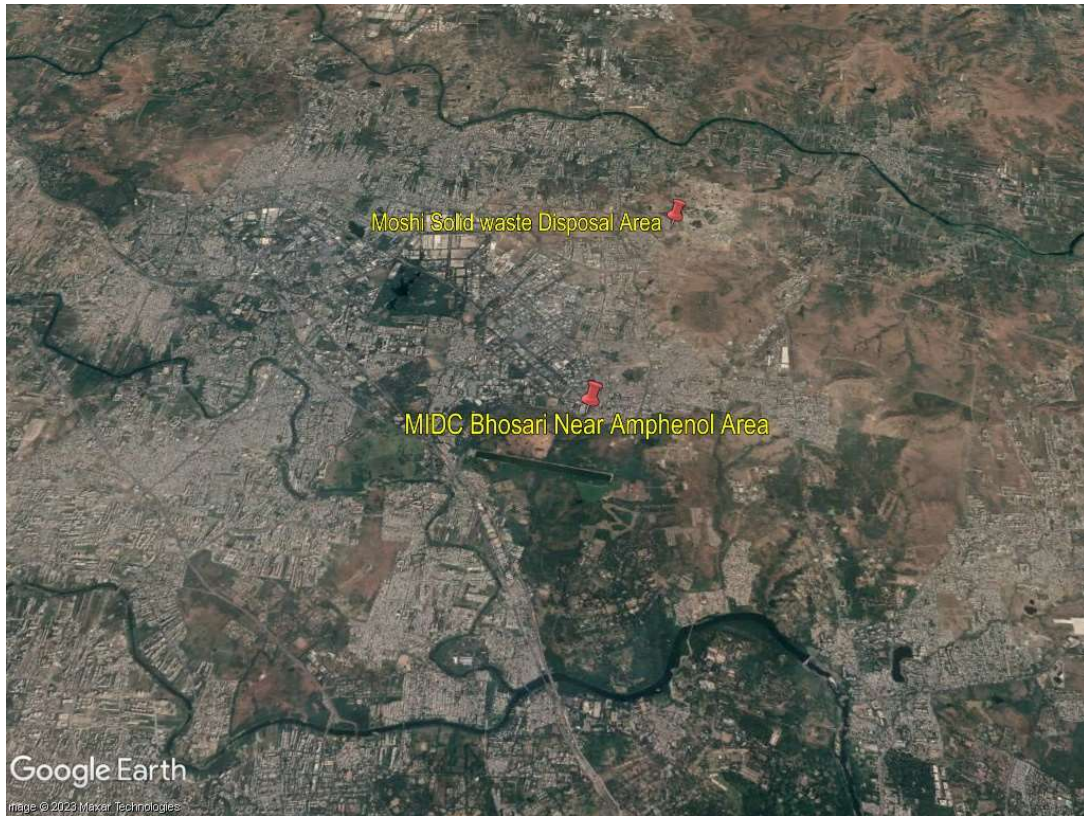


Fig: Geographical Locations of VOCs Monitoring

Table 5.3 Ambient Air Quality Monitoring Results

Parameters	Unit	Results			
		Thergaon Near Puduji Industries	Akurdi Near Force Motor	Pimpri Chinchwad Municipal Corporation	MIDC Pimpri Area, Yashwant Nagar Chouk Near Training Hall
Sulphur Dioxide (SO ₂)	µg/m ³	10.2	13.2	11	12.2
Nitrogen Dioxide (NO ₂)	µg/m ³	18.2	15.0	14.5	13.3
Particulate Matter (size less than 10 µm) or PM ₁₀	µg/m ³	82	79	90	77
Particulate Matter (size less than 2.5 µm) or PM _{2.5}	µg/m ³	23	23	25	20
Ozone (O ₃)	µg/m ³	BLQ	BLQ	25	BLQ
Lead (Pb)	µg/m ³	BLQ	BLQ	BLQ	BLQ
Carbon Monoxide (CO) (1 h)	mg/m ³	1.52	1.52	1.53	1.51
Carbon Monoxide (CO) (8 h)	mg/m ³	1.76	1.78	1.77	1.71
Ammonia (NH ₃)	µg/m ³	58.7	99.9	86	98.4
Benzene (C ₆ H ₆)	ng/m ³	3.37	2.50	2.73	2.79

Parameters	Unit	Results			
		Thergaon Near Puduji Industries	Akurdi Near Force Motor	Pimpri Chinchwad Municipal Corporation	MIDC Pimpri Area, Yashwant Nagar Chouk Near Training Hall
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m ³	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m ³	BLQ	BLQ	BLQ	BLQ
Nickel (Ni)	ng/m ³	5.9	BLQ	4	BLQ

Parameters	Unit	Results			
		MIDC Bhosari Near Amphenol Area Pune	Moshi Municipal Solid Waste Disposal Site	Charoli Moshi Crusher Area	Moshi RR Scrap
Sulphur Dioxide (SO ₂)	µg/m ³	9.98	8.22	5.75	6.73
Nitrogen Dioxide (NO ₂)	µg/m ³	20.4	18.1	19.1	21.07
Particulate Matter (size less than 10 µm) or PM ₁₀	µg/m ³	88	82	81	87
Particulate Matter (size less than 2.5 µm) or PM _{2.5}	µg/m ³	24	23	23	24
Ozone (O ₃)	µg/m ³	BLQ	BLQ	BLQ	41.3
Lead (Pb)	µg/m ³	BLQ	BLQ	BLQ	BLQ
Carbon Monoxide (CO) (1 h)	mg/m ³	1.64	1.81	1.54	1.54
Carbon Monoxide (CO) (8 h)	mg/m ³	1.77	1.92	1.84	1.68
Ammonia (NH ₃)	µg/m ³	79.5	49.7	66.5	66.1
Benzene (C ₆ H ₆)	µg/m ³	2.22	2.6	2.42	2.81
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m ³	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m ³	0.7	0.45	0.9	0.85
Nickel (Ni)	ng/m ³	BLQ	BLQ	BLQ	BLQ

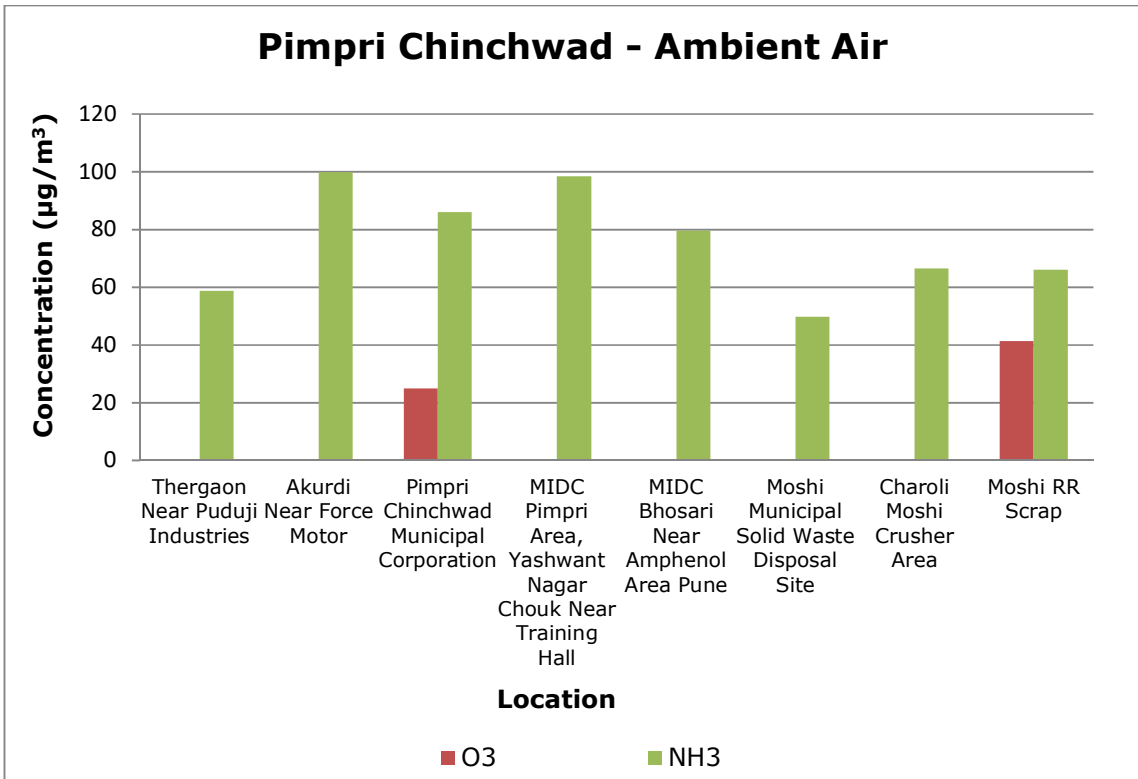
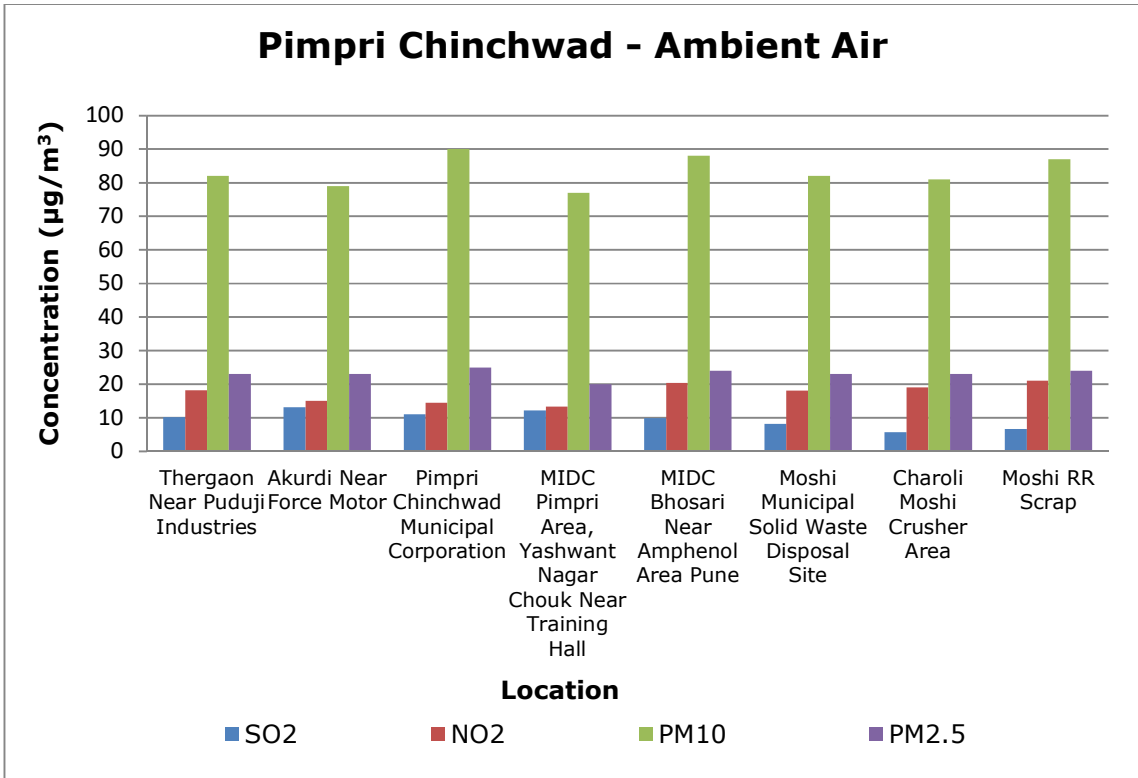
Table 5.4 Volatile Organic Compounds (VOCs) in Ambient Air Results

Parameters	Unit	Results	
		MIDC Bhosari Near Amphenol Area Pune	Moshi Municipal Solid Waste Disposal Site
Dichloromethane	µg/m ³	0.746	1.61

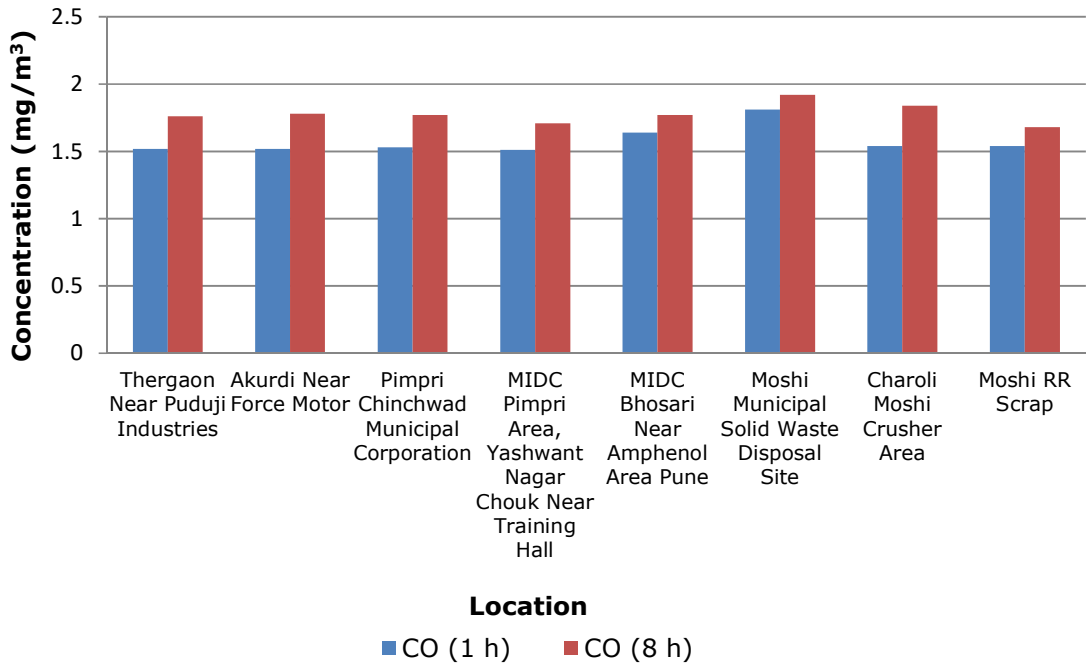
Parameters	Unit	Results	
		MIDC Bhosari Near Amphenol Area Pune	Moshi Municipal Solid Waste Disposal Site
Chloroform	µg/m ³	BLQ	1.40
Carbon Tetrachloride	µg/m ³	BLQ	0.793
Trichloroethylene	µg/m ³	BLQ	BLQ
Bromodichloromethane	µg/m ³	BLQ	BLQ
1,3-Dichloropropane	µg/m ³	BLQ	BLQ
1,4-Dichlorobenzene	µg/m ³	BLQ	BLQ
1,3-Dichlorobenzene	µg/m ³	BLQ	BLQ
1,2-Dichlorobenzene	µg/m ³	BLQ	BLQ
1,2-Dibromo-3-Chloropropane	µg/m ³	BLQ	BLQ
Naphthalene	µg/m ³	BLQ	BLQ
Bromobenzene	µg/m ³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m ³	BLQ	BLQ
2-Chlorotoluene	µg/m ³	BLQ	BLQ
Tert-Butylbenzene	µg/m ³	BLQ	BLQ
SEC-Butylbenzene	µg/m ³	BLQ	BLQ
P-Isopropyltoluene	µg/m ³	BLQ	BLQ
M-Xylene	µg/m ³	BLQ	BLQ
P-Xylene	µg/m ³	2	3.94
Styrene	µg/m ³	BLQ	BLQ
Cumene	µg/m ³	BLQ	BLQ
1,2,3-Trichloropropane	µg/m ³	BLQ	BLQ
N-Propylbenzene	µg/m ³	6.46	BLQ
Dibromochloromethane	µg/m ³	BLQ	BLQ
1,2-Dibromoethane	µg/m ³	BLQ	BLQ
Chlorobenzene	µg/m ³	BLQ	BLQ
1,1,1,2-Tetrachloroethane	µg/m ³	BLQ	BLQ
Ethylbenzene	µg/m ³	0.841	BLQ
1,1-Dichloropropylene	µg/m ³	BLQ	0.77
1,2-Dichloroethane	µg/m ³	3.87	4.00
1,2-Dichloropropane	µg/m ³	BLQ	BLQ
Trans-1,3-Dichloropropene	µg/m ³	BLQ	BLQ
CIS 1,3-Dichloropropene	µg/m ³	BLQ	BLQ

Parameters	Unit	Results	
		MIDC Bhosari Near Amphenol Area Pune	Moshi Municipal Solid Waste Disposal Site
1,1,2-Trichloroethane	µg/m ³	BLQ	BLQ
Tetrachloroethylene	µg/m ³	0.697	0.702
1,3,5-Trimethylbenzene	µg/m ³	BLQ	BLQ
N-Butylbenzene	µg/m ³	BLQ	BLQ
1,2,3-Trichlorobenzene	µg/m ³	BLQ	BLQ
Hexachlorobutadiene	µg/m ³	BLQ	BLQ
1,2,4-Trichlorobenzene	µg/m ³	BLQ	BLQ
2,2-Dichloropropane	µg/m ³	BLQ	BLQ
Dibromomethane	µg/m ³	BLQ	BLQ
Toluene	µg/m ³	1.73	BLQ
O-Xylene	µg/m ³	BLQ	BLQ
Bromoform	µg/m ³	BLQ	BLQ
1,1,2,2-Tetrachloroethane	µg/m ³	BLQ	BLQ
4-Chlorotoluene	µg/m ³	BLQ	BLQ
1,1-Dichloroethylene	µg/m ³	BLQ	BLQ
Trans-1,2-Dichloroethylene	µg/m ³	BLQ	BLQ
1,1-Dichloroethane	µg/m ³	BLQ	BLQ
CIS-1,2-Dichloroethylene	µg/m ³	BLQ	BLQ
Bromochloromethane	µg/m ³	BLQ	BLQ
1,1,1-Trichloroethane	µg/m ³	BLQ	BLQ

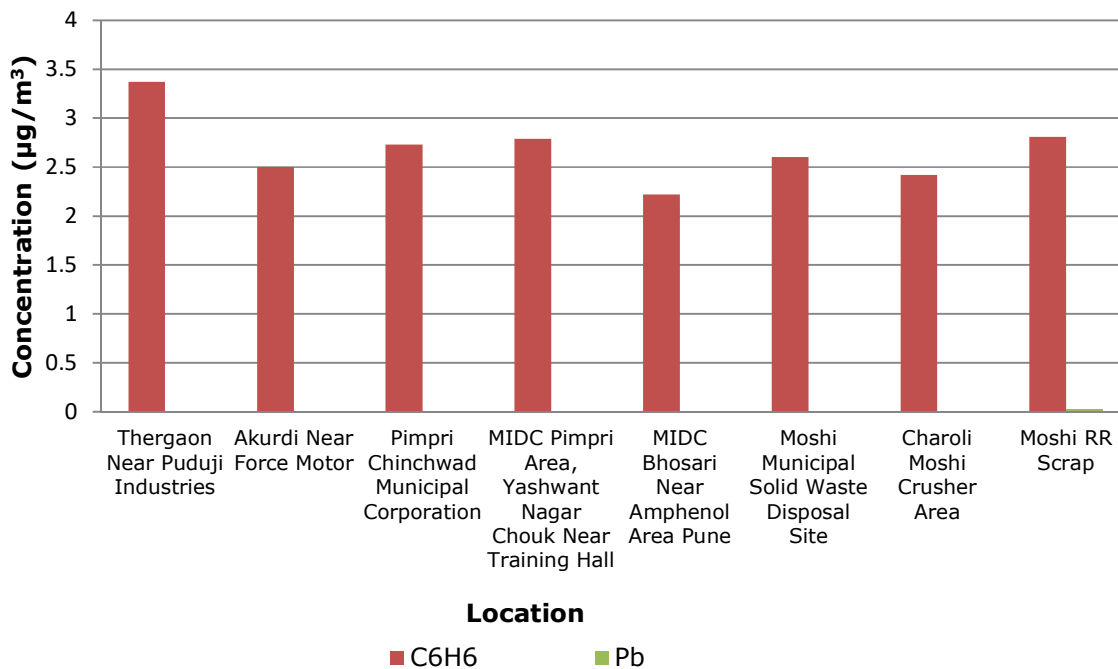
Graphs - Ambient Air Quality Monitoring



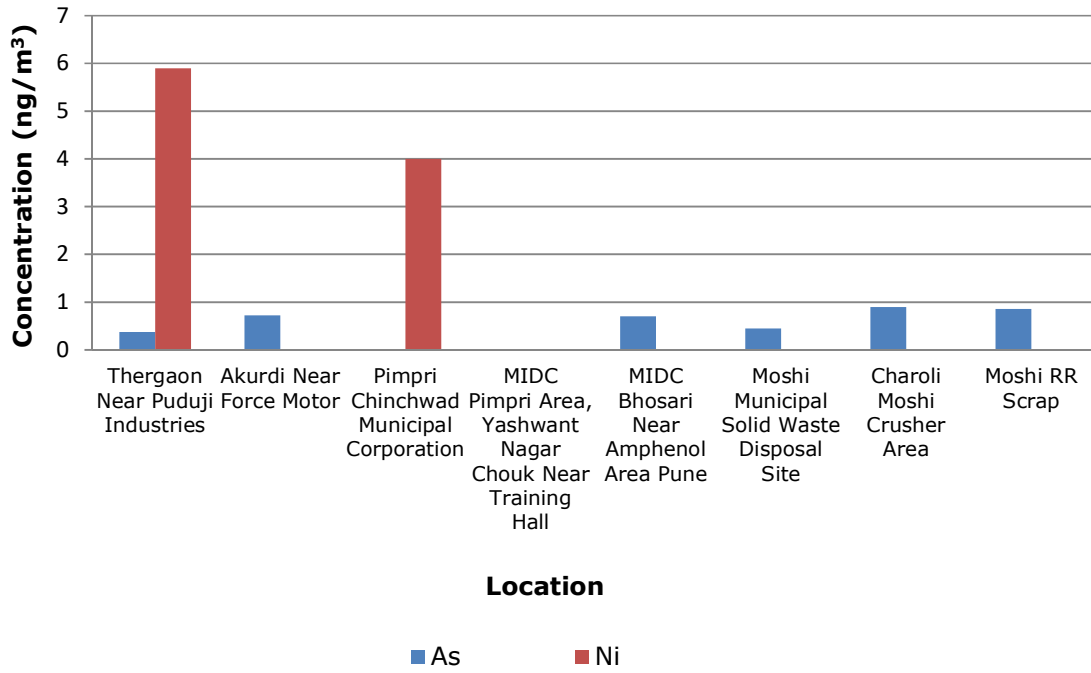
Pimpri Chinchwad - Ambient Air



Pimpri Chinchwad - Ambient Air



Pimpri Chinchwad - Ambient Air



WATER ENVIRONMENT

6. Water Environment

For studying the water environment of Pimpri-Chinchwad area, six samples of Surface water were collected from different industries.

- All six water samples collected are not found acceptable in sanitary survey, general appearance, smell and transparency. Colour is observed in acceptable limit.
- General parameters like pH, electrical conductivity, suspended solids, and total dissolved solids are also observed well within the limits in all the samples except BOD.
- In fish bioassay 100% survival of fishes was observed in all the water samples except one location.
- The presence of faecal coliform was also well within the acceptable limits.
- All metals like Nickel, Hexavalent Chromium (Cr^{6+}), Total Chromium, Total Arsenic, Lead, Cadmium, Mercury, Vanadium, etc. are also observed either below the limit of quantification or below their standard limits except Copper, Iron.
- Parameters like Cyanide, Sulphide and Phenolic compounds are found within acceptable limit except Fluoride and Total Ammonia.
- Total Kjeldahl Nitrogen also observed well within the limits in all the samples except Total Phosphate exceeds in 4 samples.
- Organo Chlorine Pesticides, Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are also observed below the detectable limit in all the studied samples.

Table 6.1 Details of Sampling Location of Surface Water

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Pawana River-Chinchwad	18°62'42.41"N	73°76'88.62"E	25.05.2023	27.05.2023	29.05.2023
2.	Pawana River-Ravet	18°64'08.31"N	73°74'72.67"E	25.05.2023	27.05.2023	29.05.2023
3.	Indrayani River - Chikhali	18°65'51.44"N	73°81'87.27"E	25.05.2023	27.05.2023	29.05.2023
4.	Indrayani River – Moshi Bridge	18°68'84.5"N	73°84'56.27"E	25.05.2023	27.05.2023	29.05.2023
5.	Pawana River-Pimpri	18°62'32.06"N	73°78'85.44"E	25.05.2023	27.05.2023	29.05.2023
6.	Pawana River-Kasarwadi	18°60'21.78"N	73°82'17.1"E	25.05.2023	27.05.2023	29.05.2023

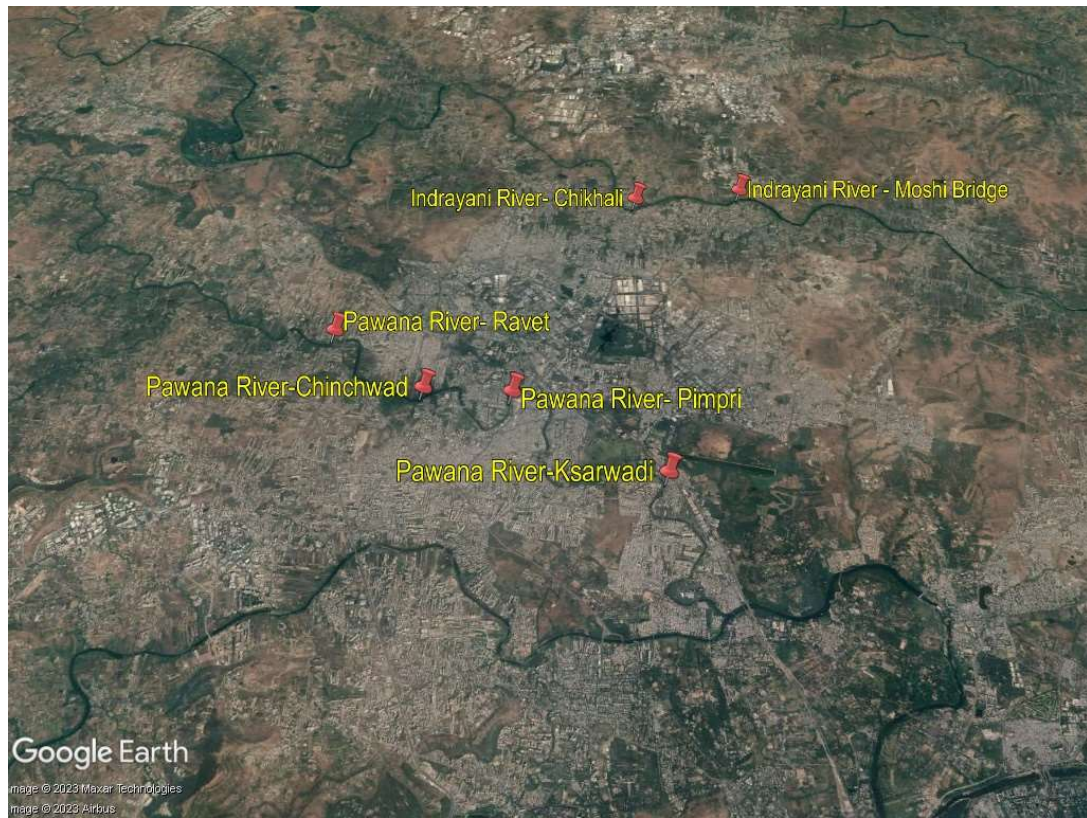


Fig: Geographical Locations of Surface Water Sampling

Table 6.2 Results of Surface Water

Parameters	Unit	Results		
		Pawana River- Chinchwad	Pawana River- Ravet	Indrayani River- Chikhali
Sanitary Survey	-	Reasonably clean neighbourhood	Reasonably clean neighbourhood	Reasonably clean neighbourhood
General Appearance	-	Floating Matter Evident	No Floating Matter	No Floating Matter
Transparency	m	0.7	0.6	0.7
Temperature	°C	29	30	30
Colour	Hazen	2	2	2
Smell	-	Agreeable	Agreeable	Agreeable
pH	-	6.94	6.74	6.76
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	38	27	25
Total Dissolved Solids	mg/L	271	113	329
Dissolved Oxygen (% Saturation)	%	47	58	68
Chemical Oxygen Demand	mg/L	48	56	12
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	13	20	3

Parameters	Unit	Results		
		Pawana River-Chinchwad	Pawana River-Ravet	Indrayani River-Chikhali
Electrical Conductivity (at 25°C)	µmho/cm	482	141	586
Nitrite Nitrogen	mg/L	0.07	0.07	0.03
Nitrate Nitrogen	mg/L	1.16	1.38	1.46
(NO ₂ + NO ₃)-Nitrogen	mg/L	1.17	1.5	1.46
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ	BLQ
Free Residual Chlorine	mg/L	0.77	BLQ	0.5
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.4	0.2	0.5
Sulphide (as S ²⁻)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.56	BLQ	0.12
Sodium Adsorption Ratio	-	1.37	0.95	1.52
Total Coliforms	MPN Index/ 100 ml	787	757	855
Faecal Coliforms	MPN Index/ 100 ml	654	583	855
Total Phosphate (as P)	mg/L	0.38	BLQ	0.17
Total Kjeldahl Nitrogen (as N)	mg/L	1.49	1.12	0.93
Total Ammonia (NH ₄ +NH ₃)-Nitrogen	mg/L	0.92	0.615	0.33
Total Nitrogen	mg/L	2.22	1.3	2.03
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	0.093	BLQ	BLQ
Nickel (as Ni)	mg/L	0.011	0.011	0.029
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	0.062
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	0.014
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.067	0.087	0.111
Iron (as Fe)	mg/L	0.25	0.22	0.361

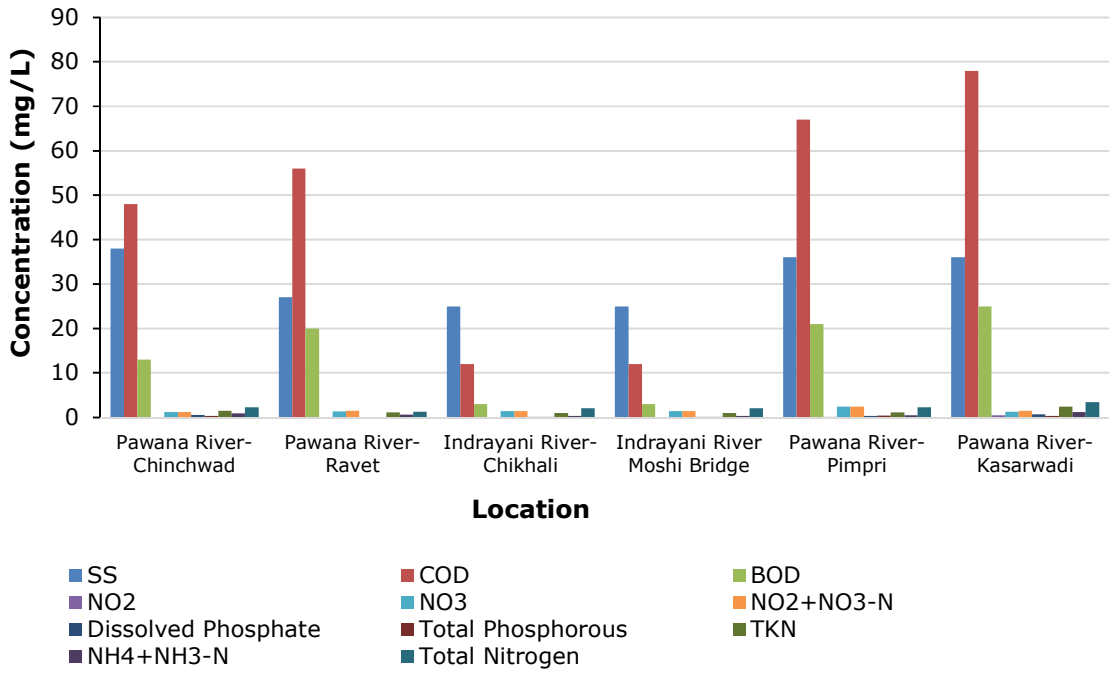
Parameters	Unit	Results		
		Pawana River- Chinchwad	Pawana River- Ravet	Indrayani River- Chikhali
Vanadium (as V)	mg/L	BLQ	0.025	0.024
Selenium (as Se)	mg/L	0.012	0.005	0.018
Boron (as B)	mg/L	0.446	BLQ	0.275
Bioassay Test on fish	% survival	100	100	100

Parameters	Unit	Results		
		Indrayani River - Moshi Bridge	Pawana River- Pimpri	Pawana River- Kasarwadi
Sanitary Survey	-	Reasonably clean neighbourhood	Generally clean neighbourhood	Generally clean neighbourhood
General Appearance	-	No Floating Matter	Floating Matter Evident	No Floating Matter
Transparency	m	0.7	0.6	0.6
Temperature	°C	30	29	30
Colour	Hazen	2	2	3
Smell	-	Agreeable	Not Agreeable	Agreeable
pH	-	6.76	6.80	6.77
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	25	36	36
Total Dissolved Solids	mg/L	329	299	305
Dissolved Oxygen (% Saturation)	%	68	59	51
Chemical Oxygen Demand	mg/L	12	67	78
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	3	21	25
Electrical Conductivity (at 25°C)	µmho/cm	586	534	543
Nitrite Nitrogen	mg/L	0.03	0.13	0.48
Nitrate Nitrogen	mg/L	1.46	2.42	1.28
(NO ₂ + NO ₃)-Nitrogen	mg/L	1.46	2.43	1.52
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ	BLQ
Free Residual Chlorine	mg/L	0.5	0.61	0.27
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.5	0.5	0.5
Sulphide (as S ²⁻)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.12	0.365	0.7
Sodium Adsorption Ratio	-	1.52	1.27	1.65
Total Coliforms	MPN Index/ 100 ml	855	718	840

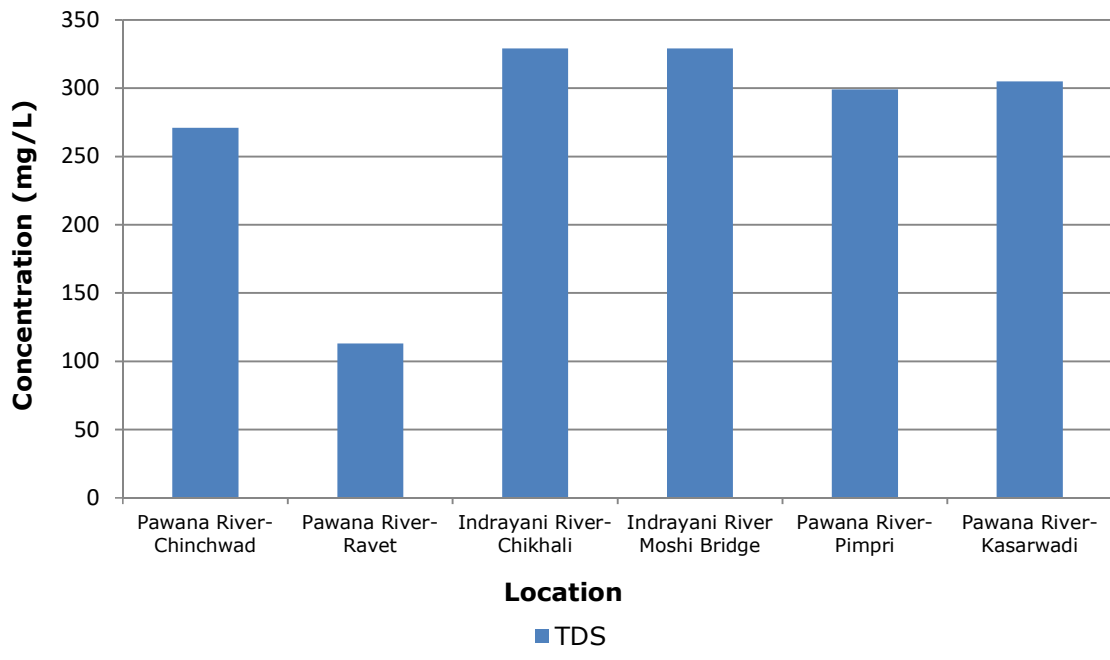
Parameters	Unit	Results		
		Indrayani River - Moshi Bridge	Pawana River- Pimpri	Pawana River- Kasarwadi
Faecal Coliforms	MPN Index/ 100 ml	855	653	825
Total Phosphate (as P)	mg/L	0.17	0.42	0.34
Total Kjeldahl Nitrogen (as N)	mg/L	0.93	1.12	2.43
Total Ammonia (NH ₄ +NH ₃)- Nitrogen	mg/L	0.33	0.52	1.17
Total Nitrogen	mg/L	2.03	2.24	3.45
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS)	µg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	mg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	BLQ	0.157	0.142
Nickel (as Ni)	mg/L	0.029	0.026	0.017
Copper (as Cu)	mg/L	BLQ	0.188	0.025
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	0.062	0.046	0.03
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	0.014	0.011	0.012
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.111	0.12	0.091
Iron (as Fe)	mg/L	0.361	0.869	0.366
Vanadium (as V)	mg/L	0.024	0.01	0.026
Selenium (as Se)	mg/L	0.018	0.011	0.013
Boron (as B)	mg/L	0.275	BLQ	BLQ
Bioassay Test on fish	% survival	100	100	67

Graphs - Surface Water Quality

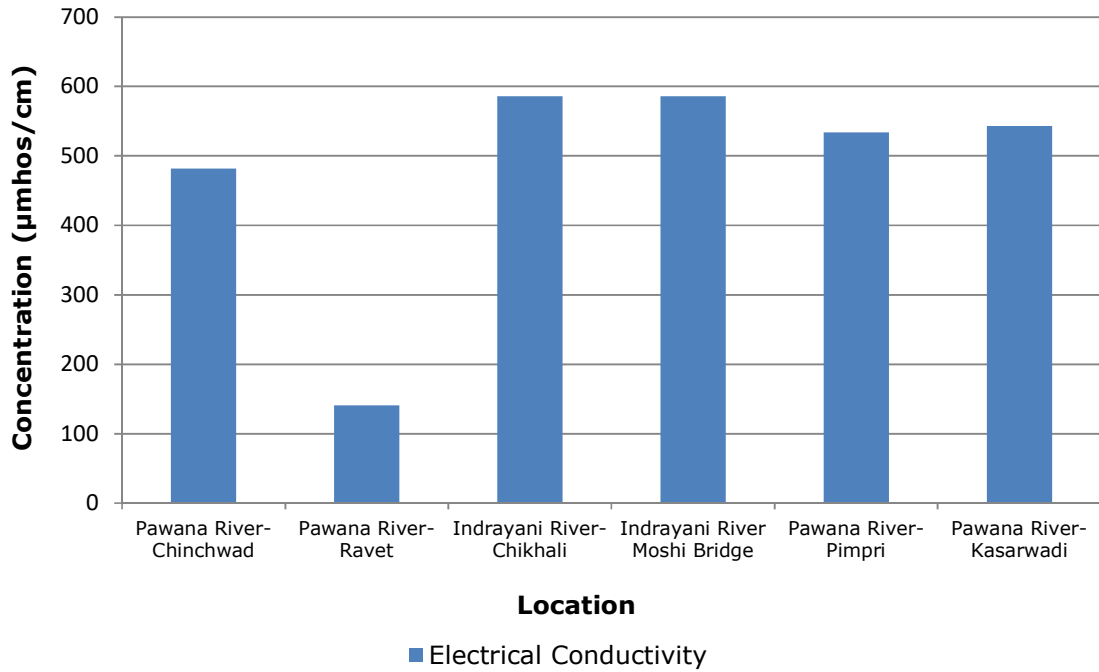
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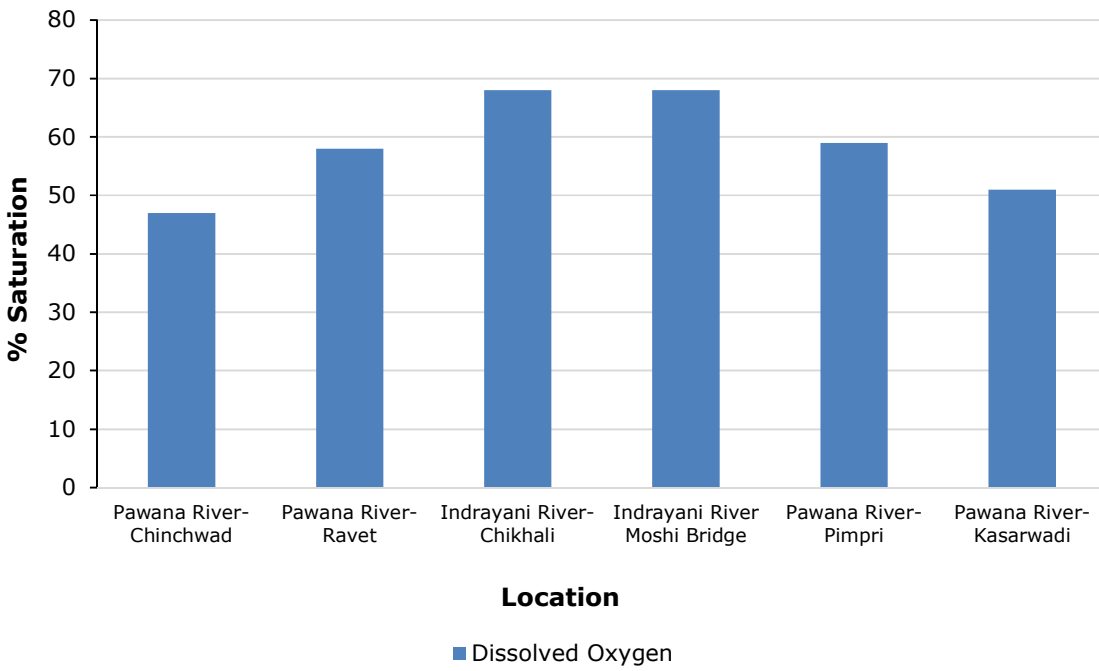
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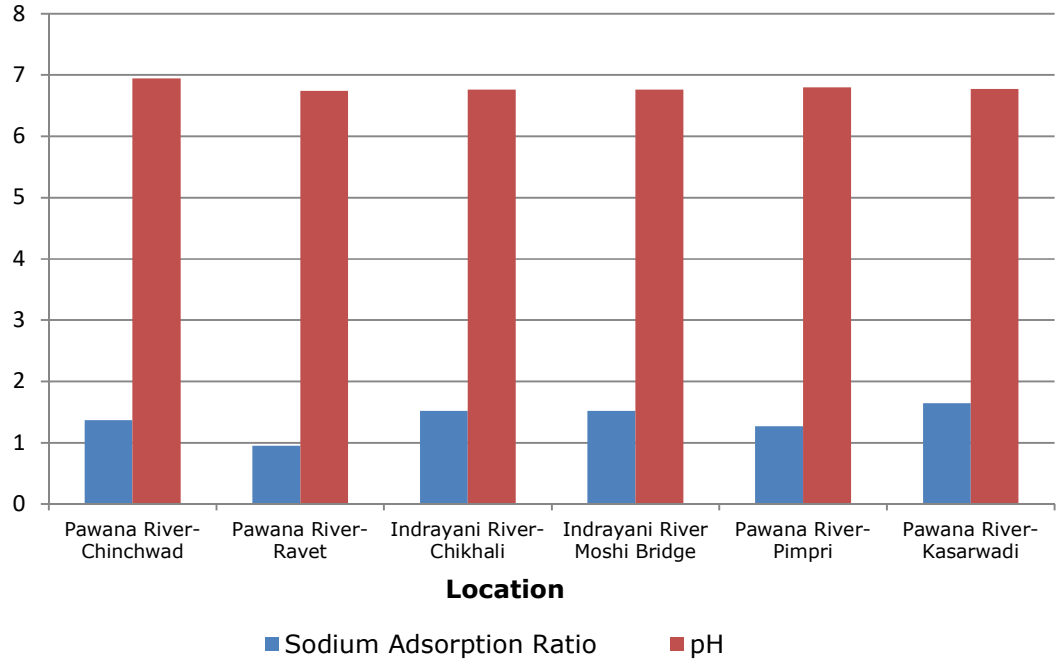
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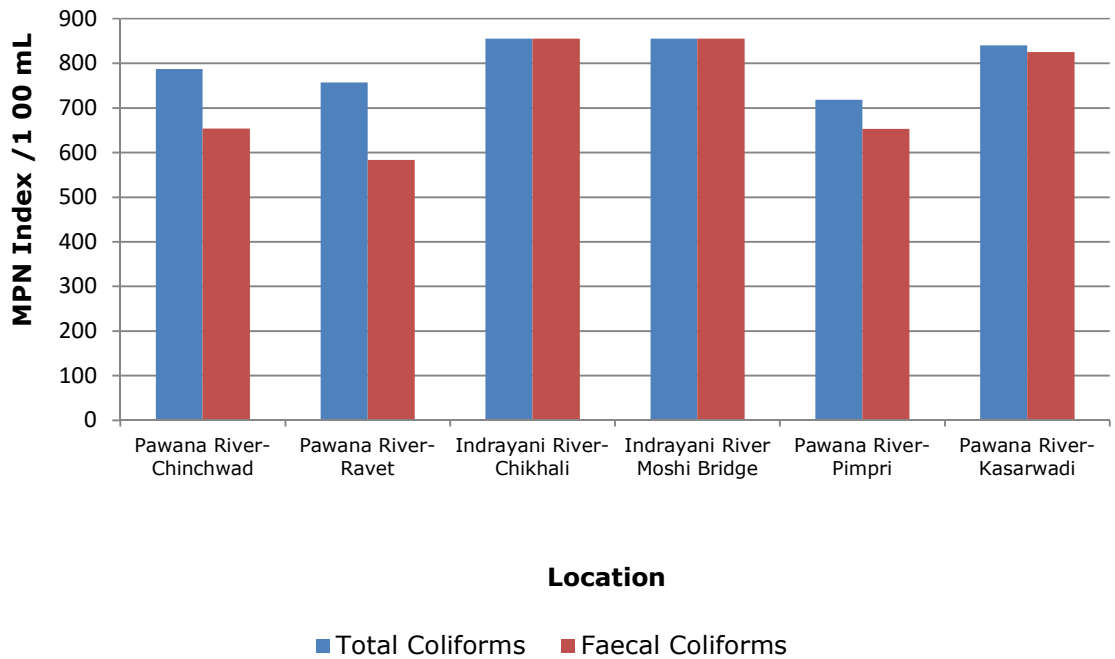
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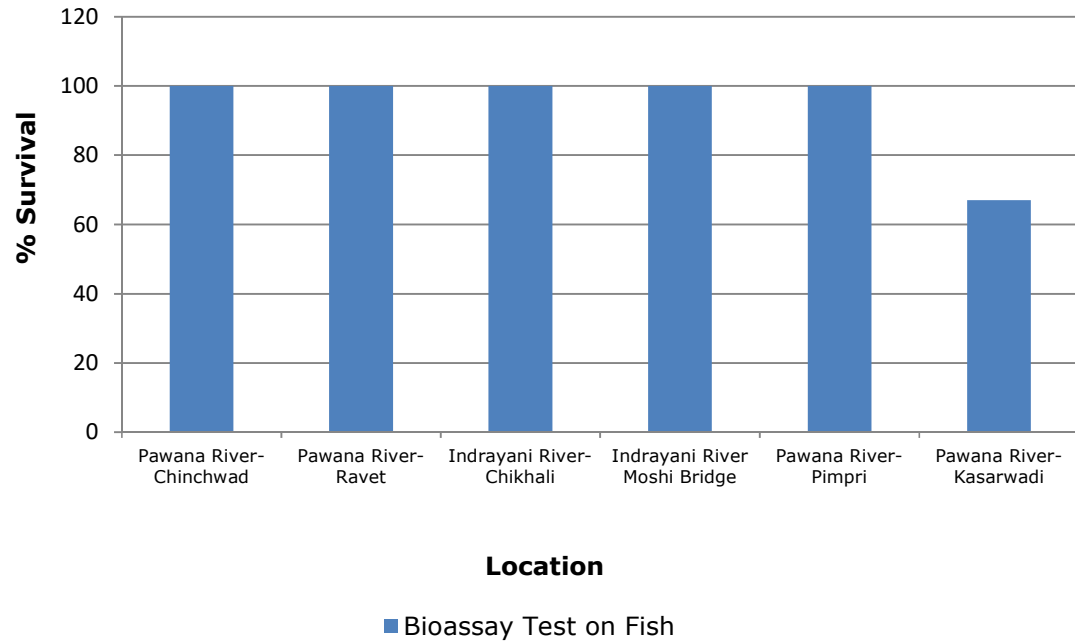
Pimpri Chinchwad - Surface Water



Pimpri Chinchwad - Surface Water



Pimpri Chinchwad - Surface Water



LAND ENVIRONMENT

7. Land Environment

For studying the land Environment of Pimpri-Chinchwad area, ground water was collected 6 Borewell, open well and Hand pump.

- All the water samples collected are found acceptable in general appearance, colour, smell except transparency.
- General parameters like pH, suspended solids, BOD, COD and Total Kjeldahl Nitrogen (TKN) are also observed well within the limits in all the collected samples.
- Concentration of Total Phosphate, Hexavalent Chromium (Cr^{6+}) and Iron is found higher than the standard limits in few of the water samples.
- The presence of faecal coliform was also well within the acceptable limits.
- All metals like Arsenic, Nickel, Copper, Iron, Manganese, Selenium, etc. are also observed either below the limit of quantification or below their standard limits.
- Parameters like Total Residual Chlorine, Cyanide, Fluoride, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds, also meet the criteria as prescribed by CPCB.
- Organo Chlorine Pesticides, Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are below the detectable limit in all studied samples.

Table 7.1 Details of Sampling Location of Ground Water

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Patil Niwas Near Keshav Nagar School Chinchwad Gaon	18°62'47.65"N	73°78'13.17"E	26.05.2023	28.05.2023	30.05.2023
2.	Rohit Park-I Tapkir Nagar Kalewadi	18°61'04.59"N	73°78'63.11"E	26.05.2023	28.05.2023	30.05.2023
3.	Near Kashiba Shinde Sabhagruha Pimprigaon	18°61'05.16"N	73°79'74.63"E	26.05.2023	28.05.2023	30.05.2023
4.	Near Saritakunj Building Kasadwadi	18°60'15.7"N	73°82'18.63"E	26.05.2023	28.05.2023	30.05.2023
5.	Sai Dham Landewadi Bhosari	18°61'97.68"N	73°84'34.23"E	26.05.2023	28.05.2023	30.05.2023

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
6.	Gandharve Nagari Moshi	18°66'06.2"N	73°84'94.91"E	26.05.2023	28.05.2023	30.05.2023

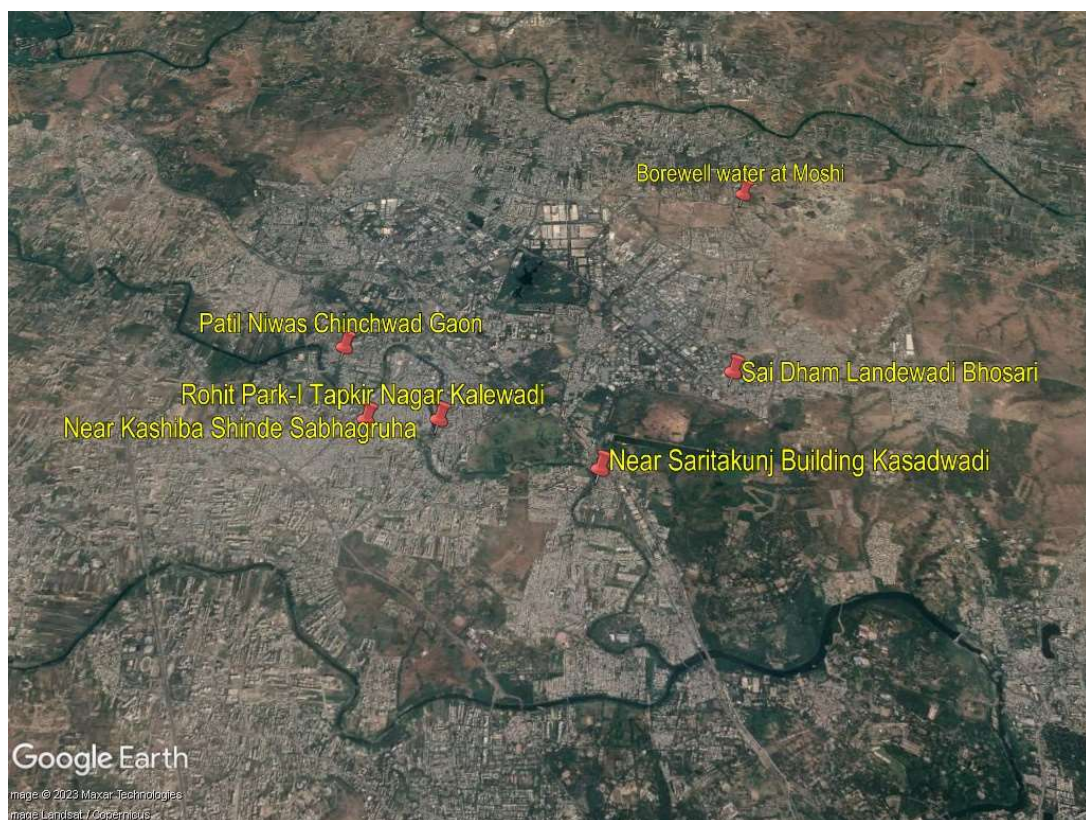


Fig: Geographical Locations of Ground Water Sampling

Table 7.2 Results of Ground Water

Parameters	Unit	Results		
		Patil Niwas Near Keshav Nagar School Chinchwad Gaon	Rohit Park-I Tapkir Nagar Kalewadi	Near Kashiba Shinde Sabhagruha Pimprigaon
Sanitary Survey	-	Generally clean neighbourhood	Generally clean neighborhood	Generally clean neighborhood
General Appearance	-	Not Applicable	Not Applicable	Not Applicable
Transparency	M	Not Applicable	Not Applicable	Not Applicable
Temperature	°C	27	27	27
Colour	Hazen	1	1	1
Smell	-	Agreeable	Agreeable	Agreeable

Parameters	Unit	Results		
		Patil Niwas Near Keshav Nagar School Chinchwad Gaon	Rohit Park-I Tapkir Nagar Kalewadi	Near Kashiba Shinde Sabhagraha Pimprigaon
pH	-	7.68	7.80	7.20
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	14	8	12
Total Dissolved Solids	mg/L	530	533	563
Chemical Oxygen Demand	mg/L	8.5	8	8
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	2	2	2
Electrical Conductivity (at 25 °C)	µmhos/cm	944	948	1003
Nitrite Nitrogen (as NO ₂)	mg/L	0.02	0.02	BLQ
Nitrate Nitrogen (as NO ₃)	mg/L	2.36	2.27	1
(NO ₂ + NO ₃)-Nitrogen	mg/L	2.37	2.29	1
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	0.33	0.24	0.255
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.9	0.9	0.9
Sulphide (as S ²⁻)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.41	0.9	0.65
Sodium Adsorption Ratio	-	2.11	1.88	2.53
Total Coliforms	MPN Index/100 ml	215	16	277
Faecal Coliforms	MPN Index/100 ml	96	6.9	112
Total Phosphate (as P)	mg/L	0.34	0.54	0.7
Total Kjeldahl Nitrogen	mg/L	0.56	0.56	0.56
Total Ammonia (NH ₄ +NH ₃)-Nitrogen	mg/L	0.14	0.15	0.15
Total Nitrogen	mg/L	2.44	2.67	1.03
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS, Calculated as LAS, mol.wt. 288.38)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	0.006	BLQ	BLQ
Nickel (as Ni)	mg/L	BLQ	BLQ	0.012
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ

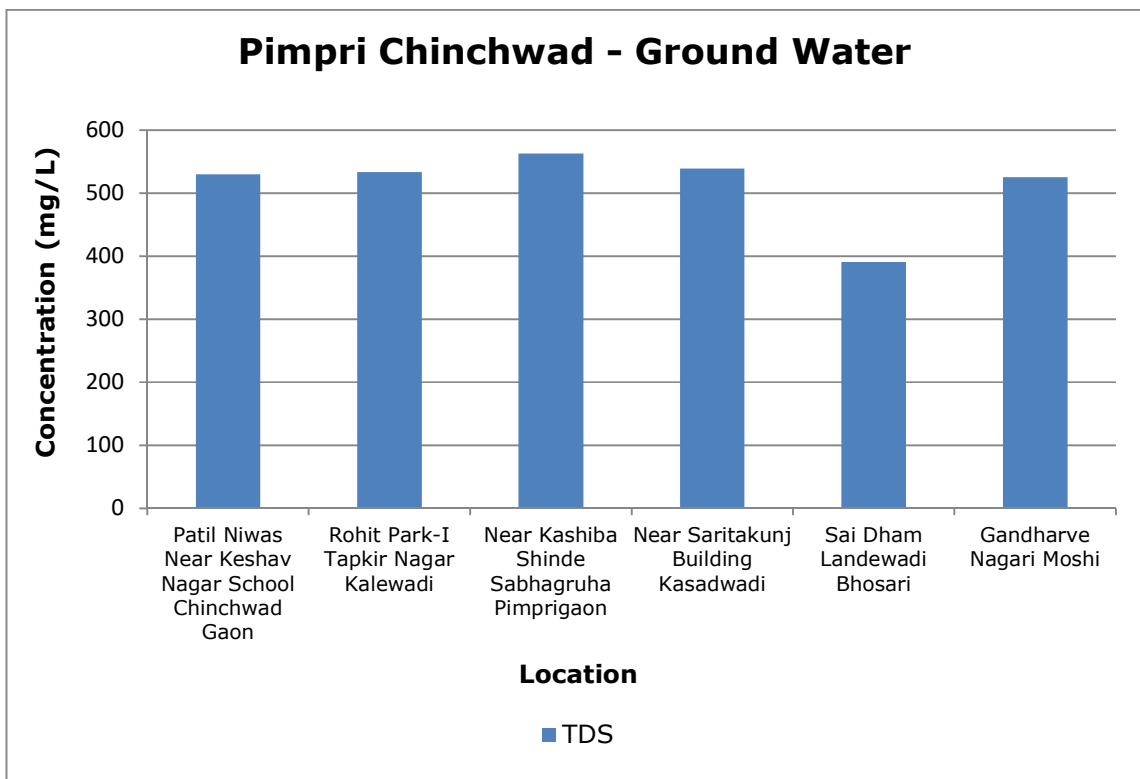
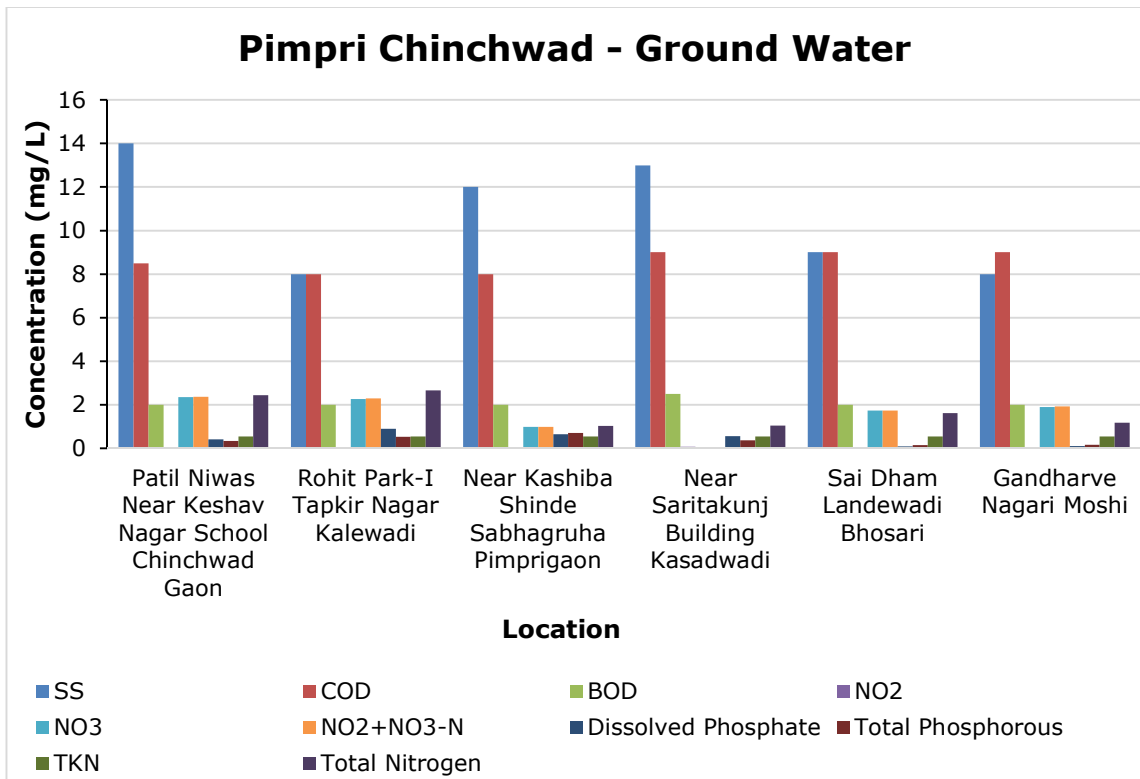
Parameters	Unit	Results		
		Patil Niwas Near Keshav Nagar School Chinchwad Gaon	Rohit Park-I Tapkir Nagar Kalewadi	Near Kashiba Shinde Sabhagruha Pimprigaon
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	0.06	0.026
Total Arsenic (as As)	mg/L	0.198	BLQ	BLQ
Lead (as Pb)	mg/L	0.022	BLQ	BLQ
Cadmium (as Cd)	mg/L	0.008	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	100	BLQ	0.072
Iron (as Fe)	mg/L	BLQ	0.637	0.506
Vanadium (as V)	mg/L	BLQ	0.023	0.015
Selenium (as Se)	mg/L	BLQ	0.009	BLQ
Boron (as B)	mg/L	BLQ	0.151	0.178
Bioassay Test on fish	% survival	100	100	57

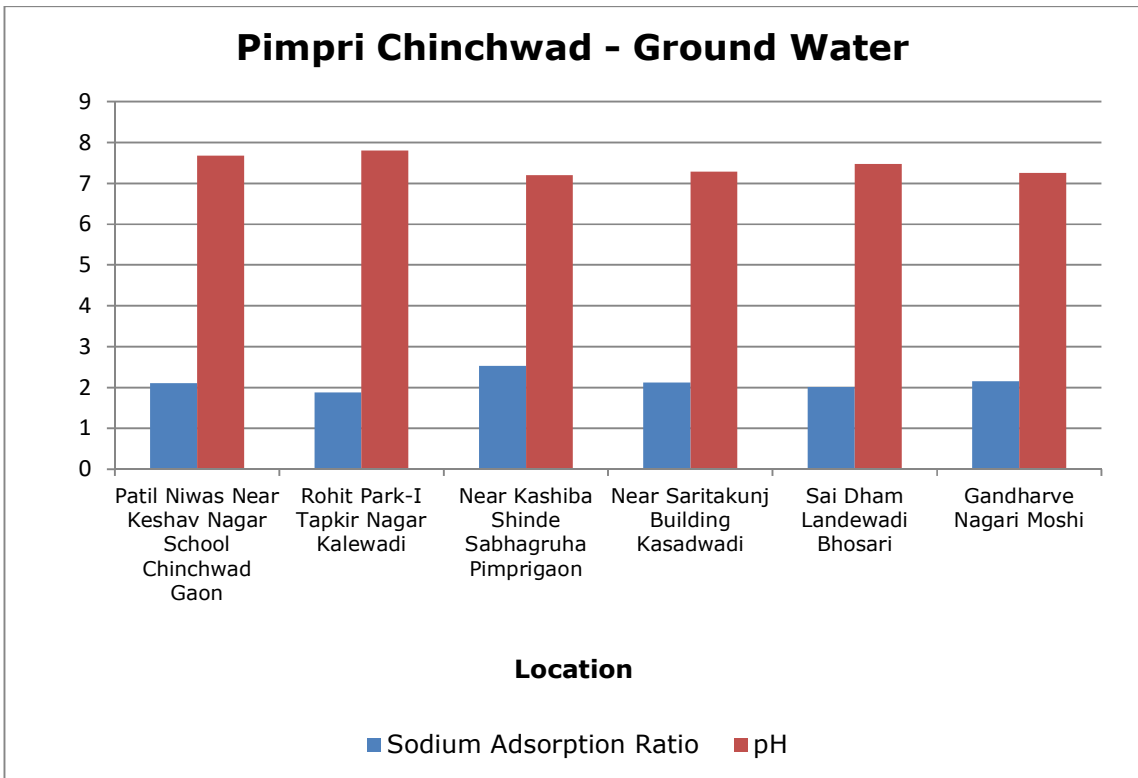
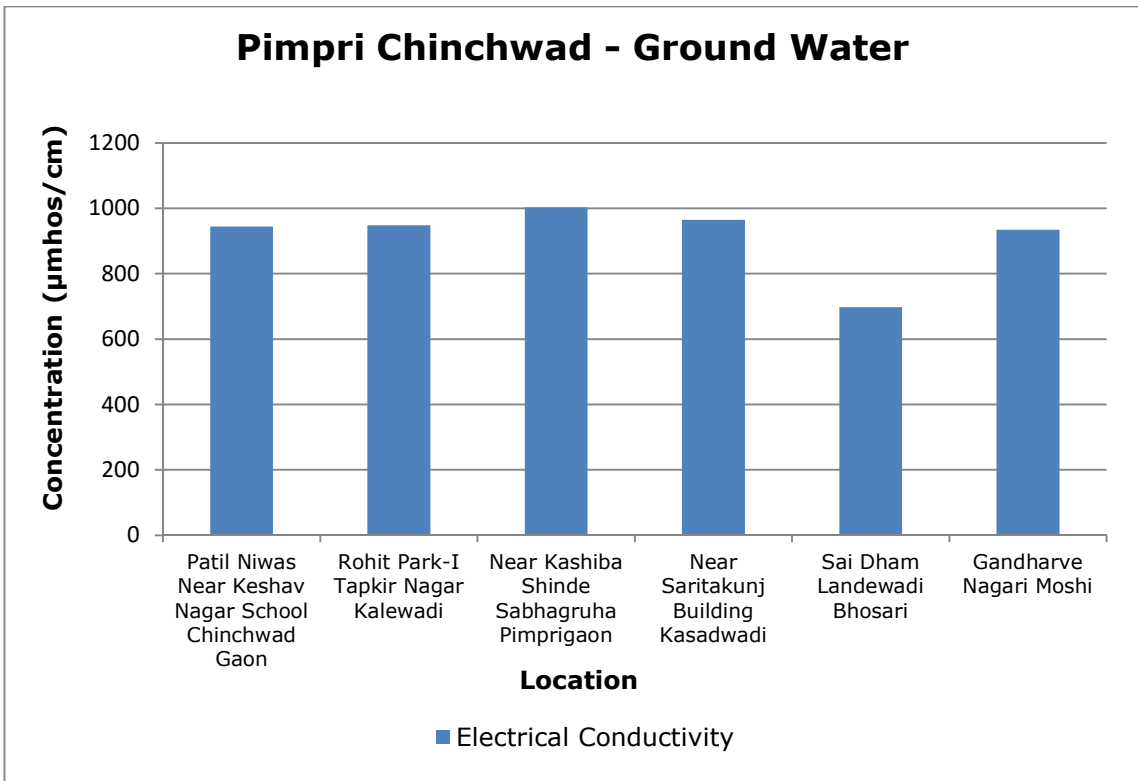
Parameters	Unit	Results		
		Near Saritakunj Building Kasadwadi	Sai Dham Landewadi Bhosari	Gandharve Nagari Moshi
Sanitary Survey	-	Generally clean neighbourhood	Generally clean neighbourhood	Generally clean neighborhood
General Appearance	-	Not Applicable	Not Applicable	Not Applicable
Transparency	M	Not Applicable	Not Applicable	Not Applicable
Temperature	°C	28	27	27
Colour	Hazen	1	1	1
Smell	-	Agreeable	Agreeable	Agreeable
pH	-	7.29	7.48	7.26
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	13	9	8
Total Dissolved Solids	mg/L	539	391	525
Chemical Oxygen Demand	mg/L	9	9	9
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	2.5	2	2
Electrical Conductivity (at 25 °C)	µmhos/cm	965	697	935
Nitrite Nitrogen (as NO ₂)	mg/L	0.09	BLQ	0.07
Nitrate Nitrogen (as NO ₃)	mg/L	BLQ	1.74	1.91
(NO ₂ + NO ₃)-Nitrogen	mg/L	BLQ	1.745	1.93

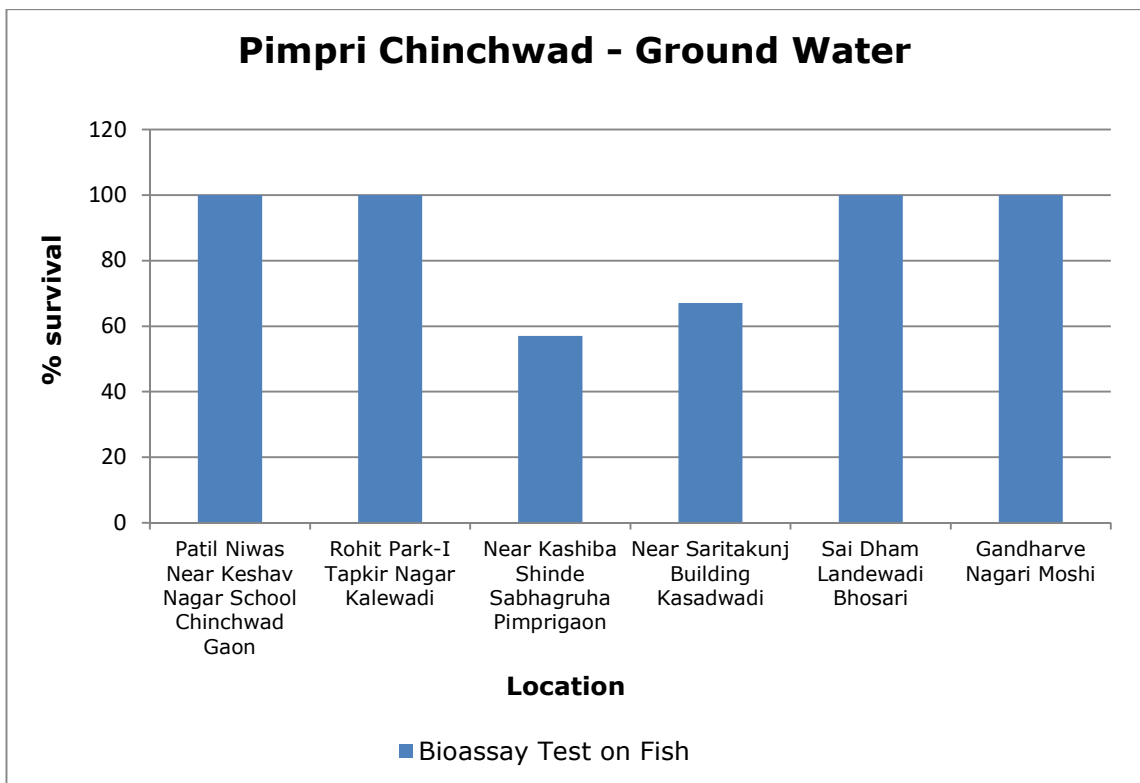
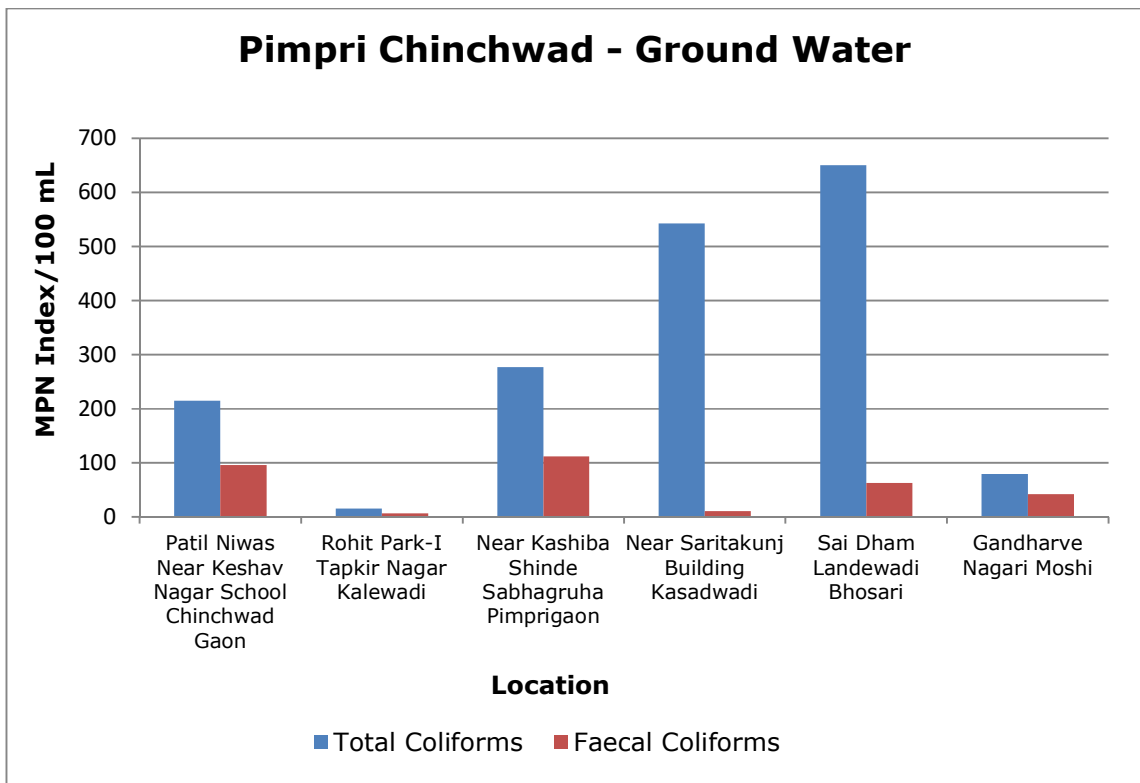
Parameters	Unit	Results		
		Near Saritakunj Building Kasadwadi	Sai Dham Landewadi Bhosari	Gandharve Nagari Moshi
Free Ammonia (as NH ₃ -N)	mg/L	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	0.24	0.25	0.235
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.8	0.7	0.9
Sulphide (as S ²⁻)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.57	0.1	0.11
Sodium Adsorption Ratio	-	2.12	2.01	2.15
Total Coliforms	MPN Index/100 ml	542	650	79
Faecal Coliforms	MPN Index/100 ml	11	63	42
Total Phosphate (as P)	mg/L	0.37	0.15	0.16
Total Kjeldahl Nitrogen	mg/L	0.56	0.56	0.56
Total Ammonia (NH ₄ +NH ₃)-Nitrogen	mg/L	0.145	0.13	0.13
Total Nitrogen	mg/L	1.05	1.61	1.17
Phenols (as C ₆ H ₅ OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS, Calculated as LAS, mol.wt. 288.38)	µg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	mg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	BLQ	BLQ	BLQ
Nickel (as Ni)	mg/L	BLQ	BLQ	BLQ
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr ⁶⁺)	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.041	0.079	BLQ
Iron (as Fe)	mg/L	0.445	0.499	0.299
Vanadium (as V)	mg/L	0.02	BLQ	BLQ
Selenium (as Se)	mg/L	0.006	0.006	0.006
Boron (as B)	mg/L	0.155	BLQ	0.18

Parameters	Unit	Results		
		Near Saritakunj Building Kasadwadi	Sai Dham Landewadi Bhosari	Gandharve Nagari Moshi
Bioassay Test on fish	% survival	67	100	100

Graphs - Ground Water Quality







8. Health Related Data

C: Receptor

Table 10.1 Details of Component C

Component C (Impact on Human Health) 10	
Main - 10	
% increase in cases	Marks
<5%	0
5-10%	5
>10%	10

- % increase is evaluated based on the total no. of cases recorded during two consecutive years.
- For Air Environment, total no. of cases related to Asthma, Bronchitis, Cancer, Acute respiratory infections etc. are to be considered.
- For surface water/ ground water Environment, cases related to Gastroenteritis, Diarrhoea, renal (kidney) malfunction, cancer etc are to be considered.
- For the above evaluation, the previous 5 years records of 3-5 major hospitals of the area shall be considered.

Annexure – I Health Related Data enclosed.

9. CEPI Score

Comprehensive Environmental Pollution Index (CEPI) is intended to act as early warning tool which helps in categorization of industrial clusters/ areas in terms of priority of needing attention. The CEPI score have been calculated based on CPCB Letter No. B-29012/ESS (CPA)/2015-16 dated 26th April 2016. The scoring system involves an algorithm that considers the basic selection criteria. It is proposed to develop the CEPI based on Sources of pollution, real time observed values of the pollutants in the ambient air, surface water and ground water in & around the industrial cluster and health related statistics.

Table 8.1 CEPI score of the Pre monsoon season 2023

	A1	A2	A	B	C	D	CEPI
Air Index	2.75	2.5	6.88	3	0	0	9.88
Water Index	2.5	2.5	6.25	30	10	0	46.25
Land Index	1.5	2.5	3.75	20.25	10	0	34.00
Aggregated CEPI							48.06

Table 8.2 Comparison of CEPI Scores

	Air Index	Water Index	Land Index	CEPI
CEPI score June 2023	9.88	46.25	34.00	48.06
CEPI score March 2023	19.9	36.3	43.8	47.9
CEPI score June 2021	17.5	34.9	43.8	47.2
CEPI Score March 2021	20.5	34.9	32.6	39.3
CEPI score March 2020	43.1	7.5	38.1	44.7
CEPI score June 2019	33.1	30.2	30.5	39.26
CEPI score March 2019	36.3	32.9	29.2	42.4
CEPI score June 2018	37	25.15	26.99	40.82
CEPI score March 2018	34.45	37.4	36.91	43.49

CPCB CEPI score March 2018	52	6.25	5.25	52.16
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CEPI score calculation:

Ambient Air Analysis Report

Pollutant	Group	A1	A2	A (A1 X A2)
PM ₁₀	B	2	Moderate	
PM _{2.5}	B	0.5		
SO ₂	A	0.25		
		2.75	2.5	6.875

Pollutant	Avg (1)	Std (2)	EF (3) [(3)=(1)/(2)]	No. of samples Exceeding (4)	Total no. of samples (5)	SNLF Value (6) [(6)=(4)/(5)x(3)]	SNLF score (B)		
PM ₁₀	83.25	100	0.83	0	8	0.00	L	3	
PM _{2.5}	23.13	60	0.39	0	8	0.00	L	0	
SO ₂	9.66	80	0.12	0	8	0.00	L	0	
B score = (B1+B2+B3)								B	3

C	0	<5%
D	0	A-A-A

Air CEPI Score	(A+B+C+D)	9.88
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Water Quality Analysis Report

Pollutant	Group	A1	A2	A (A1 X A2)
BOD	B	2	Moderate	
Zn	A	0.25		
TDS	A	0.25		
		2.5	2.5	6.25

Pollutant	Avg (1)	Std (2)	EF (3) [(3)=(1)/(2)]	No. of samples Exceeding (4)	Total no. of samples (5)	SNLF Value (6) [(6)=(4)/(5)x(3)]	SNLF score (B)		
BOD	14.17	8	1.77	4	6	1.18	H	30	
Zn	0.07	0.3	0.23	0	6	0.00	L	0	
TDS	274.33	2000	0.14	0	6	0.00	L	0	
B score = (B1+B2+B3)								B	30

C	10	>10%
D	0	A-A-A

Water CEPI Score	(A+B+C+D)	46.25
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Ground Water Quality Analysis Report

Pollutant	Group	A1	A2	A (A1 X A2)
TP	A	1	Moderate	
TDS	A	0.25		
Fe	A	0.25		
		1.5	2.5	3.75

Pollutant	Avg (1)	Std (2)	EF (3) [(3)=(1)/(2)]	No. of samples Exceeding (4)	Total no. of samples (5)	SNLF Value (6) [(6)=(4)/(5)x(3)]	SNLF score (B)	
TP	0.38	0.3	1.27	4	6	0.84	H	20.25
TDS	513.50	2000	0.26	0	6	0.00	L	0
Fe	0.85	1.5	0.57	0	6	0.00	L	0
B score = (B1+B2+B3)							B	20.25

C	10	>10%
D	0	A-A-A

Land CEPI Score	(A+B+C+D)	34.00
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Water CEPI Score (im) 46.25
Land CEPI Score (i2) 34.00
Air CEPI Score (i3) 9.88

Aggregated CEPI Score = $im + \{(100-im)*i2/100\}*i3/100\}$
 where, im = maximum sub index; and i2 and i3 are sub indices for other media

CEPI Score = 48.06

10. Conclusion

Ambient Air Quality

- The AAQ stations were identified in the CEPI impact area to cover both upwind and crosswind directions and AAQ survey was conducted.
- All parameters are well within the limits as per NAAQS.
- In the CEPI score calculated for Air Environment by CPCB in March 2018, PM₁₀ and PM_{2.5} have exceeded which may also be due to the vehicular emissions.

Surface Water Quality

- Higher concentration of BOD was observed in the surface water samples.
- All the industries in the Pimpri-Chinchwad region are either reusing the treated trade effluent as sewage in their process or gardening or are disposed into Sea.

Ground Water Quality

- Ground water samples were collected from different Bore well in the region.
- Concentration of Total Phosphate and Iron is found higher than the standard limits in few of the water samples.

CEPI Score

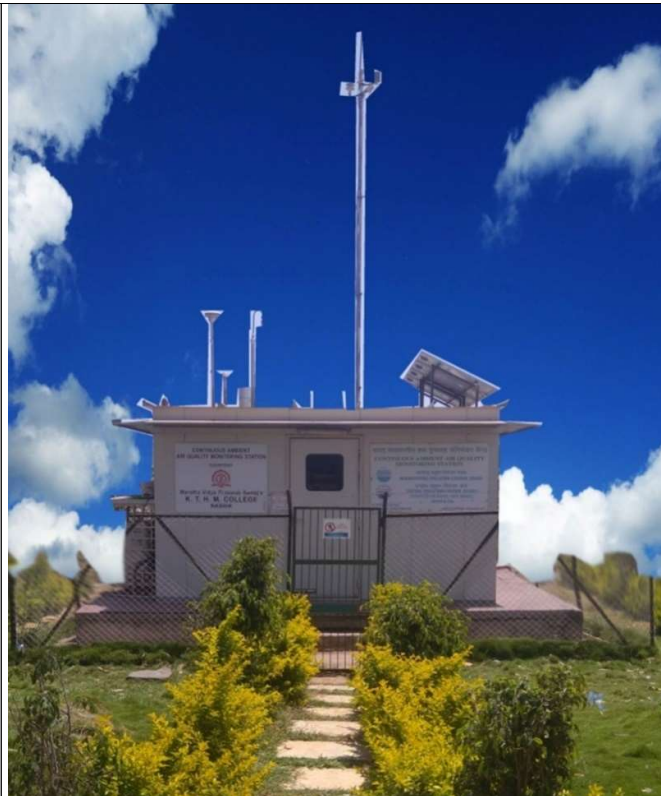
- The CEPI Score pre monsoon season is 48.06.
- In comparison with the CEPI Score of March 2023, an increase in Water Index and land Index and Ambient were is observed decreased in this season.

11. Efforts taken by MPCB to control and reduce Environmental Pollution Index

- Drive against open burning of biomass, crop residue, garbage, leaves, etc.: Follow up with PCMC authority for not to allow open burning of biomass garbage.
- **Organic Waste Compost machines:** All construction project have provided organic waste compost machines for treatment of wet waste.
- **Waste collection and segregation centres:**
 - ✓ **Domestic Solid Waste:** PCMC has provided door to door waste collection and segregation facility for residential area.
 - ✓ **Industrial Non-Hazardous Waste:** Recyclable waste is sent to authorized waste recyclers and other waste collected by corporations.
 - ✓ **Hazardous Waste:** Industrial hazardous waste sent to common hazardous treatment and disposal facility by industries.
- **Construction of Common Effluent Treatment plant (CETP):** Small Scale Industrial Association and MCCIA has formed Special Purpose Vehicle (SPV) for provision of CETP. Accordingly, MIDC has allotted Plot No. 188/1 T Block, Bhosari MIDC for proposed 0.5 MLD in Phase I and 0.5 MLD in Phase II CETP. The preparation of DPR is in progress. M/s SAM Consultech has been selected for preparation of DPR. As per the submission of MCCIA, the project will be completed within one and half year.

The estimated cost of setting up the proposed CETP is Rs. 15 Corers. Out of which MIDC contribution is 20%, MPCB 5 %, Industrial Association 10% and 65% from Pimpri-Chinchwad Municipal Corporation.
- **Installation of CEMS installed for Air and Water in Large and Medium scale RED category industries:** 02 no.
- Arrangement of scientific collection and treatment of sewage generated: Pimpri-Chinchwad Municipal Corporation has provided 14 nos of STP. Due lack to lack of drainage network 32 MLD domestic effluent dispose into River Pawna, Mula and Indrayani. Proposes to provide 8 no of STPs out of which installation work of 2 no of STPs is in progress. PCMC has prepared Plan for rejuvenation of river Pawna and Indrayani.
- Installation of CAAQMS station: 3 no of CAAQM stations provided at Rose Garden, Gavali Matha, Bhosari, PCMC garden, Jagtap Dairy, Pimple Nilakh and Chhatrapati Shivaji Maharaj Garden Dange Chowk, Pune and all in CAAQM stations are in operation for monitoring of air quality.
- Establishment of Monitoring stations under National Water Quality Monitoring Programme (NWMP) are 06.
- Steps are taken for industrial area/other units to recycle 100% treated effluent to achieve zero liquid discharge (ZLD): Directions were issued to the unit to provide ZLD and use 100% treated water for the secondary purpose. About 60 units have been provided by ZLD system.
- Steps taken to reduce dust emission:
 1. Conservation of traditional crematorium to electric based technology.
 2. Conversion 100% city transport bus in to CNG.
 3. Conversion of Auto into PNG and CNG based fuel.

4. RTO has started the implementation of Policy for discarding old vehicles. Also recently started online PUC certification for all vehicles. During their regular survey 2388 vehicles found defaulter and fine of Rs. 5,94,000/- were collected and from 01.04.2020 to 29.09.2020. 603 no. of vehicles found defaulter and fine of Rs. 67,000/- were collected.
 5. The industries have changed their fuel F.O. to low Sulphur fuel and Green fuel like LPG, PNG and Electricity.
 6. Regular cleaning of roads and traffic diversions and signals shall be installed by the corporation.
 7. Road swiping machine provided.
- Tree plantation in last one year (2021-2022): 10,000 nos.
 - Other initiatives taken to control and reduce pollution in air, surface water and ground water in last one year (2021-2022):
 - a) Presently 03 CAAQM stations are installed at Rose Garden, Gavali Matha, Bhosari, PCMC Garden, Jagtap Dairy, Pimple Nilakh and Chhatrapati Shivaji Maharaj Garden Dange Chowk, Pune.
 - b) PCMC has prepared plan for rejuvenation of river Pawna and Indrayani.
 - c) Tree Plantation drive in MIDC area.
 - d) Awareness programme has been carried out for ban of Single Use Plastic with Plastic Manufacturing Associations and with PCMC are ward wise. Also, survey has been carried out on regular basis with PCMC officials to seize the ban of Single Use Items and also imposed fine to the establishments.



Continuous Ambient Air Quality Monitoring Station



Ambient Air Quality Monitoring Van

12. Photographs

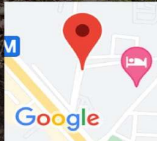


Pimpri-Chinchwad, Maharashtra, India

6, Nana Peth, Morewadi, Pimpri Colony,
Pimpri-Chinchwad, Maharashtra 411018, India

Lat 18.6286349 / Long 73.8053793

Thursday 25 May 2023 15:30:24

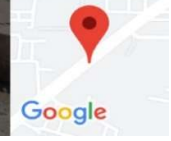


Pimpri-Chinchwad, Maharashtra, India

JQCF+M36, Shrikrushna Colony, Thergaon,
Pimpri-Chinchwad, Maharashtra 411033, India

Lat 18.6218534 / Long 73.7727213

Thursday 25 May 2023 11:10:34



**Ambient Air Sampling at Pimpri Chinchwad
Municipal Corporation**

**Ambient Air Sampling at Thergaon Near
Puduji Industries**

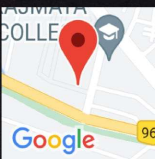


Pune, Maharashtra, India

JR8R+PMR, Landewadi, Bhosari, Pune, Maharashtra
411039, India

Lat 18.6170635 / Long 73.8413961

Friday 26 May 2023 10:49:06

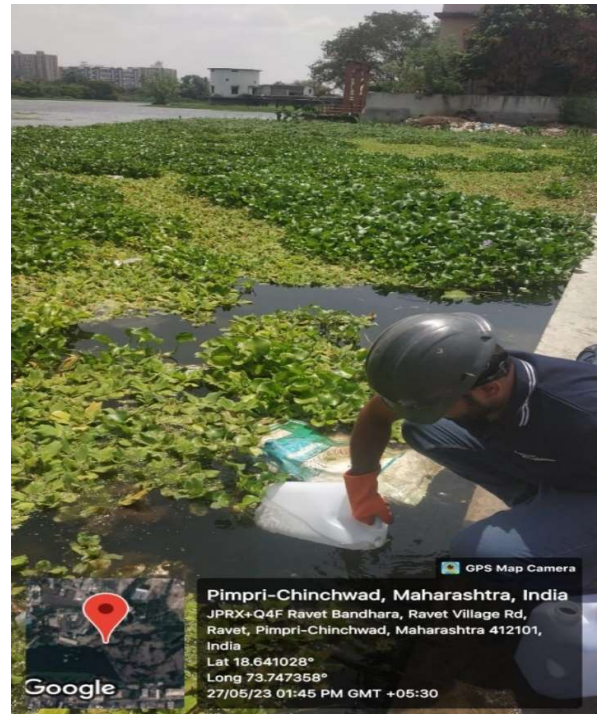


**Ambient Air Sampling at MIDC Bhosari Near
Amphenol Area**

**Ambient Air Sampling at MIDC Pimpri Area,
Yashwant Nagar Chouk Near Training Hall**



Surface water sampling at Pawana River-Chinchwad



Surface water sampling at Pawana River-Ravet



Surface water sampling at Indrayani River-Chikhali



Surface water sampling at Indrayani River - Moshi Bridge



Surface water sampling at Pawana River-Ksarwadi



Ground water Sampling at Gandharve Nagari Moshi



Ground water Sampling at Patil Niwas Near Keshav Nagar School Chinchwad Gaon



Ground water Sampling at Rohit Park-I Tapkir Nagar Kalewadi



**Ground water Sampling at Sai Dham
Landewadi Bhosari**



**Ground water Sampling at Near Saritakunj
Building Kasarwadi**

Annexure – I Health Related Data



LOKMANYA HOSPITAL, NIGDI

Tilak Road, Pradhikaran, Nigdi, Pune - 411 044.

Tel. : 67392001/02/03

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Study by
Maharashtra Pollution Control Board (MPCB)

Name of the Polluted Industrial Area (PIA)	PIMPRI-CHINCHWAD
Name of the major health center/ organization	Lokmanya Hospital Nigdi Unit II
Name and designation of the Contact person	Dinesh Narkar Manager HR & Admin 9552532039
Address	Sec No 24, Tilak Road, Prdhikaran Nigdi Pune 411044

S No.	Diseases	No. of Patients Reported	
		2022 (Jan-Dec)	2021 (Jan-Dec)
AIRBORNE DISEASES			
1.	Asthma	43	39
2.	Acute Respiratory Infection	194	188
3.	Bronchitis	92	84
4.	Cancer	2	2
WATERBORNE DISEASES			
1.	Gastroenteritis	119	217
2.	Diarrhea	94	78
3.	Renal diseases	64	59
4.	Cancer	2	2

Date: 01/02/2023



Dinesh Narkar
Signature



NIRAMAYA HOSPITALS PVT. LTD.

CIN-U55101PN2000PTCO14383

Behind Jai Hind Petrol Pump, Chinchwad station – Pune –MH 411 019 ,IN

Ph.: 27441860-65, 27607777 Mobile : 9325697153

E Mail : nhplchinchwad@gmail.com

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Study by
Maharashtra Pollution Control Board (MPCB)

ANNEXURE B

INFORMATION ON HEALTH STATISTICS IN PIA

1. Name of the Polluted Industrial Area (PIA) : PIMPRI-CHINCHWAD
2. Name of the major health centre/ organization : Niramaya Hospitals Pvt. Ltd.
3. Name and designation of the contact person : Dr. Mrs. Kamal Yadav (CEO)
4. Address : S. No. 4742, Next to behind Jaihind Petrol Pump, Chinchwad Station, Pune - 411019
5. Year of Establishment:

Sl No.	Diseases	No. of patients reported for the years	
		2022 (Jan-Dec)	2021 (Jan-Dec)
Air Borne Diseases			
1.	Asthma	40	49
2.	Acute Respiratory Infection	87	57
3.	Bronchitis	57	41
4.	Cancer	4	4
Water Borne Diseases			
5.	Gastroenteritis	106	53
6.	Diarrhea	62	49
7.	Renal diseases	84	76
8.	Cancer	2	0




CEO

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Study by Maharashtra Pollution Control Board (MPCB)

Name of the Polluted Industrial Area (PIA)	PIMPRI-CHINCHWAD
Name of the major health center/ organization	Yashwantrao Chavan Memorial Hospital
Name and designation of the Contact person	Dr. Rajendra Wabale
Address	PGIYCMH, Sant Tukaram Nagar, Pimpri-411018

S.No.	Diseases	No. of Patients Reported	
		2022 (Jan-Dec)	2021 (Jan-Dec)
AIRBORNE DISEASES			
1.	Asthma	156	130
2.	Acute Respiratory Infection	224	897
3.	Bronchitis	64	63
4.	Cancer	---	----
WATERBORNE DISEASES			
1.	Gastroenteritis	290	180
2.	Diarhea	24	25
3.	Renal diseases	3775	1274
4.	Cancer	---	---

Date:

HEALTH STATISTICS

Signature
[Handwritten Signature]
08.2.23