COMPILATION OF AIR QUALITY DATA RECORDED IN MAHARASHTRA

2012-13

Recorded by

Maharashtra Pollution Control Board
महाराष्ट्र प्रदूषण नियंत्रण मंडळ

Compiled by

The Energy and Resources Institute

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May 2014

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The Energy and Resources Institute
...towards global sustainable development

राजीव कुमार मित्तल भाप्रसे
सदस्य सचिव
Rajeev Kumar Mital IAS
MEMBER SECRETARY

महाराष्ट्र प्रदूषण नियंत्रण मंडळ
MAHARASHTRA POLLUTION CONTROL BOARD

PREFACE

Maharashtra Pollution Control Board (MPCB) has established Ambient Air Quality Network in Maharashtra covering major cities to comply with the mandate of Air (Prevention & Control of Pollution) Act, 1981 and to disseminate status of air quality prevailing in the State of Maharashtra.

The Ambient air quality is monitored by the Board through manually operated stations at various locations in Maharashtra under National Ambient Air Quality Monitoring Program (NAMP) / State Ambient Air Quality Monitoring Program (SAMP) and Continuous Ambient Air Quality Monitoring Stations (CAAQMS) at Mumbai, Pune and Solapur. The Air Quality data is regularly hosted on MPCB's website.

This report compiles and presents illustrative statistical data of the ambient air quality in Maharashtra for the fiscal year 2012-13. Also, Air Quality Index have been applied for reporting to convey the information on Air Quality to general Public in a easiest possible way.I trust this report will help all stake holders to take necessary mitigation measures.

This report is prepared by The Energy and Resources Institute (TERI), Western Regional Centre (WRC), Mumbai and I appreciate the efforts of Dr. Anjali Parasnis, *Associate Director*, TERI and Shri. Prathamesh Chourey *Associate Fellow*, TERI in preparing this report for the Board. I also acknowledge the monitoring agencies for their efforts in the field for monitoring work carried out to generate the air quality data. The contribution of Shri V.M. Motghare, *Joint Director* and Shri S.C. Kollur, *Scientific Officer*, MPCB is also appreciated.

(Rajeev Kumar Mital, IAS)
Member Secretary

April 2014

कल्पतरु पॉईंट, सायन सर्कल, सायन (पूर्व), मुंबई - ४०० ०२२. टेलि. : २४०१ ०७०६ • फॅक्स : २४०२ ३५१६

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Abbreviations

AAQM	Ambient Air Quality Monitoring
AAQMS	Ambient Air Quality Monitoring Stations
ALRI	Acute Lower Respiratory Infections
AMR	Amravati
Ar	Argon
AUR	Aurangabad
CAAQMS	Continuous Ambient Air Quality Monitoring Stations
CDP	Chandrapur
CH_4	Methane
CIDCO	City and Industrial Development Corporation of Maharashtra Ltd
CO	Carbon Monoxide
CO_2	Carbon-di-oxide
CPCB	Central Pollution Control Board
GoM	Government of Maharashtra
H_2	Hydrogen
He	Helium
KOP	Kolhapur
Kr	Krypton
Max	Maximum
MIDC	Maharashtra Industrial Development Corporation
Min	Minimum
MPCB	Maharashtra Pollution Control Board
MVD	Motor Vehicle Department
N_2	Nitrogen
NAAQM	National Ambient Air Quality Monitoring
NAMP	National Air Monitoring Program
Ne	Neon
NEERI	National Environmental Engineering Research Institute
NGP	Nagpur
NHK	Nashik
NOX	Oxides of Nitrogen

NVM	Navi Mumbai
O_2	Oxygen
O_3	Ozone
Pb	Lead
PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 microns
$PM_{2.5}$	Particulate Matter less than 2.5 microns
PUN	Pune
RO	Regional Office
RGD	Raigad
RSPM	Respirable Suspended Particulate Matter
SAMP	State Air Monitoring Program
SO_2	Sulphur dioxide
SPM	Suspended Particulate Matter
TERI	The Energy and Resources Institute
TNA	Thane
TTC	Trans Thane Creek
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
$\mu g/m^3$	Micrograms per cubic meter

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Executive Summary

Maharashtra state accounts for more than 13% of India's urban population (Census, 2011), the highest in the country, and is also known to contribute more than 15% to the national industrial output (World Bank). Given this, Maharashtra is undoubtedly the most urbanised and highly industrialized state of the country. However, this progress leads to a direct demand for natural resources, increased vehicular usage, consumption of fossil fuels, petrochemicals and so on.

Maharashtra state has the highest number of registered vehicles and also consumes the maximum amount of fossil fuels in the country. Combustion of fossil fuels like coal, petrol, diesel and so on to meet the energy demands for electricity generation and vehicular movement are considered the major reasons for air pollution. To keep a tab on the air pollution levels, MPCB (Maharashtra Pollution Control Board) has been taking action oriented initiatives to monitor, regulate, mitigate and reduce the emissions since the implementation of the Air act in 1981 in the state.

To monitor the ambient air quality, MPCB has installed various Ambient Air Quality Monitoring Stations (AAQMS) across the state under the NAMP (National Air Monitoring Program) and SAMP (State Air Monitoring Program). As on March 2013, there were 68 active AAQMS in Maharashtra under NAMP (58), SAMP (4) and Continuous AAQMS (CAAQMS) (6). Apart from these there are 3 more AAQMS under NAMP, which are regulated and monitored by NEERI (National Environmental Engineering Research Institute). SO_2 (Sulphur Dioxide), NO_x (Oxides of Nitrogen) and RSPM (Respirable Suspended Particulate Matter) are monitored across all the AAQMS. Other air pollutants like CO (Carbon Monoxide), ozone, benzene, toluene and xylene were monitored at 2 CAAQMS locations namely Bandra and Pune while only CO and ozone was monitored at Solapur CAAQMS.

This report also presents an illustrative compilation of the daily, monthly and annual data recorded by the AAQMS in Maharashtra for the SO_2, NOx and RSPM levels. Also for a comprehensive comparison for all the AAQMS at a glance and to have a glimpse of the overall performance of the areas in terms of the quality of air, the AQI (Air Quality Index) have been developed and presented in the report.

Sulphur –dioxide

SO_2 concentrations were recorded well within the annual standard (50µg/m^3) across all the AAQMS in Maharashtra except for two places, both being industrial areas, Nanded (53µg/m^3) and Dombivali (50µg/m^3). Similarly, among the AAQMS representing residential areas of Ulhasnagar and Badlapur recorded the highest annual average SO_2 levels of around 43 and 41.0µg/m^3 respectively. These values have remained consistent in comparison to the SO_2 concentrations recorded in 2011-12 at both these locations. All other regions in Maharashtra recorded SO_2 concentrations under the annual standard. Table No. 1, presents the top five AAQMS which recorded highest annual SO_2 concentrations.

In terms of AQI for SO_2, the Dombivali area recorded moderate air quality for more than 6% for the 24 hour observations at both the AAQMS in Dombivali MIDC area. Similarly, the AAQMS installed at Badlapur and Navi Mumbai (Vashi and Airoli), recorded AQI of moderate quality for around 3-5% of the observations. Given that the SO_2 levels were under

the standard at all the other stations, they could be classified as 'Good' air quality in terms of SO_2 levels, indicating low SO_2 pollution in Maharashtra.

Table No. 1: Top five AAQMS which recorded highest annual average SO_2 pollution (2012-13)

Region	MPCB RO	Monitoring Station	Annual Average of SO_2 ($\mu g/m^3$) (annual standard 50$\mu g/m^3$)
Nanded	Aurangabad	Industrial Area CIDCO	53
Dombivali	Kalyan	Dombivali – MIDC	50
Ulhasnagar	Kalyan	Powai Chowk- Ulhasnagar	43
Ambernath	Kalyan	Ambernath – MIDC	42
Badlapur	Kalyan	Badlapur - BIWA House	41

Oxides of Nitrogen

As compared to SO_2 concentrations, NOx concentrations exceeded the annual standard (40$\mu g/m^3$), at more than 29 locations. Although the AAQMS at Sion (Mumbai) recorded more than 2.5 times (106$\mu g/m^3$) the annual NOx standard, the NOx concentrations in Kalyan region are of major concern, since 6 out of 9 AAQMS in Kalyan RO exceeded the annual NOx concentrations (Table No. 2). AAQMS at Dombivali, Ambernath and Badlapur consistently recorded higher NOx concentrations. Similarly all the AAQMS in Navi-Mumbai recorded the NOx levels in the range of 56–40$\mu g/m^3$, indicating NOx levels above the acceptable standard in Navi Mumbai. Two more regions of concern due to high NOx concentrations are the MIDC areas of Nanded and Jalgaon which recorded NOx levels of 54 and 51$\mu g/m^3$ respectively which is much above the annual standard.

Table No. 2: Top ten AAQMS which recorded highest annual average NO_X pollution (2012-13)

Region	MPCB RO	Monitoring Station	Annual Average of NO_X ($\mu g/m^3$) (annual standard 40$\mu g/m^3$)
Mumbai	Mumbai	Sion	106
Dombivali	Kalyan	Dombivali	94
Ambernath	Kalyan	Ambernath	91
Ulhasnagar	Kalyan	Powai Chowk	81
Badlapur	Kalyan	Badlapur - BIWA House	69
Pune	Pune	Karve Road - CAAQMS	66
Dombivali	Kalyan	MIDC Office Dombivali	61
Ulhasnagar	Kalyan	SMT. CHM College Campus	58
Navi Mumbai	Navi Mumbai	Vashi	56
Nanded	Aurangabad	Industrial Area CIDCO	54

Particulate Matter (PM)

Particulate matter pollution has always been of severe concern in the state. The emission from various industries involved in activities like cement manufacturing, quarrying activities, power plants and so on, coupled with increasing construction activities and heavy traffic movement increases the dispersion of RSPM (Respirable Suspended Particulate Matter) in the air and poses a threat. In the year 2012-13, all but 4 AAQMS, recorded RSPM levels which violated the annual standard (60µg/m^3).

Air quality in the Chandrapur area is the most deteriorated in terms of RSPM concentrations. Four AAQMS in Chandrapur region were amongst the top ten AAQMS (Table No. 3) which recorded highest annual RSPM levels in the state. The RSPM levels at the AAQMS of Ghuggus (207µg/m^3), Rajura (196µg/m^3) and Ballarshah (192µg/m^3), violated the annual standard by more than 3 times. The region is highly influenced with activities like mining, cement manufacturing and presence of thermal power plant. The MIDC areas of Jalgaon and Amravati also recorded high RSPM concentrations.

Table No. 3: Top ten AAQMS which recorded highest annual average RSPM pollution (2012-13)

Region	MPCB RO	Monitoring Station	Annual Average of RSPM (µg/m^3) (annual standard 60µg/m^3)
Chandrapur	Chandrapur	Ghuggus	207
Chandrapur	Chandrapur	Rajura	196
Chandrapur	Chandrapur	Ballarshah	192
Chandrapur	Chandrapur	Tadali MIDC	173
Panvel	Raigad	Panvel- Water Supply Plant	168
Kolhapur	Kolhapur	Ruikar Trust	159
Akola	Amravati	Akola- College of Engg & Technology	151
Jalgaon	Nashik	MIDC Jalgaon	150
Jalna	Aurangabad	Jalna- Krishnadhan seeds Ltd	143
Akola	Amravati	MIDC Water Works	142

Carbon monoxide and Ozone

Partial oxidation of carbon-containing compounds leads to production of CO (Carbon monoxide) and is highly toxic to humans and animals at higher concentrations.IN the year 2012-13, CO was monitored by the CAAQMS at Bandra, Pune and Solapur and recorded The Bandra region consistently exceeded the 8 hourly standard (2mg/m^3) for almost all the months of the year except the month of February and March. More than 74% of the total readings at the Bandra CAAQMS (1087) exceed the 8 hourly standard. This situation is in contrast to the readings recorded in Pune and Solapur where the readings were below the permissible limits, for most of the year. However, at both the places the CO level increased dramatically between February and March where the percentage exceedence was to the tune of 10.8 and 3 percent respectively. Also fluctuations were recorded in December for CO levels at Solapur.

O_3 (Ozone) is a secondary pollutant, formed when NOx and VOCs undergo a photochemical reaction in the atmosphere. People who are active outdoors, especially in hot sunny days are more vulnerable to its harmful impacts. Ozone levels were recorded to be moderately high in Pune whereas Solapur and Bandra stations recorded O_3 levels well below the 8 hourly standard. The Pune stations recorded percent exceedence of about 4.8% while Bandra and Solapur stations registered a percentage exceedence of 0.4 and 0.2 respectively.

Benzene

Benzene (C_6H_6) is a colourless sweet smelling liquid and is generated whenever carbon-rich materials undergo incomplete combustion of aromatic compounds like tobacco, furniture wax, glue paints and so on. Benzene pollution was recorded at 2 CAAQMS, Bandra and Pune. The annual average benzene concentrations were recorded to be 0.85 and 0.73µg/m^3 respectively. The annual average standard for benzene have been set as 5µg/m_3 by CPCB, indicating that the benzene pollution at both the locations were well below the permissible limits. However the highest 8 hour ozone concentration recorded at Bandra and Pune were 1.3 and 225µg/m^3 respectively. Both the stations recorded high benzene concentrations in the month of March, especially the Pune CAAQMS which recorded unusually high level of day time benzene concentrations. A cyclic trend, of night time low and day time high concentrations of benzene was recorded throughout the month of March at Pune. This could be attributed to some renovation and repair work (external painting/road repair) which may have involved usage of chemicals containing benzene ring.

Air Quality Indexing

Quality of air around us has direct implications on our health. The air quality, like weather of a location, can change dynamically within a span of an hour. Hence to convey the information on outdoor air quality in the easiest possible way which could be easily understood by general public, tools such as AQI (Air Quality Index) have been devised. The AQI is useful for reporting daily air quality and to gauge the pollution load. Most of the AQI developed by various agencies are within a range of 0 to 500. An AQI of 100 or below indicates attainment of National Ambient Air Quality Standards. Higher value of AQI indicates high level of pollution.

In terms of AQI (Air Quality Index), on an average all the AAQMS recorded about 56percent for 'Good' Air Quality while' Moderate' and 'Poor' air quality averaged about 27 and 16percent respectively (Figure No. 1).

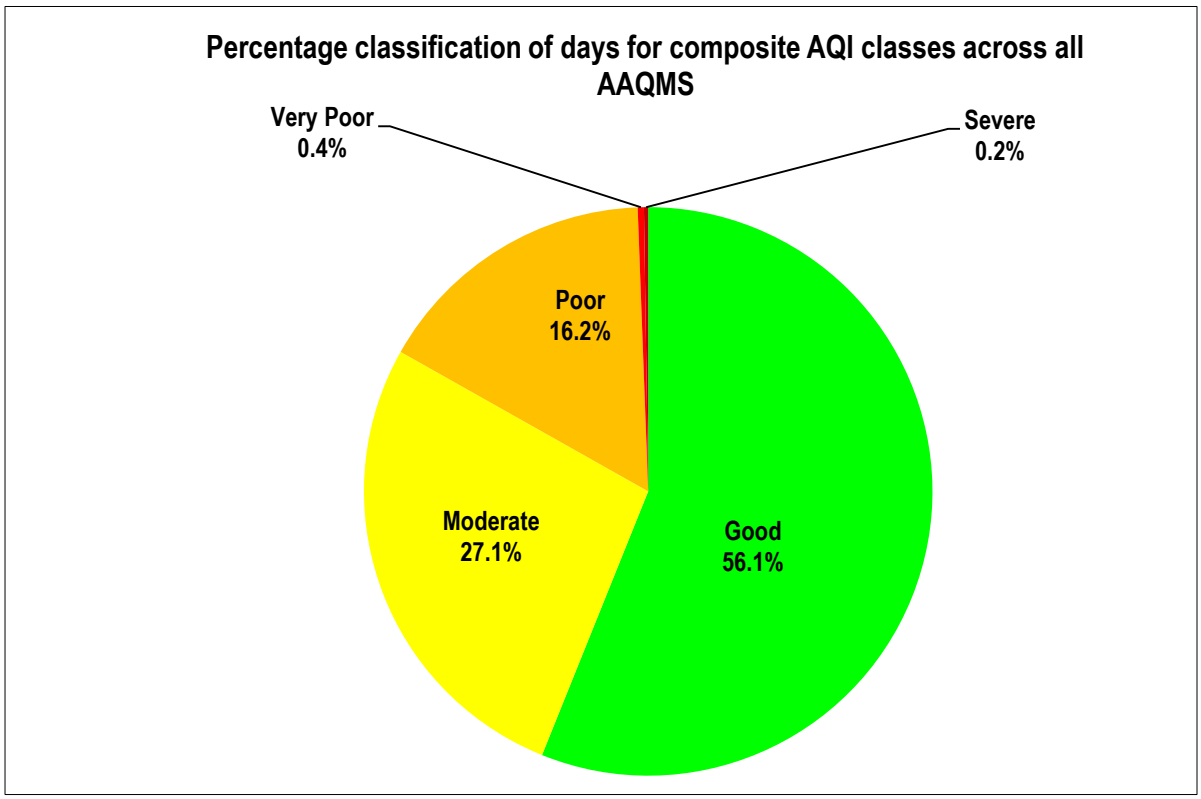


Figure No. 1: Percentage classification of days for composite AQI classes across all AAQMS

The Chandrapur region which recorded high RSPM levels recorded poor and severe Air Quality for most of the readings and it is striking to note that 4 out of 6 AAQMS in Chandrapur, namely Rajura, Ballarshah, Ghuggus, and Tadali MIDC have poor air quality for more than 60% of the times in the year. The situation is even more critical at Rajura and Ghuggus where at certain days the air quality has been recorded to be in the category of very poor and severe. The bias is majorly due to high RSPM levels recorded in the region, since the AQI for SO_2 and NOx levels in the region are well within the acceptable limits and the air quality was recorded to be good for both the parameters (Figure No. 26 and Figure No. 27). The MIDC region in Jalgaon, under Nashik RO failed to have good air quality even for a single day indicating that the air quality is a concern and may severely affect the unhealthy population in the region.

Given the fact that Maharashtra is one of the most urbanized and industrialized states in the country it would be of paramount importance to develop a comprehensive road map which provides specific guidelines necessary to strengthen the existing monitoring network. Also the rapidly developing regions where new infrastructure needs to be set up should be prioritized to establish state of the art, real time monitoring stations across the entire state.

Introduction

Urbanization is a process of relative growth of a country's urban population accompanied by a rapid increase in the economic, political, and cultural importance of cities relative to rural areas. While urbanization is characteristic of nearly all developing countries, levels of urbanization vary quite significantly by region. Transformation of villages to towns and to cities, and then cities into metropolitan regions, is an ongoing process that is highly resource intensive.

Urbanization, in India is on rise. This is evident from the fact that, for the first time since independence, the last decade registered an absolute increase in urban population more than in rural population. The level of urbanization in India has also increased significantly from 27.81% in 2001 to 31.16% in 2011[1]. On one hand, the escalating demands and limited supply for resources like water and energy are creating a severe resource crunch and on the other hand, anthropogenic activities induces stress on the ecosystem due to release of pollutants which leads to undesirable pollution in the environment. Pollution is defined as the introduction of contaminants into the natural environment that causes adverse change to the otherwise normal constituents of natural resources like water, land and air.

The Earth's atmosphere is a layer of gases surrounding the planet that is retained by its gravitational power. This mixture of gases which envelopes the earth is commonly known as Air. The composition of pure air consists majorly of Nitrogen and Oxygen. Other gases like Argon, Carbon-di-oxide, Methane and so on are present in trace amounts. A representative pie chart depicting the composition of natural air, in earth's atmosphere is presented in Figure No. 2: Composition of natural air Figure No. 2.

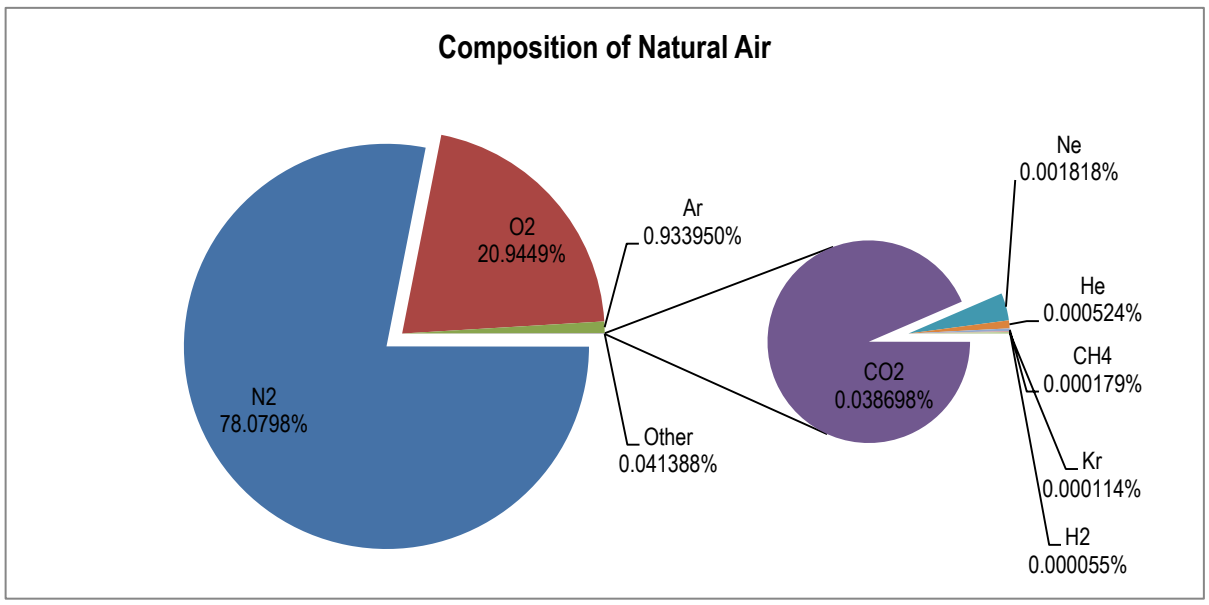


Figure No. 2: Composition of natural air

Data Source: Hand book of Air Pollution, PHS Publication AP-44 (PB 190-247), 1968 [40]

Note: Ar: Argon; CH_4: Methane, CO_2: Carbon-di-oxide; H_2: Hydrogen; He: Helium; Kr: Krypton; N_2: Nitrogen; Ne: Neon; O_2: Oxygen.

[1] http://censusindia.gov.in/2011-prov-results/paper2/data_files/india/Rural_Urban_2011.pdf

Air Pollution

A lot of undesired elements have been added to the natural ambient air's composition especially due to anthropogenic activities involving combustion of fossil fuels. Power plants, industries, automobiles, construction activities and so on emit tonnes of air pollutants every day, thereby deteriorating the air quality and exposing citizens to great health risks. An 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. This change in the composition of pure air is termed as "*Air Pollution*". The source of air pollutants could be both natural as well as anthropogenic. The 6 major air pollutants identified by USEPA (United States Environmental Protection Agency), their anthropogenic source and their effects on human health, is presented below in Table No. 4.

Table No. 4: Major air pollutants, their sources and their effects on humans

Pollutants	Sources	Effects
Nitrogen dioxide (NOx)	Combustion processes (heating, power generation, and vehicles)	• Bronchitis in asthmatic children. • Reduced lung function
Particulate Matter (PM2.5, PM10)	Vehicles, industrial sources, domestic fuel burning, road dust re-suspension,	• Cardiovascular and respiratory diseases, • Lung cancer, • ALRI (Acute Lower Respiratory Infections)
Carbon monoxide (CO)	Incomplete fuel combustion (as in motor vehicles)	• Reduces the oxygen carrying capacity of blood, • Causes headaches, nausea, and dizziness • Can lead to death at high levels
Sulphur dioxide (SO_2)	Burning of sulphur-containing fuels for heating, power & vehicles.	• Affects respiratory system and lung function. Coughing, mucus secretion, asthma and chronic bronchitis. • Causes acid rain.
Lead (Pb)	Petrol and industry (such as smelting, and paint works).	• Affects brain development in children, • At very high doses leads to poisoning, • May lead to brain and organ damage.
Ozone (O_3) Tropospheric	Formed by the reaction of NO_X and (VOCs) in sunlight	• Breathing problems, asthma, reduced lung function.

Challenges and Initiatives in India

As India is developing, the problems associated with pollution are also increasing at a rapid rate. Rapidly growing Indian cities are suffering from some of the worst air quality problems in the world. The major sources responsible for air pollution in India are fuel adulteration, emissions from power plants, transport sector, industrial emissions, combustion of fuel wood & biomass, construction activities, and traffic congestion[2].

Since the 1970s many initiatives have been taken to tackle the issue of air pollution including environmental legislations. To counter the problems associated with air pollution, The Government of India enacted the Air (prevention and control pollution) Act 1981. The act prescribes to combat air pollution by prohibiting the use of polluting fuels and substances as well as appliances that give rise to air pollution. Under this Act, the central government is empowered to take measures necessary to protect and improve the quality of the environment by setting standards for emissions and discharges; regulating the location of industries; management of hazardous wastes, and protection of public health and welfare.

Central Pollution Control Board

The CPCB (Central Pollution Control Board), a statutory organisation, was constituted in September, 1974 under the Water (Prevention and Control of Pollution) Act, 1974. Further, CPCB was entrusted with the powers and functions under the Air (Prevention and Control of Pollution) Act, 1981. The principal function of the CPCB, under the Air (Prevention and Control of Pollution) Act, 1981, is to improve the quality of air and to prevent, control or abate air pollution in the country.

CPCB initiated NAAQM (National Ambient Air Quality Monitoring) programme in the year 1984. Subsequently, expanding the network to have representation of various regions in the country, various stations under the programme were established nationwide. The program was subsequently renamed as NAMP (National Air Quality Monitoring Programme). In the year 2010-11 CPCB was executing NAMP for generating air quality database at 456 air quality motoring stations throughout the nation covering 190 cities in 26 States and 4 union territories[3]. Further, CPCB under the Air (Prevention and Control) Act has set the NAAQS (National Ambient Air Quality Standards) with the following objectives:

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

The revised National Ambient Air Quality Standards were notified on 18 November 2009. A copy of the Gazette is enclosed as **Appendix A.**

[2] "Urban Air Pollution, Catching gasoline and diesel adulteration. The World Bank. 2002
[3] CPCB, 2011-12 *National Ambient Air Quality Status & Trends In India-2010*, Chapter 1 Introduction, pg 3

Maharashtra Pollution Control Board

The Maharashtra State government in 1981 adopted the Water (Prevention and Control of Pollution) Act 1974 and under this MPCB (Maharashtra Pollution Control Board) was established in the year 1981.

MPCB has established 12 regional offices across the state to check and regulate the pollution level with necessary control measures. MPCB implements a range of environmental legislation in the state and functions under the administrative control of Environment Department, Government of Maharashtra.

The main functions of MPCB are:

- To plan comprehensive programs for the prevention, control or abatement of pollution and secure executions thereof,
- To collect and disseminate information relating to pollution and the prevention, control or abatement thereof,
- To inspect sewage or trade effluent treatment and disposal facilities, and air pollution control systems and to review plans, specification or any other data relating to the treatment plants, disposal systems and air pollution control systems in connection with the consent granted,
- To support and encourage developments in the fields of pollution control, waste recycle reuse, eco-friendly practices etc.
- To educate and guide entrepreneurs in improving the environment by suggesting appropriate pollution control technologies and techniques
- To create public awareness about clean and healthy environment and attending to public complaints regarding pollution.

The Air (Prevention &Control of Pollution) Act 1981 was adopted by the state of Maharashtra in 1983 and the MPCB is functioning as the state board under section 5 of this Act. Following which MPCB has taken many initiatives to control, prevent and monitor air quality in the state of Maharashtra.

Being a highly industrialised, populated and urbanized state, Maharashtra has numerous air pollution sources, which has resulted in the deterioration of air quality in many cities. The state has a wide range of major industries involved in polluting activities like power plants, pharmaceuticals, petroleum, and manufacturing of fertilizers. Vehicular growth, construction activities, quarry sites and so on have augmented the deterioration of the air quality.

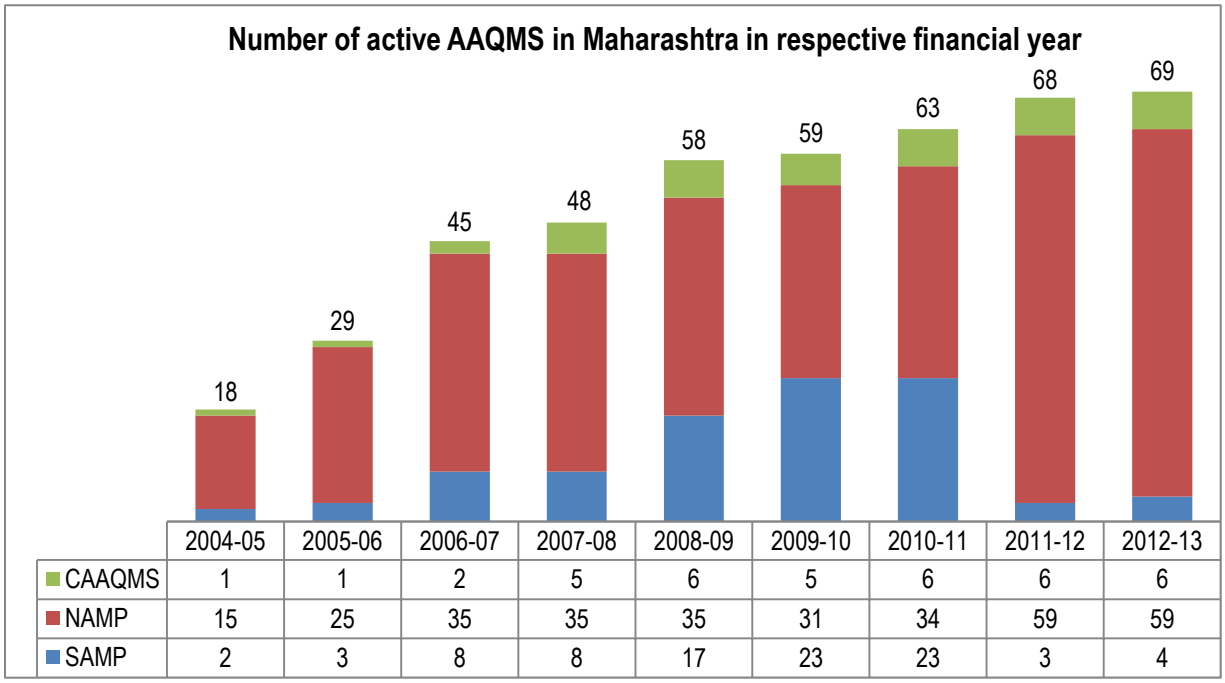
Hence, to keep a constant vigilance on the status of the air quality in the industrial influenced areas like Dombivali, Ambernath, Chandrapur and the exposure to the population in residential areas, MPCB has installed air quality monitoring stations in Maharashtra. The following section presents the highlights of the monitoring and the air quality recorded in the year 2012-13.

Air Quality Monitoring in Maharashtra

Ambient air quality monitoring network is designed to get spatial and temporal variation of ambient air concentrations for a wide range of pollutants that are considered relevant for evolving a strategic management plan. Monitoring locations are selected to represent different land use categories like kerbside, residential, industrial, commercial and so on were selected so as to capture air quality levels under different activity profiles. To have a continuous vigilance of the air quality in the different parts of the state MPCB has installed various AAQMS (Ambient Air Quality Monitoring Stations) in various regions of the state. The following section provides an overview of the status of AAQM (Ambient Air Quality Monitoring) in the year 2012-13.

Monitoring Network

AAQMS are added periodically to expand the network of monitoring stations. However due to operating challenges like maintenance issues, shortage of manpower and change of location, some monitoring stations are closed temporarily and the hence data may be unavailable for a particular station for that spell of time. In the year 2012-13, there were 69 active AAQMS in Maharashtra under CAAQMS (6), NAMP (59) and SAMP (4). Apart from these there are 3 more AAQMS under NAMP, which are regulated and monitored by NEERI (National Environmental Engineering Research Institute). As per data availability each year the corresponding tally of AAQMS is presented below in Figure No. 3.



	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
CAAQMS	1	1	2	5	6	5	6	6	6
NAMP	15	25	35	35	35	31	34	59	59
SAMP	2	3	8	8	17	23	23	3	4

Figure No. 3: Number of active AAQMS in Maharashtra in respective financial year

Data Source: MPCB, 2013

**Note: Data for Worli, Kalbadevi and Parel AAQMS monitored by NEERI has been considered separately for the analysis as per data provided by them.*

Given that Maharashtra has very prominent industrial zones and is one of the highly populated states in the country air quality monitoring becomes essential at these locations. However, owing to the population growth and expansion of the cities the residential areas have now grown so large that they are now located in very close vicinity of the industrial belts. Some examples of the same are the residential areas in Navi Mumbai, Dombivali, Ambernath, where the residential zones are very close to the industrial areas. Hence, in a given region there is a mix of various types of monitoring stations representing various type of areas. MPCB-RO (Regional Office) wise tally of AAQMS operating in the year 2012-13 is presented in Table No. 5. The detailed list of the active stations is presented in Annex-I of this report. The jurisdiction boundaries and the tally of the AAQMS in each RO are presented in Figure No. 4.

Table No. 5: MPCB RO wise tally of active AAQMS (2012-13)

Regional Office	Commercial	Industrial	Residential	Rural & other areas	Sensitive	Total
Amravati	1	2	2	1	-	**6**
Aurangabad	1	3	6	1	-	**11**
Chandrapur	-	3	3	-	-	**6**
Kalyan	2	-	-	3	1	**6**
Kolhapur	-	2	4	2	-	**8**
Mumbai*	-	-	2	-	-	**2**
Nagpur	-	1	2	1	-	**4**
Nashik	-	2	4	-	-	**6**
Navi Mumbai	-	3	3	1	-	**7**
Pune	-	1	6	1	-	**8**
Raigad	-	-	1	-	-	**1**
Thane	-	1	1	1	-	**3**
Total	**4**	**18**	**35**	**11**	**1**	**68**

Data Source: MPCB, 2013

Note: *NEERI Worli AAQMS is under Mumbai but not considered in this tally*

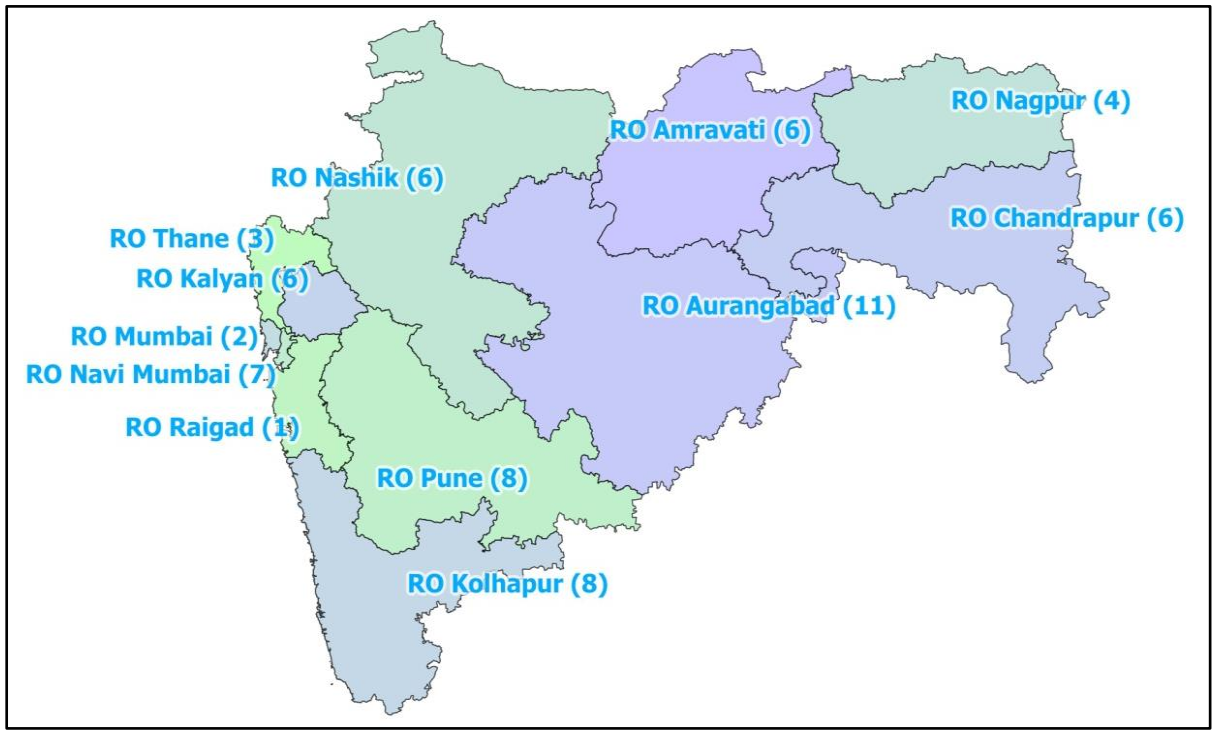


Figure No. 4: Boundaries and tally of AAQMS in each RO of MPCB (2012-13)

Pollutants Monitored

SO_2 (Sulphur Dioxide), NO_X (Nitrogen Oxides) and RSPM (Respirable Suspended Particulate Matter) are regularly and consistently monitored across all the monitoring sites in Maharashtra under NAMP, SAMP and also at the CAAQMS. SPM (Suspended Particulate Matter) are bigger than coarse particles, they settle down fast and do not reach the respiratory tract and therefore they have less adverse effect on health[4]. As a result the standard for SPM have not been set as per revised NAAQS (2009). Although some monitoring stations do record the concentrations of SPM, this has not been considered for the statistical compilation.

Air Quality Monitoring Data

MPCB published the data recorded by all the monitoring sites in Maharashtra on its website. It also presents an interactive way to select the time series data for a particular monitoring station. The data sets recorded at the monitoring station for the year 2012-13 have been compiled in this report. A pollutant wise overview for the air quality recorded at the areas representing residential, industrial, commercial, rural & other areas and sensitive monitoring is presented in the following section.

Monitoring station wise annual trend for the recent 5 years and monthly trend for the year 2012-13 have been presented in Annex – II.

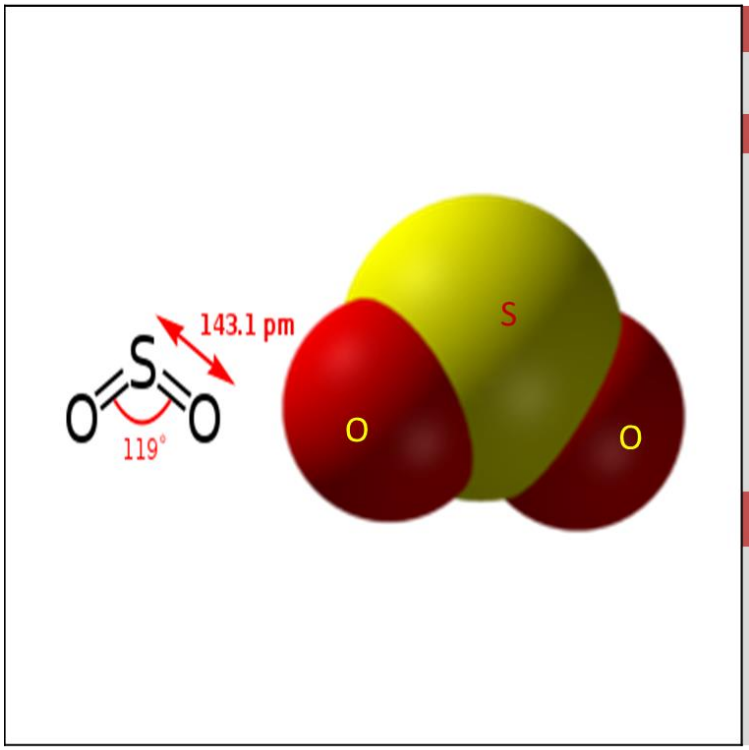
[4] CPCB 2012, *National Ambient Air Quality Status & Trends In India-2010*, Chapter 6, Pg 83

Status of Air Quality

Sulphur dioxide

Sulphur dioxide (SO_2) belongs to a group of highly reactive gases known as "oxides of sulphur". It is a colourless gas and smells like burnt matches. Sulphur compounds are responsible for the major damage to materials and are generally known to accelerate metal corrosion by forming sulphuric acid. The largest sources of SO_2 emissions are from fossil fuel combustion at power plants and other industrial facilities. Smaller sources of SO_2emissions include industrial processes such as extracting metal from ore, and combustion of sulphur containing fuels (diesel) by vehicles. The skeletal structure sources and impacts on humans is presented in Figure No. 5.

SO_2 is linked with a number of adverse effects on the respiratory system. SO_2 is known to increase the airway resistance, and lung diseases. Sulphur oxide in combination with particulate matter and moisture is a potentially serious health hazard and results in increased mortality. Aerosols of sulphuric acid and other sulphates have a share of 5-20% in total suspended particulate matter in urban air and are responsible for the reduction in visibility.



Chemical/ Molecular Formula

SO_2

Sources

- Vehicles, Power plants, Combustion of fossil fuels (fossil fuels such as oil and coal contain sulfur),
- Extraction of metals from sulfide ores.
- Paper industry
- Extraction and distribution of fossil fuel
- Petroleum refining
- Combustion of diesel, Petrol and Natural gas

Harmful Effects

- Affects respiratory system and lung function.
- Coughing, mucus secretion,
- Asthma and chronic bronchitis,
- Causes acid rain.

Figure No. 5: Molecular formula, sources and harmful impacts of Sulphur dioxide

Data Source: IB Chemistry

SO_2 concentration in industrial areas

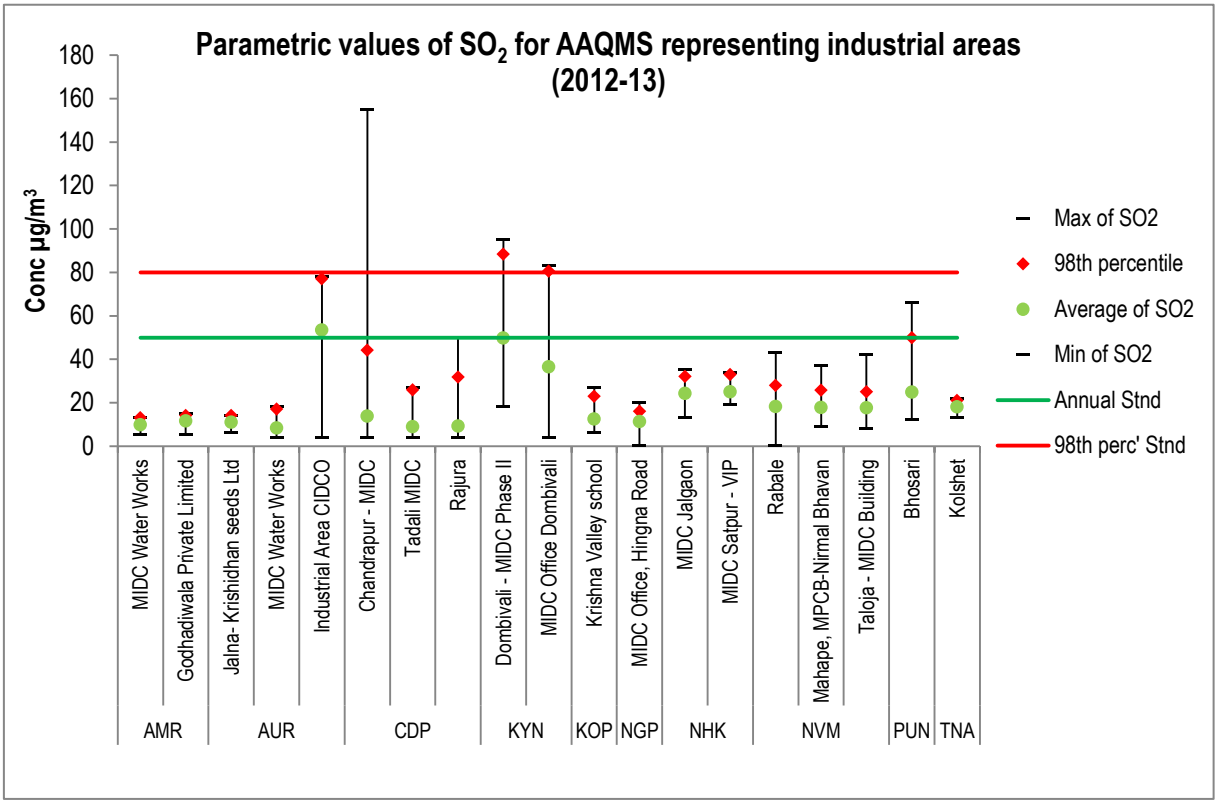


Figure No. 6: Parametric values of SO_2 for AAQMS representing industrial areas (2012-13)

Data Source: MPCB, 2014

As seen in Figure No. 6, out of all the monitoring stations representing industrial areas of Maharashtra, the highest annual average SO_2 concentrations was recorded at Nanded industrial area (53.4µg/m³). Also at various occasions the 24 hours standard was violated as per monitoring done at that AAQMS.

Both the AAQMS representing industrial area of Dombivali, MIDC Phase–II (49.7µg/m³) and MIDC Office (36.5µg/m³) recorded annual SO_2 concentrations very close to the annual standard (50µg/m³), thus indicating high levels of SO_2 pollution in Dombivali area.

The highest 24 hour SO_2 concentration was recorded at Chandrapur MIDC area (155µg/m³), however upon analysing the 98th percentile value (44µg/m³) and the annual average (13.8µg/m³), both were found to be well within the standard.

All the other industrial areas with active AAQMS in the year 2012-13 were found to be clean for SO_2 pollution. The data sets for the parametric values of SO_2 concentrations recorded at AAQMS in industrial areas of Maharashtra have been tabulated in Table No. 6.

Table No. 6: Data for SO_2 recorded at AAQMS representing industrial areas (2012-13)

RO	Monitoring Station	Station Code	Max of SO_2	98th percentile	Average of SO_2	Min of SO_2
	CPCB Standard		*80*	*80*	*50*	*80*
AMR	MIDC Water Works	701	13.0	13.0	9.8	5.0
	Godhadiwala Private Limited	549	15.0	14.0	11.6	5.0
AUR	Jalna- Krishidhan seeds Ltd	707	14.0	14.0	11.0	6.0
	MIDC Water Works	641	18.0	17.0	8.3	4.0
	Industrial Area CIDCO	705	78.0	77.0	**53.4**	4.0
CDP	Chandrapur - MIDC	281	**155.0**	44.2	13.8	4.0
	Tadali MIDC	638	27.0	25.8	8.9	4.0
	Rajura	640	50.0	31.7	9.2	4.0
KYN	Dombivali - MIDC Phase II	-	**95.0**	**88.3**	49.7	18.0
	MIDC Office Dombivali	-	**83.0**	**80.5**	36.5	4.0
KOP	Krishna Valley school	576	27.0	23.0	12.4	6.0
NGP	MIDC Office, Hingna Road	288	20.0	16.0	11.2	0.0
NHK	MIDC Jalgaon	646	35.0	32.0	24.3	13.0
	MIDC Satpur - VIP	269	34.0	33.0	24.9	19.0
NVM	Rabale	491	43.0	28.0	18.2	0.0
	Mahape, MPCB-Nirmal Bhavan	493	37.0	25.7	17.7	9.0
	Taloja - MIDC Building	496	42.0	25.0	17.6	8.0
PUN	Bhosari	312	66.0	49.8	24.9	12.0
TNA	Kolshet	305	22.0	21.0	18.1	13.0

Data Source: MPCB, 2014 **Units: µg/m³**

SO_2 concentration in residential areas

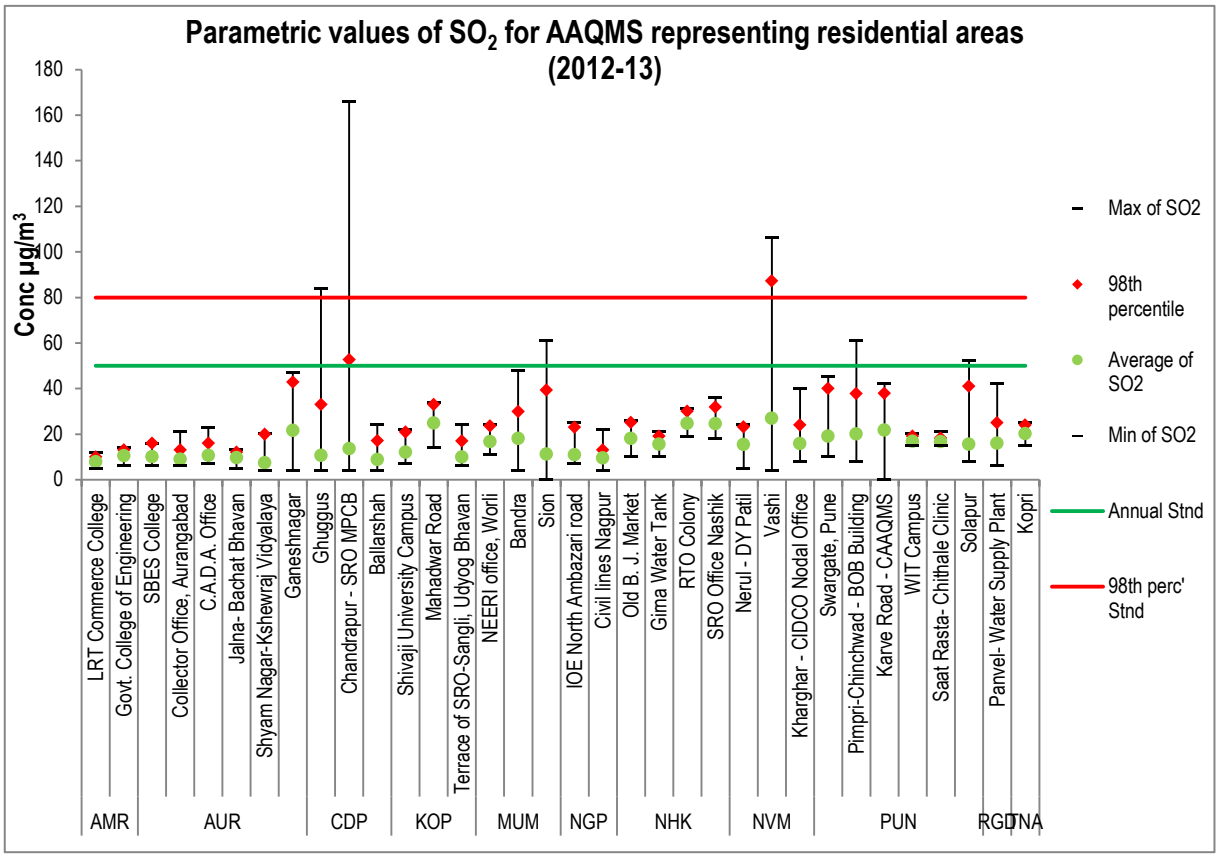


Figure No. 7: Parametric values of SO_2 for AAQMS representing residential areas (2012-13)

Data Source: MPCB, 2014

**Data for NEERI office, Worli is procured from data posted on MPCB's website*

The AAQMS representing residential areas in Maharashtra recorded low levels of SO_2 pollution in the year 2012-13.

Although the annual average SO_2 concentration recorded at the CAAQMS at Vashi in Navi Mumbai (27µg/m^3) didn't violate the annual standard, on numerous occasions the AAQMS recorded violation of the 24 hour standard. The 98th percentile concentration recorded at the same AAQMS was 87.2µg/m^3 which exceeds the 24hour standard (80µg/m^3) indicating certain days in the year with unacceptable SO_2 pollution in the region.

Similarly the highest 24 hour SO_2 concentration was recorded by the AAQMS located at Chandrapur–SRO office (166µg/m^3). However, the 98th percentile and annual average readings were recorded well below the respective standard. This indicates sporadic influx of SO_2 pollutant or a monitoring bias for a given day/sampling period.

Similar to the previous year 2011-12, the residential areas of Amravati and Aurangabad regions were the cleanest in terms of SO_2 pollution.

Table No. 7: Data for SO_2 recorded at AAQMS representing residential areas (2012-13)

RO	Monitoring Station	Station Code	Max of SO_2	98th percentile	Average of SO_2	Min of SO_2
	CPCB Standard		*80*	*80*	*50*	*80*
AMR	LRT Commerce College	700	12.0	10.0	7.8	5.0
	Govt. College of Engineering	548	14.0	13.0	10.5	6.0
AUR	SBES College	511	16.0	16.0	10.1	6.0
	Collector Office, Aurangabad	512	21.0	13.0	8.9	6.0
	C.A.D.A. Office	513	23.0	16.0	10.6	7.0
	Jalna- Bachat Bhavan	706	13.0	12.0	9.6	5.0
	Shyam Nagar-Kshewraj Vidyalaya	642	20.0	19.9	7.4	4.0
	Ganeshnagar	703	47.0	42.8	21.6	4.0
CDP	Ghuggus	267	**84.0**	32.9	10.6	4.0
	Chandrapur - SRO MPCB	396	**166.0**	52.6	13.5	4.0
	Ballarshah	639	24.0	17.1	8.8	4.0
KOP	Shivaji University Campus	508	22.0	20.9	12.0	7.0
	Mahadwar Road	510	34.0	33.0	24.9	14.0
	Terrace of SRO-Sangli, Udyog Bhavan	574	24.0	16.9	9.9	6.0
MUM	Neeri office, Worli	349	24.0	23.6	16.6	11.0
	Bandra	(blank)	48.0	29.9	18.1	4.0
	Sion		61.0	39.2	11.2	0.0
NGP	IOE North Ambazari road	287	25.0	22.9	10.9	7.0
	Civil lines Nagpur	711	22.0	13.0	9.5	4.0
NHK	Old B. J. Market	644	26.0	25.0	18.1	10.0
	Girna Water Tank	645	21.0	19.0	15.6	10.0
	RTO Colony	259	31.0	30.0	24.7	19.0
	SRO Office Nashik	710	36.0	31.8	24.5	18.0
NVM	Nerul - DY Patil	492	24.0	23.1	15.4	5.0
	Vashi	(blank)	**106.0**	**87.2**	27.0	4.0
	Kharghar - CIDCO Nodal Office	494	40.0	24.0	15.8	8.0
PUN	Swargate, Pune	381	45.0	39.9	19.0	10.0
	Pimpri-Chinchwad - BOB Building	708	61.0	37.7	20.0	8.0
	Karve Road - CAAQMS	(blank)	42.0	37.8	21.7	0.0
	WIT Campus	299	20.0	19.0	16.8	15.0
	Saat Rasta- Chithale Clinic	300	21.0	18.2	16.7	15.0
	Solapur	(blank)	52.0	41.0	15.6	8.0
RGD	Panvel- Water Supply Plant	495	42.0	25.0	16.0	6.0
TNA	Kopri	303	25.0	24.0	20.2	15.0

Data Source: MPCB, 2014 **Units: µg/m³**

SO_2 concentration in rural and other areas

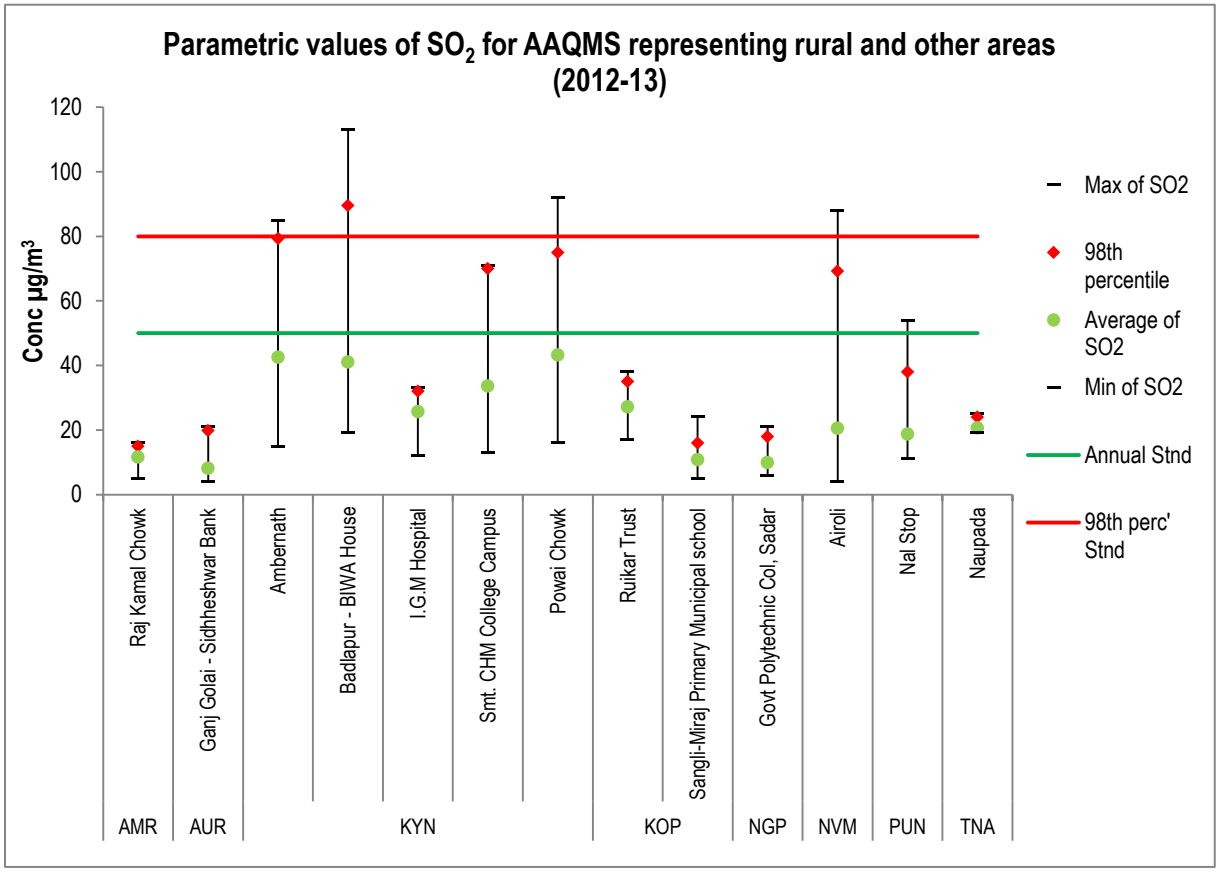


Figure No. 8: Parametric values of SO_2 for AAQMS representing rural and other areas (2012-13)

Data Source: MPCB, 2014

**Note: I.G.M Hospital is categorized as a sensitive type of monitoring zone by MPCB*

The AAQMS which represented mixed and other areas in Maharashtra recorded SO_2 concentrations well within the prescribed standard.

However, as seen in Figure No. 8, three monitoring stations in the Kalyan region (Bhiwandi, Badlapur and Ulhasnagar) recorded annual average SO_2 concentrations very close to the annual average standard. On certain days, the maximum as well as the 98th percentile reading recorded at the AAQMS at Badlapur (BIWA house) and Ambernath exceeded the daily standard (80µg/m^3). This indicates that these areas need further investigation.

Amravati, Aurangabad, Kolhapur and Nagpur were amongst the regions which recorded least SO_2 concentrations.

Table No. 8: Data for SO_2 recorded at AAQMS representing rural & other types of areas (2012-13)

RO	Monitoring Station	Station Code	Max of SO_2	98th percentile	Average of SO_2	Min of SO_2
	CPCB Standard		*80*	*80*	*50*	*80*
AMR	Raj Kamal Chowk	547	16.0	15.0	11.6	5.0
AUR	Ganj Golai - Sidhheshwar Bank	643	21.0	19.9	8.1	4.0
KYN	Ambernath	(blank)	**85.0**	79.4	42.5	15.0
	Badlapur - BIWA House	649	**113.0**	**89.5**	41.0	19.0
	I.G.M Hospital	(blank)	33.0	32.0	25.7	12.0
	Smt. CHM College Campus	647	71.0	70.0	33.6	13.0
	Powai Chowk	648	**92.0**	75.0	43.2	16.0
KOP	Ruikar Trust	509	38.0	35.0	27.2	17.0
	Sangli-Miraj Primary Municipal school	575	24.0	16.0	10.9	5.0
NGP	Govt Polytechnic Col, Sadar	314	21.0	18.0	9.9	6.0
NVM	Airoli	(blank)	**88.0**	69.2	20.6	4.0
PUN	Nal Stop	379	54.0	38.0	18.7	11.0
TNA	Naupada	304	25.0	24.0	20.6	19.0

Data Source: MPCB, 2014 **Units: µg/m³**

SO_2 concentration in commercial areas

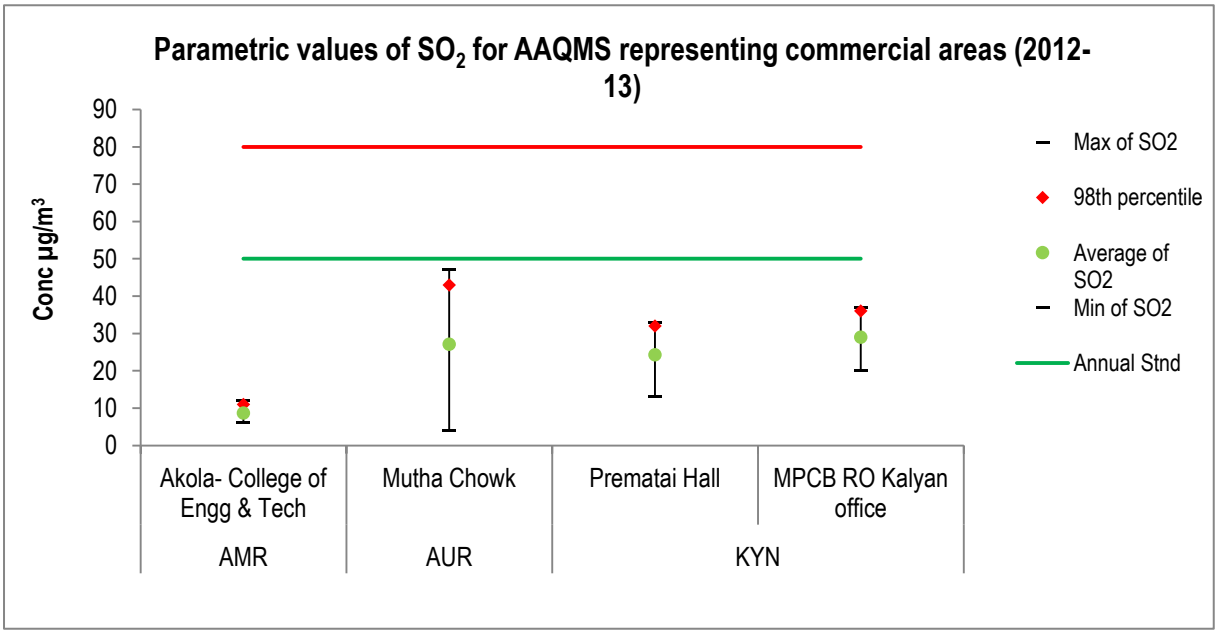


Figure No. 9: Parametric values of SO_2 for AAQMS representing commercial areas (2012-13)

Data Source: MPCB, 2014

Air quality monitored in areas representing commercial areas was amongst the cleanest in terms of SO_2 pollution. All the AAQMS recorded SO_2 concentrations of almost less than half of the annual standard. The maximum SO_2 concentration of 47µg/m³ was recorded at Mutha Chowk in Aurangabad. Amravati region recorded the best annual statistics for SO_2 concentrations with all the readings being below 12µg/m³.

Table No. 9: Data for SO_2 recorded at AAQMS representing commercial areas (2012-13)

RO	Monitoring Station	Station Code	Max of SO_2	98th percentile	Average of SO_2	Min of SO_2
	CPCB Standard		*80*	*80*	*50*	*80*
AMR	Akola- College of Engg & Tech	702	12.0	11.0	8.7	6.0
AUR	Mutha Chowk	704	47.0	42.9	27.1	4.0
KYN	Prematai Hall	(blank)	33.0	32.0	24.2	13.0
	MPCB RO Kalyan office	(blank)	37.0	36.0	29.0	20.0

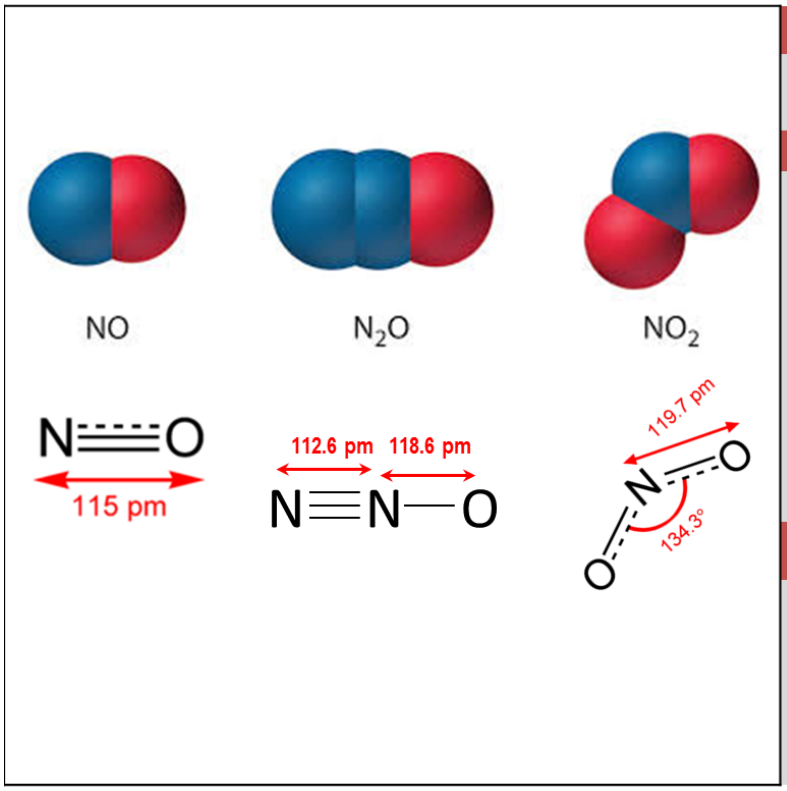
Data Source: MPCB, 2014 **Units: µg/m³**

Oxides of Nitrogen

The oxides of nitrogen, NO (Nitric Oxide) and NO_2 (nitrogen dioxide) are significant air pollutants. Neither NO nor NO_2 causes direct damage to materials; however, NO_2 reacts with atmospheric moisture to form nitric acid, which causes considerable corrosion of metal surfaces. NO_2 acts as an acute irritant and is more injurious than NO. The skeletal structure, their significant sources and impacts are presented below in Figure No. 10.

In the presence of sunlight the oxides of nitrogen react with the unburned hydrocarbons to form photochemical smog which causes damage to plants and is also detrimental to human health. NO_2 is linked with a number of adverse effects on the respiratory system. Further it is also known to contribute to the formation of ground-level ozone and fine particle pollution.

Oxides of nitrogen are produced from the reaction of nitrogen and oxygen gases in the air during combustion, especially at high temperatures. In areas of high motor vehicle traffic, such as in large cities, the amount of nitrogen oxides emitted into the atmosphere as air pollution can be significant.



Chemical/ Molecular Formula

NO_x

Sources

- Combustion processes (heating, power generation, and vehicles)
- Paper industry
- Extraction and distribution of fossil fuel
- Smelting of Metals
- Petroleum refining
- Combustion of diesel, Petrol and Natural gas

Harmful Effects

- Bronchitis in asthmatic children
- Reduced lung function
- Visibility impairment
- Aggravates existing heart and lung disease

Figure No. 10: Molecular formula, sources and harmful impacts of oxides of nitrogen

Data Source: UC Davis

NO_X concentration in industrial areas

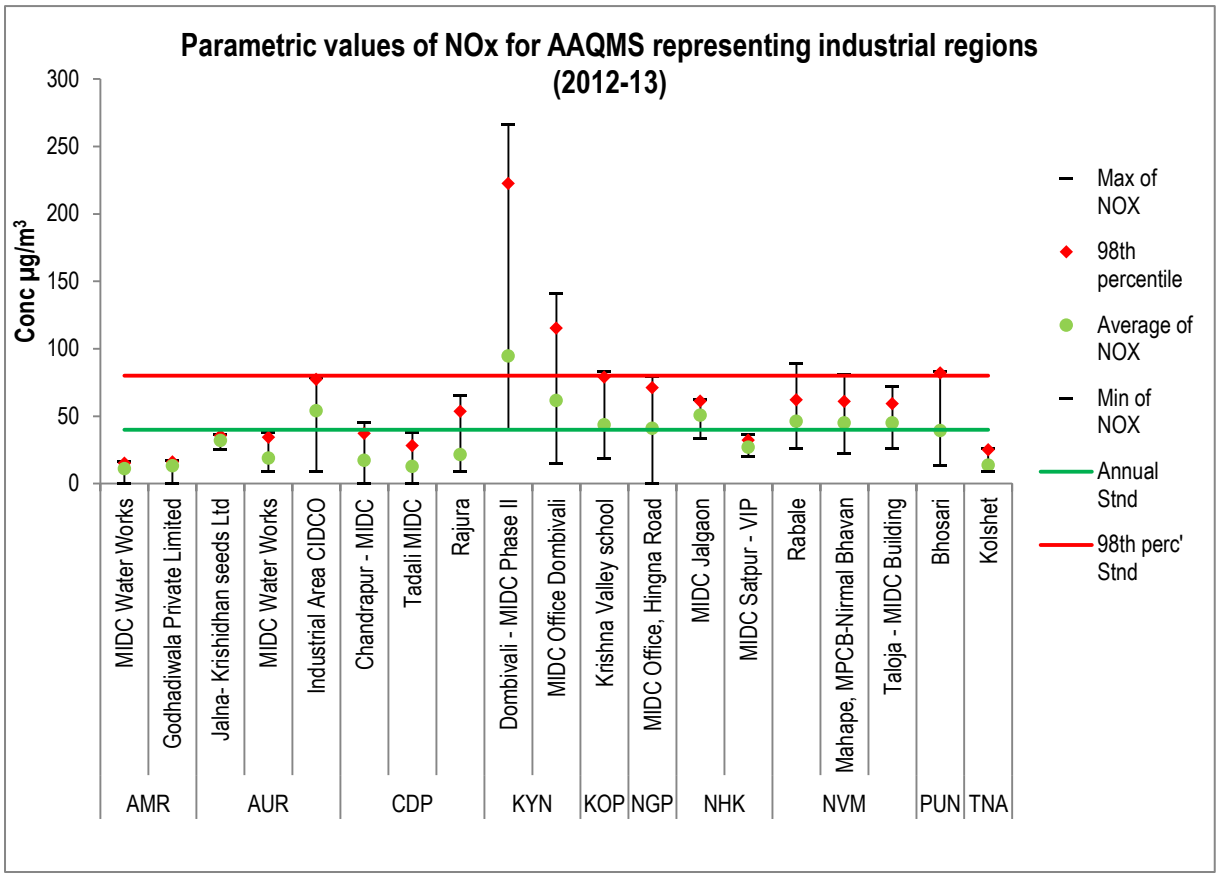


Figure No. 11: Parametric values of NO_X for AAQMS representing industrial regions (2012-13)

Data Source: MPCB, 2014

One may note from Figure No. 11, that a total 9 out of 19 AAQMS representing industrial areas of Maharashtra exceeded the annual average NO_X standard (40µg/m³).

Dombivali-MIDC area recorded the highest annual NO_X concentration at both the monitoring stations, MIDC Phase-II (94.4µg/m³) and MIDC office (64.4µg/m³), representing the area. The AAQMS at MIDC Phase II also recorded a 24 hour reading for NO_X concentrations (266µg/m³) more than three times the standard. Similarly Navi Mumbai industrial best also recorded high levels of NOX concentration at all its three AAQMS.

The AAQMS at MIDC Jalgaon is of major concern for NO_X pollution since the maximum and annual average NO_X concentration ranged between 62 to 50.7µg/m³ indicating a very narrow range in the NO_X concentrations and high level of NO_X pollution throughout the year. Similarly Nanded industrial area also recorded readings more than the annual average 53.8µg/m³.

Industrial areas of Amravati, Aurangabad and Chandrapur were recorded clean in regard to NO_X pollution.

Table No. 10: Data for NO_x recorded at AAQMS representing commercial areas (2012-13)

RO	Monitoring Station	Station Code	Max of NO_X	98th percentile	Average of NO_X	Min of NO_X
	CPCB Standard		*80*	*80*	*40*	*80*
AMR	MIDC Water Works	701	16.0	15.0	11.0	0.0
	Godhadiwala Private Limited	549	17.0	16.0	13.1	0.0
AUR	Jalna- Krishidhan seeds Ltd	707	36.0	35.3	31.9	25.0
	MIDC Water Works	641	38.0	34.1	18.6	9.0
	Industrial Area CIDCO	705	78.0	77.0	**53.8**	9.0
CDP	Chandrapur - MIDC	281	45.0	37.1	17.2	0.0
	Tadali MIDC	638	38.0	27.9	12.6	0.0
	Rajura	640	65.0	53.5	21.4	9.0
KYN	Dombivali - MIDC Phase II	(blank)	**266.0**	**222.3**	**94.4**	40.0
	MIDC Office Dombivali		**141.0**	**115.0**	**61.4**	15.0
KOP	Krishna Valley school	576	**83.0**	78.9	**43.3**	18.0
NGP	MIDC Office, Hingna Road	288	79.0	71.0	**40.7**	0.0
NHK	MIDC Jalgaon	646	62.0	61.0	**50.7**	33.0
	MIDC Satpur - VIP	269	36.0	32.0	26.9	20.0
NVM	Rabale	491	**89.0**	62.0	**46.0**	26.0
	Mahape, MPCB-Nirmal Bhavan	493	**81.0**	60.7	**44.9**	22.0
	Taloja - MIDC Building	496	72.0	59.0	**44.8**	26.0
PUN	Bhosari	312	**83.0**	**81.9**	39.2	13.0
TNA	Kolshet	305	26.0	25.0	13.5	9.0

Data Source: MPCB, 2014 **Units: µg/m³**

NO_X concentration in residential areas

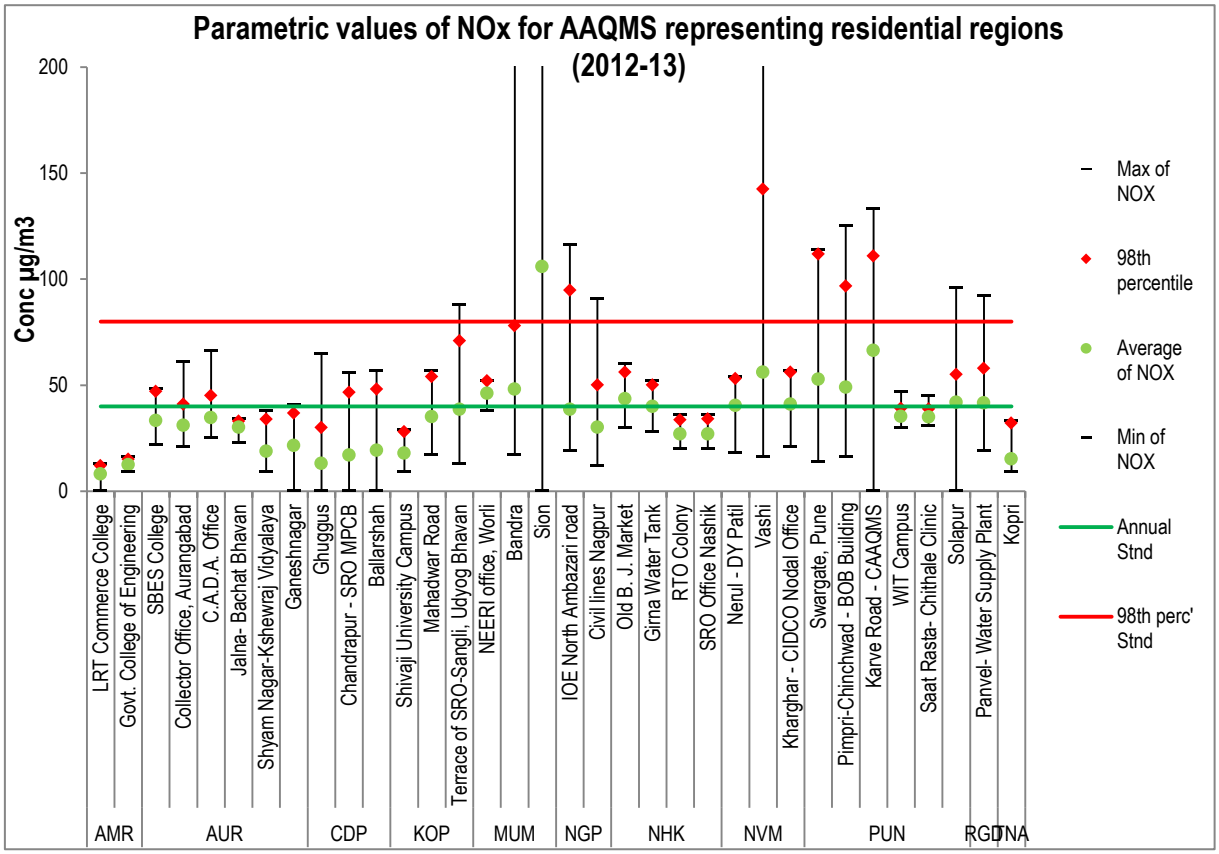


Figure No. 12: Parametric values of NOx for AAQMS representing residential regions (2012-13)

Data Source: MPCB, 2014

**Data for NEERI office, Worli is procured from data posted on MPCB's website*

13 out of 34 monitoring stations (Figure No. 12) representing residential areas exceeded the annual average NOx concentrations. The AAQMS at Sion (Mumbai), recorded the highest annual concentration of NO_X (105.9µg/m³), violating the standard by more than 2.5 times. Also the monitoring at Bandra (Mumbai), which is located at a traffic junction recorded annual NOx levels of 48µg/m³.

All the monitoring stations in Navi Mumbai and 4 out of 6 AAQMS in Pune exceeded the annual NOx standard. These areas have dense vehicular population and also the monitoring is located close to highways and busy streets which influence the NO_X levels in those regions.

Residential areas in Amravati, Aurangabad, Nagpur and Thane region were the best performing regions in terms of NO_X pollution and recorded the least annual average concentrations of NO_X.

Table No. 11: Data for NO_x recorded at AAQMS representing residential areas (2012-13)

RO	Monitoring Station	Station Code	Max of NO_X	98th percentile	Average of NO_X	Min of NO_X
	CPCB Standard		*80*	*80*	*40*	*80*
AMR	LRT Commerce College	700	13.0	12.0	8.0	0.0
	Govt. College of Engineering	548	16.0	15.0	12.5	9.0
AUR	SBES College	511	48.0	47.0	33.3	22.0
	Collector Office, Aurangabad	512	61.0	41.0	31.0	21.0
	C.A.D.A. Office	513	66.0	45.0	34.7	25.0
	Jalna- Bachat Bhavan	706	34.0	33.0	30.1	23.0
	Shyam Nagar-Kshewraj Vidyalaya	642	38.0	33.9	18.8	9.0
	Ganeshnagar	703	41.0	36.8	21.4	0.0
CDP	Ghuggus	267	65.0	30.0	13.0	0.0
	Chandrapur - SRO MPCB	396	56.0	46.6	17.0	0.0
	Ballarshah	639	57.0	48.0	19.3	0.0
KOP	Shivaji University Campus	508	29.0	27.9	17.9	9.0
	Mahadwar Road	510	57.0	54.0	35.1	17.0
	Terrace of SRO-Sangli, Udyog Bhavan	574	**88.0**	70.8	38.5	13.0
MUM	NEERI office, Worli	349	52.0	52.0	**46.1**	38.0
	Bandra	(blank)	**312.0**	77.9	**48.0**	17.0
	Sion		**269.0**	**207.5**	**105.9**	0.0
NGP	IOE North Ambazari road	287	**116.0**	**94.8**	38.5	19.0
	Civil lines Nagpur	711	**91.0**	50.0	30.1	12.0
NHK	Old B. J. Market	644	60.0	56.0	**43.6**	30.0
	Girna Water Tank	645	52.0	50.0	**40.0**	28.0
	RTO Colony	259	36.0	33.5	26.9	20.0
	SRO Office Nashik	710	36.0	34.0	26.9	20.0
NVM	Nerul - DY Patil	492	54.0	53.0	**40.3**	18.0
	Vashi	(blank)	**290.0**	**142.4**	**56.1**	16.0
	Kharghar - CIDCO Nodal Office	494	57.0	56.0	**41.0**	21.0
PUN	Swargate, Pune	381	**114.0**	**111.8**	**52.8**	14.0
	Pimpri-Chinchwad - BOB Building	708	**125.**0	**96.7**	**49.0**	16.0
	Karve Road - CAAQMS	(blank)	**133.**0	**110.8**	**66.3**	0.0
	WIT Campus	299	47.0	39.0	35.2	30.0
	Saat Rasta- Chithale Clinic	300	45.0	38.7	34.9	31.0
	Solapur	(blank)	**96.0**	55.0	**41.8**	0.0
RGD	Panvel- Water Supply Plant	495	**92.0**	57.9	**41.6**	19.0
TNA	Kopri	303	33.0	32.0	15.2	9.0

Data Source: MPCB, 2014 **Units: µg/m³**

NO_X concentration in rural and other areas

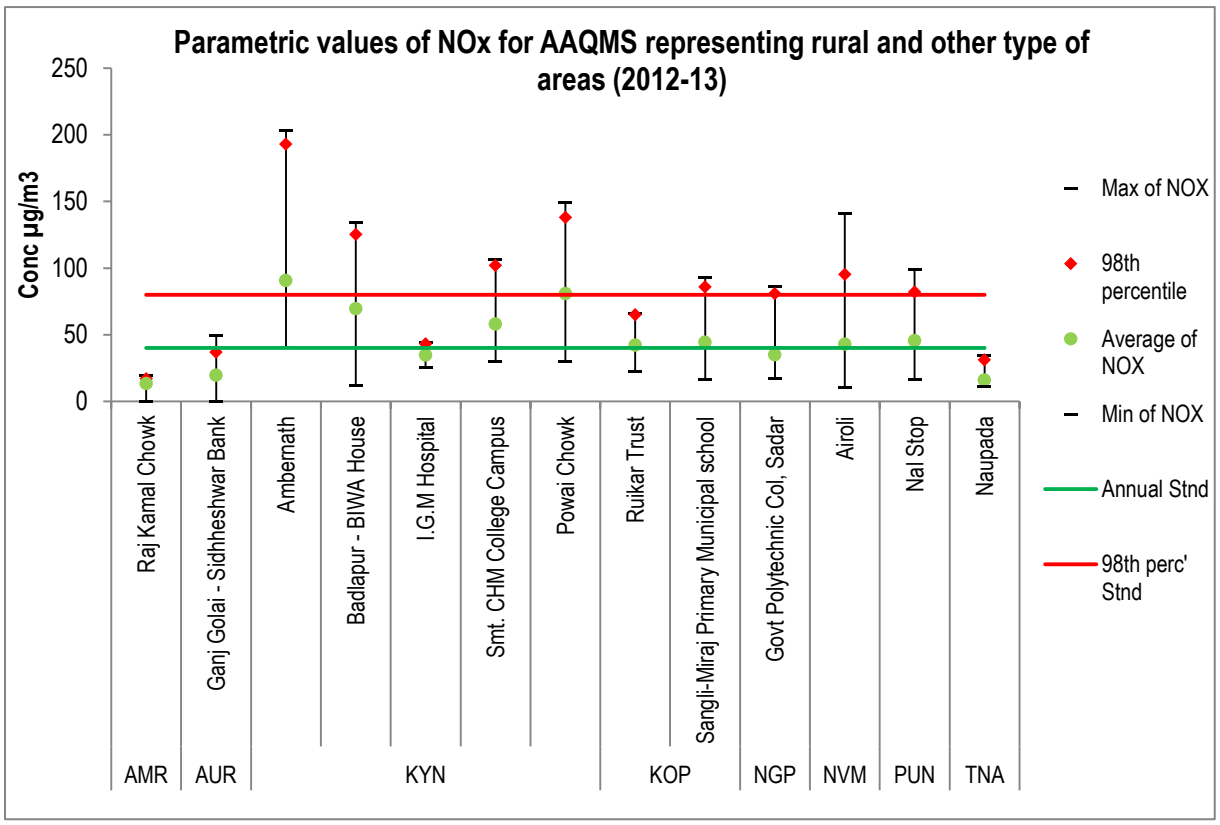


Figure No. 13: Parametric values of NOx for AAQMS representing rural and other type of areas (2012-13)

Data Source: MPCB, 2014

**Note: I.G.M Hospital is categorized as a sensitive type of monitoring zone by MPCB*

Out of all the active monitoring stations representing rural or other typeof areas Kalyan, Pune and Navi-Mumbai regions exceeded the NOx standard.

Ambernth, Badlapur and Ulhasnagar area under Kalyan RO of MPCB, recorded annual NOx concentrations of 90.7, 69.5 and 58µg/m^3 respectively. These areas are industrially influenced and also the vehicular population in these areas has increased in the past few years. The peak 24 hour reading at Ambernath monitoring was recorded to be 203µg/m^3 followed by monitoring at Ulhasnagar (Powai Chowk) with maximum 24 hour NO_X concentration of 149µg/m^3.

Pune (Nal-Stop) and Navi Mumbai (Airoli) recorded 42.8 and 45.4µg/m^3 of annual NOx levels which is very close to the annual standard (40µg/m^3). Thane, Aurangabad, Nagpur and Kolhapur recorded NO_X concentration well within the standard. Raj Kamal Chowk AAQMS at Amravati recorded the least annual average NO_X concentration of 13.4µg/m^3 among the stations representing rural and other type of areas.

Table No. 12: Data for NO_x recorded at AAQMS representing rural and other type of areas (2012-13)

RO	Monitoring Station	Station Code	Max of NO_X	98th percentile	Average of NO_X	Min of NO_X
	CPCB Standard		*80*	*80*	*40*	*80*
AMR	Raj Kamal Chowk	547	19.0	17.0	13.4	0.0
AUR	Ganj Golai - Sidhheshwar Bank	643	49.0	36.9	19.7	0.0
KYN	Ambernath	(blank)	**203.0**	**193.0**	**90.7**	40.0
	Badlapur - BIWA House	649	**134.0**	**125.3**	**69.5**	12.0
	I.G.M Hospital	(blank)	44.0	43.0	34.6	25.0
	Smt. CHM College Campus	647	**106.0**	**102.0**	**58.0**	30.0
	Powai Chowk	648	**149.0**	**138.0**	**80.8**	30.0
KOP	Ruikar Trust	509	66.0	65.0	**42.1**	22.0
	Sangli-Miraj Primary Municipal school	575	**93.0**	**86.0**	**44.4**	16.0
NGP	Govt Polytechnic Col, Sadar	314	**86.0**	**80.8**	34.9	17.0
NVM	Airoli	(blank)	**141.0**	**95.2**	**42.8**	10.0
PUN	Nal Stop	379	**99.0**	**82.0**	**45.4**	16.0
TNA	Naupada	304	34.0	31.0	16.0	11.0

Data Source: MPCB, 2014 **Units: µg/m³**

NO_X concentration in commercial areas

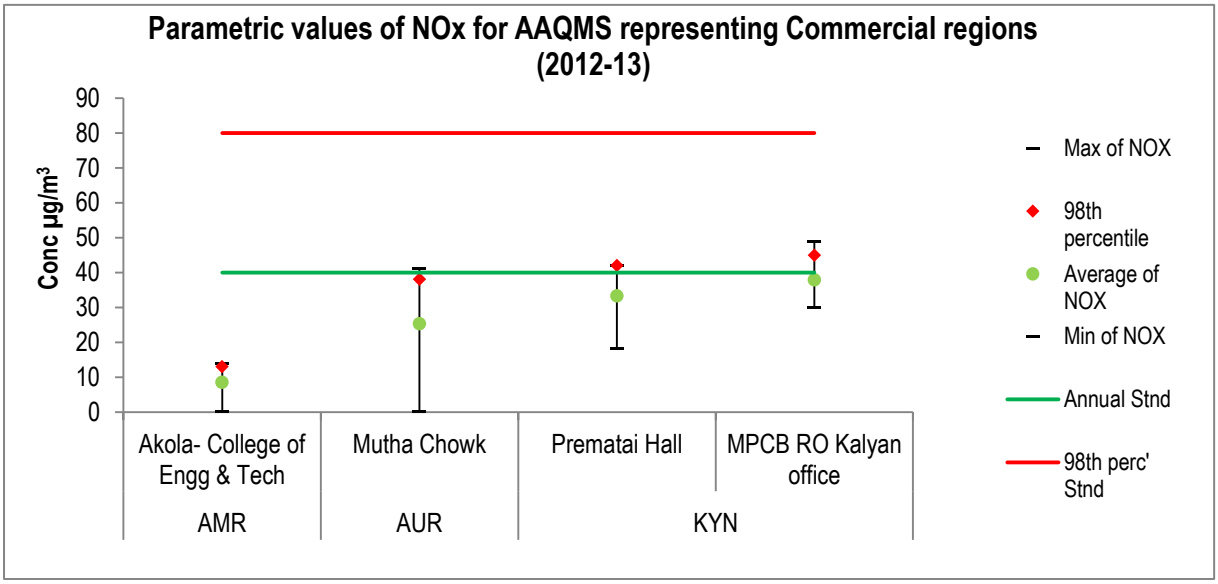


Figure No. 14: Parametric values of NOx for AAQMS representing Commercial regions (2012-13)

Data Source: MPCB, 2014

As seen in Figure No. 14, all the AAQMS representing commercial areas recorded NOx levels well below acceptable limits for annual and daily standard. Although the AAQMS at MPCB office at Kalyan, recorded the highest NO_X value of 49µg/m³ the annual average was under 38µg/m³. AAQMS at Amravati recorded the lowest annual NOx concentrations of 8.4µg/m³.

Table No. 13: Data for NO_x recorded at AAQMS representing commercial areas (2012-13)

RO	Monitoring Station	Station Code	Max of NO_X	98th percentile	Average of NO_X	Min of NO_X
	CPCB Standard		*80*	*80*	*40*	*80*
AMR	Akola- College of Engg & Tech	702	14.0	13.0	8.4	0.0
AUR	Mutha Chowk	704	41.0	38.0	25.3	0.0
KYN	Prematai Hall	(blank)	42.0	42.0	33.2	18.0
	MPCB RO Kalyan office	(blank)	49.0	45.0	37.8	30.0

Data Source: MPCB, 2014 **Units: µg/m³**

Respirable Suspended Particulate Matter (RSPM)

Particulate Matter is a complex mixture of fine particles and aerosols, and is also known as particle pollution. It is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and dust particles. Particles that are 10 micrometers in diameter or smaller can pass through the throat and nose and enter the lungs and are commonly referred to as RSPM (Respirable Suspended Particulate Matter). They are even smaller than human hair follicle and fine sand particles (Figure No. 15). Once inhaled, these particles can affect the heart and lungs and cause serious health effects.

Various studies prove the relationship of high PM and respiratory problems. Statistical analysis of data indicate a relationship between increase in particulate concentration and rise in the number of hospital visits for upper respiratory infections, cardiac diseases, bronchitis, asthma, pneumonia, emphysema and so on. Studies also indicate that much of the PM in the atmosphere is carcinogenic in nature. In some cases it has been observed that exposure to particulate matter in combination with other pollutants such as SO_2 produces more severe health deterioration than exposure to each pollutant separately.

Several specific substances which are constituents of PM have been observed to cause some damage to plants and vegetation. Particles containing fluorides appear to cause plant damage, and magnesium oxide falling on agricultural soils has been seen to cause poor plant growth. PM affects the visibility in a region. Due to absorption and scattering of light by airborne particulates, the visibility tends to reduce. PM can affect painted surfaces, clothing, and curtains just by settling on them. Also, PM is known to cause direct chemical damage by corrosion.

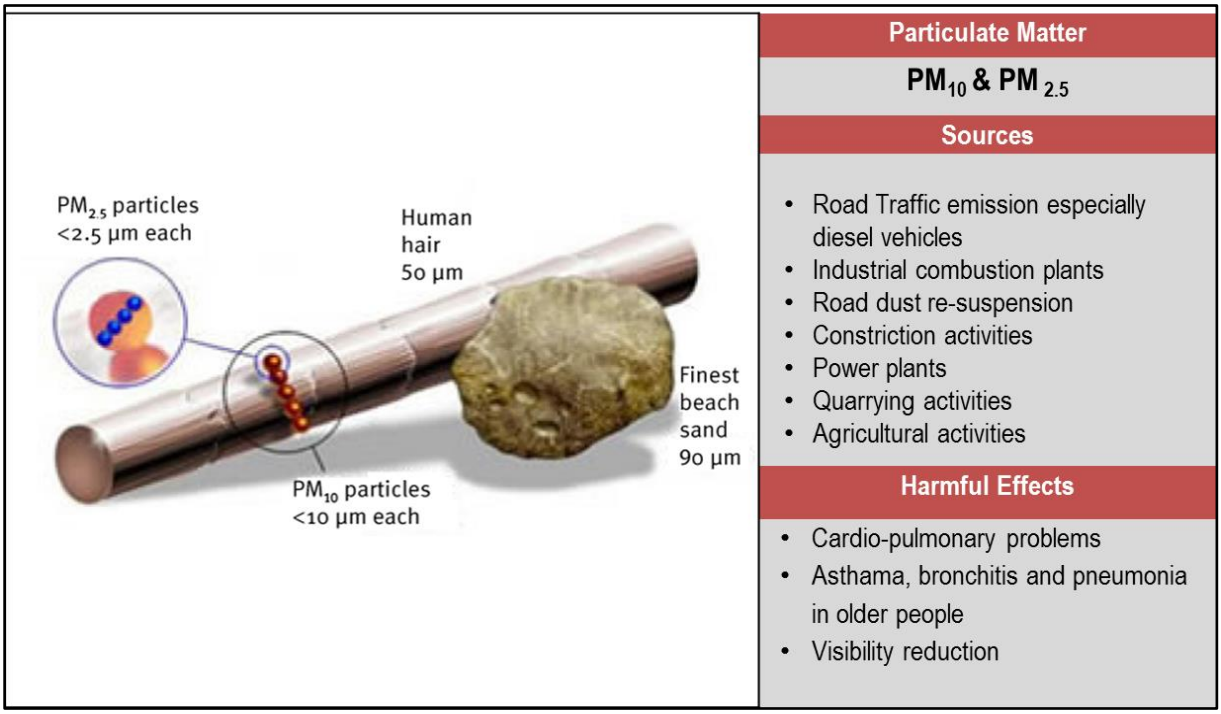


Figure No. 15: Size difference between $PM_{2.5}$ and PM_{10}, their sources and harmful impacts of Particulate Matter

Data Source: Parivesh ENVIS, CPCB

RSPM concentrations in industrial areas

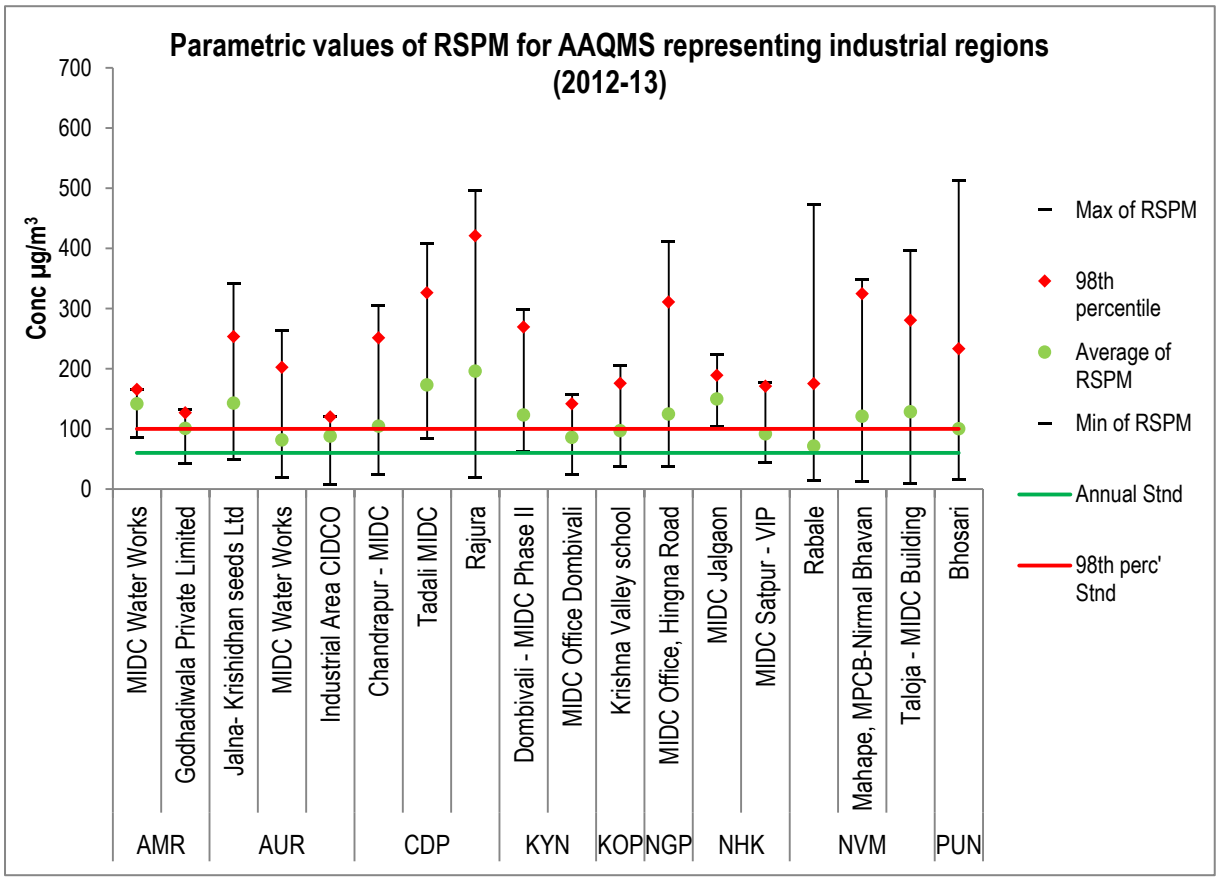


Figure No. 16: Parametric values of RSPM for AAQMS representing industrial regions (2012-13)

Data Source: MPCB, 2014

High concentration of RSPM has always been a concern for the state. In the year 2012-13, all the industrial areas were recorded with RSPM levels higher than the annual standard.

The Rajura and the Tadali industrial areas of Chandrapur region recorded annual RSPM concentrations of 196.1 and 173µg/m³ respectively, the highest among all the industrial areas in Maharashtra. The high RSPM levels in the area could be attributed to the coal mining activity and cement manufacturing companies in Rajura industrial for the. As seen in Figure No. 16, Rajura MIDC also recorded the highest 24 hour and the 98th percentile concentration of RSPM above 400µg/m³, which was more than 4 times the daily standard (100µg/m³).

The industrial area at Amravati recorded a very narrow range between its highest (166µg/m³) and annual average (141µg/m³), indicating that more than 50% of the observations violated the standard and demands immediate attention and action. A major concern may be noted for MIDC Jalgaon, since even the minimum 24 hour reading recorded here (104µg/m³) exceeded the annual standard.

Table No. 14: Data for RSPM recorded at AAQMS representing industrial areas (2012-13)

RO	Monitoring Station	Station Code	Max of RSPM	98th percentile	Average of RSPM	Min of RSPM
	CPCB Standard		*100*	*100*	*60*	*100*
AMR	MIDC Water Works	701	166.0	165.8	141.6	86.0
	Godhadiwala Private Limited	549	132.0	126.7	100.8	43.0
AUR	Jalna- Krishidhan seeds Ltd	707	342.0	253.4	142.7	50.0
	MIDC Water Works	641	264.0	202.5	81.9	20.0
	Industrial Area CIDCO	705	121.0	120.0	88.1	7.0
CDP	Chandrapur - MIDC	281	305.0	251.6	104.5	25.0
	Tadali MIDC	638	409.0	326.2	173.0	84.0
	Rajura	640	496.0	421.4	196.1	19.0
KYN	Dombivali - MIDC Phase II	(blank)	298.0	269.7	123.0	62.0
	MIDC Office Dombivali		158.0	142.0	86.0	25.0
KOP	Krishna Valley school	576	205.0	175.8	97.4	37.0
NGP	MIDC Office, Hingna Road	288	411.0	311.2	124.7	37.0
NHK	MIDC Jalgaon	646	224.0	189.0	149.6	104.0
	MIDC Satpur - VIP	269	177.0	170.9	91.8	44.0
NVM	Rabale	491	473.0	175.5	71.4	14.0
	Mahape, MPCB-Nirmal Bhavan	493	349.0	324.7	121.3	12.0
	Taloja - MIDC Building	496	396.0	280.9	128.6	10.0
PUN	Bhosari	312	514.0	233.6	100.5	15.0
TNA	Kolshet	305	141.0	135.2	72.9	51.0

Data Source: MPCB, 2014 **Units: µg/m³**

RSPM concentrations in residential areas

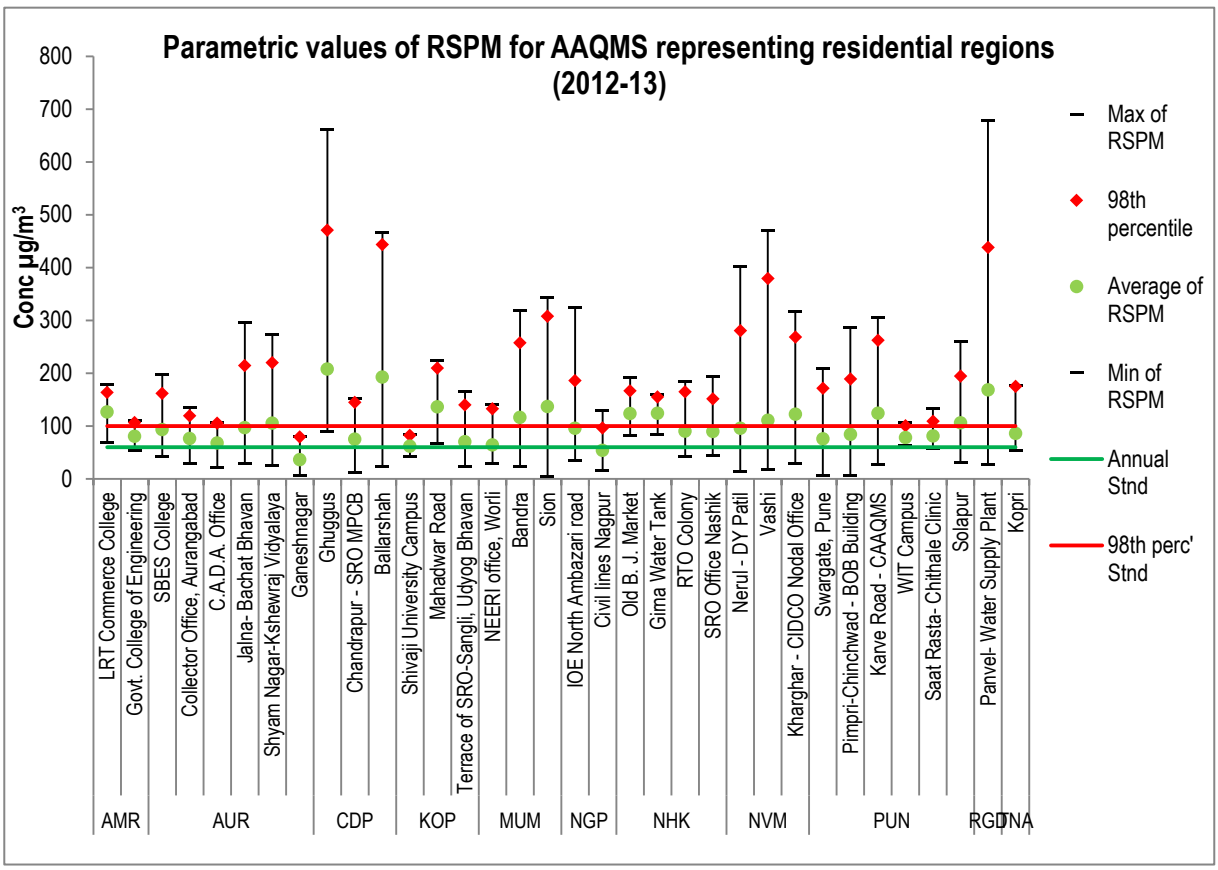


Figure No. 17: Parametric values of RSPM for AAQMS representing residential regions (2012-13)

Data Source: MPCB, 2014

**Data for NEERI office, Worli is procured from data posted on MPCB's website*

Amongst the monitored residential areas in Maharashtra, only the Ganeshnagar AAQMS of Aurangabad region recorded levels of RSPM concentration which were acceptable as clean in the year 2012-13, all other areas violated the standard set for RSPM.

Similar to the industrial monitoring, the AAQMS representing Ghuggus and Ballarshah residential area in Chandrapur recorded highest annual RSPM concentrations of 207 and 192µg/m³ respectively.

As for the residential areas of Mumbai and Navi Mumbai, which recorded high NOx levels, annual RSPM levels were recorded to be almost double the annual standard. In Mumbai the AAQMS at Sion and Bandra recorded annual concentrations of 136.5 and 115.9µg/m³ respectively.

Residential areas of Pune, Amravati and Nashik recorded RSPM levels within a very narrow range, between (100 to 200µg/m³), indicating high level of RSPM pollution at any given time of the year.

Table No. 15: Data for RSPM recorded at AAQMS representing residential areas (2012-13)

RO	Monitoring Station	Station Code	Max of RSPM	98th percentile	Average of RSPM	Min of RSPM
	CPCB Standard		*100*	*100*	*60*	*100*
AMR	LRT Commerce College	700	179.0	163.0	126.1	68.0
	Govt. College of Engineering	548	110.0	106.0	80.0	52.0
AUR	SBES College	511	197.0	161.6	92.8	42.0
	Collector Office, Aurangabad	512	135.0	119.0	75.7	28.0
	C.A.D.A. Office	513	106.0	104.9	67.6	20.0
	Jalna- Bachat Bhavan	706	296.0	214.4	96.7	29.0
	Shyam Nagar-Kshewraj Vidyalaya	642	272.0	219.5	104.9	25.0
	Ganeshnagar	703	80.0	79.0	35.8	5.0
CDP	Ghuggus	267	661.0	470.6	207.3	89.0
	Chandrapur - SRO MPCB	396	151.0	144.6	74.7	11.0
	Ballarshah	639	467.0	443.3	192.3	24.0
KOP	Shivaji University Campus	508	84.0	81.9	61.4	42.0
	Mahadwar Road	510	224.0	209.0	136.1	66.0
	Terrace of SRO-Sangli, Udyog Bhavan	574	165.0	139.7	69.8	23.0
MUM	NEERI office, Worli	349	140.0	132.6	63.5	28.0
	Bandra	(blank)	318.0	257.2	115.9	22.0
	Sion		342.0	307.4	136.5	4.0
NGP	IOE North Ambazari road	287	324.0	185.6	95.6	34.0
	Civil lines Nagpur	711	128.0	95.9	53.7	15.0
NHK	Old B. J. Market	644	192.0	166.0	123.2	81.0
	Girna Water Tank	645	159.0	155.0	123.8	84.0
	RTO Colony	259	183.0	164.5	89.6	42.0
	SRO Office Nashik	710	193.0	151.0	89.6	43.0
NVM	Nerul - DY Patil	492	401.0	280.1	95.4	13.0
	Vashi	(blank)	470.0	378.8	110.3	18.0
	Kharghar - CIDCO Nodal Office	494	317.0	268.0	121.9	29.0
PUN	Swargate, Pune	381	209.0	170.9	75.3	6.0
	Pimpri-Chinchwad - BOB Building	708	286.0	188.5	83.9	6.0
	Karve Road - CAAQMS	(blank)	305.0	261.8	124.0	27.0
	WIT Campus	299	107.0	99.9	78.0	62.0
	Saat Rasta- Chithale Clinic	300	132.0	108.8	81.0	57.0
	Solapur	(blank)	260.0	194.0	105.8	30.0
RGD	Panvel- Water Supply Plant	495	678.0	437.5	168.0	26.0
TNA	Kopri	303	177.0	174.6	85.8	53.0

Data Source: MPCB, 2014 **Units: µg/m³**

RSPM concentrations in rural and other of areas

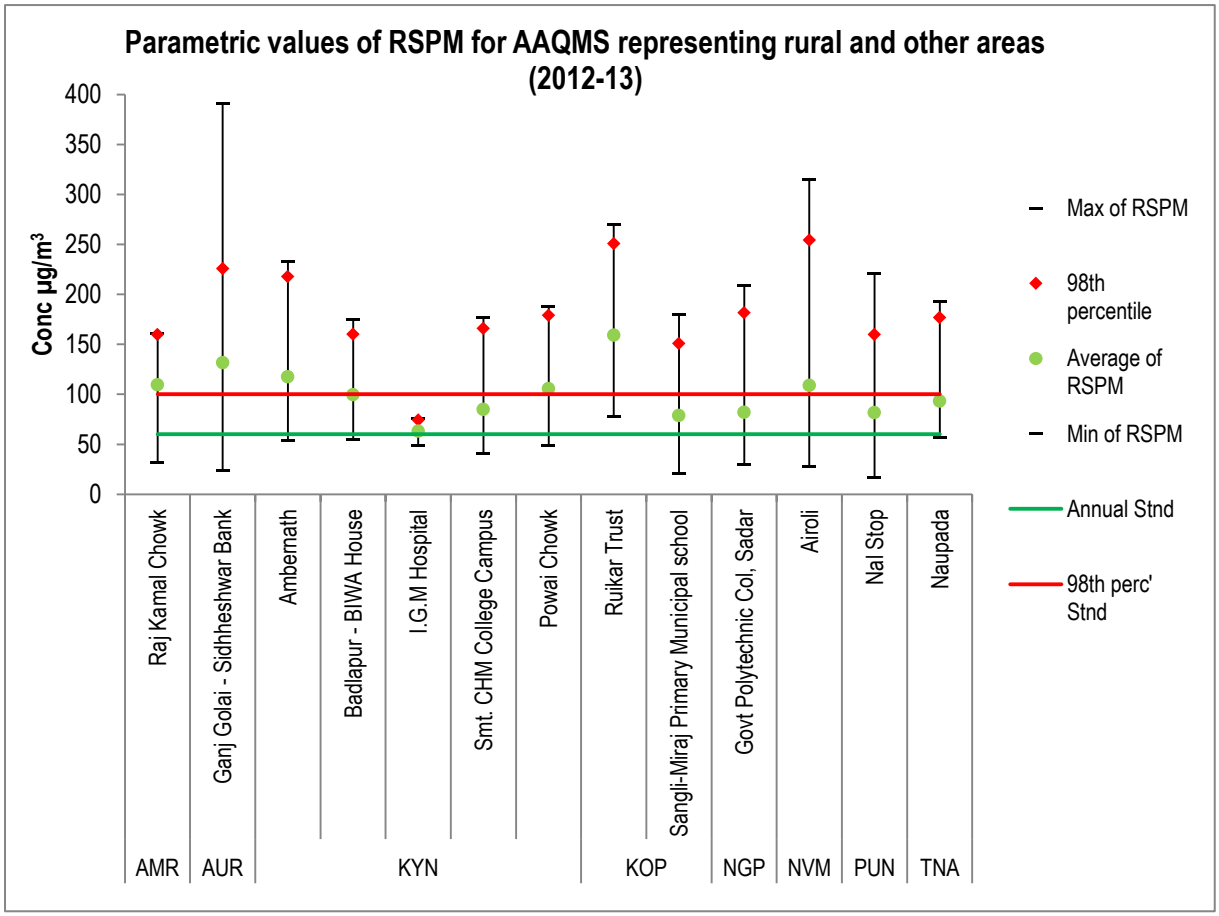


Figure No. 18: Parametric values of RSPM for AAQMS representing rural and other areas (2012-13)

Data Source: MPCB, 2014

**Note: I.G.M Hospital is categorized as a sensitive type of monitoring zone by MPCB*

The AAQMS at Ruikar trust in Kolhapur recorded its 98th percentile and annual average reading between 160 and 250µg/m³. Also the minimum RSPM concentration recorded here (78µg/m³) was more than the annual standard. This was followed by the monitoring at Aurangabad (Ganj Golai) and at Ambernath area of Kalyan RO.

A remarkable increase in the annual concentrations of RSPM may be noted at the AAQMS installed at Naupada (Thane) which has almost doubled in one year from 56.0 to 93.1µg/m³ much above the annual standard.

As per Figure No. 18, the RSPM monitoring at the IGM hospital (Bhiwandi) representing a sensitive area also exceeded the annual standard set for sensitive areas.

Table No. 16: Data for RSPM recorded at AAQMS representing rural and other areas (2012-13)

RO	Monitoring Station	Station Code	Max of RSPM	98th percentile	Average of RSPM	Min of RSPM
	CPCB Standard		*100*	*100*	*60*	*100*
AMR	Raj Kamal Chowk	547	**161.0**	**159.8**	**109.5**	32.0
AUR	Ganj Golai - Sidhheshwar Bank	643	**391.0**	**225.8**	**131.7**	24.0
KYN	Ambernath	(blank)	**233.0**	**218.0**	**117.6**	54.0
	Badlapur - BIWA House	649	**175.0**	**160.1**	**99.5**	55.0
	I.G.M Hospital	(blank)	76.0	74.2	**63.1**	49.0
	Smt. CHM College Campus	647	**177.0**	**166.1**	**84.9**	41.0
	Powai Chowk	648	**188.0**	**179.0**	**105.8**	49.0
KOP	Ruikar Trust	509	**270.0**	**250.9**	**159.1**	78.0
	Sangli-Miraj Primary Municipal school	575	**180.0**	**151.0**	**78.7**	21.0
NGP	Govt Polytechnic Col, Sadar	314	**209.0**	**181.8**	**81.9**	30.0
NVM	Airoli	(blank)	**315.0**	**254.5**	**108.9**	28.0
PUN	Nal Stop	379	**221.0**	**160.0**	**81.6**	17.0
TNA	Naupada	304	**193.0**	**177.0**	**93.1**	57.0

Data Source: MPCB, 2014 **Units: µg/m³**

RSPM concentrations in commercial areas

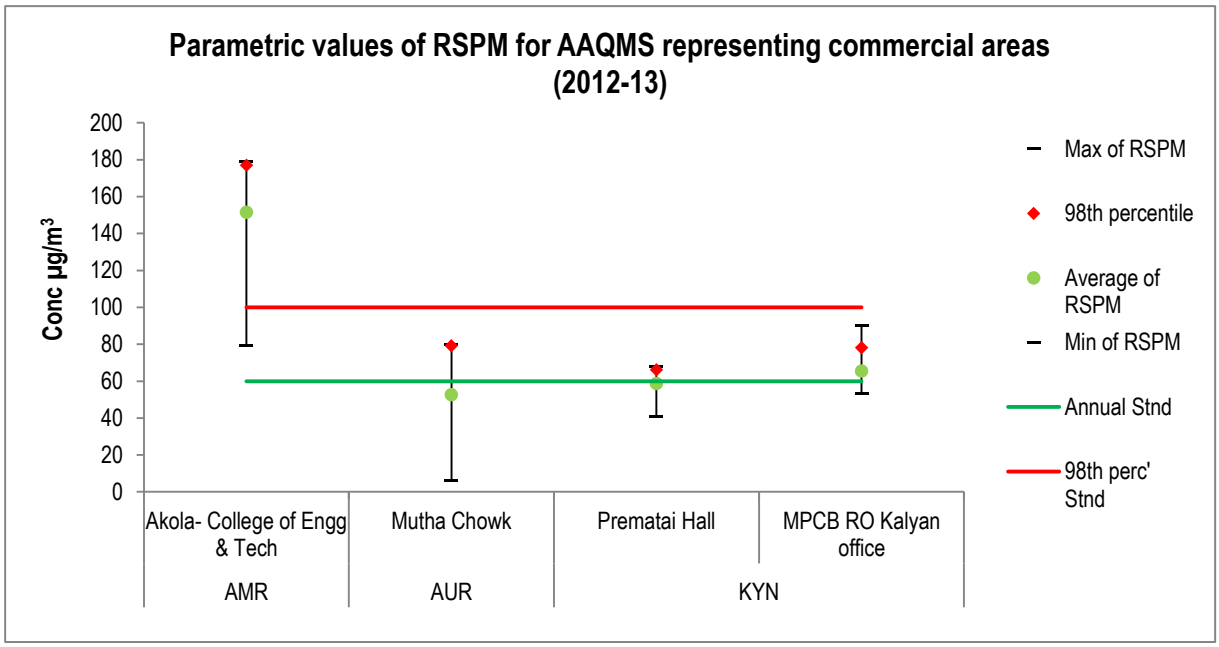


Figure No. 19: Parametric values of RSPM for AAQMS representing commercial areas

Data Source: MPCB, 2014

Contrary to the SO_2 and NO_X pollution which were well below standard for commercial areas, RSPM pollution was found to exceed the standard at 2 commercial locations Amravati and Kalyan. Among commercial areas Amravati recorded the highest pollution levels for RSPM with a maximum value of 179µg/m³ and an average annual concentration of 151.4µg/m³. AAQMS at Kalyan RO of MPCB also violated the annual standard and recorded annual average RSPM concentrations of about 65.4µg/m³. Annual RSPM levels at Bhiwandi (Prematai hall) (58.5µg/m³) were close to the annual average standard too.

Table No. 17: Data for RSPM recorded at AAQMS representing rural and other areas (2012-13

RO	Monitoring Station	Station Code	Max of RSPM	98th percentile	Average of RSPM	Min of RSPM
	CPCB Standard		*100*	*100*	*60*	*100*
AMR	Akola- College of Engg & Tech	702	**179.0**	**177.0**	**151.4**	79.0
AUR	Mutha Chowk	704	80.0	79.0	52.6	6.0
KYN	Prematai Hall	(blank)	68.0	66.0	58.5	41.0
	MPCB RO Kalyan office	(blank)	90.0	78.0	**65.4**	53.0

Data Source: MPCB, 2014 **Units: µg/m³**

Carbon Monoxide

Partial oxidation of carbon-containing compounds leads to production of CO (Carbon monoxide); which forms when there is not enough oxygen to produce CO_2 (carbon dioxide), such as when operating a stove or an internal combustion engine in an enclosed space. CO has no colour, odour or taste and is highly toxic to humans and animals at higher concentrations. Although CO has a half-life of 5 hours in fresh air, it combines with haemoglobin to produce carboxy-haemoglobin, which occupies the space in haemoglobin that normally carries oxygen, and hence is a toxic gas. It is known to reduce the oxygen carrying capacity of blood, causes headaches, nausea, and dizziness and at high concentrations can lead to death. Partial combustion of petroleum products in vehicles and, emissions from gas stoves are some of the major sources of CO emissions.

CO is monitored at the CAAQMS in Maharashtra at Bandra, Pune and Solapur. The 8 hour concentrations have been presented for the data recorded at the CAAQMS for the year 2012-13 in Figure No. 20.

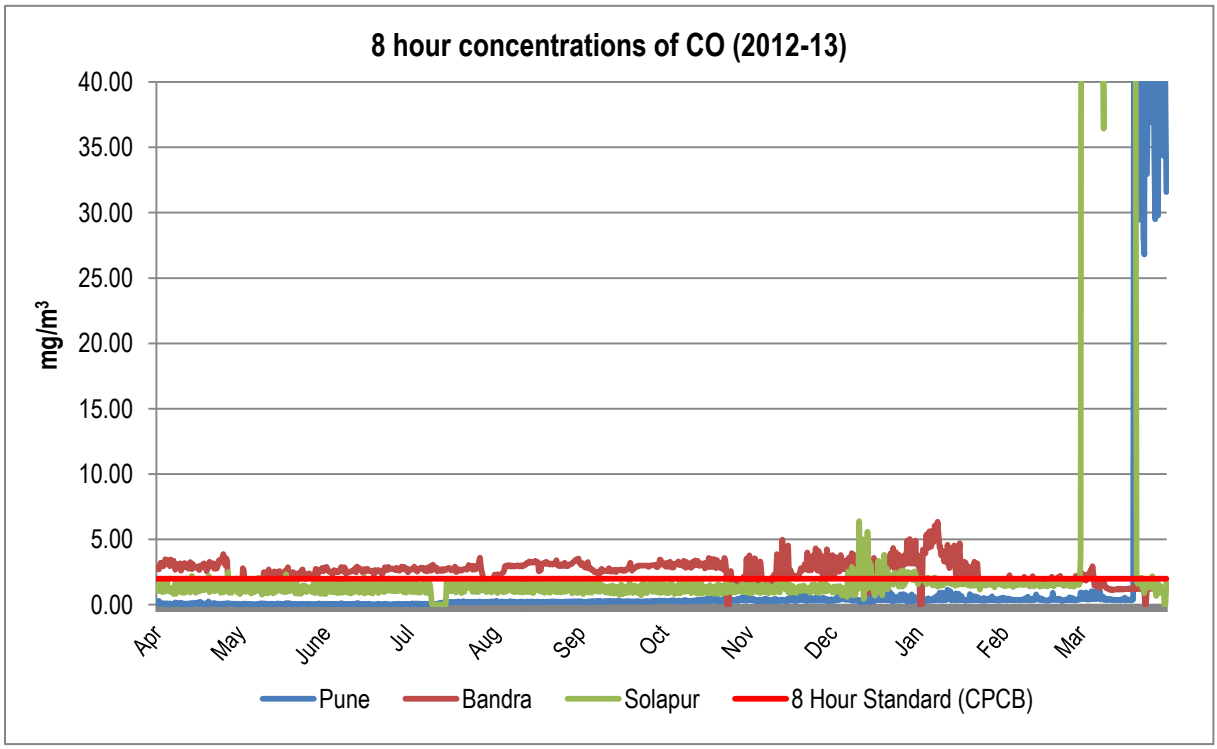


Figure No. 20: Carbon monoxide concentrations at Pune, Bandra and Solapur (2012-13)

The Bandra region consistently exceeded the 8 hourly standard (2mg/m^3) for almost all months of the year except the month of February and March. More than 74% of the total readings at the Bandra CAAQMS (1087) exceed the 8 hourly standard.

This was in contrast to the readings in recorded in Pune and Solapur where the reading were below the standard, for most of the time in the year but at both the places the CO level increased dramatically between February and March. Pune and Solapur recorded percentage exceedence of 10.8 and 3 percent respectively. Also fluctuations were recorded in December for CO levels at Solapur.

Ozone

O_3 (Ozone) is a secondary pollutant, formed when NOx and VOCs undergo a photochemical reaction in the atmosphere. People who are active outdoors, especially in hot sunny days are more vulnerable to the harmful impacts of O_3. Children are also more likely than adults to have asthma as an impact of O_3 pollution. Breathing ozone can trigger a variety of health problems including chest pain, coughing, throat irritation, and congestion. It can worsen bronchitis, emphysema, and asthma. Ground level ozone also can reduce lung function and inflame the linings of the lungs. Repeated exposure may permanently scar lung tissue.

Ozone is monitored at select locations in Maharashtra. The data for ozone monitored by the CAAQMS at Pune, Bandra for the year 2012-13 has been presented in Figure No. 21.

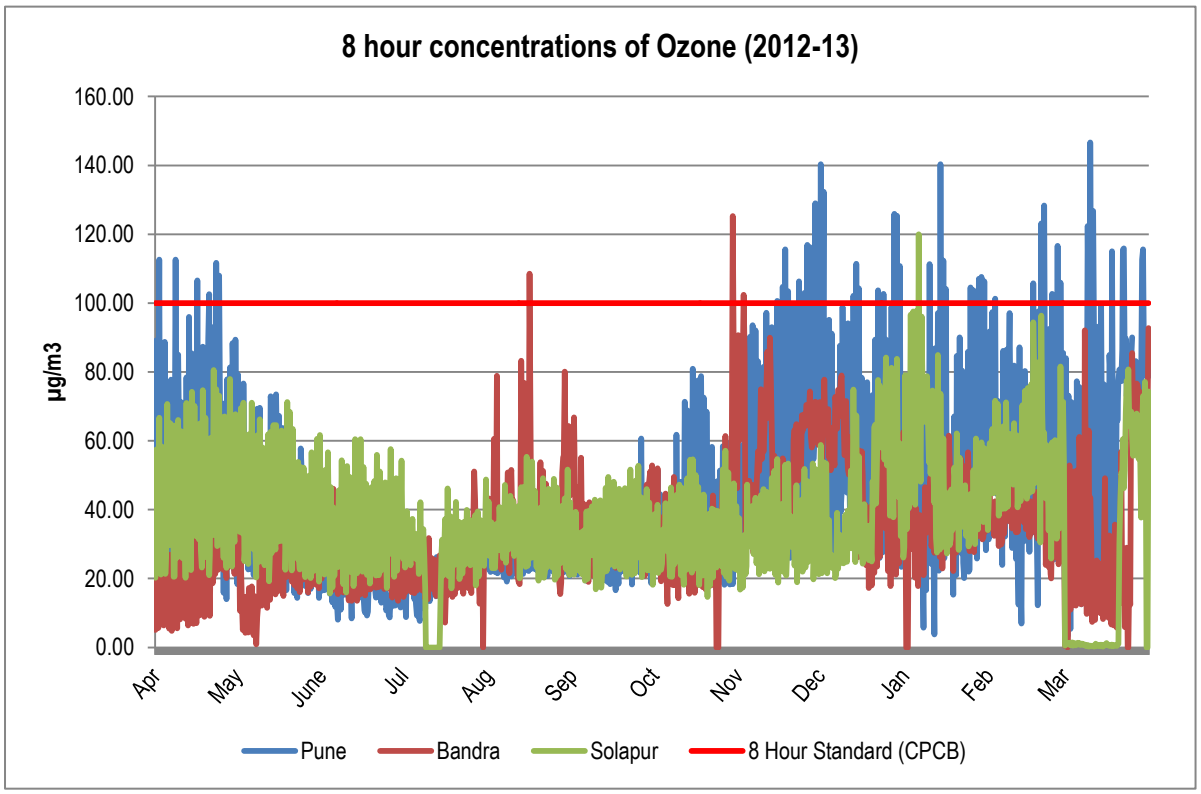


Figure No. 21: Ozone concentrations at Pune, Bandra and Solapur (2012-13)

O_3 levels were recorded to be moderately high in Pune whereas Solapur and Bandra stations recorded O_3 levels well below the 8 hour standard. The Pune stations recorded percentage exceedence of about 4.8% while Bandra and Solapur station registered a percentage exceedence of 0.4 and 0.2 respectively. The reason for slightly higher ozone condition in Pune could be attributed to the prevailing weather conditions and complex chemistry in formation of ozone involving hydrocarbons and nitrogen oxides in presence of sunlight.

Benzene

Benzene (C_6H_6) is a colourless sweet smelling liquid and is generated whenever carbon-rich materials undergo incomplete combustion. Combustion of aromatic compounds, evaporation during fuelling, tobacco smoke, furniture wax and glue paints are some of the major sources of benzene pollution. The natural sources include volcanoes and forest fires. Benzene increases the risk of cancer and other illnesses. Benzene is a notorious cause of bone marrow failure. Substantial quantities of epidemiologic, clinical, and laboratory data link benzene to aplastic anaemia, acute leukaemia, and bone marrow abnormalities. Benzene targets liver, kidney, lung, heart and the brain and can cause strand breaks of the DNA (Deoxyribonucleic acid), ultimately leading to chromosomal damage.

Benzene pollution was recorded at 2 CAAQMS, Bandra and Pune. The annual average benzene concentrations were recorded to be 0.85 and 0.73µg/m^3 respectively. The annual average standard for benzene have been set as 5µg/m_3 by CPCB, indicating that the benzene pollution at both the locations was well below the permissible limits. However the highest 8 hour ozone concentration recorded at Bandra and Pune were 1.3 and 225µg/m^3 respectively. Both the stations recorded high benzene concentrations in the month of March, especially the Pune CAAQMS which recorded unusually high level of day time benzene concentrations. A cyclic trend, of night time low and day time high concentrations of benzene was recorded throughout the month of March at Pune. This could be attributed to some renovation and repair work (external painting/road repair) which may have involved usage of chemicals containing benzene ring.

Air Quality Index

Quality of air around us has direct implications on our health. The air quality, like weather of a location, can change dynamically within a span of an hour. Hence to convey the information on outdoor air quality in the easiest possible way which could be easily understood by general public, tools such as AQI (Air Quality Index) have been devised.

Various International environmental agencies such as US-EPA have developed their own set of mathematical algorithms to determine AQI, which are based on human exposure dose of air pollutants. Pollutant specific, parametric indexing has become very instrumental and indicative in drawing conclusion on the status and trend of air quality by measuring pollution.

The AQI is useful for reporting daily air quality and to gauge the pollution load. Most of the AQI developed by various agencies are within a range of 0 to 500. An AQI of 100 or below indicates attainment of National Ambient Air Quality Standards. Higher value of AQI indicates high level of pollution. When AQI values are above 100, air quality is considered to be unhealthy—at first for certain sensitive groups of people, then for everyone (including healthy people) as AQI values get higher. Depending upon 'doses of exposure' they are further divided into five classes of AQI, which present different health concerns. To make it easy to understand, the categories of AQI are assigned color codes (**Figure No. 22**) i.e. color Green to 'Good', Yellow to 'Moderate', Orange to 'Poor', Red to 'Very Poor' and Dark Red to 'Severe'.

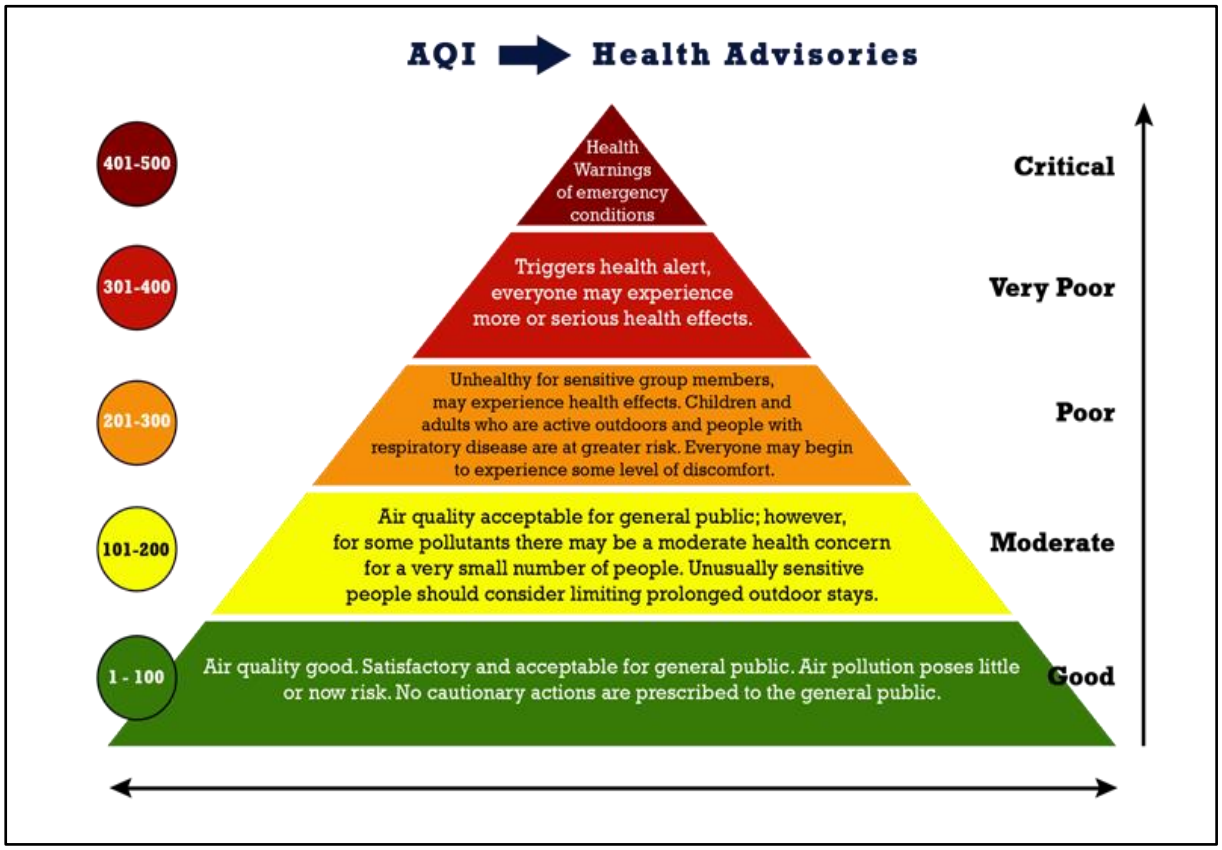


Figure No. 22: Health advisories for various range of Air Quality Indices and respective colour codes

Data Source: EPA and System of Air Quality Weather Forecasting and Research, MoES, GoI

AQI for Indian Standards

With reference to the formula used for calculating AQI, the breakpoint used for SO_X and NO_2 by EPA are of 1 hour averaging time and not 24-hourly whereas, the AAQMS in Maharashtra report levels of major air pollutants for a period of 24-hour. In addition, an AQI value of 100 or below would correspond to the attainment of the pollutant concentration adhering to National Ambient Standards. Since it was not possible to derive any value from it, US-EPA's algorithms were not used.

Air quality index is a piecewise linear function of the pollutant concentration and there is a discontinuous jump of AQI unit and the corresponding adjustments are made to set the low and high range of AQI corresponding to a certain concentration of the pollutant. IIT-Kanpur has defined daily exposure limits of various pollutants and laid sets of formulae to calculate AQI on similar lines with other indexing worldwide (Table No. 18). These calculations have been endorsed by NEERI (National Environmental Engineering Research Institute), a constituent of CSIR (Council of Scientific & Industrial Research)[5], India.

The algorithm for calculating Air Quality Index is based upon daily averaging time and since dynamic behaviour of concentration of air pollutants causes it to change even within an hour, mentioning of the air quality annually would average out the extremities. The possibility of examining daily air quality gives the scope to study in detail the subject and hence the daily data recorded by AAQMS against the 24 hour standard has been considered while developing the AQI for the AAQMS in Maharashtra.

Table No. 18: Sub-index and breakpoint pollutant concentration for Indian Air Quality Index

Index	Category	SO_2	NO_X	SPM	RSPM
		(24 hr avg)	*(24-hr avg)*	*(24-hr avg.)*	*(24-hr avg.)*
		(µgm/m³)	*(µgm/m³)*	*(µgm/m³)*	*(µgm/m³)*
0-100	Good	0-80	0-80	0-200	0-100
101-200	Moderate	81-367	81-180	201-260	101-150
201-300	Poor	368-786	181-564	261-400	151-350
301-400	Very poor	787-1572	565-1272	401-800	351-420
401-500	Severe	>1572	>1272	>800	>420

$$I = \frac{(I_{High} - I_{low})}{(C_{high} - C_{low})} * (C - C_{low}) + I_{low}$$

where: I = the (Air Quality) index
C = the pollutant concentration
C_{low}= the concentration breakpoint that is $\leq C$
C_{high}= the concentration breakpoint that is $\geq C$
I_{low}= the index breakpoint corresponding to C_{low}
I_{High}= the index breakpoint corresponding to C_{high}

[5]Research Article, Prakash Mamta and Bassin J.K, *Analysis of Ambient Air Quality Using Air Quality Index*, IJAET/ Vol.I/ Issue II/July-Sept.,2010/106-114; E-ISSN 0976-3945

AQI for AAQMS in Maharashtra

The data generated by continuous monitoring of parameters, majorly three of them namely– RSPM, NO_X, and SO_2 at selected locations spread across the state, have been analysed for above mentioned calculations. The concentration levels were then converted into AQI using the formulae elaborated in Table No. 18. Finally, the highest or 'dominant' of the AQI value for the respective individual pollutant becomes the AQI for that day.

As per the results obtained upon developing the composite AQI, one may note from **Figure No. 23**, that mere 8 AAQMS in the state met the daily standard of good air quality for at least 98 percent of the observations; while majority of the regions have moderate air quality for most of the year.

It is striking to note that 4 out of 6 AAQMS, namely Rajura, Ballarshah, Ghuggus, and Tadali MIDC have poor air quality for more than 60% of the times in the year. The situation is even more critical at Rajura and Ghuggus where at certain days the air quality has been recorded to be in the category of very poor and severe. The bias is majorly due to high RSPM levels recorded in the region, since the AQI for SO_2 and NOx levels in the region are well within the acceptable limits and the air quality was recorded to be good for both the parameters (Figure No. 26 and Figure No. 27). The mining activities, emissions from power plants, cement factories in the region could be the major source of the same. A stringent regulatory policy and strict adherence to the norms is highly desired in the region.

The AAQMS in Amravati recorded moderate to poor air quality for more than 50 percent of the observations in the region. The MIDC area in Amravati and the area represented by the AAQMS at Akola College of Engineering recorded good air quality for less than 5 percent of the observations. The only exception in the RO was the AAQMS at Government engineering college which recorded good air quality for almost 90 percent of the observed days. The poor air quality in this region could be majorly attributed because of high RSPM levels recorded by the AAQMS the AQI for SO_2 and NOx levels in the region are well within the, acceptable limits.

The MIDC region in Jalgaon, under Nashik RO failed to have good air quality even for a single day. The high levels of RSPM and NOx concentrations in the region could be attributed for the same. Although the NOx levels recorded at AAQMS at Jalgaon are lower than the daily standard but the NOx levels failed to meet the annual standard.

The RO wise and type wise percentage occurrence of AQI classes for composite AQI for the AAQMS in Maharashtra have been presented in Figure No. 23 and Figure No. 24. To further analyse the parameter wise, RSPM (Figure No. 25), NOx (Figure No. 26) and SO_2 (Figure No. 27), occurrence of these have been presented separately for further investigation.

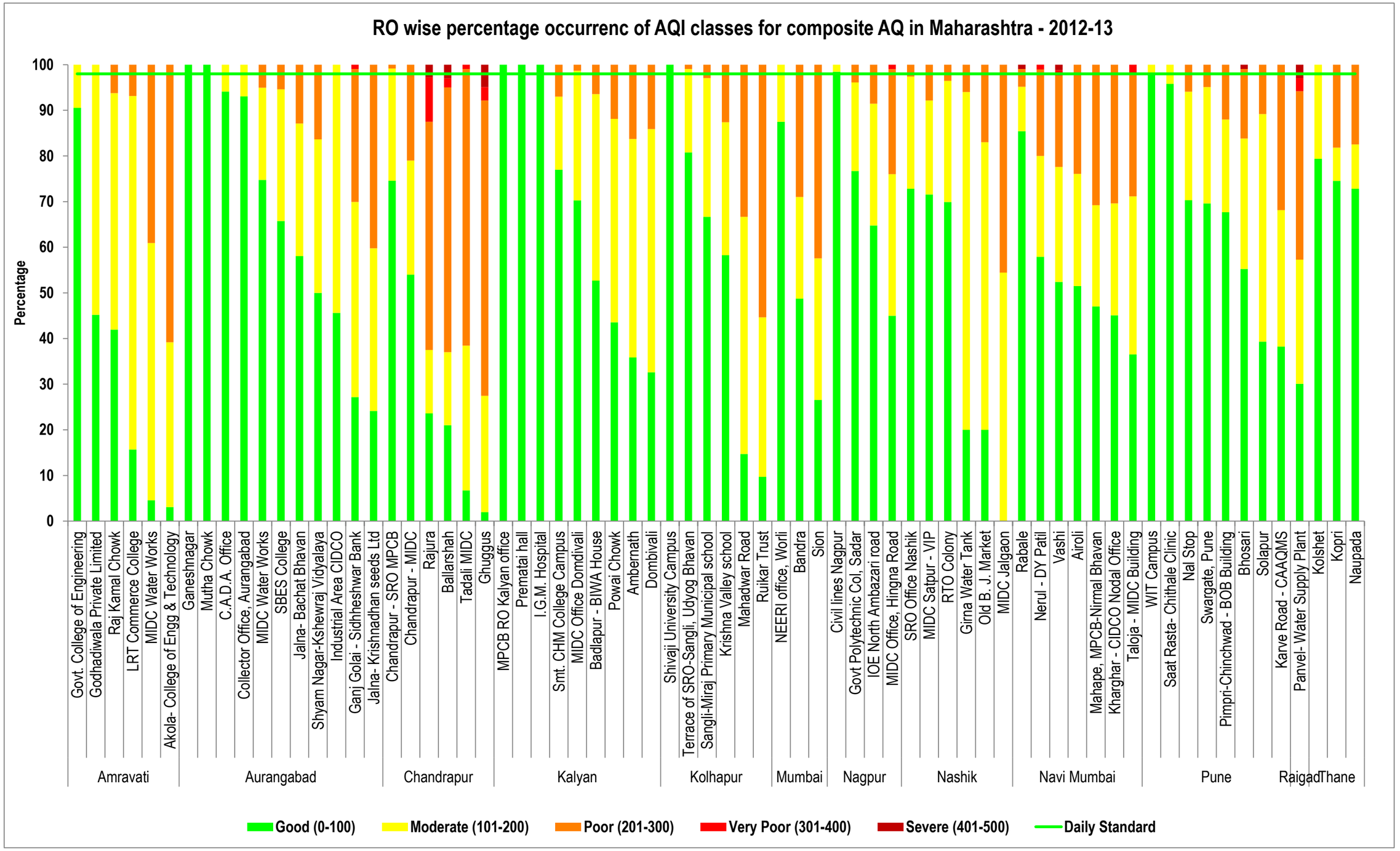


Figure No. 23: RO wise percentage occurrence of AQI classes for composite AQ in Maharashtra

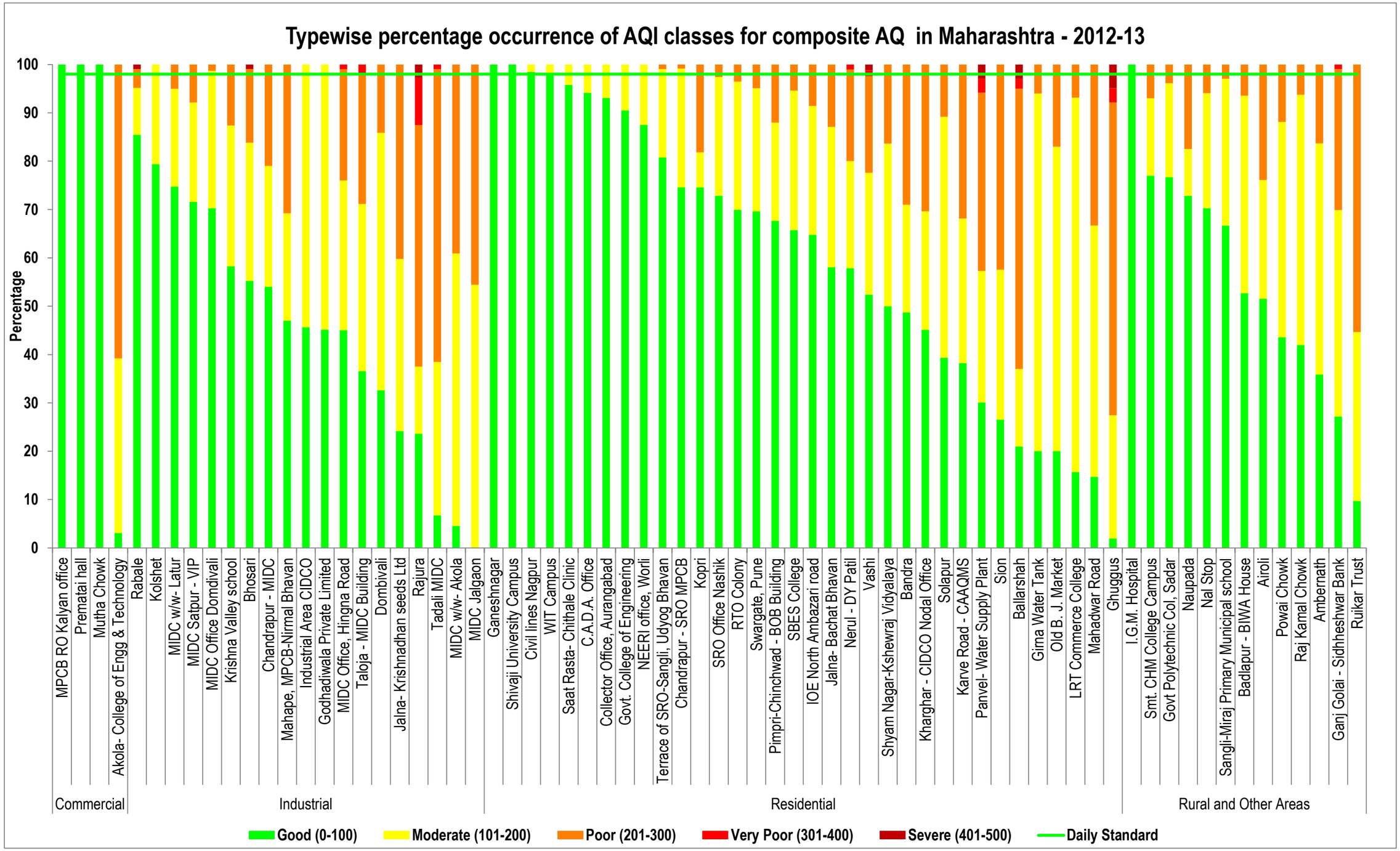


Figure No. 24: Type wise percentage occurrence of AQI classes for composite AQ in Maharashtra

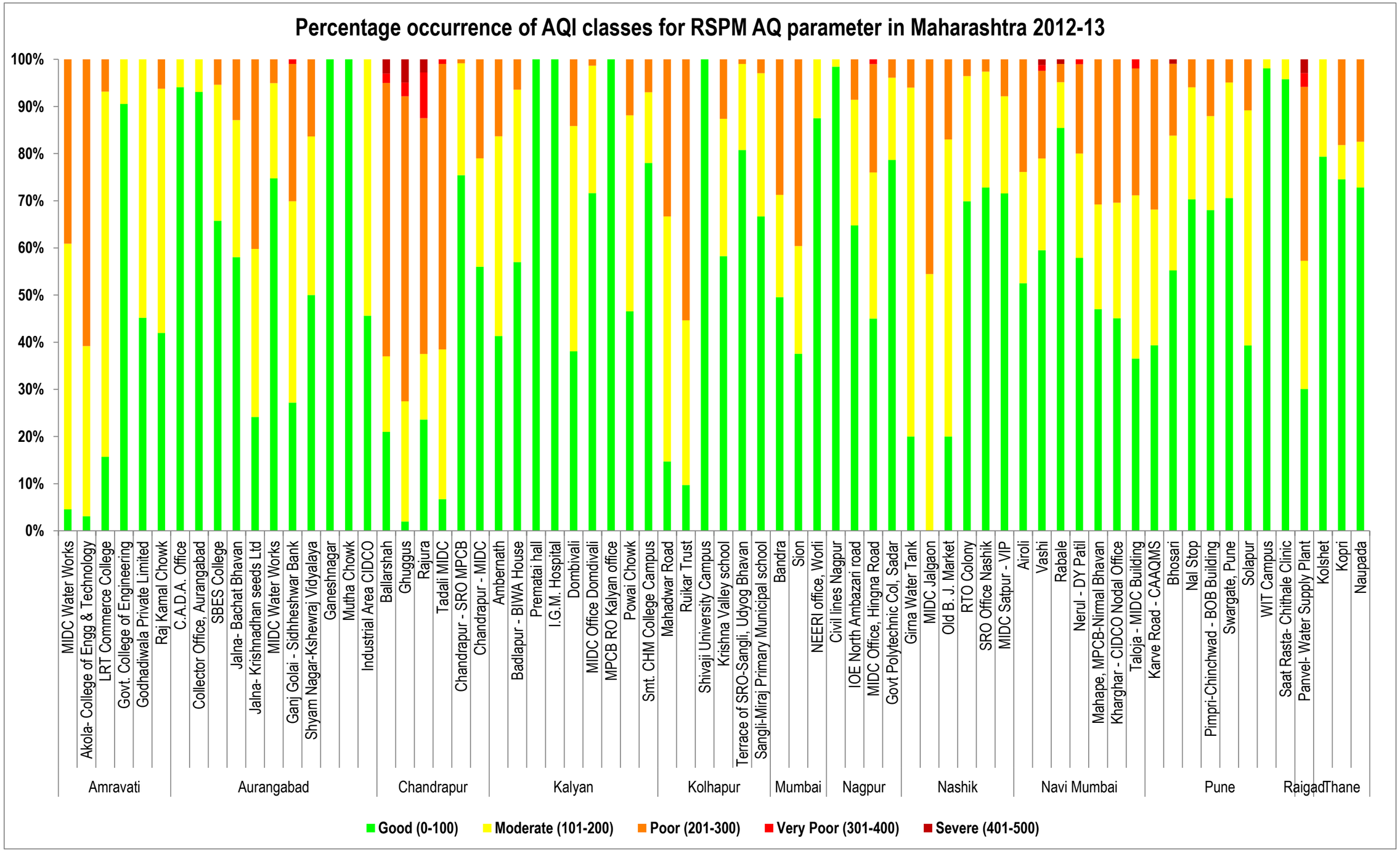


Figure No. 25: Percentage occurrence of AQI classes for RSPM AQ parameter in Maharashtra

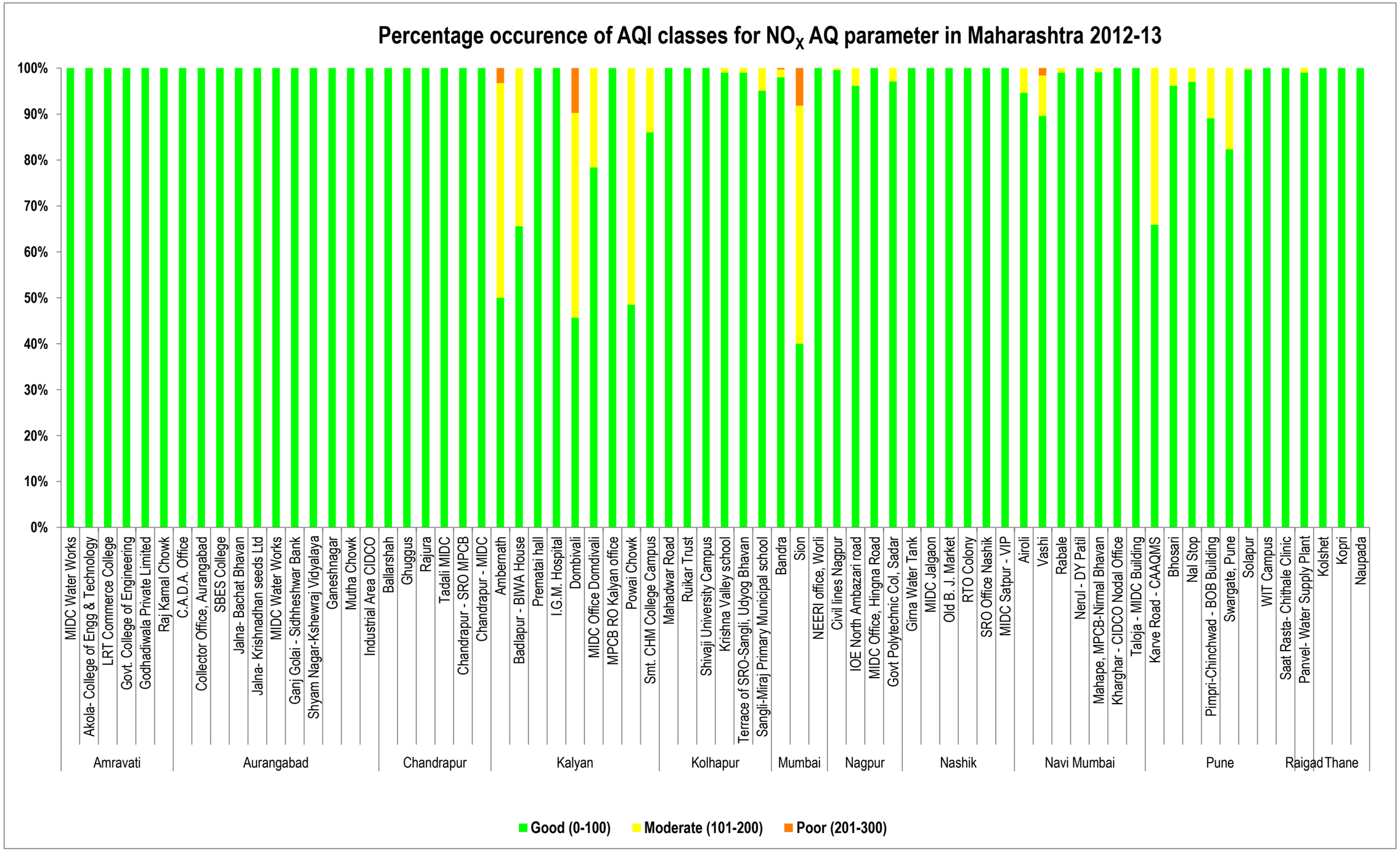


Figure No. 26: Percentage occurrence of AQI classes for NO_X AQ parameter in Maharashtra

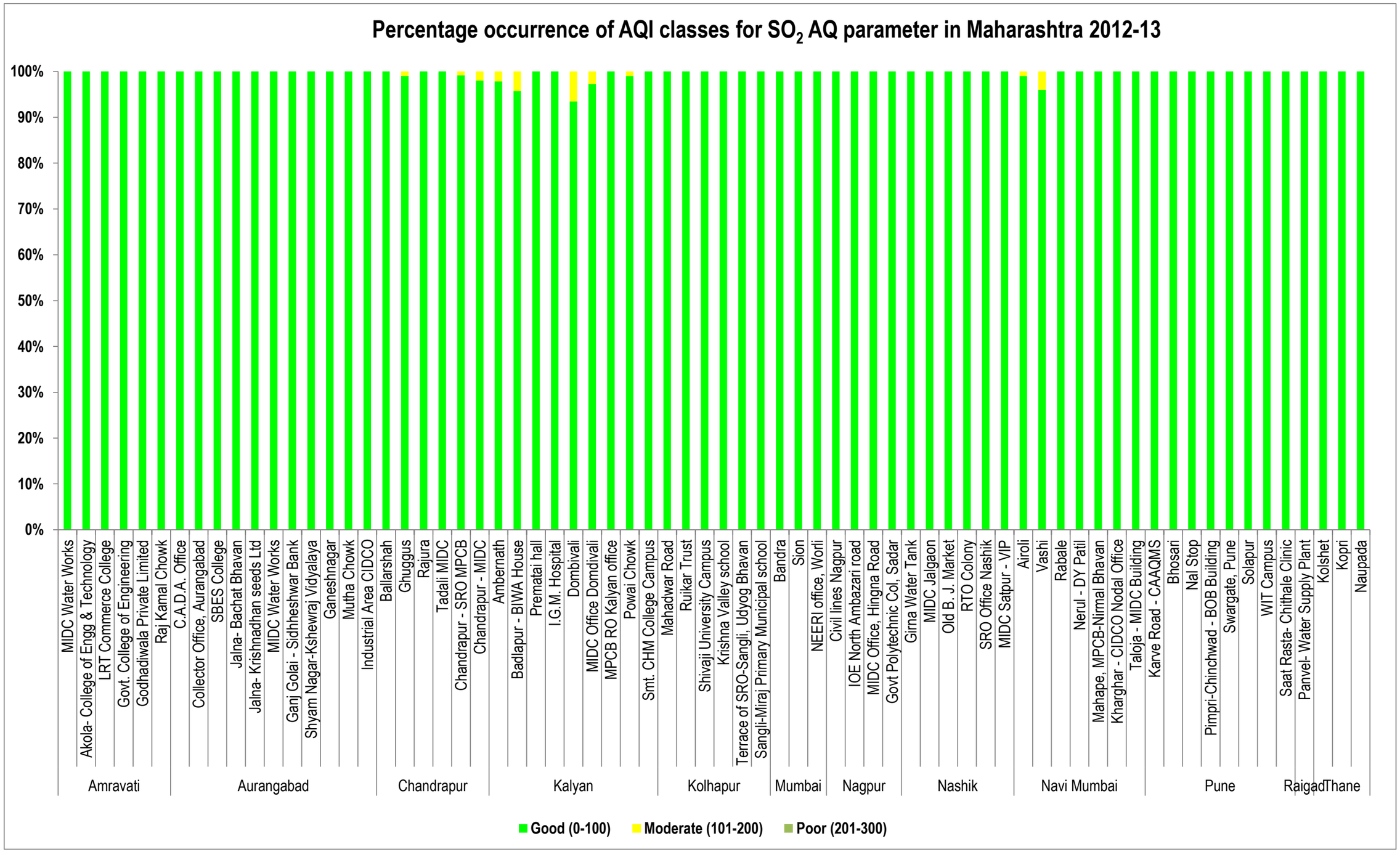


Figure No. 27: Percentage occurrence of AQI classes for SO_2 AQ parameter in Maharashtra

Conclusion

Urbanization, industrialization, vehicular emissions, construction sector, quarrying and mining activities and so on are some of the major drivers for air pollution in Maharashtra. MPCB has been implementing strategies for air monitoring and has the highest number of AAQMS under NAMP in India. As a result, MPCB records massive amount of datasets which was used in this report, to present an overview on the status of concentration for various air pollutants recorded at 69 AAQM stations which were active in the year 2012-13.

Out of all the measured parameters including, SO_2, NO_X, RSPM, CO, benzene and Ozone the main and primary pollutant was RSPM (PM_{10}) followed by NO_X. RSPM was found to exceed the annual standard at 65 out of 79 AAQMS in the year 2012-13. It was found that 45% times the particulate concentration in ambient air exceeded daily standard. Areas influenced with industries and mining activities (quarry sites) like Chandrapur and Navi Mumbai, recorded severe levels of RSPM concentrations.

The NO_X concentration values exceeded at 29 out of 69 AAQMS, in the year 2012-13. Annual trends were found to be less conclusive, proposing the needs for implementation of control measure for areas with higher exposure of NO_X. Navi Mumbai area recorded high levels of Nox pollution and requires immediate attention. The SO_2 pollution posed no threat as its annual average readings were recorded to be below standard at almost all the monitoring stations, except for the monitoring at Dombivali area as both the monitoring stations in Dombivali, recorded annual SO_2 concentrations very close to the annual standard.

CO and Ozone are among 6 major pollutants commonly found in urban environment and have the potential to harm human health and properties, but the monitoring of CO and Ozone was limited to Bandra and Pune monitoring station. It was found that the relation is seasonal as well as region-based for these two pollutants. Upon comparing with national CO standard it was observed that 74% times the CO levels exceeded in Bandra, whereas in Pune it was majorly found to be below the permissible limits and recorded mere 3% exceedence for CO levels. The Ozone stood as non-polluting at Bandra with mere 0.4% exceedence levels for 8 hour standard, whereas in Pune the ozone concentrations recorded 4.8% of exceedence.

Given the fact that Maharashtra is the most urbanized and highly industrialized augmenting new AAQMS to the existing network is highly desired. Rapidly developing regions and regions which are yet to have a regular AAQM stations should be prioritized. A road map to be developed to strengthen the monitoring network. Areas like Badlapur, Ulhasnagar, Chandrapur and so on which recorded high pollutant concentrations in 2012-13 should be considered for installing CAAQMS.

Annex – I: List of AAQMS in Maharashtra

RO	Region	Program	Station	Location	Type
Amravati	Amravati	NAMP	Godhadiwala Private Limited	Building of Apurva Oil Industries	Industrial
			Govt. College of Engineering	Terrace of Govt. Coll. Of Engi., Electronic & Computer Building Amravati	Residential
			Raja Kamal Chowk,Amravati	Vanita Samaj Building	Rural & other areas
	Akola	NAMP	Collage of Eng. And Technology Akola (Architecture of branch)	Akola	Commercial
			LR College of Engg	Plot No. 10 Ranpise Nagar professor Colony	Residential
			MIDC Water Works	Phase II, MIDC	Industrial
Aurangabad	Aurangabad	NAMP	C.A.D.A. Office	C.A.D.A. Office , Garkheda Aurangabad	Residential
			Collector Office, Aurangabad	Collector Office	Residential
			SBES College	SBES College Campus,Aurangabad	Residential
	Jalna	NAMP	Jalna- Bachat Bhavan	Bachat Bhavan Building Jalna	Residential
			Jalna- Krishna Dhan	Krishna Dhan Compound Jalna	Industrial
	Latur	NAMP	MIDC Water Works	Latur	Industrial
			Terrace of Kshewraj Vidyalaya	Latur	Residential
			Terrace of Sidhheshwar Sahakari Bank	Ganjgolai, Latur	Rural & other areas

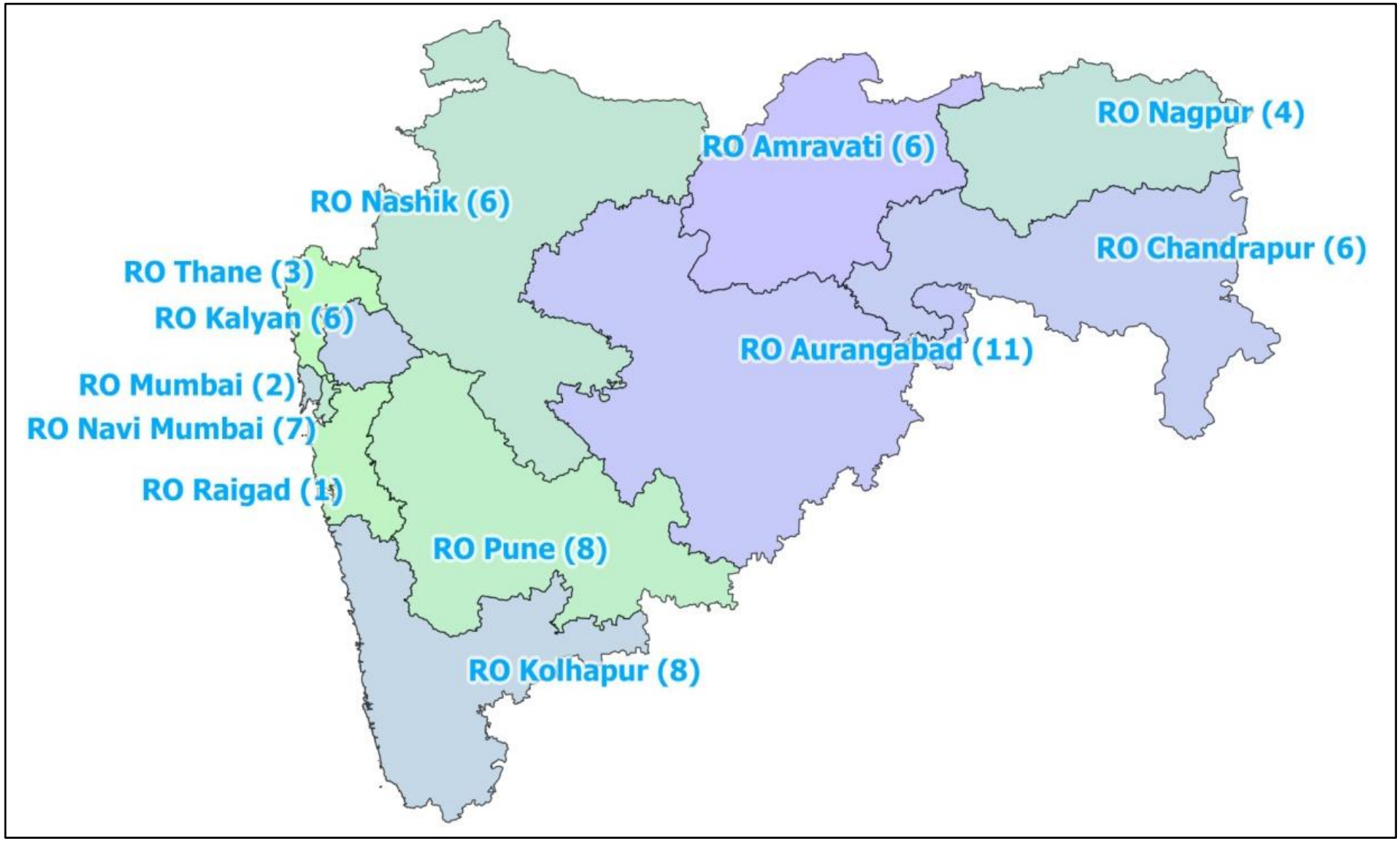
RO	Region	Program	Station	Location	Type
	Nanded	NAMP	Ganeshnagar	Nanded	Residential
			Industrial Area CIDCO	Nanded	Industrial
			MuthaChowk	Nanded	Commercial
Chandrapur	Chandrapur	NAMP	Ballarshah	Ballarpur	Residential
			Ghuggus	Office of Grampanchayat Ghuggus	Residential
			MIDC, Chandrapur	M/s Multiorganic Pvt. Ltd. Chandrapur	Industrial
			Rajura	Chandrapur	Industrial
			SRO Office, Chandrapur	Office of Nagar Parishad Chandrapur Premises	Residential
			Tadali MIDC	MIDC	Industrial
	Ambernath	NAMP	Ambernath	Ambernath Municipal Council Building, Ambernath	Rural & other areas
	Badlapur	NAMP	Badlapur	BIWA Office, Badlapur	Rural & other areas
Kalyan	Bhiwandi	SAMP	I.G.MHospital	Bhiwandi	Sensitive
			Prematahall	Bhiwandi	Commercial
	Dombivali	NAMP	Dombivali	CETP, Phase- II MIDC, Dombivali	Industrial
		SAMP	MIDC Office Domdivali	Dombivali	Industrial
	Kalyan	SAMP	MPCB Ro Kalyan office	Kalyan	Commercial

RO	Region	Program	Station	Location	Type
	Ulhasnagar	NAMP	Powai Chowk	Octroi Naka	Rural & other areas
			Smt. Chandibai Himmatlal Mansukhani College Campus	CHM College Ulhasnagar	Rural & other areas
Kolhapur	Chiplun	NAMP	MIDC Chalkewadi	MIDC Chalkewadi,Chiplun	Residential
			MIDC Lote	MIDC Water supply Plant Chiplun	Industrial
	Kolhapur	NAMP	Mahadwar Road	Near Mahalaxmi temple ,Kolhapur	Residential
			Ruikar Trust	Ruikar trust, Dhabhokar corner,Kolhapur	Rural & other areas
			Shivaji University	Shivaji University Campus, Vidyanagar, Kolhapur	Residential
	Sangli	NAMP	Krishna Valley school	MIDC Kupwad	Industrial
			Sangli-Miraj Primary Municipal school, Near Bharati Vidyapeeth	Rajawada Chowk, Sangli	Rural & other areas
			Terrace of SRO-Sangli, Udyog Bhavan	Vishrambag, Sangli	Residential
Mumbai	Mumbai	CAAQMS	Bandra	Govt. Polytechnique.Premises Kherwadi	Residential
			Sion	Sion Hospital	Residential
		NAMP	Neeri office, Worli	Worli	Residential
Nagpur	Nagpur	NAMP	Civil lines Nagpur	RO Office Nagpur Premises	Residential
			Hingna Road	MIDC office Hingna Road Nagpur	Industrial

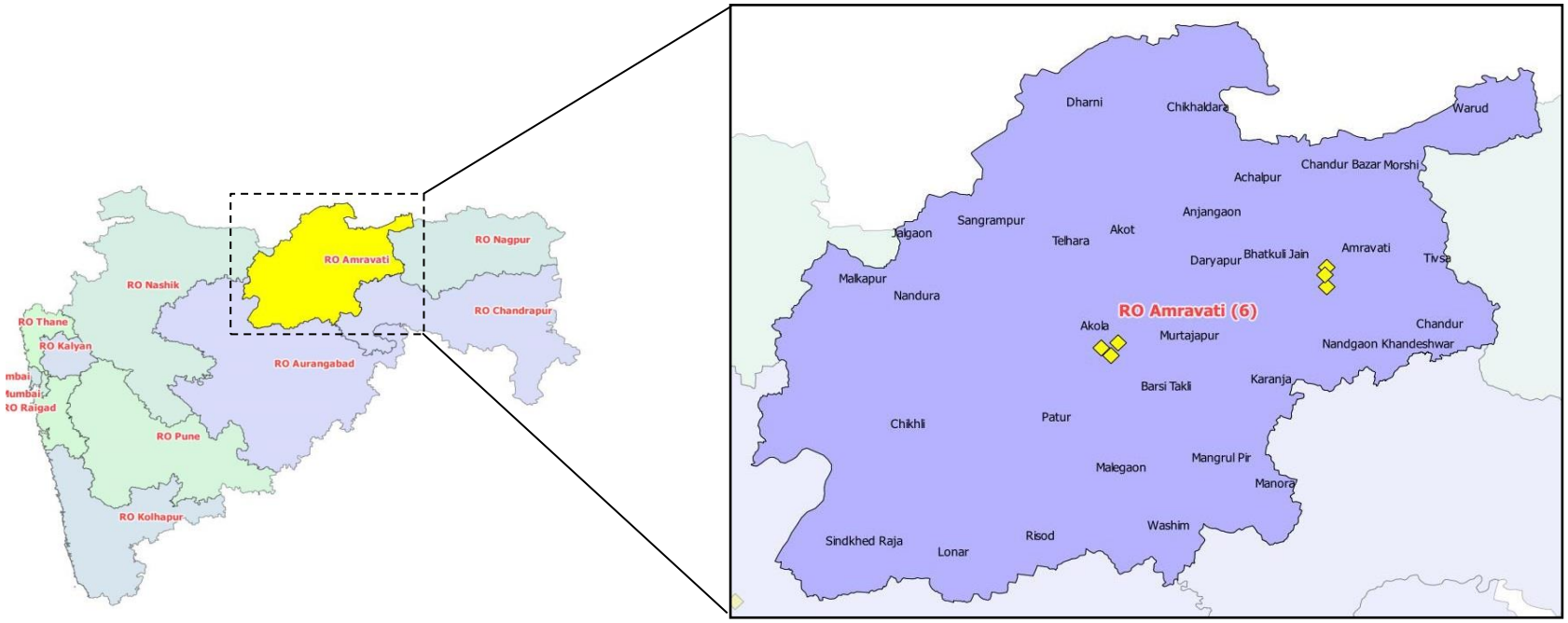
RO	Region	Program	Station	Location	Type
Nashik			North Ambazani road	Terrace of Institute of Engineering, North Ambazano road	Residential
			Sadar	Govt. poly technique College , Sadar	Rural & other areas
	Jalgaon	NAMP	Girna Water Tank	Ramanand Nagar	Residential
			MIDC Jalgaon	Terrace of MIDC Office	Industrial
			Old B. J. Market	Terrace of SRO building	Residential
	Nashik	NAMP	MIDC Satpur	VIP industries ltd ,MIDC satpur, Nashik	Industrial
			RTO Colony	RTO Colony Water Tank near Golf Club	Residential
			SRO Office Nashik	Udyog Bhavan	Residential
Navi Mumbai	Navi Mumbai	CAAQMS	Airoli	Airoli fire station	Rural & other areas
		NAMP	Vashi	Fire Brigade compound, Vashi.	Residential
			MPCB-Nirmal Bhavan, Mahape	Central lab Building, MPCB Navi Mumbai	Industrial
			Nerul	Dr.D.Y. Patil College Building Nerul	Residential
			Rabale	T.B.I.A, Rabale	Industrial
	Taloja	NAMP	Kharghar	Nimisha Hospital Sec-12 ,Kharghar	Residential
			MIDC Taloja	MIDC Common Facility Building	Industrial
Pune	Pune	CAAQMS	Karve Road - CAAQMS	PMC Zonal office	Residential

RO	Region	Program	Station	Location	Type
		NAMP	Bhosari	Maratha Chamber of commerce Building terrace	Industrial
			Nal Stop	MSEB Office Nal Stop ,Pune	Rural & other areas
			Pimpri-Chinchwad	Pimpri-Chinchwad Municipal corporation	Residential
			Swarget	Terrace of Swargate police Chowky	Residential
	Solapur	CAAQMS	Solapur	Municipal Corporation Premises	Residential
		NAMP	Saat Rasta	Saat Rasta Opp. ST Bus stand, Chitale Clinic Solapur	Residential
			WIT Campus	WIT Campus Ashok Chawk ,Solapur	Residential
Raigad	Panvel	NAMP	Panvel Water Supply	Panvel Water Supply Behind ST Stand	Residential
Thane	Thane	NAMP	Kolshet	M/s Clariant (chemical unit)Kolshet Thane	Industrial
			Kopri	Old Thane Maternity Hospital , Kopri, Thane	Residential
			Naupada	Thane M.C. Regional Office Naupada ,Shahu Market , Thane	Rural & other areas

Annex – II: Data for AAQMS in Maharashtra



RO – Amravati



Region	Program	Station No	Station	Frequency	Latitude	Longitude
Akola	NAMP	700	LRT Commerce College	Two Day In a Week	20° 41' 01.2" N	77° 02' 43.5" E
		701	MIDC Water Works	Two Days In A Week	20° 41' 12.1" N	77° 02' 20.1" E
		702	Akola- College of Engg & Technology	Two Days In A Week	20° 42' 16.6" N	77° 05' 35.9" E
Amravati	NAMP	547	Raj Kamal Chowk	Two Days In A Week	20° 55' 42.4" N	77° 45' 14.2" E
		548	Govt. College of Engineering	Two Days In A Week	20° 57' 14.8" N	77° 45' 35.3" E
		549	Godhadiwala Private Limited	Two Days In A Week	20° 53' 20.9" N	77° 45' 32.0" E

Akola - LRT Commerce College

Table No. 19: Data for monthly average reading recorded at LRT Commerce College.- Akola

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	9	126.6	8.4	7.8
May	9	130.2	9.9	8.4
Jun	9	158.2	10.4	8.6
Jul	10	93.7	0.0	6.0
Aug	8	86.9	9.4	6.0
Sep	6	110.0	1.5	6.8
Oct	9	124.1	9.6	8.7
Nov	8	131.8	9.5	8.6
Dec	9	131.6	9.6	7.9
Jan	9	137.1	8.2	7.9
Feb	8	139.4	9.1	8.0
Mar	8	141.8	9.8	8.4
Total N		% of exceedence		
102		86.3	0.0	0.0

Table No. 20: Data for annual average trend of RSPM, NO_X and SO_2 at LRT Commerce College.- Akola

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	24	86.5	1.5	5.5
10-11	88	107.0	2.9	6.3
11-12	86	124.5	7.1	7.0
12-13	102	126.1	8.0	7.8

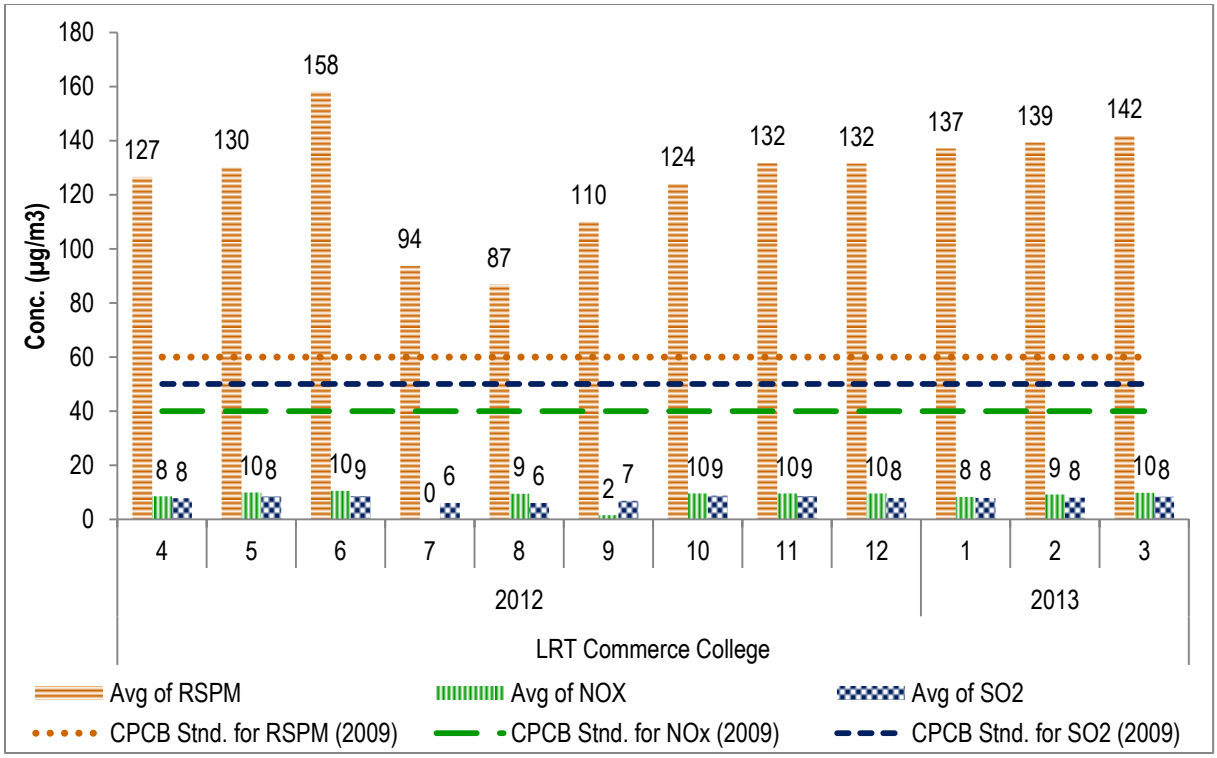


Figure No. 28: Monthly average reading recorded at LRT Commerce Collage. - Akola

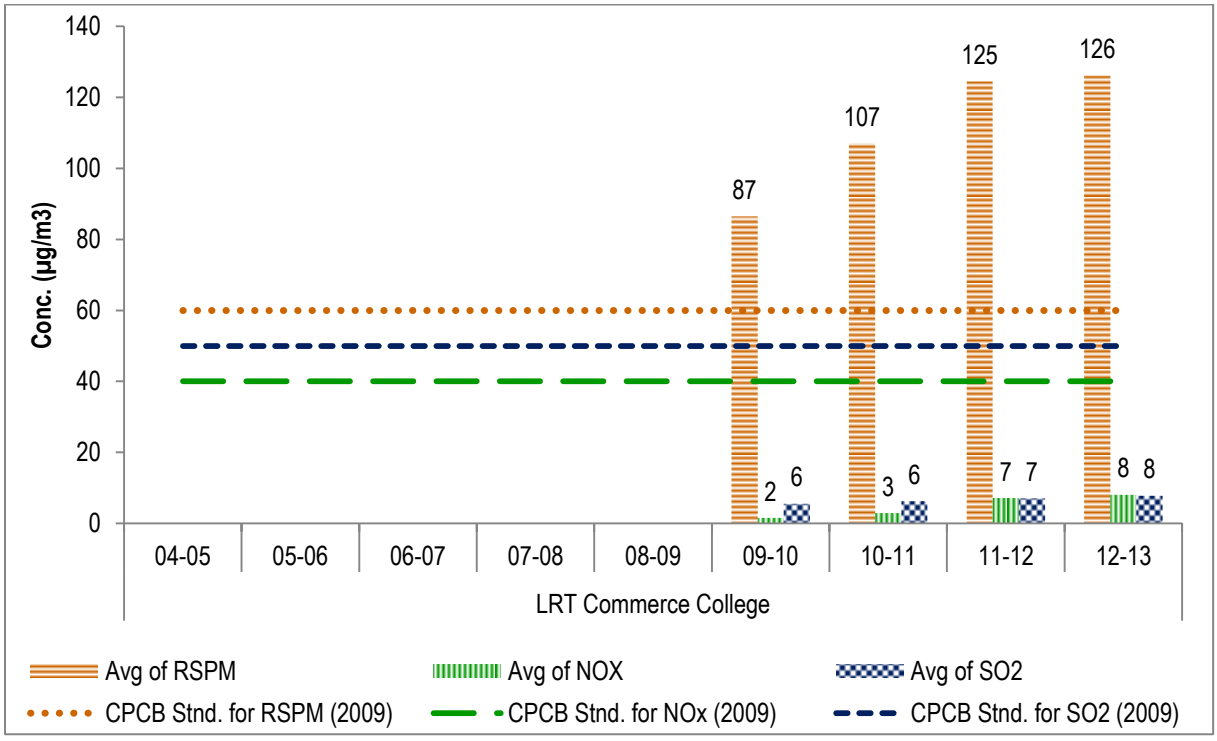


Figure No. 29: Annual average trend of SO_2, NO_X and RSPM at LRT Commerce Collage. - Akola

Akola - MIDC Water Works

Table No. 21: Data for monthly average reading recorded at MIDC Water Works.- Akola

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	157.5	12.9	11.4
May	10	152.0	13.7	11.7
Jun	8	130.9	11.0	9.9
Jul	8	116.4	7.6	7.8
Aug	9	113.8	7.7	8.0
Sep	6	124.8	9.5	8.5
Oct	8	132.5	9.6	8.1
Nov	10	143.8	11.7	10.0
Dec	8	152.6	13.4	11.6
Jan	9	149.7	10.3	9.7
Feb	8	146.0	11.5	9.6
Mar	18	156.3	11.7	10.4
	Total N		% of exceedence	
	110	**95.5**	**0.0**	**0.0**

Table No. 22: Data for annual average trend of RSPM, NO_X and SO_2 at MIDC Water Works.- Akola

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	1	88.0	10.0	8.0
10-11	84	130.6	7.3	8.6
11-12	94	141.3	11.3	9.9
12-13	110	141.6	11.0	9.8

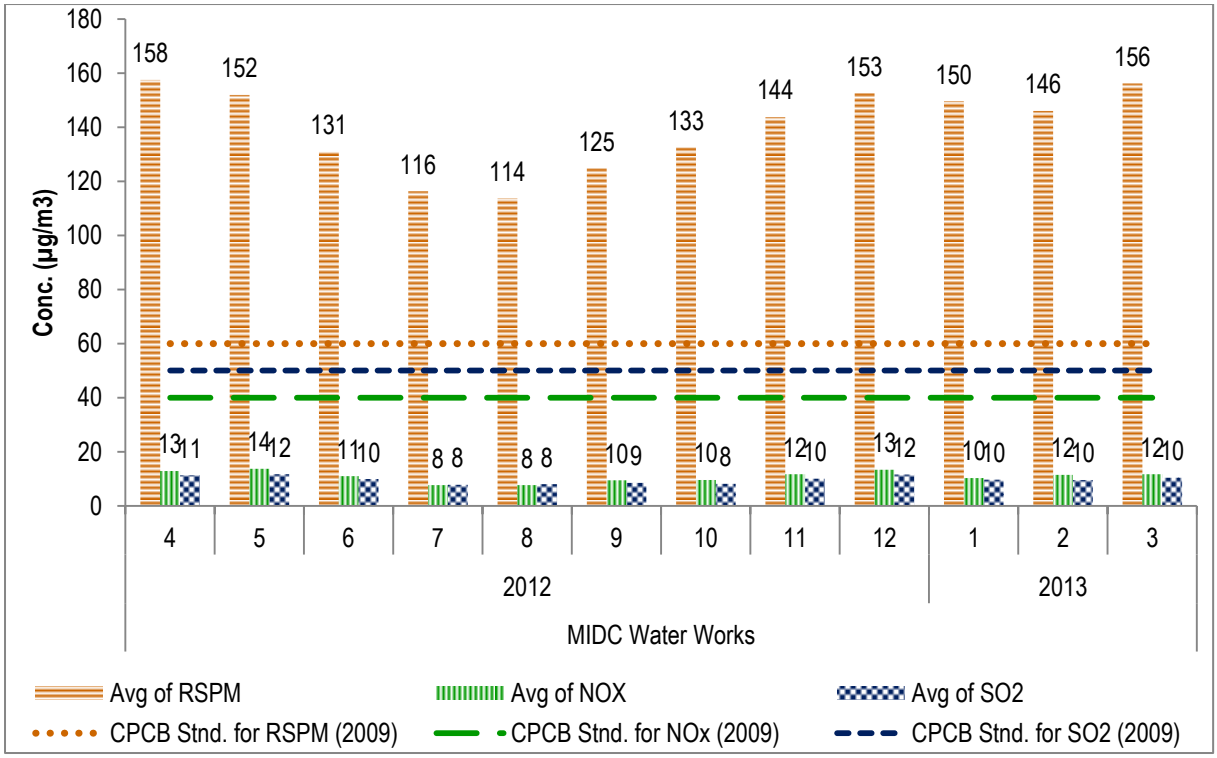


Figure No. 30: Monthly average reading recorded at MIDC Water Works.- Akola

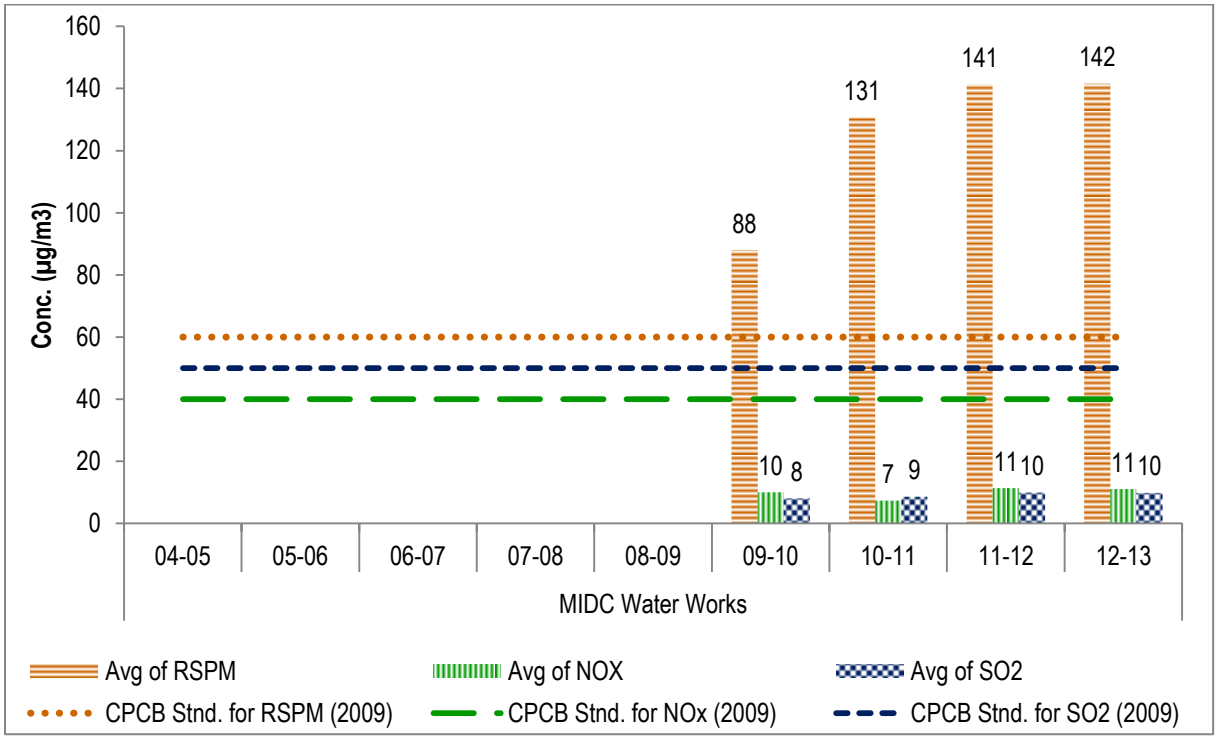


Figure No. 31: Annual average trend of SO_2, $NO_x$and RSPM at MIDC Water Works.-Akola

Akola - Akola College of Engg & Technology

Table No. 23: Data for monthly average reading recorded at College of Engg & Technology Akola (Architecture Branch) –Akola

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	9	172.7	10.9	9.2
May	8	173.4	11.4	9.8
Jun	8	115.9	3.4	6.9
Jul	6	133.3	4.8	7.7
Aug	7	121.9	3.9	7.1
Sep	8	136.6	4.5	7.5
Oct	7	148.1	9.4	8.1
Nov	10	159.5	10.5	9.2
Dec	9	169.8	11.7	10.2
Jan	8	164.0	10.8	9.5
Feb	8	144.8	6.5	8.3
Mar	9	160.3	10.8	9.4
Total N		% of exceedence		
97		**96.9**	**0.0**	**0.0**

Table No. 24: Data for annual average trend of SO_2 NO_X and RSPM at College of Engg & Technology Akola (Architecture Branch) –Akola

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	26	116.5	2.1	6.2
10-11	74	141.8	5.1	7.3
11-12	92	150.1	9.4	8.6
12-13				

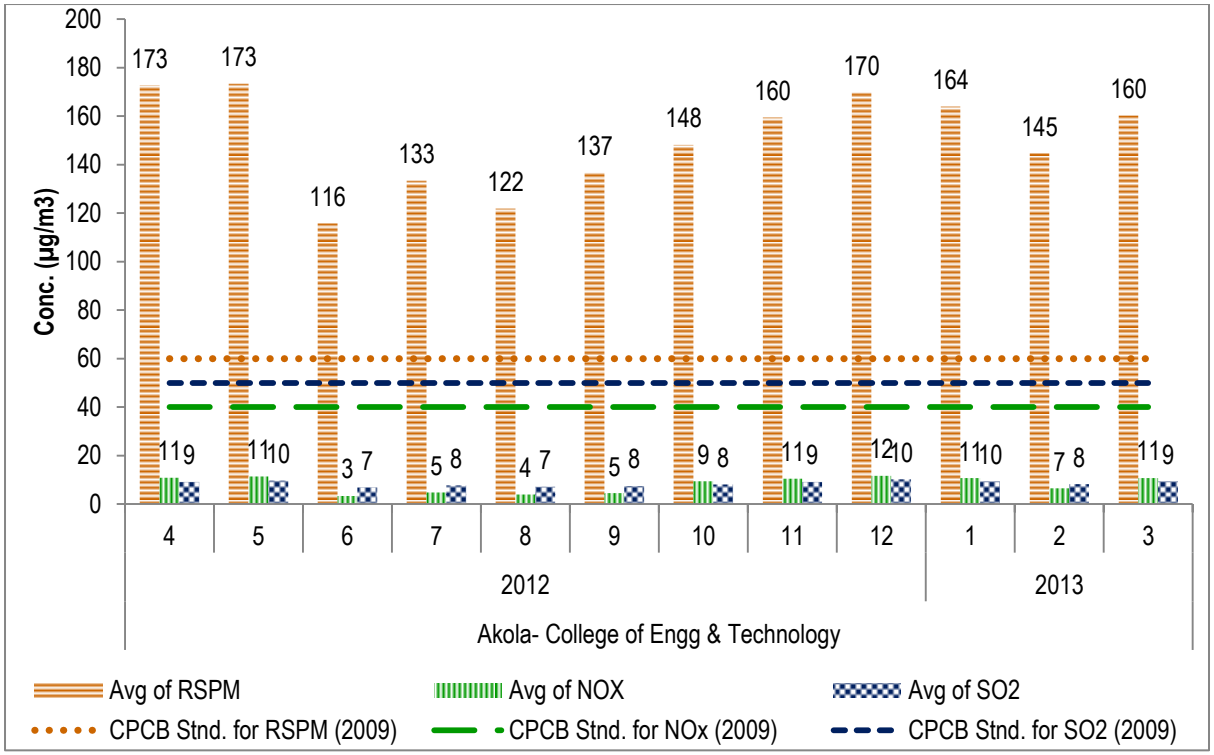


Figure No. 32: Monthly average reading recorded at Collage of Eng. And Technology Akola (Architecture Branch)-Akola

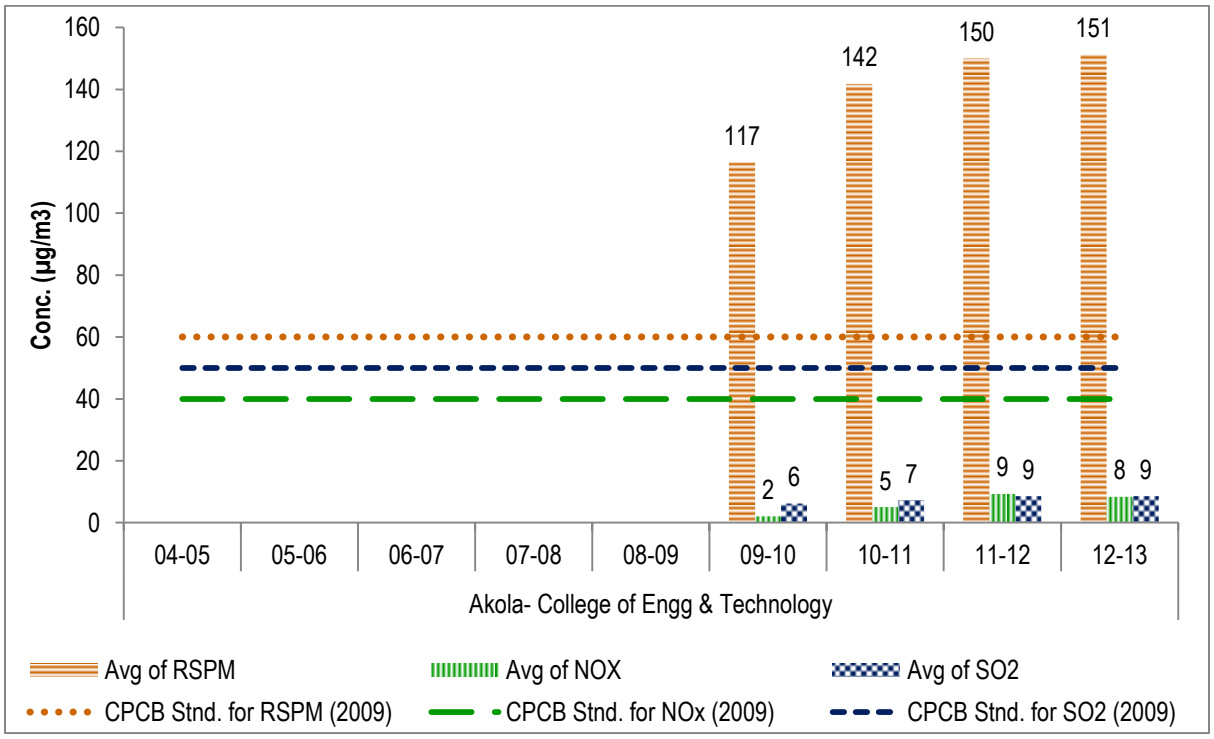


Figure No. 33: Annual average trend of SO_2 NO_X and RSPM at Collage of Eng And Technology Akola (Architecture Branch)-Akola

Amravati - Raj Kamal Chowk

Table No. 25: Data for monthly average reading recorded at Raj Kamal Chowk, Amravati

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	140.5	15.0	12.8
May	9	153.7	15.9	14.1
Jun	9	134.0	13.1	11.4
Jul	16	88.0	11.1	10.6
Aug	9	63.8	11.6	9.6
Sep	8	91.5	13.3	11.3
Oct	9	85.6	13.2	11.2
Nov	9	97.2	14.1	11.9
Dec	9	111.3	13.7	11.8
Jan	9	115.0	13.7	11.1
Feb	8	116.1	14.1	12.3
Mar	9	135.8	13.9	12.4
	Total N		% of exceedence	
	112	**60.7**	**0.0**	**0.0**

Table No. 26: Data for annual average trend of RSPM, NO_X and SO_2 at Raj Kamal Chowk, Amravati

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	43	78.7	19.1	13.3
07-08	94	78.4	15.8	11.1
08-09	98	99.9	15.2	11.7
09-10	104	125.0	16.1	13.6
10-11	104	146.1	15.2	12.8
11-12	102	107.6	17.9	14.6
12-13	112	109.5	13.4	11.6

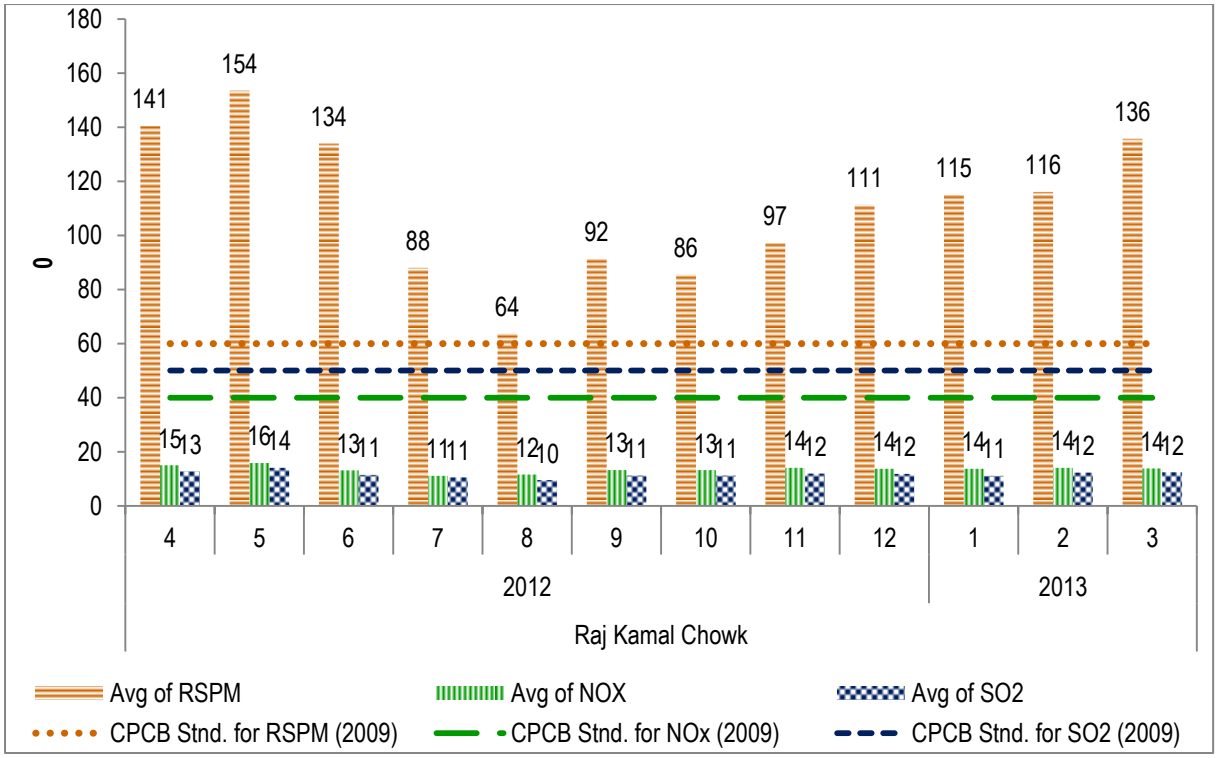


Figure No. 34: Monthly average reading recorded at Raj Kamal Chock, Amravati

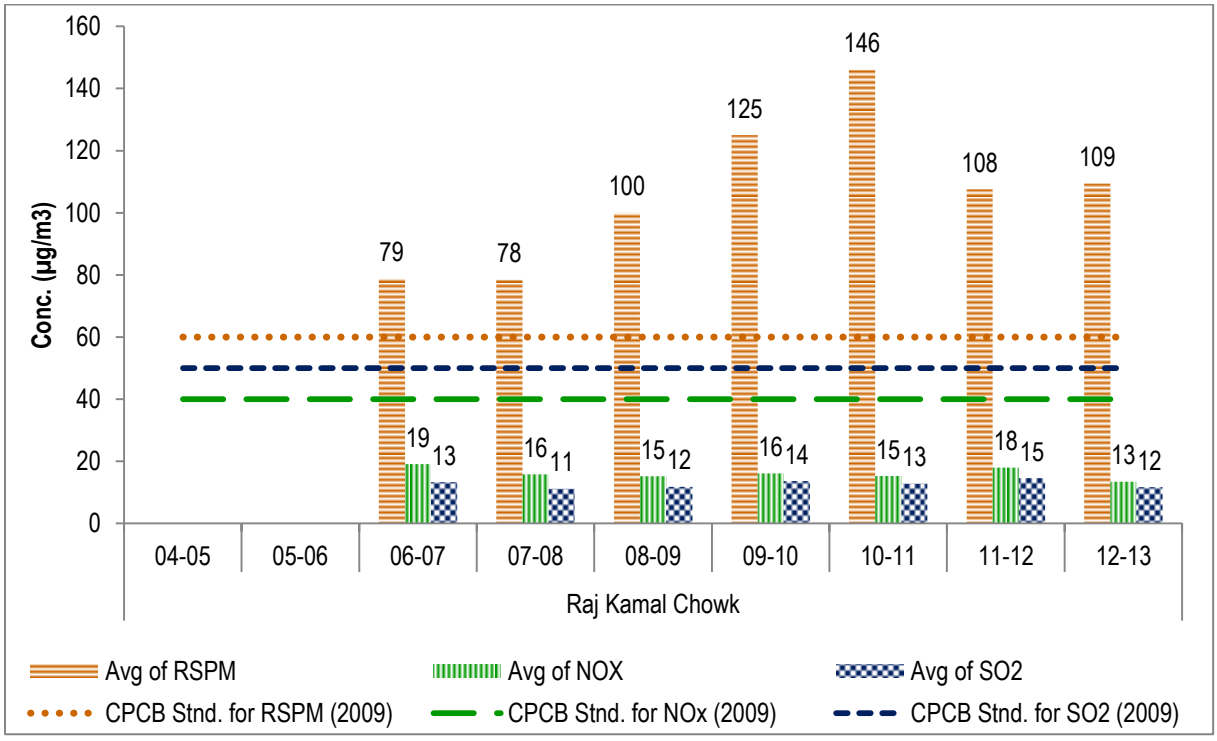


Figure No. 35: Annual average trend of SO_2, NO_X and RSPM at Raja Kamal Chock, Amravati

Amravati - Govt. College of Engineering

Table No. 27: Data for monthly average reading recorded at Govt. College of Engineering Amravati

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	93.9	13.0	11.0
May	9	96.0	13.9	11.6
Jun	8	87.8	13.3	10.9
Jul	8	72.0	12.4	10.3
Aug	9	70.0	11.7	9.7
Sep	5	67.2	12.4	10.4
Oct	7	68.9	12.1	9.9
Nov	9	70.9	12.3	10.4
Dec	8	79.4	12.0	10.4
Jan	8	76.9	11.5	10.4
Feb	8	84.1	12.8	10.6
Mar	8	87.3	12.3	10.6
	Total N		% of exceedence	
	95	**9.5**	**0.0**	**0.0**

Table No. 28: Data for annual average trend of SO_2, NO_X and RSPM at Govt. College of Engineering Amravati

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	38	49.8	12.3	10.3
07-08	98	40.3	8.0	8.2
08-09	99	46.5	9.8	8.3
09-10	104	77.6	12.1	10.1
10-11	101	78.5	12.8	10.5
11-12	95	78.7	12.4	10.4
12-13	95	80.0	12.5	10.5

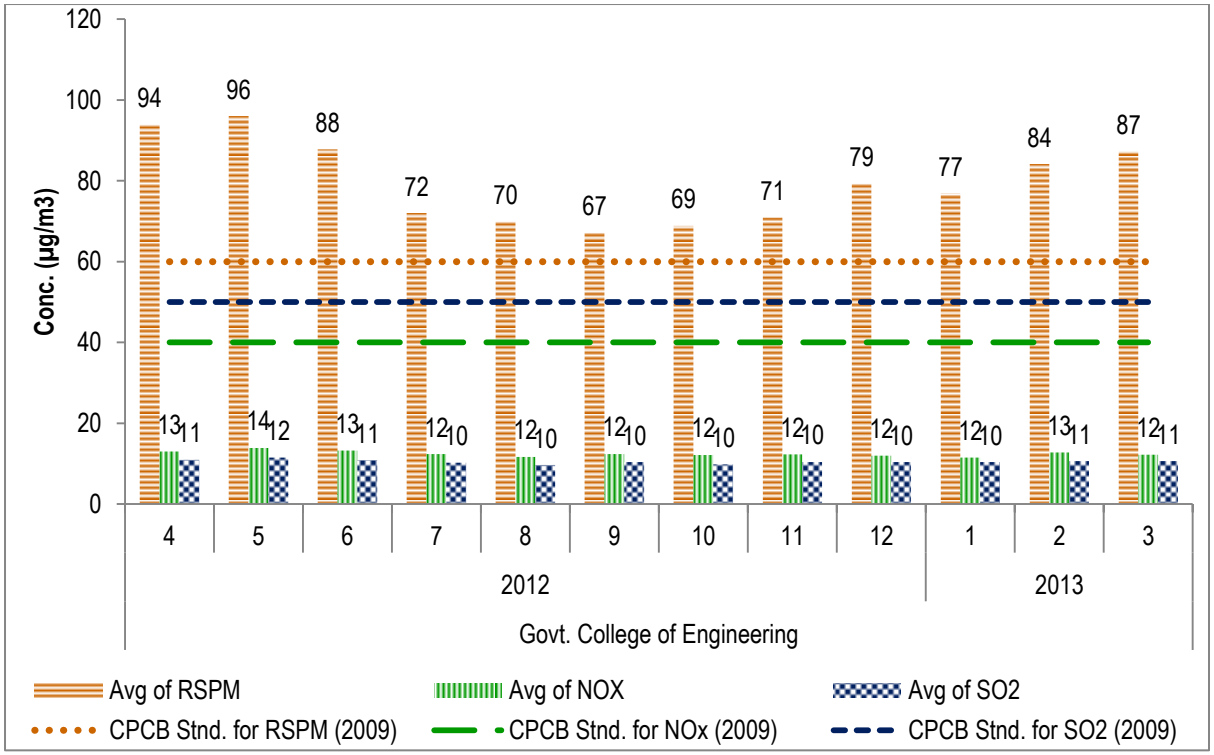


Figure No. 36 Monthly average reading recorded at Govt. Collage of Engineering –Amravati

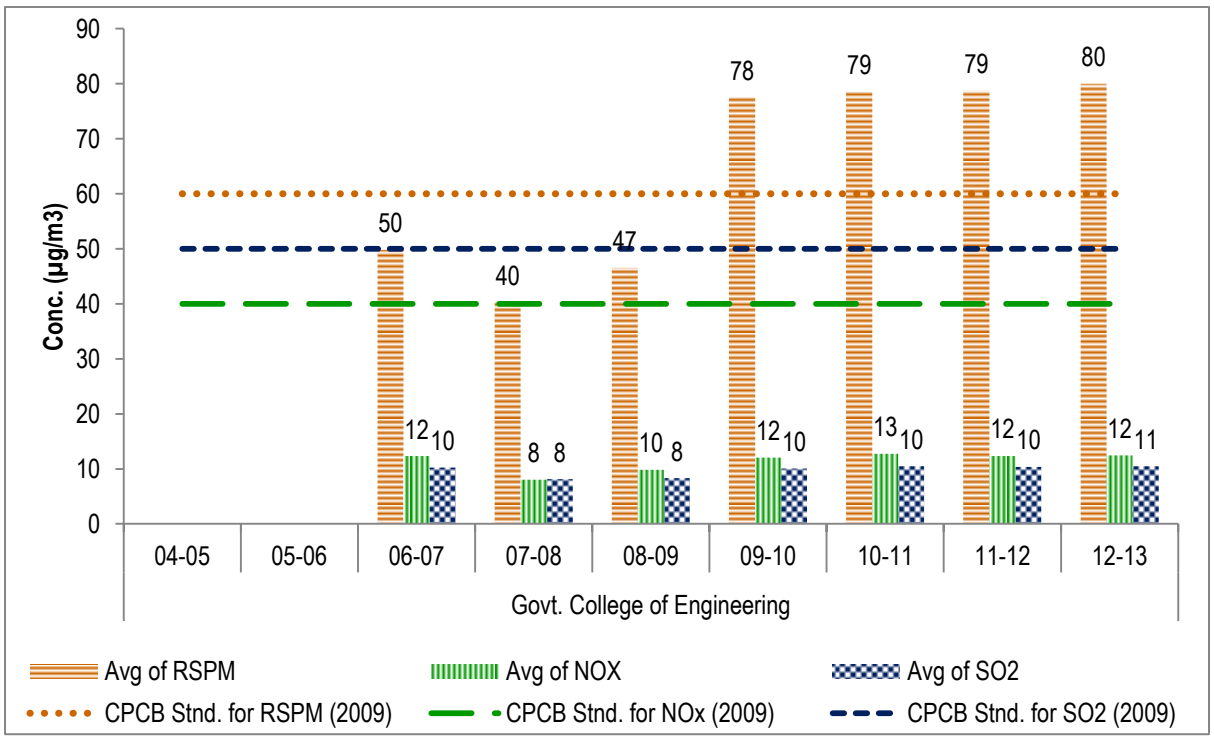


Figure No. 37 Annual average trend of SO_2, NO_X and RSPM at Govt Collage of Engineering.- Amravati

Amravati - Godhadiwala Private Limited

Table No. 29: Data for monthly average reading recorded at Godhadiwala Private Limited

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	122.9	14.0	12.4
May	9	115.4	14.3	12.7
Jun	9	108.4	13.1	11.4
Jul	9	91.9	11.3	11.0
Aug	9	88.8	12.3	10.6
Sep	8	71.5	12.1	10.8
Oct	9	92.3	13.0	11.3
Nov	9	102.0	13.3	11.7
Dec	8	98.5	12.6	11.1
Jan	9	102.3	13.4	11.6
Feb	8	104.3	13.8	12.1
Mar	9	110.9	13.9	12.1
	Total N		% of exceedence	
	104	**58.7**	**0.0**	**0.0**

Table No. 30: Data for annual average trend of RSPM, NO_X and SO_2 at Godhadiwala Private Limited

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	40	67.3	16.0	11.6
07-08	98	58.2	12.3	9.1
08-09	98	71.1	13.2	10.4
09-10	103	101.6	14.0	12.0
10-11	84	124.7	14.3	12.0
11-12	98	99.6	13.0	11.2
12-13	104	100.8	13.1	11.6

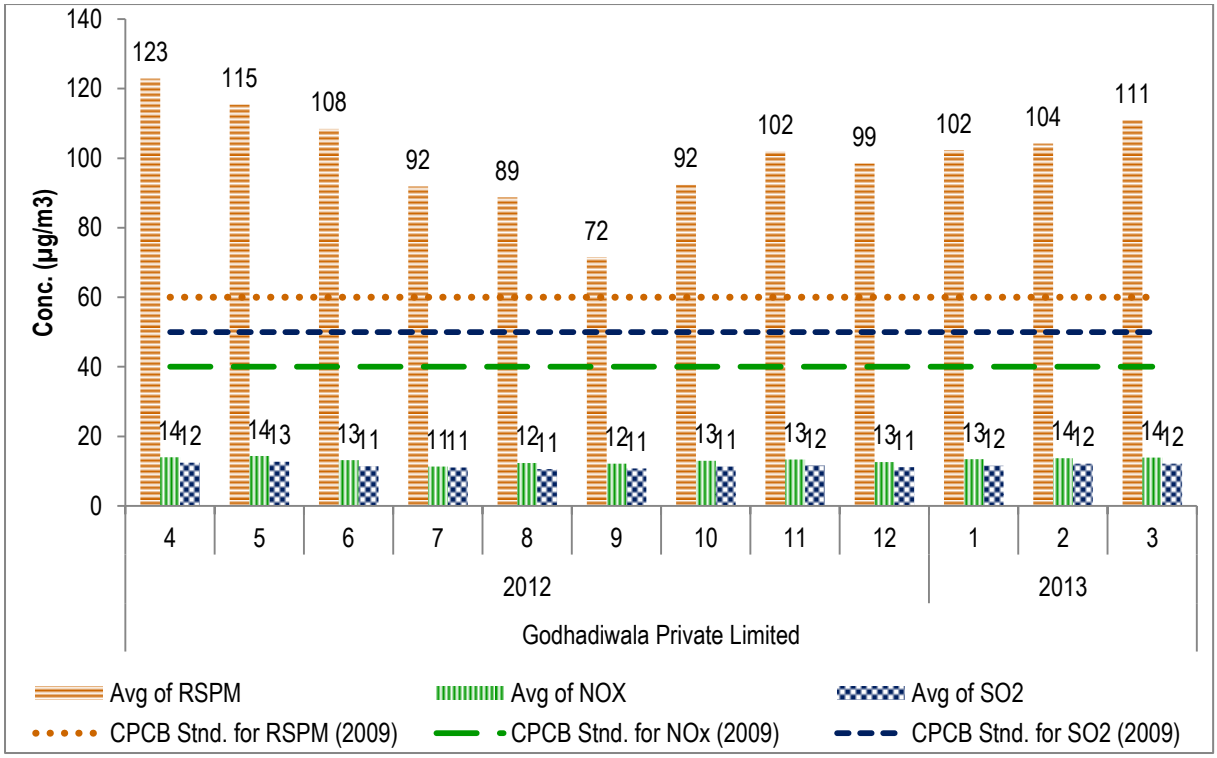


Figure No. 38: Monthly average reading recorded at Godhadiwala Pravate Limited Amravati

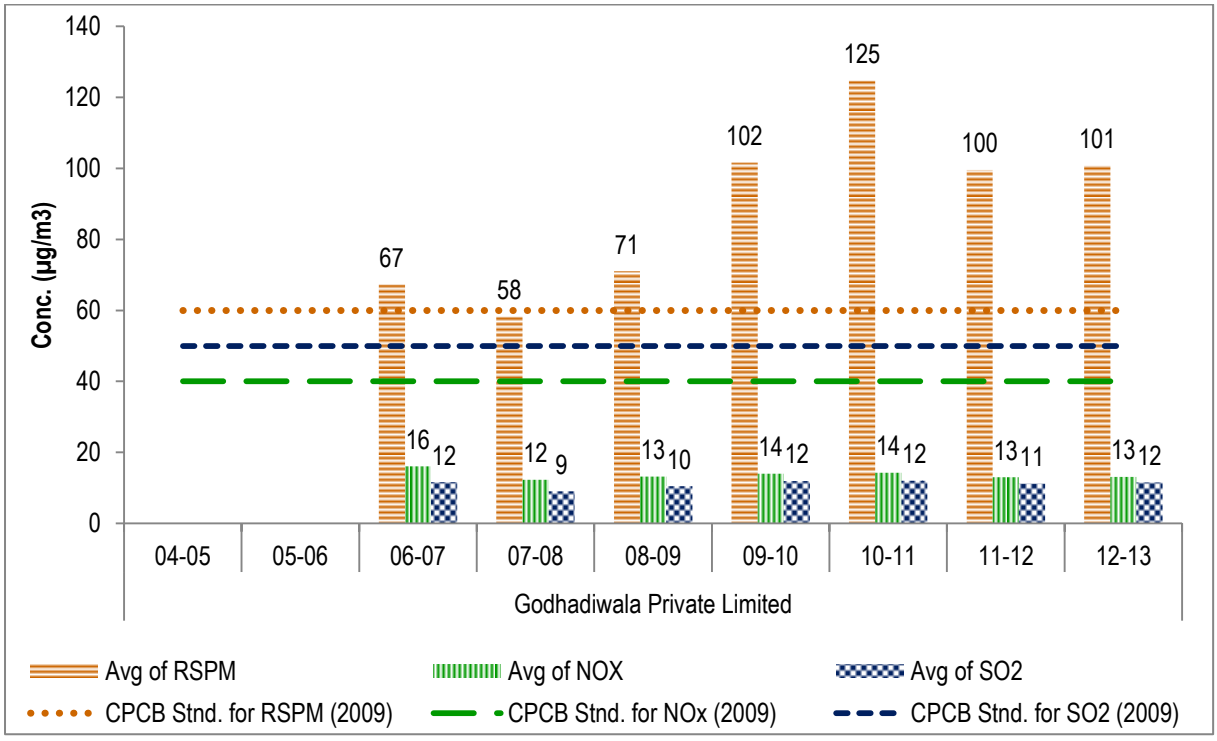


Figure No. 39: Annual average trend of SO_2, NO_X and RSPM at Godhadiwala Pravate Limited Amravati

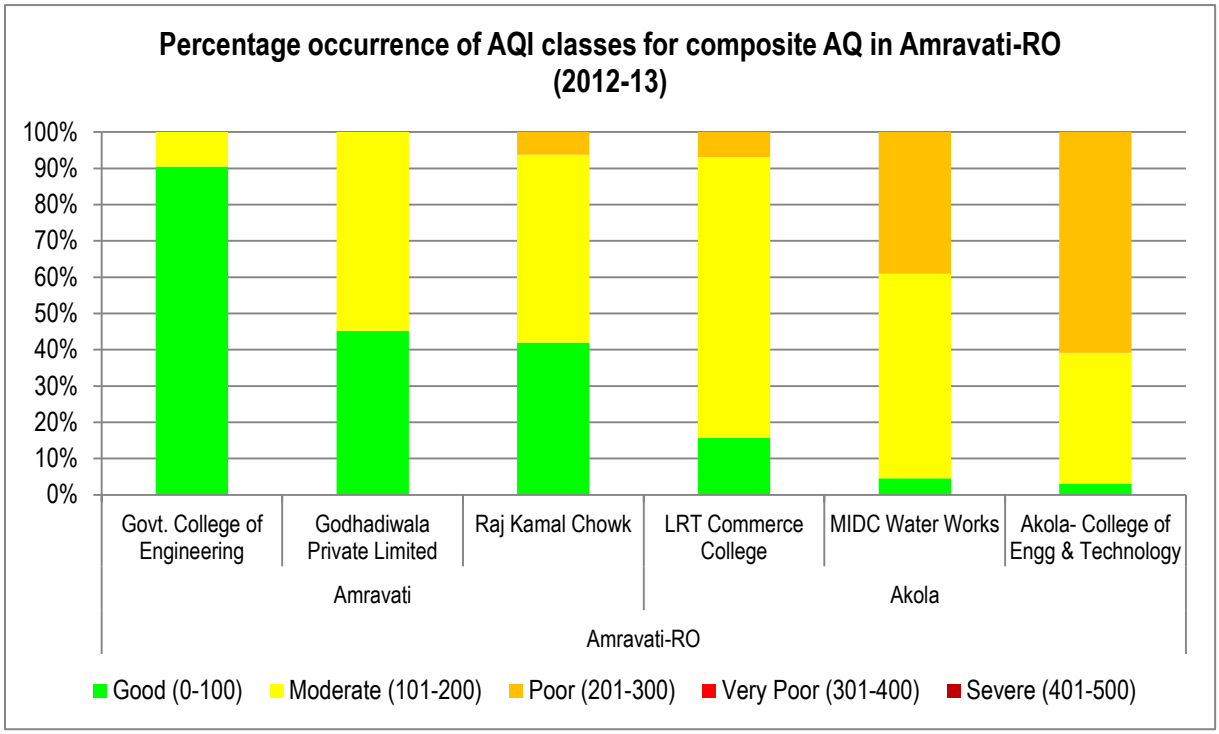
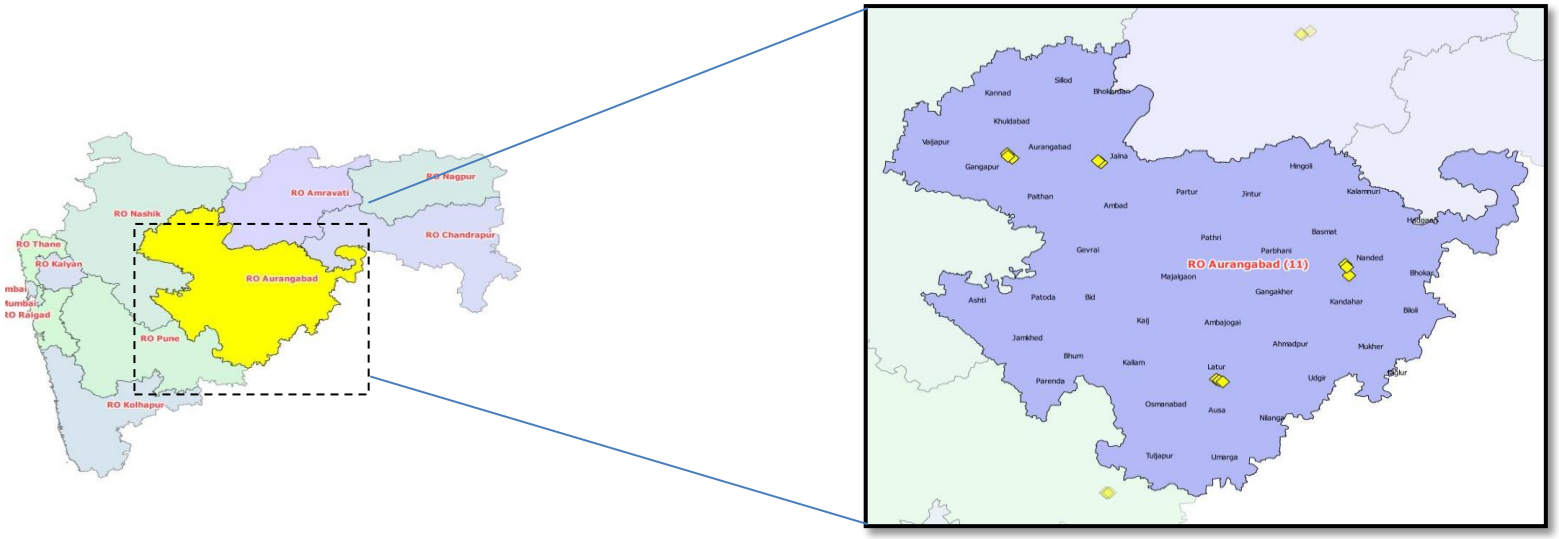


Figure No. 40: Percentage occurrence of AQI classes for composite AQ in Amravati-RO (2012-13)

RO – Aurangabad



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Aurangabad	NAMP	511	SBES College	Two Days In A Week	19° 52' 54.9" N	75° 19' 33.7" E
		512	Collector Office, Aurangabad	Two Days In A Week	19° 53' 58.4" N	75° 19' 14.2" E
		513	C.A.D.A. Office	Two Days In A Week	19° 52' 14.3" N	75° 21' 03.5" E
Jalna	NAMP	706	Jalna- Bachat Bhavan	Two Days In A Week	19° 50' 26.4" N	75° 52' 17.4" E
		707	Jalna- Krishna Dhan	Two Days In A Week	19° 51' 04.3" N	75° 51' 14.4" E
Latur	NAMP	641	MIDC Water Works	Two Days In A Week	18° 24' 53.0" N	76° 32' 49.4" E
		642	Shyam Nagar-Kshewraj Vidyalaya	Two Days In A Week	18° 24' 21.6" N	76° 33' 50.2" E
		643	Ganj Golai - Sidhheshwar Bank	Two Days In A Week	18° 23' 58.0" N	76° 35' 02.6" E
Nanded	NAMP	703	Ganeshnagar	Two Days In A Week	19° 10' 16.3" N	77° 17' 56.3" E
		704	Mutha Chowk	Two Days In A Week	19° 09' 16.8" N	77° 18' 34.9" E
		705	Industrial Area CIDCO	Two Days In A Week	19° 05' 48.2" N	77° 19' 17.9" E

Aurangabad - SBES College

Table No. 31: Data for monthly average reading recorded at SBES College -Aurngabad

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	90.8	26.5	8.1
May	17	83.0	26.4	7.3
Jun	10	74.4	27.1	7.3
Jul	8	67.9	24.6	7.8
Aug	9	69.2	29.1	8.1
Sep	9	78.8	27.7	8.0
Oct	8	84.0	32.5	8.0
Nov	9	107.2	36.9	11.7
Dec	9	130.2	45.4	15.1
Jan	6	132.3	46.5	15.3
Feb	8	109.1	45.3	15.5
Mar	10	107.0	41.8	12.9
	Total N		% of exceedence	
	111	**36.9**	**0.0**	**0.0**

Table No. 32: Data for annual average trend of SO_2, NO_X and RSPM, at SBES College -Aurngabad

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	35	166.1	30.2	6.8
06-07	83	84.9	18.2	5.8
07-08	101	78.9	22.0	5.7
08-09	104	93.6	22.4	9.4
09-10	101	98.4	24.8	7.1
10-11	95	93.9	23.1	6.5
11-12	105	90.0	33.0	9.3
12-13	111	92.8	33.3	10.1

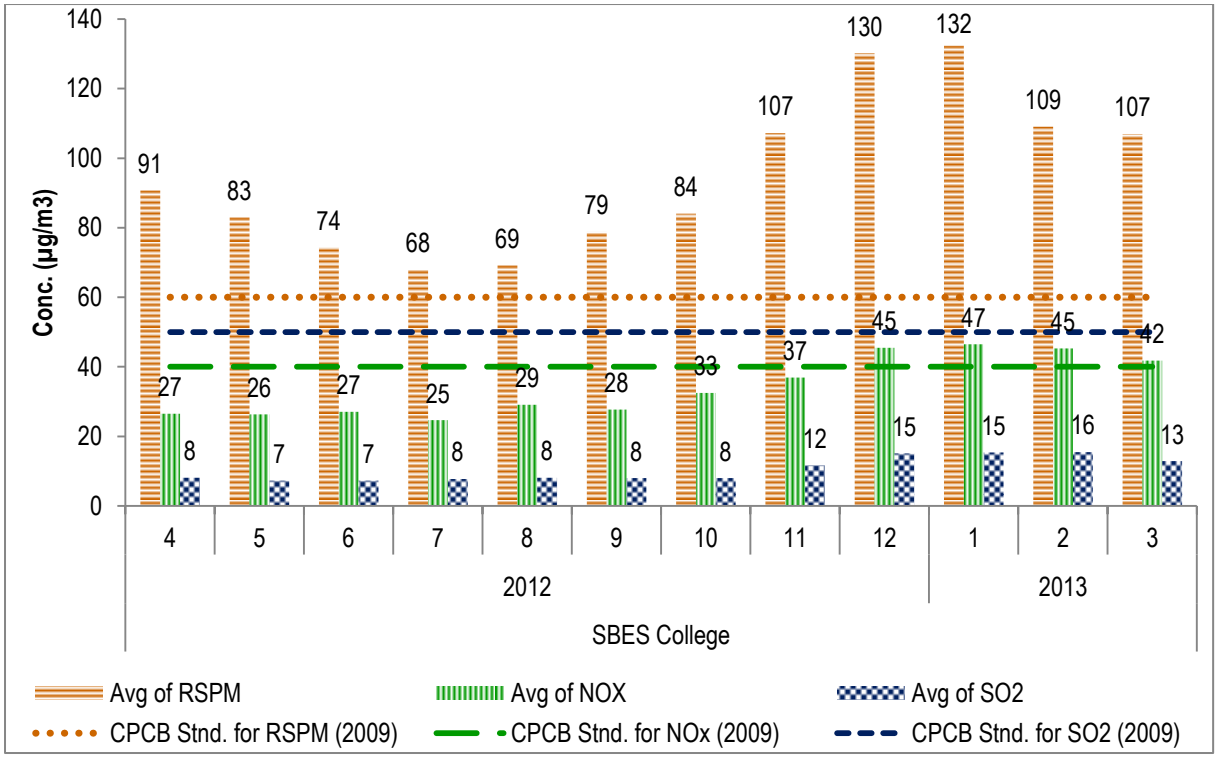


Figure No. 41: Monthly average reading recorded at SBES Collage -Aurangabad

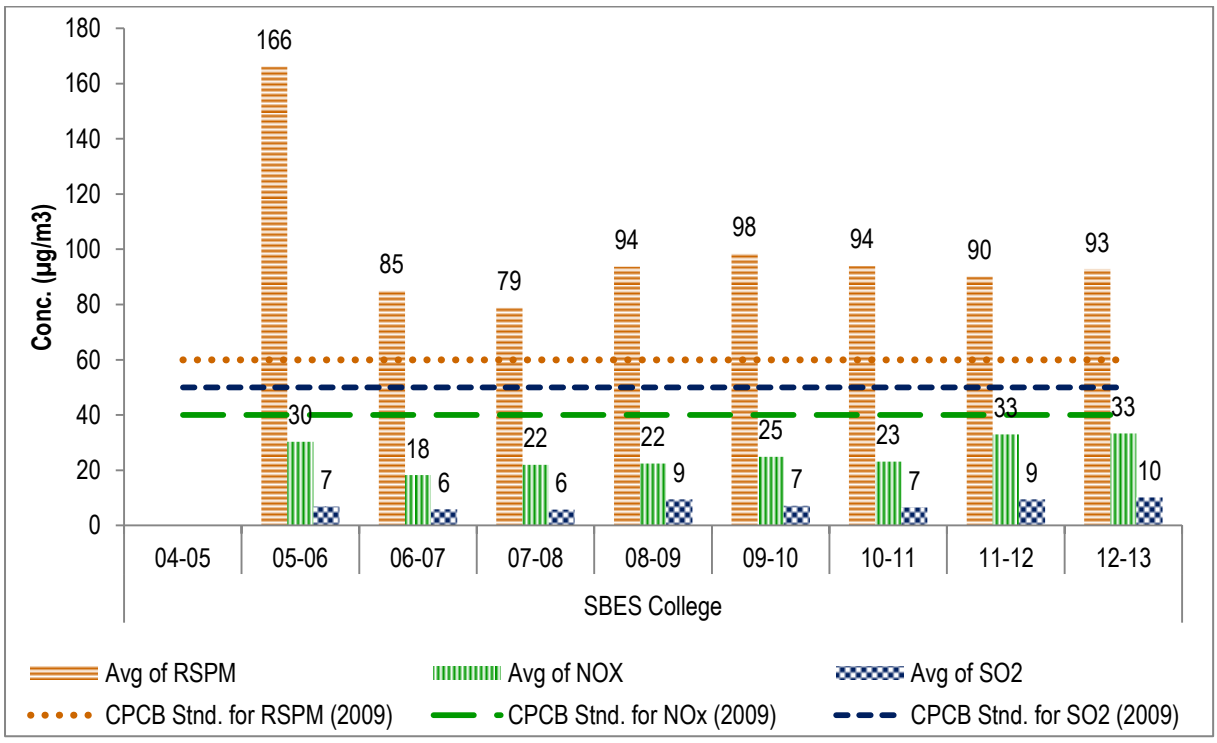


Figure No. 42: Annual average trend of SO_2, NOx and RSPM at SBES Collage -Aurangabad

Aurangabad - Collector Office, Aurangabad

Table No. 33: Data for monthly average reading recorded at Collector Office, Aurangabad

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	9	86.2	25.0	7.8
May	9	72.2	25.1	6.8
Jun	8	60.1	25.0	6.9
Jul	10	51.6	23.2	7.6
Aug	8	58.6	27.4	7.8
Sep	8	56.3	25.3	7.5
Oct	10	66.1	30.6	7.5
Nov	7	87.9	37.6	11.6
Dec	9	93.2	38.7	11.9
Jan	7	93.3	40.6	12.1
Feb	8	96.9	40.5	11.5
Mar	8	94.9	37.3	9.9
Total N		% of exceedence		
101		**9.9**	**0.0**	**0.0**

Table No. 34: Data for annual average trend of RSPM, NO_X and SO_2 at Collector Office, Aurangabad

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	34	107.5	19.2	5.7
06-07	87	72.7	12.7	4.1
07-08	100	56.0	16.1	5.1
08-09	96	67.8	19.9	8.2
09-10	101	85.5	21.9	5.9
10-11	100	68.8	21.9	6.1
11-12	104	91.6	29.1	8.2
12-13	101	75.7	31.0	8.9

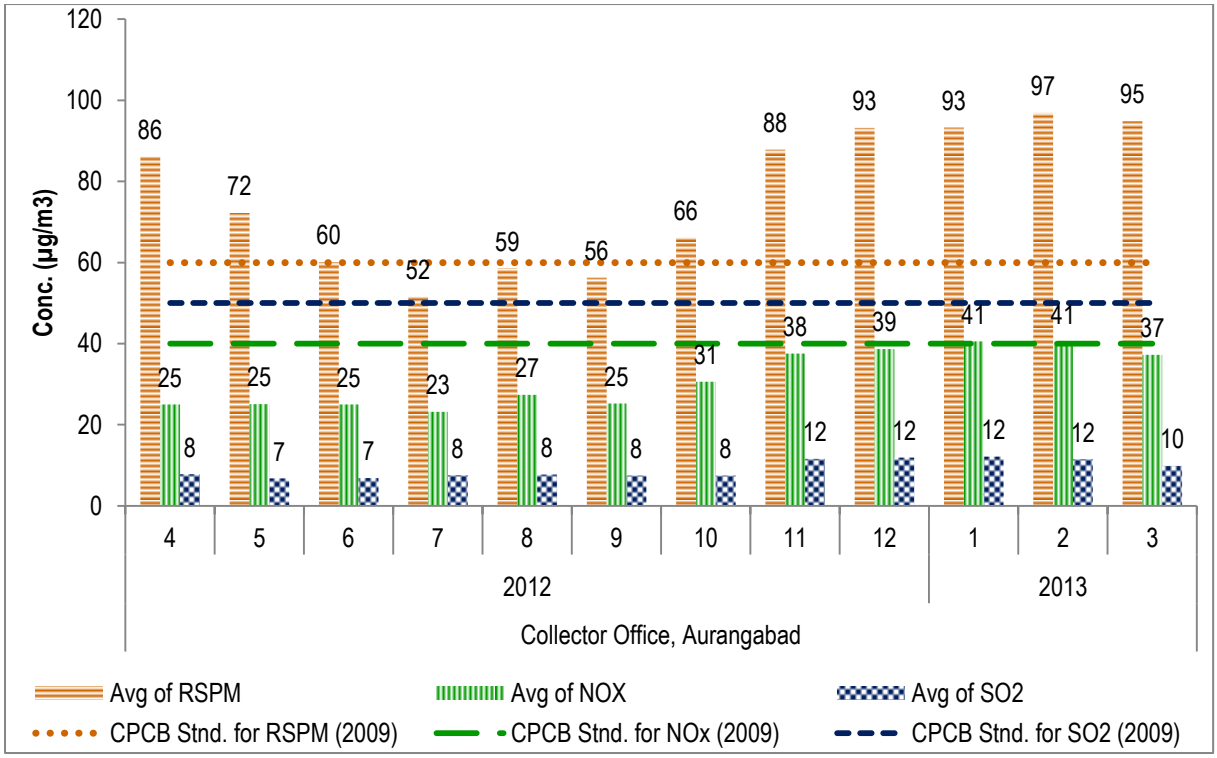


Figure No. 43: Monthly average reading recorded at Collector Office, Aurangabad

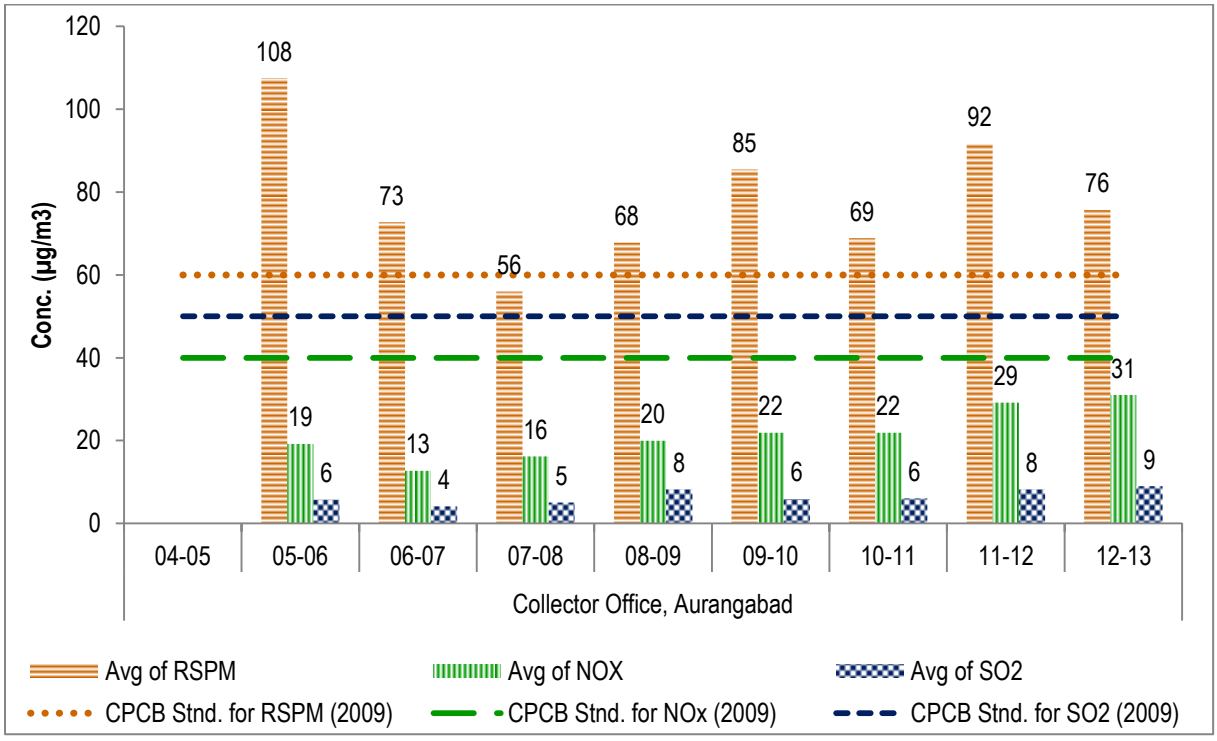


Figure No. 44: Annual average trend of SO_2, NOx and RSPM at Collector Office, Aurangabad

Aurangabad - C.A.D.A. Office

Table No. 35: Data for monthly average reading recorded at C.A.D.A. Office

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	87.8	28.1	9.1
May	10	69.5	29.2	8.6
Jun	8	41.6	28.0	7.8
Jul	8	30.6	26.8	8.4
Aug	10	39.2	30.4	8.5
Sep	8	50.8	29.4	8.8
Oct	9	70.3	33.7	8.9
Nov	9	90.4	45.8	14.4
Dec	8	87.5	40.0	12.8
Jan	8	90.9	43.6	14.4
Feb	8	76.4	43.6	14.5
Mar	8	79.4	38.9	12.0
	Total N		% of exceedence	
	102	**5.9**	**0.0**	**0.0**

Table No. 36: Data for annual average trend of RSPM, NO_X and SO_2 at C.A.D.A. Office

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	32	118.6	23.1	6.8
06-07	90	78.7	19.0	5.3
07-08	98	79.4	23.1	5.5
08-09	102	63.3	21.2	9.5
09-10	99	66.3	22.2	6.0
10-11	102	68.8	21.7	6.4
11-12	103	75.3	34.1	9.9
12-13	102	67.6	34.7	10.6

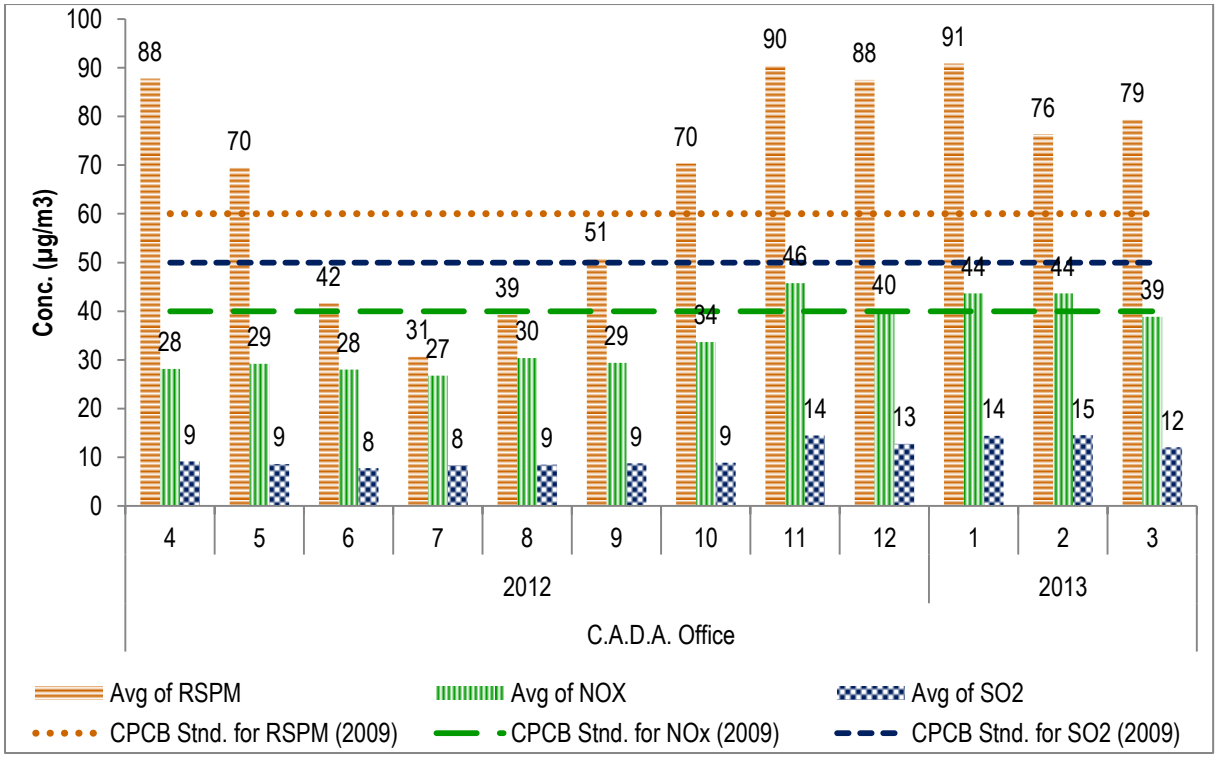


Figure No. 45: Monthly average reading recorded at C.A.D.A. Office Aurangabad

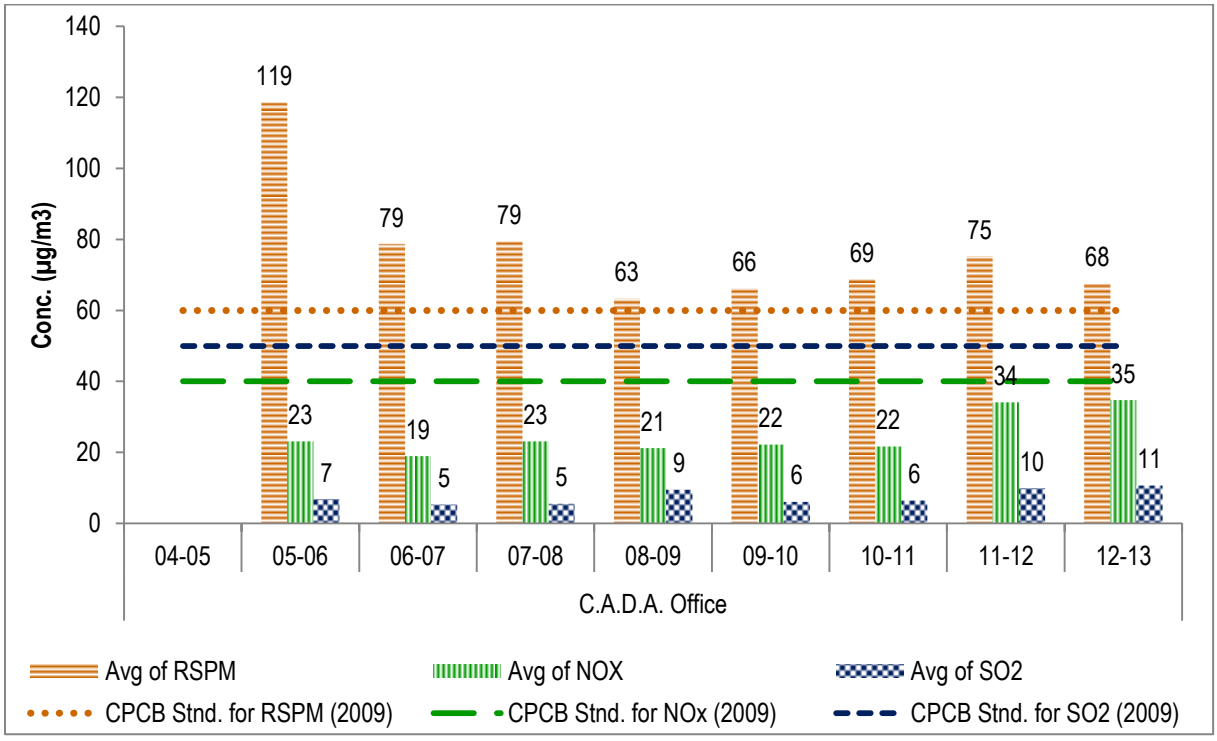


Figure No. 46: Annual average trend of SO_2, NOx and RSPM at C.A.D.A.Office Aurangabad

Jalna - Bachat Bhavan

Table No. 37: Data for monthly average reading recorded at Jalna- Bachat Bhavan

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	129.4	24.6	6.4
May	-	-	-	-
Jun	7	81.9	27.3	6.9
Jul	8	54.3	28.8	7.0
Aug	10	50.7	29.5	8.4
Sep	8	58.0	31.1	10.4
Oct	8	77.6	32.0	11.5
Nov	10	113.4	31.2	10.8
Dec	8	136.8	31.5	11.1
Jan	9	133.0	31.9	11.3
Feb	8	131.4	30.8	10.8
Mar	9	98.0	31.1	10.9
	Total N		% of exceedence	
	93	41.9	0.0	0.0

Table No. 38: Data for annual average trend of RSPM, NO_X and SO_2 at Jalna- Bachat Bhavan

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	100	52.7	21.6	13.4
07-08	95	87.0	27.8	16.6
08-09	18	66.4	32.1	17.1
09-10	32	84.3	28.2	5.5
10-11	102	73.3	26.3	5.1
11-12	104	89.4	24.7	6.3
12-13	93	96.7	30.1	9.6

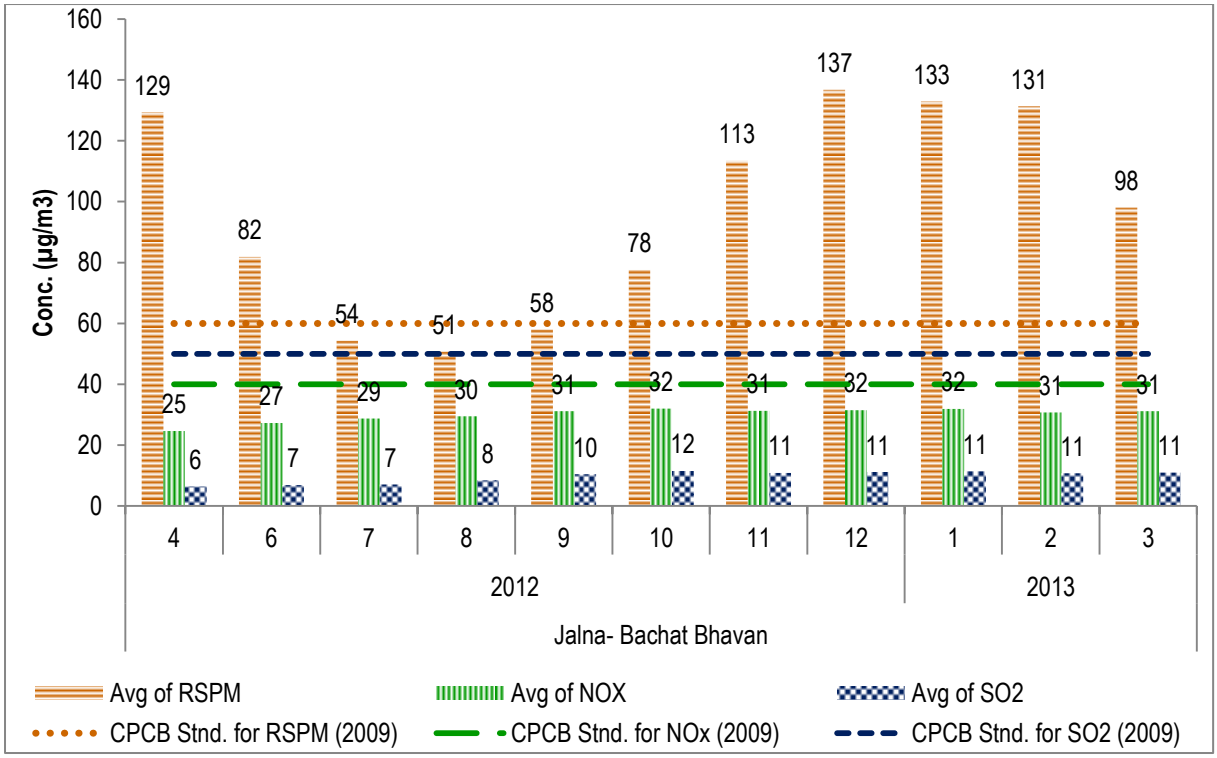


Figure No. 47: Monthly average reading recorded at Jalna Bachat Bhavan

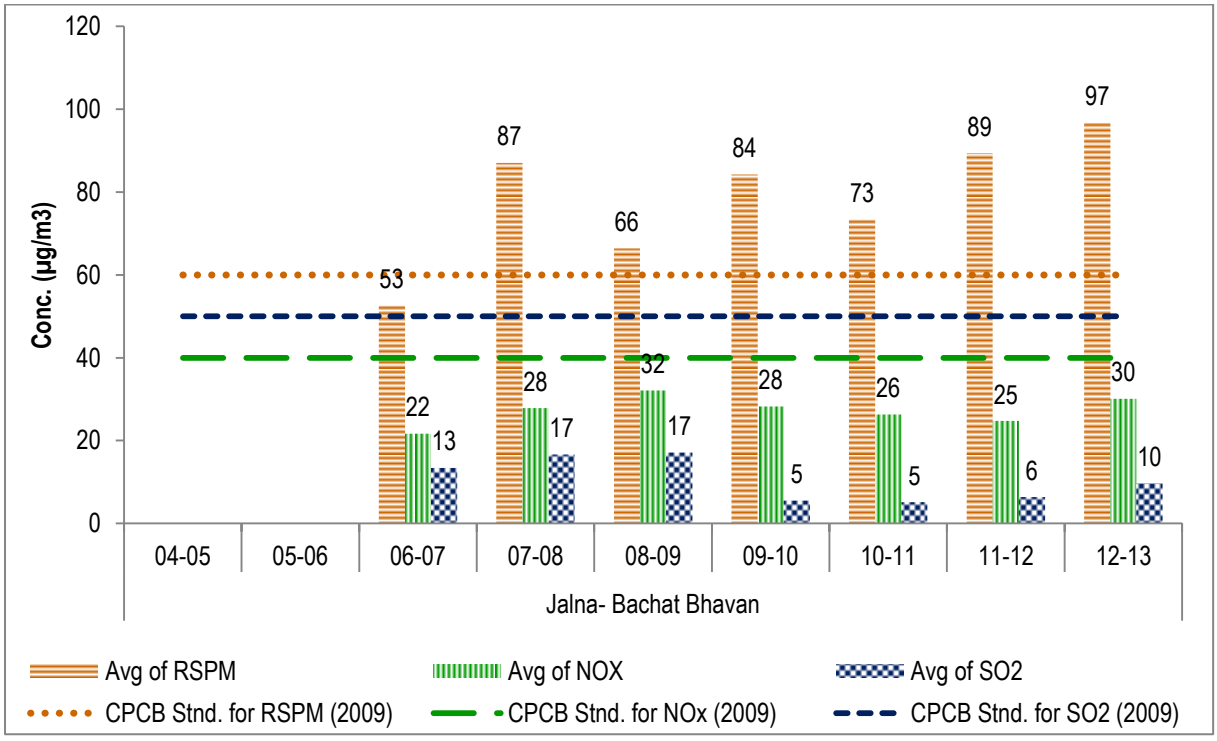


Figure No. 48: Annual average trend of SO_2, NOx and RSPM at Jalna Bachat Bhavan

Jalna - Krishnadhan seeds Ltd

Table No. 39: Data for monthly average reading recorded at Jalna- Krishnadhan seeds Ltd

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	103.4	26.4	6.9
May	-	-	-	-
Jun	7	106.7	29.6	8.6
Jul	3	135.0	34.0	8.7
Aug	9	141.8	29.8	8.9
Sep	8	149.4	32.8	10.5
Oct	10	131.8	34.7	12.8
Nov	8	157.0	32.9	12.6
Dec	8	143.8	32.6	12.4
Jan	10	178.4	33.3	13.0
Feb	8	143.5	32.3	11.9
Mar	8	164.1	32.4	12.5
	Total N		% of exceedence	
	87	78.2	0.0	0.0

Table No. 40: Data for annual average trend of RSPM, NO_X and SO_2 at Jalna- Krishnadhan seeds Ltd

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	90	124.7	29.3	17.4
07-08	103	140.1	44.0	28.3
08-09	16	182.3	45.3	29.7
09-10	52	111.0	37.3	12.9
10-11	83	139.0	32.7	6.8
11-12	104	140.1	26.5	7.7
12-13	87	142.7	31.9	11.0

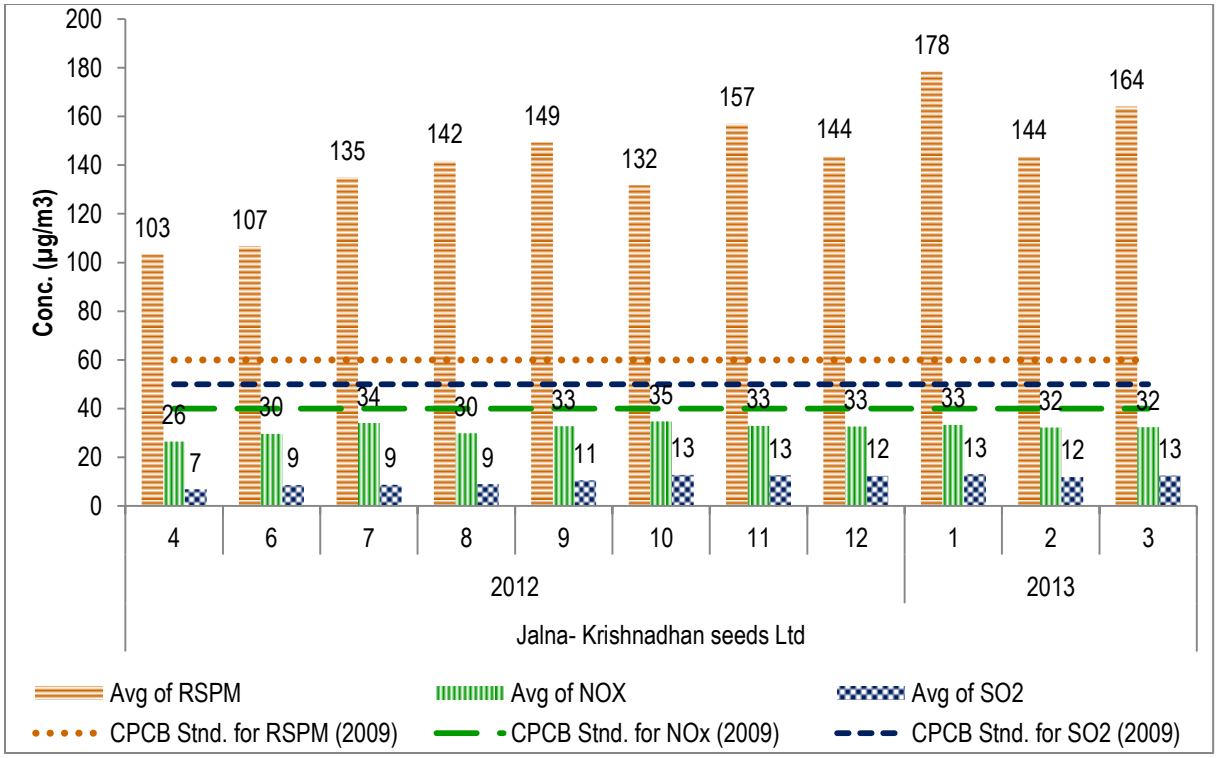


Figure No. 49: Monthly average reading recorded at Jalna Krishnadhan Seeds Ltd

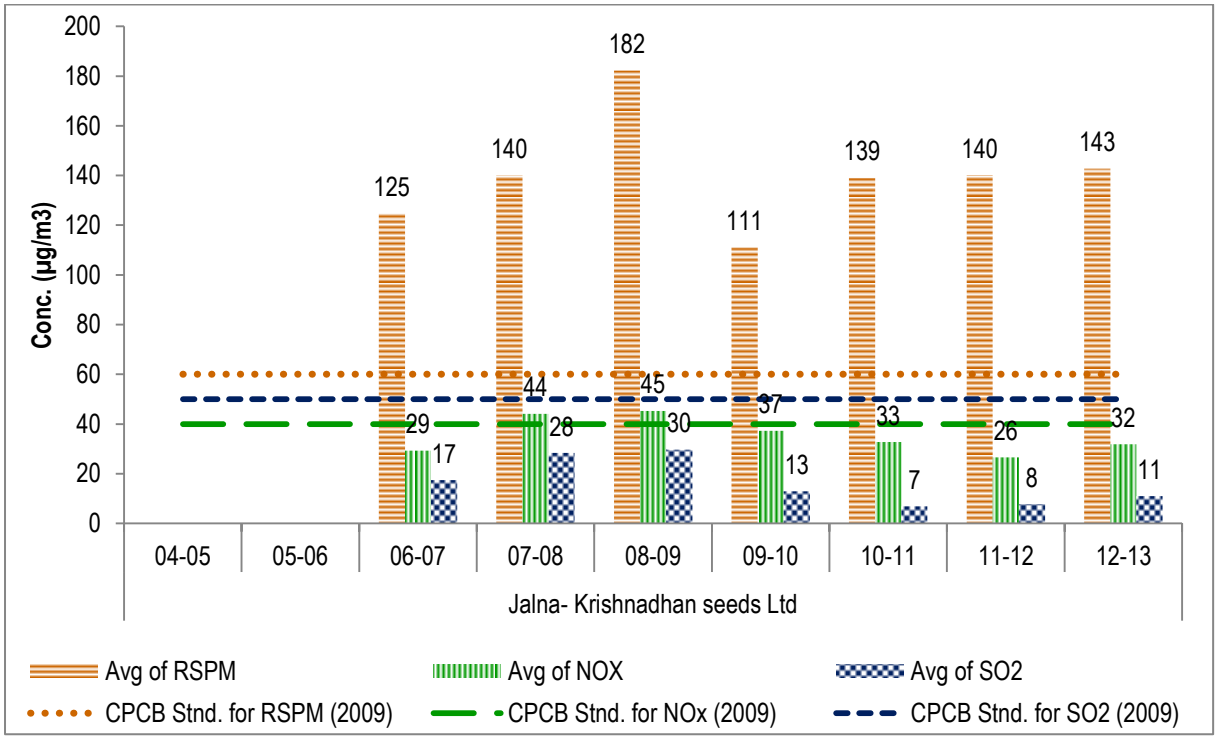


Figure No. 50: Annual average trend of SO_2, NOx and RSPM at Jalna Krishnadhan Seeds Ltd

Latur - MIDC Water Works

Table No. 41: Data for monthly average reading recorded at Latur MIDC Water Works

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	8	112.3	15.6	7.1
May	8	101.6	23.0	9.6
Jun	10	55.2	14.9	6.1
Jul	8	35.4	17.4	10.0
Aug	4	26.3	24.0	10.3
Sep	9	36.0	29.7	15.7
Oct	8	92.6	19.8	6.5
Nov	9	100.7	18.6	8.4
Dec	9	104.9	15.6	5.9
Jan	8	108.4	14.4	4.1
Feb	8	87.9	10.1	9.1
Mar	10	96.8	22.4	7.4
	Total N		% of exceedence	
	99	26.3	0.0	0.0

Table No. 42: Data for annual average trend of RSPM, NOx and SO_2 at Latur MIDC Water Works

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	91	76.6	21.7	4.4
09-10	99	75.7	22.4	7.5
10-11	100	94.8	14.6	5.6
11-12	119	99.0	15.5	5.8
12-13	99	81.9	18.6	8.3

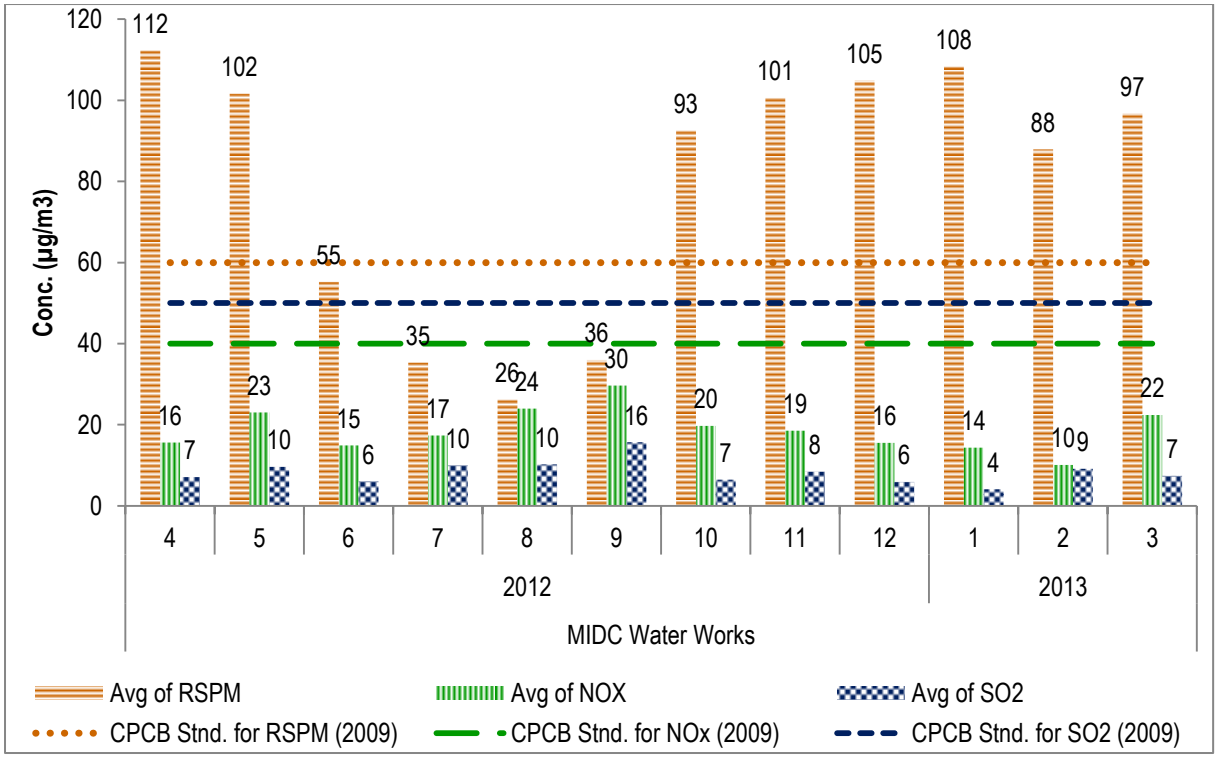


Figure No. 51: Monthly average reading recorded at Latur MIDC Water Works

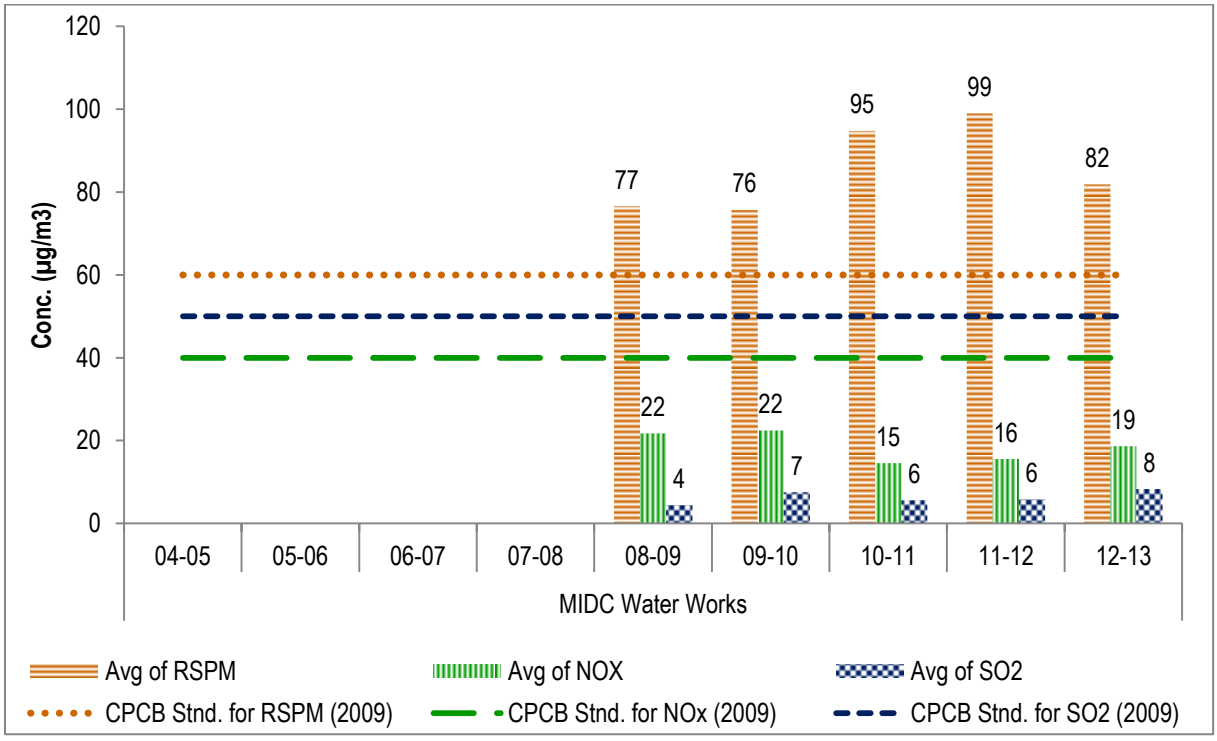


Figure No. 52: Annual average trend of SO_2, NOx and RSPM at Latur MIDC Water Works

Latur - Shyam Nagar-Kshewraj Vidyalaya

Table No. 43: Data for monthly average reading recorded at Shyam Nagar-Kshewraj Vidyalaya

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	9	165.0	13.7	6.7
May	9	115.4	15.4	8.2
Jun	8	89.4	16.3	5.5
Jul	10	44.9	14.9	8.6
Aug	8	63.0	21.1	8.5
Sep	8	51.5	22.8	12.6
Oct	10	92.7	21.4	8.3
Nov	8	96.8	23.3	7.1
Dec	9	139.1	19.6	5.4
Jan	9	138.1	17.0	5.4
Feb	8	138.4	17.8	4.6
Mar	8	125.3	23.6	8.1
Total N		% of exceedence		
104		50.0	0.0	0.0

Table No. 44: Data for annual average trend of RSPM, NOx and SO_2 at Shyam Nagar-Kshewraj Vidyalaya

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	79	99.4	16.0	3.4
09-10	90	123.3	19.3	5.6
10-11	85	139.2	12.8	5.7
11-12	100	123.5	13.9	5.8
12-13	104	104.9	18.8	7.4

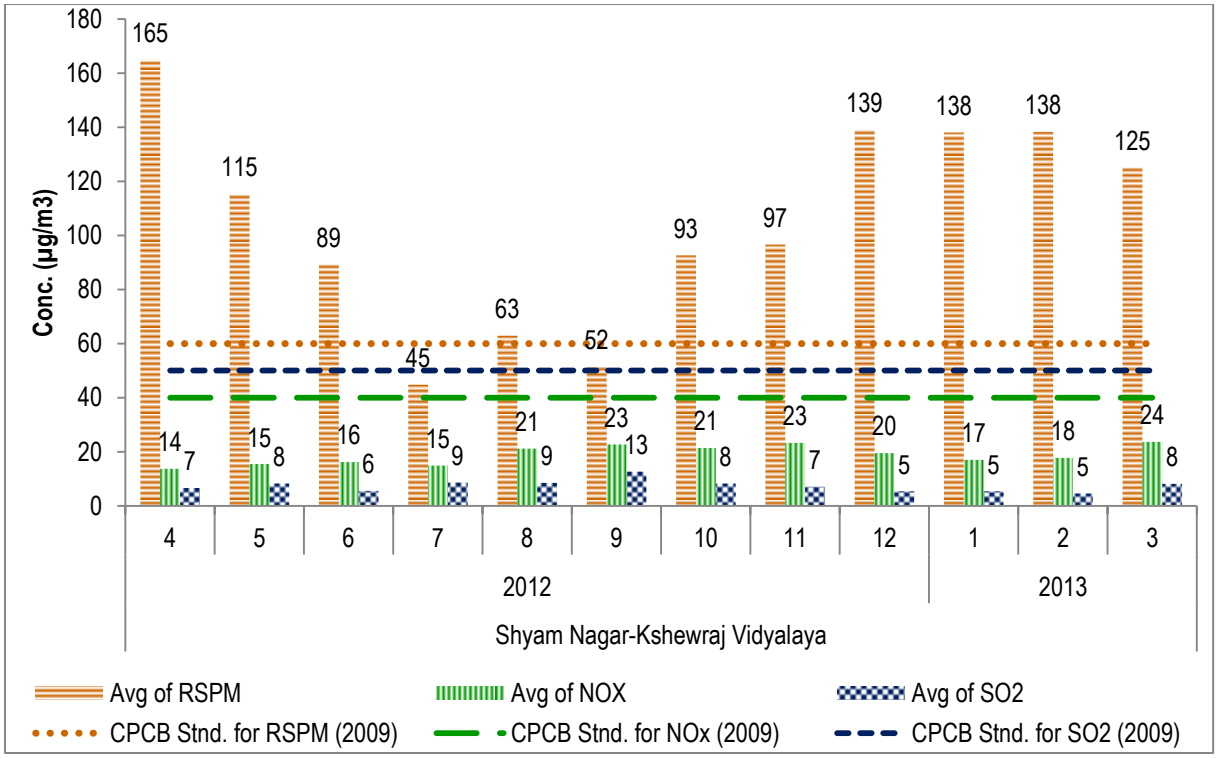


Figure No. 53: Monthly average reading recorded at Shyam Nagar Keshwraj Vidyalaya

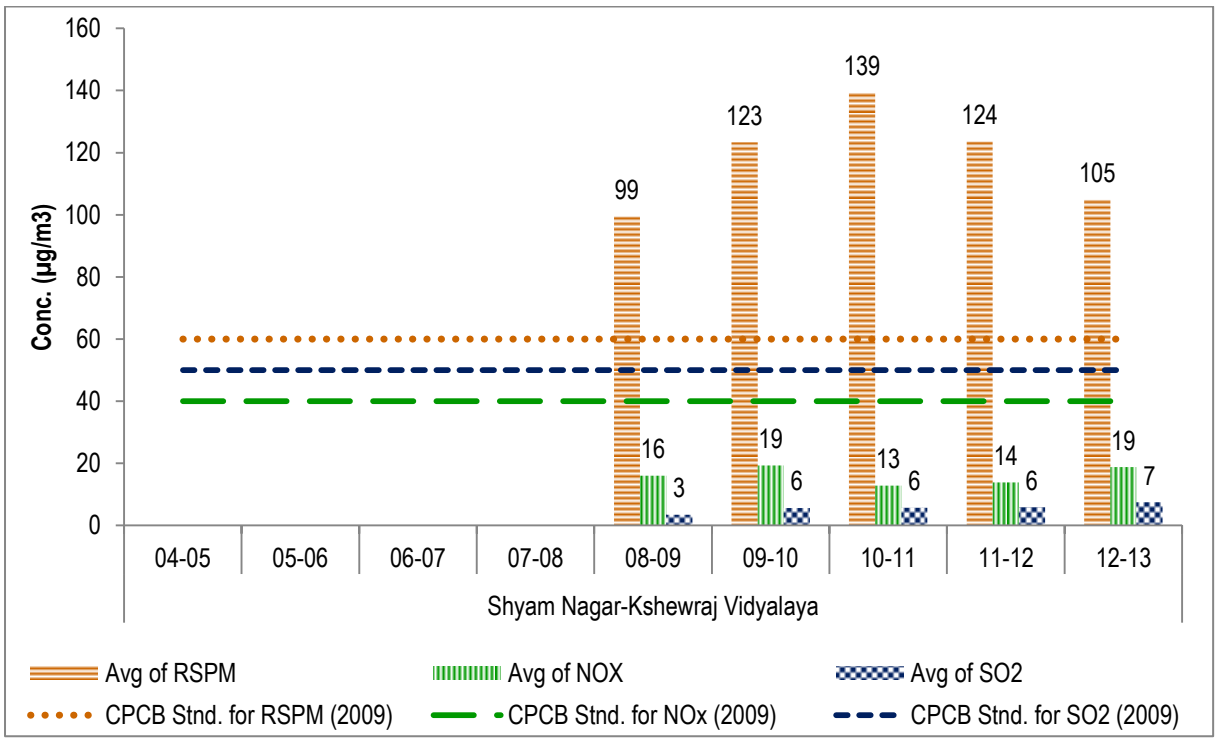


Figure No. 54: Annual average trend of SO_2, NOx and RSPM at Shyam Nagar Keshwraj Vidyalaya

Latur - Ganj Golai - Sidhheshwar Bank

Table No. 45: Data for monthly average reading recorded at Ganj Golai - Sidhheshwar Bank

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	173.1	20.4	7.4
May	10	161.0	18.1	11.1
Jun	8	151.3	14.0	5.9
Jul	8	146.8	14.0	8.4
Aug	9	85.9	22.8	10.3
Sep	8	99.3	24.3	13.4
Oct	9	100.0	25.4	8.8
Nov	9	127.4	26.0	7.6
Dec	8	144.5	16.3	8.3
Jan	10	145.1	17.0	4.4
Feb	8	119.8	13.5	4.9
Mar	8	125.6	23.6	6.9
	Total N		**% of exceedence**	
	103	**74.8**	**0.0**	**0.0**

Table No. 46: Data for annual average trend of RSPM, NO_X and SO_2 at Ganj Golai - Sidhheshwar Bank

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	91	122.5	21.7	3.9
09-10	74	143.6	25.6	6.2
10-11	89	124.0	16.3	6.4
11-12	95	140.5	17.0	6.2
12-13	103	131.7	19.7	8.1

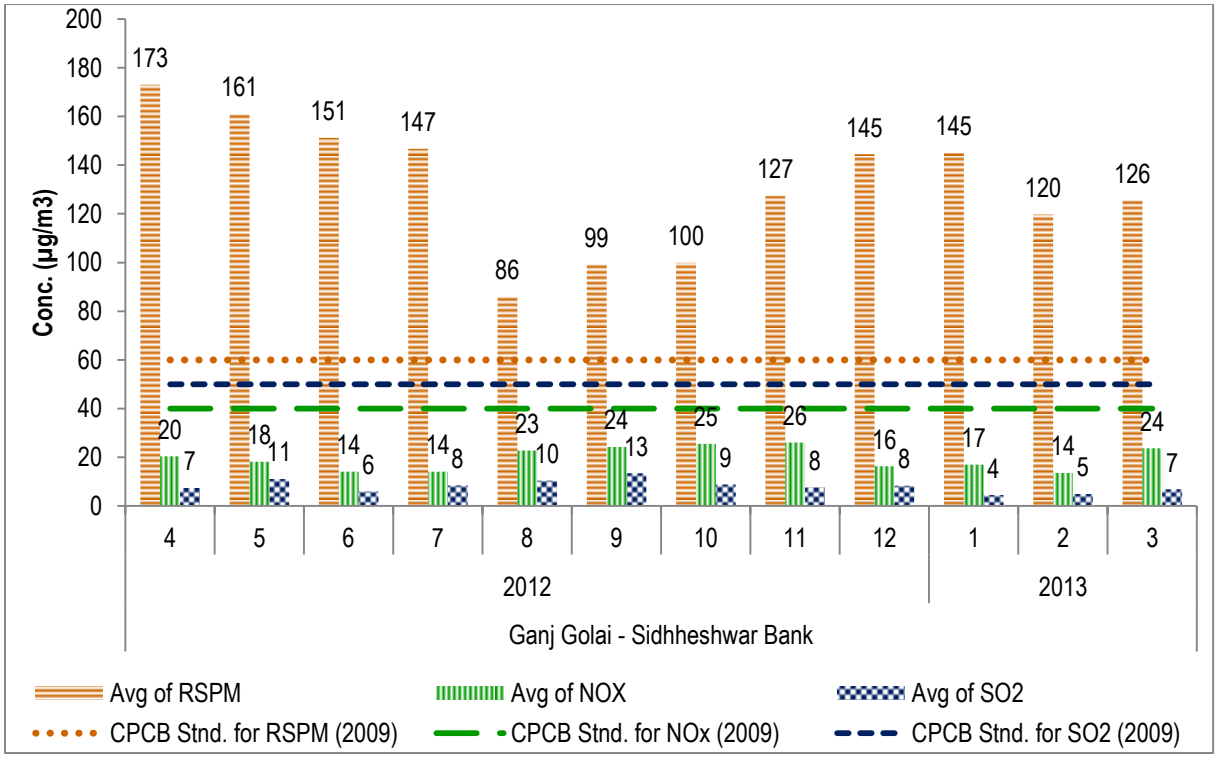


Figure No. 55: Monthly average reading recorded at Ganj Golai Sidheshwar Bank

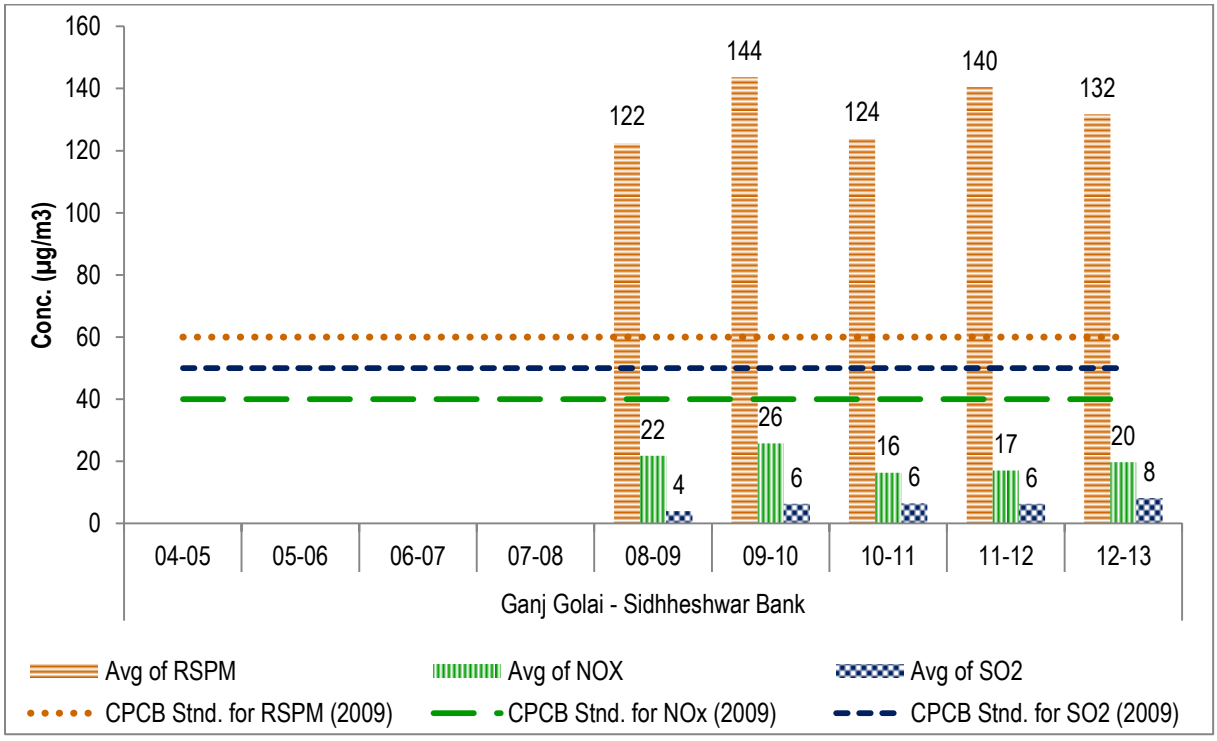


Figure No. 56: Annual average trend of SO_2, NOx and RSPM at Ganj Golai Sidheshwar Bank

Nanded - Ganeshnagar

Table No. 47: Data for monthly average reading recorded at Ganeshnagar

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	36.4	21.0	20.9
May	18	66.4	31.9	34.1
Jun	8	33.5	18.3	18.4
Jul	8	22.5	10.0	11.9
Aug	10	15.4	11.5	9.1
Sep	8	21.0	11.9	9.0
Oct	9	26.2	19.2	19.1
Nov	9	28.0	20.3	20.4
Dec	8	30.9	21.8	22.6
Jan	10	35.5	24.9	24.9
Feb	8	38.9	25.4	25.8
Mar	8	43.8	30.0	30.6
	Total N		% of exceedence	
	112	0.0	0.0	0.0

Table No. 48: Data for annual average trend of RSPM, NO_X and SO_2 at Ganeshnagar

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	-	-	-	-
10-11	10	47.0	28.6	28.2
11-12	87	25.5	18.7	18.2
12-13	112	35.8	21.4	21.6

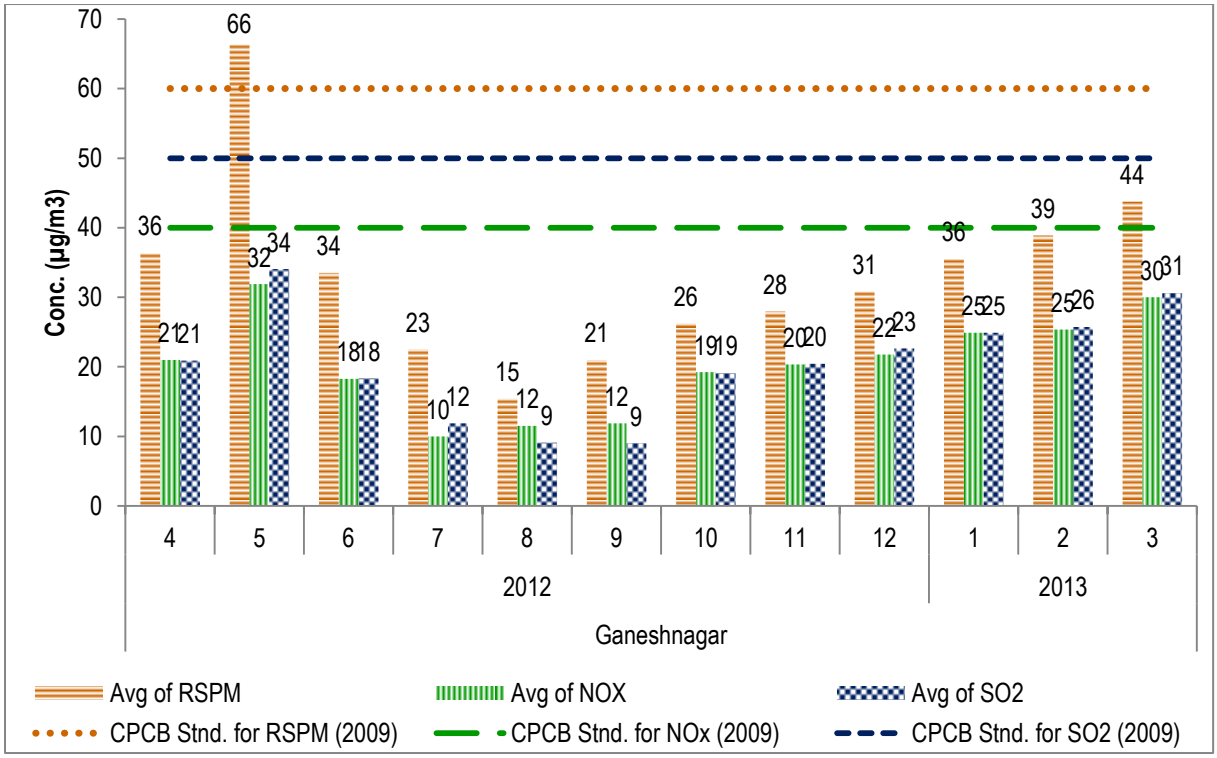


Figure No. 57: Monthly average reading recorded at Ganeshnagar

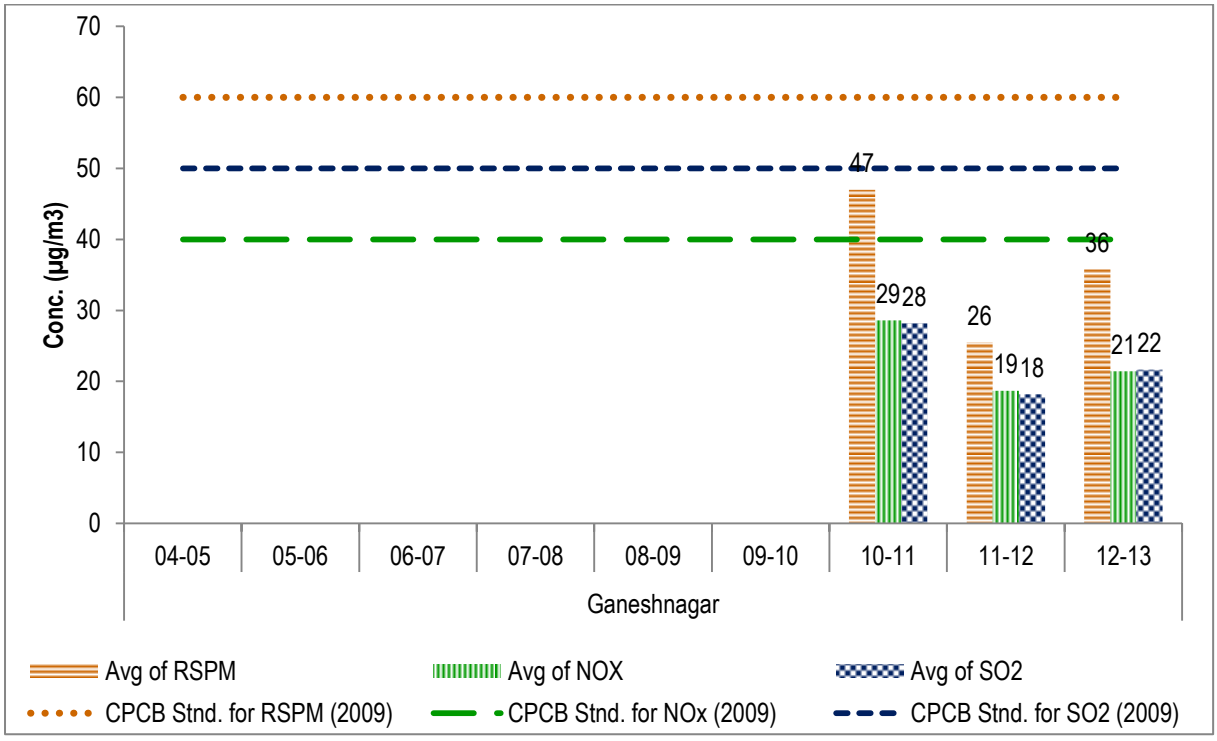


Figure No. 58: Annual average trend of SO_2, NOx and RSPM at Ganeshnagar

Nanded - Mutha Chowk

Table No. 49: Data for monthly average reading recorded at Mutha Chowk

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	63.9	33.6	33.5
May	8	78.4	36.3	41.9
Jun	10	60.5	27.9	27.8
Jul	8	22.6	12.5	12.3
Aug	9	22.7	13.9	13.7
Sep	9	34.7	14.4	15.4
Oct	8	37.1	18.5	18.8
Nov	9	52.2	22.8	25.4
Dec	9	55.8	26.7	29.7
Jan	8	61.8	27.0	30.6
Feb	8	67.4	33.9	35.9
Mar	10	72.9	35.9	40.1
	Total N		% of exceedence	
	104	0.0	0.0	0.0

Table No. 50: Data for annual average trend of RSPM, NO_X and SO_2 at Mutha Chowk

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	-	-	-	-
10-11	-	-	-	-
11-12	89	43.9	27.7	28.5
12-13	104	52.6	25.3	27.1

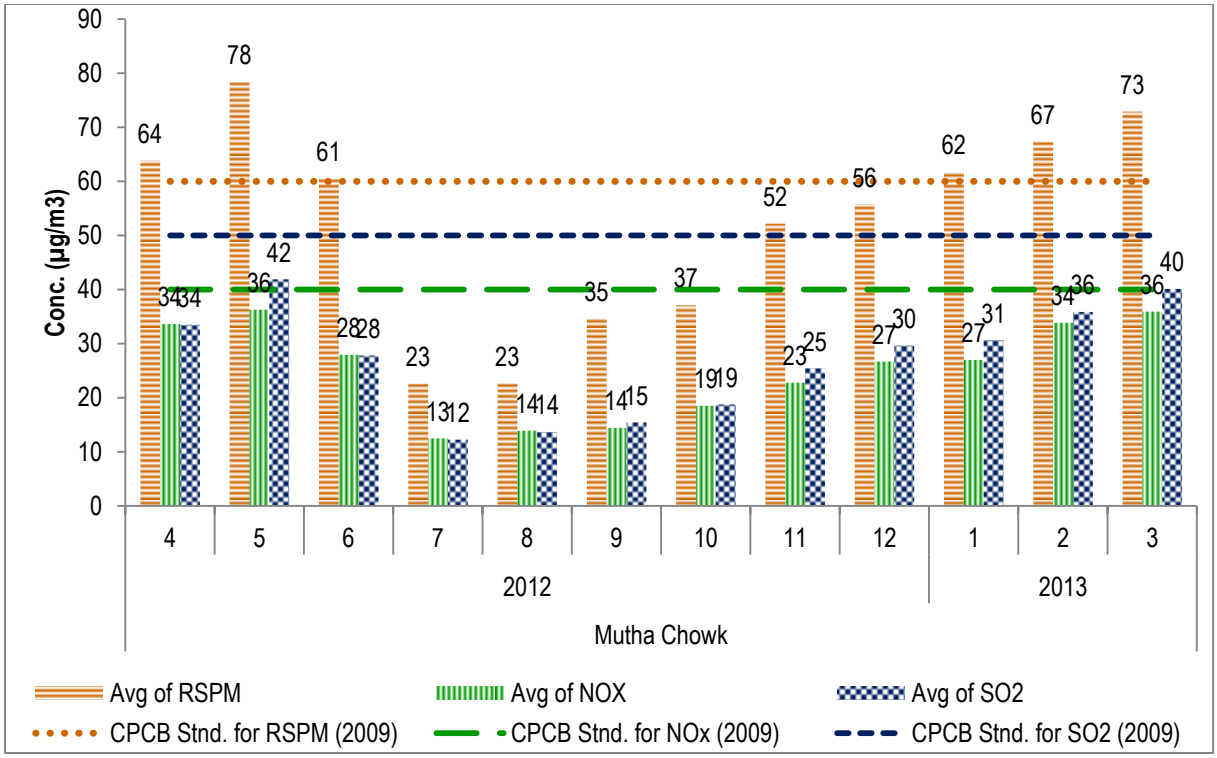


Figure No. 59: Monthly average reading recorded at Mutha Chowk

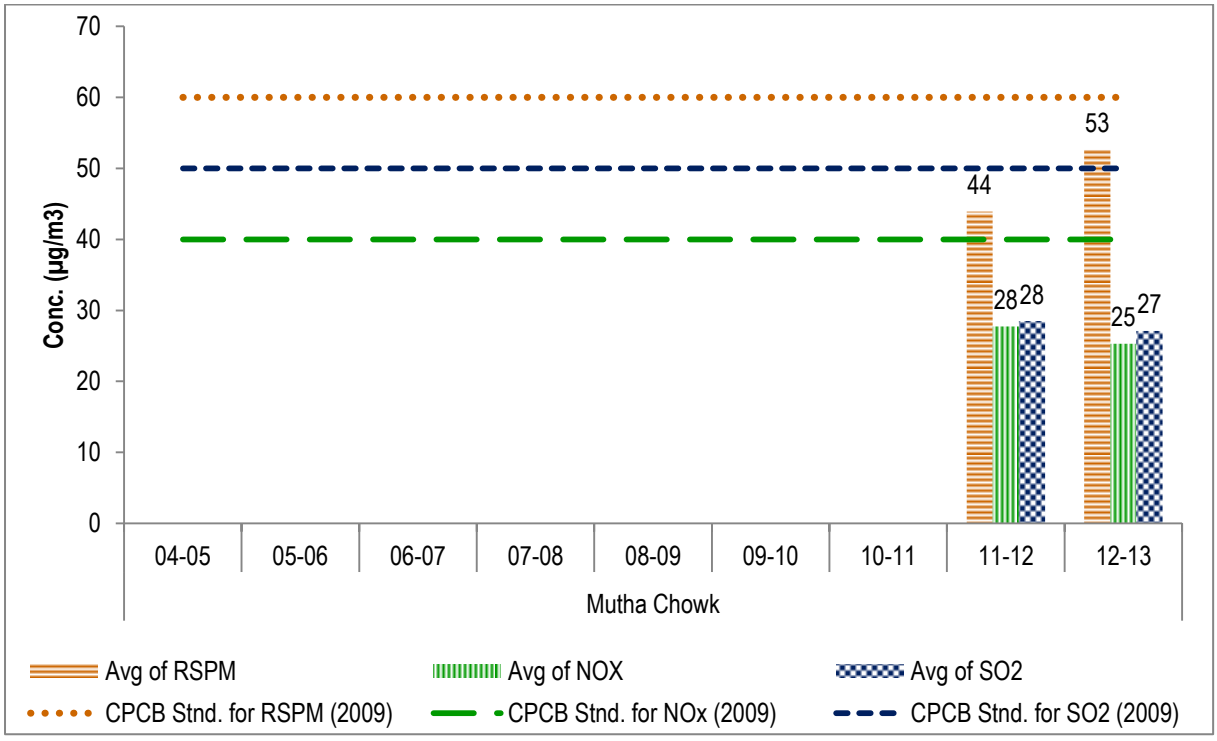


Figure No. 60: Annual average trend of SO_2, NOx and RSPM at Mutha Chowk

Nanded - Industrial Area CIDCO

Table No. 51: Data for monthly average reading recorded at Industrial Area CIDCO -Nanded

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	9	103.8	62.0	61.7
May	9	111.3	75.1	75.1
Jun	8	102.9	60.1	60.8
Jul	10	22.5	13.6	12.4
Aug	8	50.3	34.5	34.9
Sep	8	49.0	26.5	22.9
Oct	9	86.3	51.0	51.2
Nov	8	91.6	55.6	54.8
Dec	9	102.2	60.0	60.7
Jan	9	109.6	64.8	64.9
Feb	8	115.5	71.0	70.6
Mar	8	120.0	75.5	75.3
	Total N		% of exceedence	
	103	55.3	0.0	0.0

Table No. 52: Data for annual average trend of RSPM, NO_X and SO_2 at Industrial Area CIDCO - Nanded

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	-	-	-	-
10-11	-	-	-	-
11-12	84	65.0	45.1	42.8
12-13	103	88.1	53.8	53.4

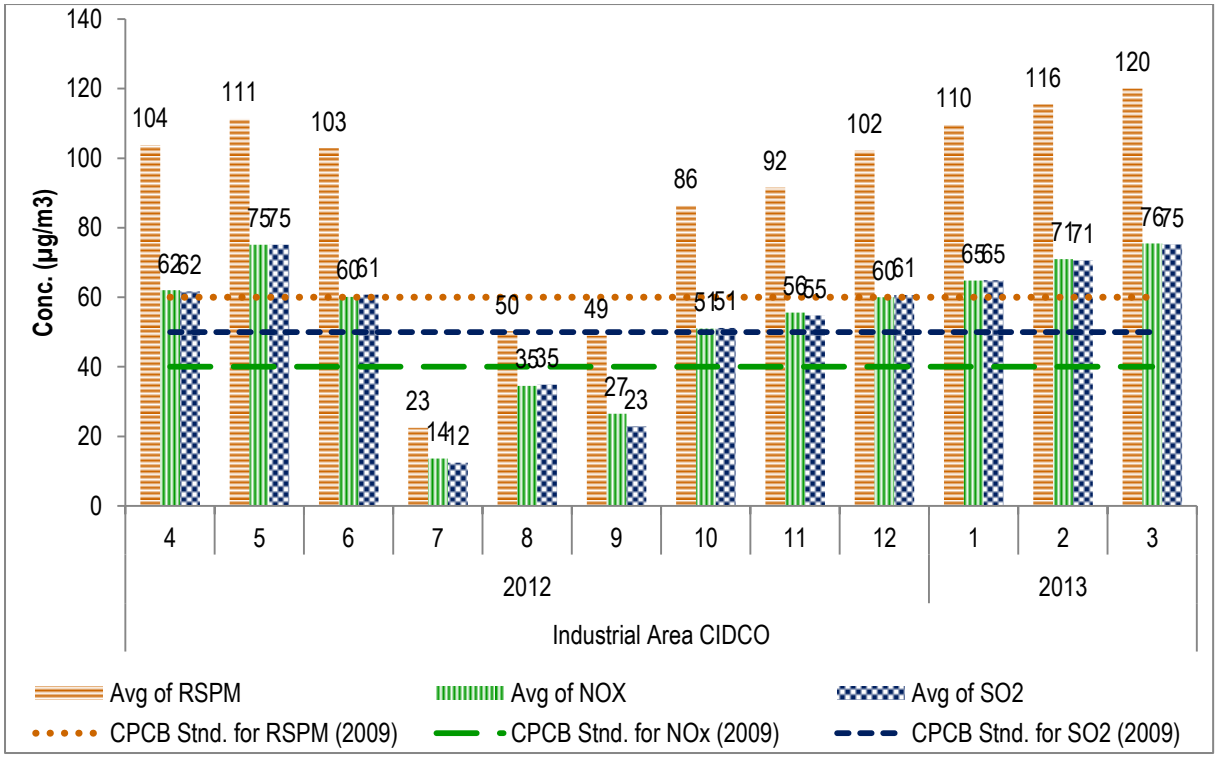


Figure No. 61: Monthly average reading recorded at Industrial Area CIDCO -Nanded

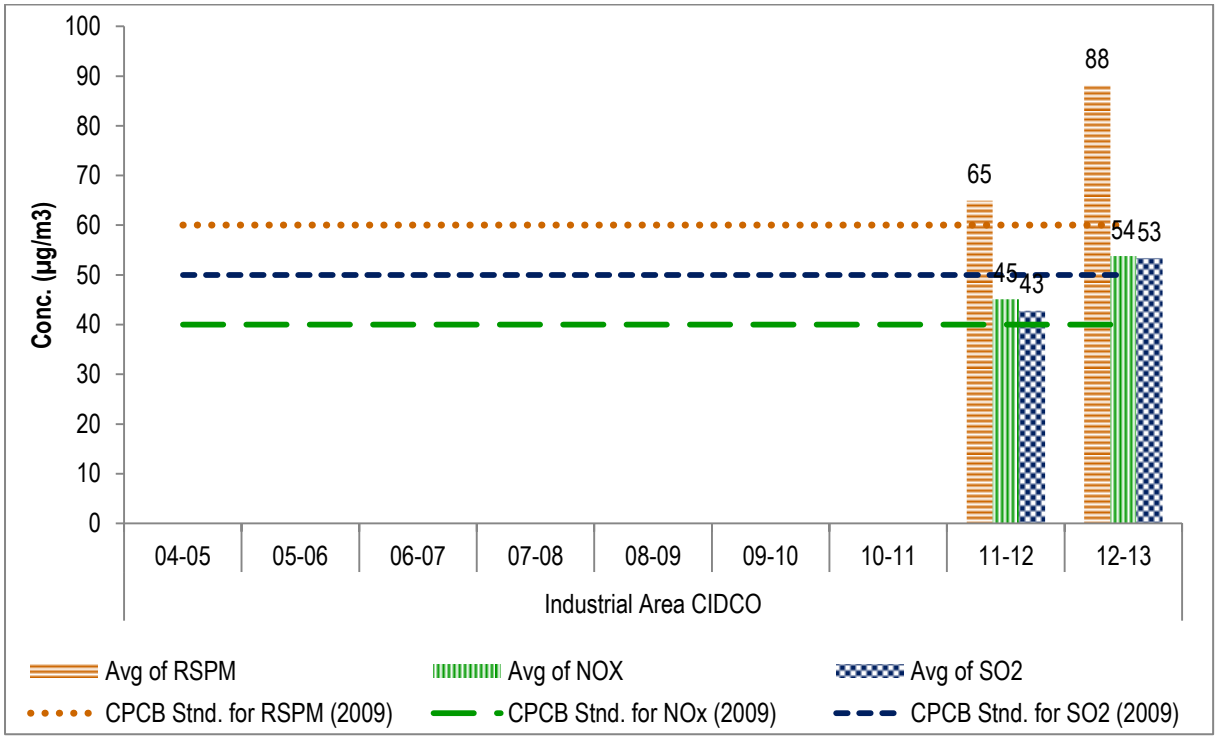


Figure No. 62: Annual average trend of SO_2, NOx and RSPM at Industrial Area Nanded

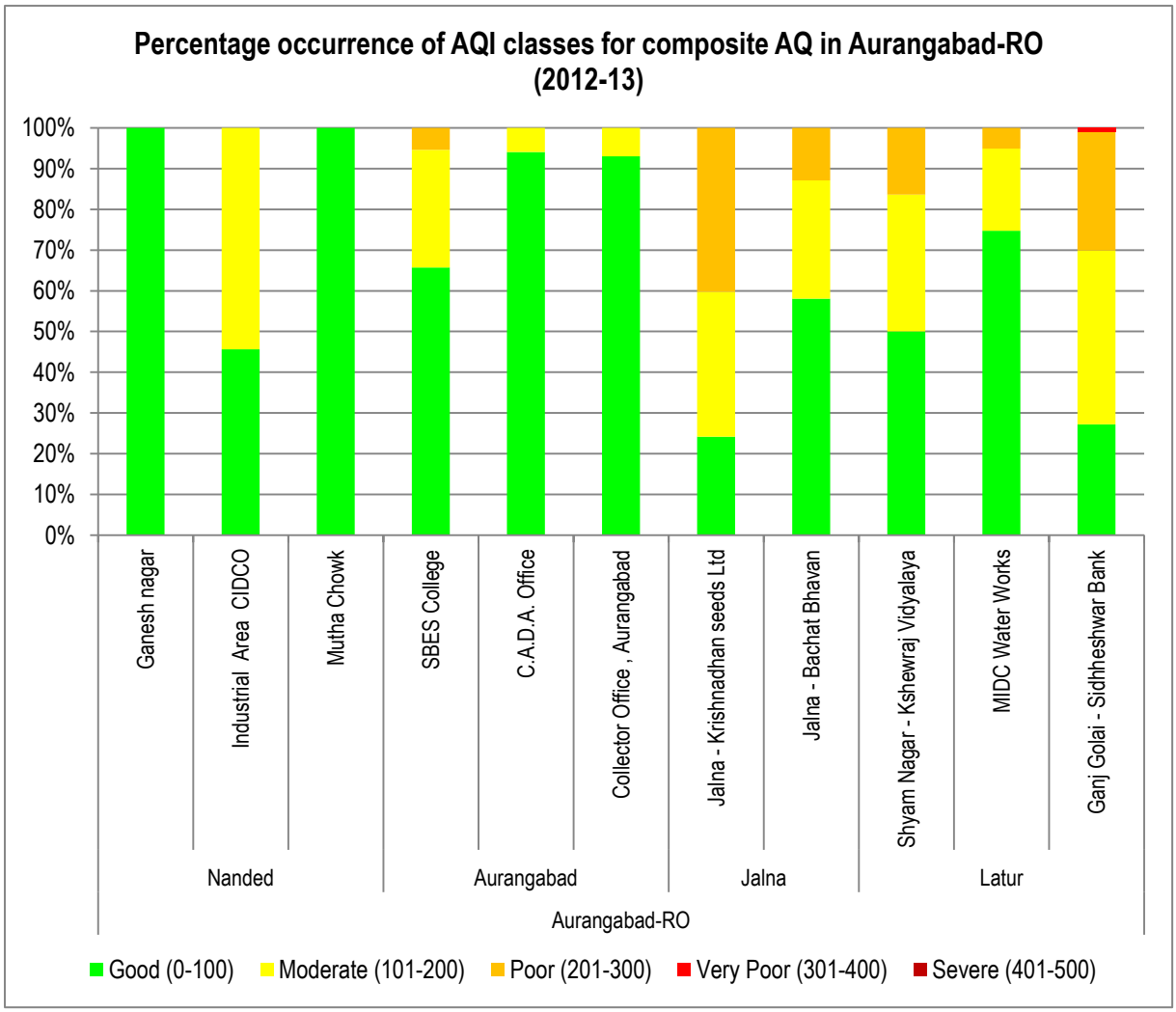
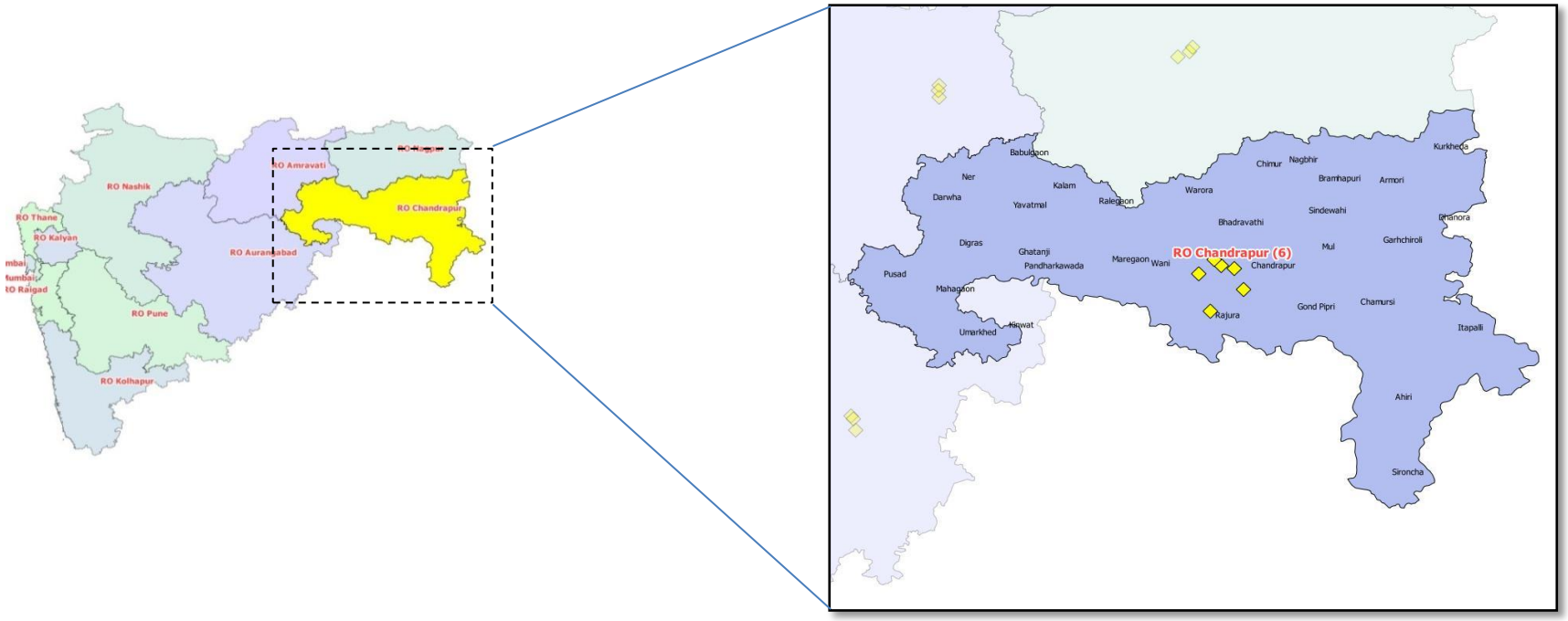


Figure No. 63: Percentage occurrence of AQI classes for composite AQ in Aurangabad-RO (2012-13)

RO - Chandrapur



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Chandrapur	NAMP	267	Ghuggus	Two Days In A Week	19° 56' 23.0" N	79° 06' 50.9" E
		281	MIDC, Chandrapur	Two Days In A Week	19° 58' 58.3" N	79° 13' 54.7" E
		396	SRO Office, Chandrapur	Two Days In A Week	19° 57' 55.9" N	79° 17' 59.1" E
		639	Ballarshah	Two Days In A Week	19° 51' 11.8" N	79° 20' 55.7" E
		640	Rajura	Two Days In A Week	19° 44' 11.7" N	79° 10' 29.5" E
		638	Tadali MIDC	Two Days In A Week	20° 00' 59.6" N	79° 11' 51.5" E

Chandrapur - Ghuggus

Table No. 53: Data for monthly average reading recorded at Ghuggus

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	279.0	18.1	18.4
May	10	219.9	12.9	13.4
Jun	8	165.6	17.9	9.4
Jul	8	210.8	31.9	8.5
Aug	10	156.1	15.2	6.8
Sep	8	156.3	12.3	6.6
Oct	10	255.7	9.1	16.2
Nov	8	149.3	11.1	6.8
Dec	8	219.4	11.0	7.4
Jan	8	218.5	8.6	5.6
Feb	8	177.3	1.1	4.3
Mar	8	277.8	7.8	23.3
	Total N		% of exceedence	
	102	98.0	0.0	1.0

Table No. 54: Data for annual average trend of RSPM, NO_X and SO_2 at Ghuggus

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	80	79.5	27.9	18.2
05-06	96	130.5	30.7	20.5
06-07	75	138.8	38.5	31.4
07-08	95	186.3	53.5	35.9
08-09	86	172.4	54.2	34.0
09-10	77	179.9	31.7	45.9
10-11	103	211.3	23.6	22.9
11-12	95	206.2	20.8	18.3
12-13	102	207.3	13.0	10.6

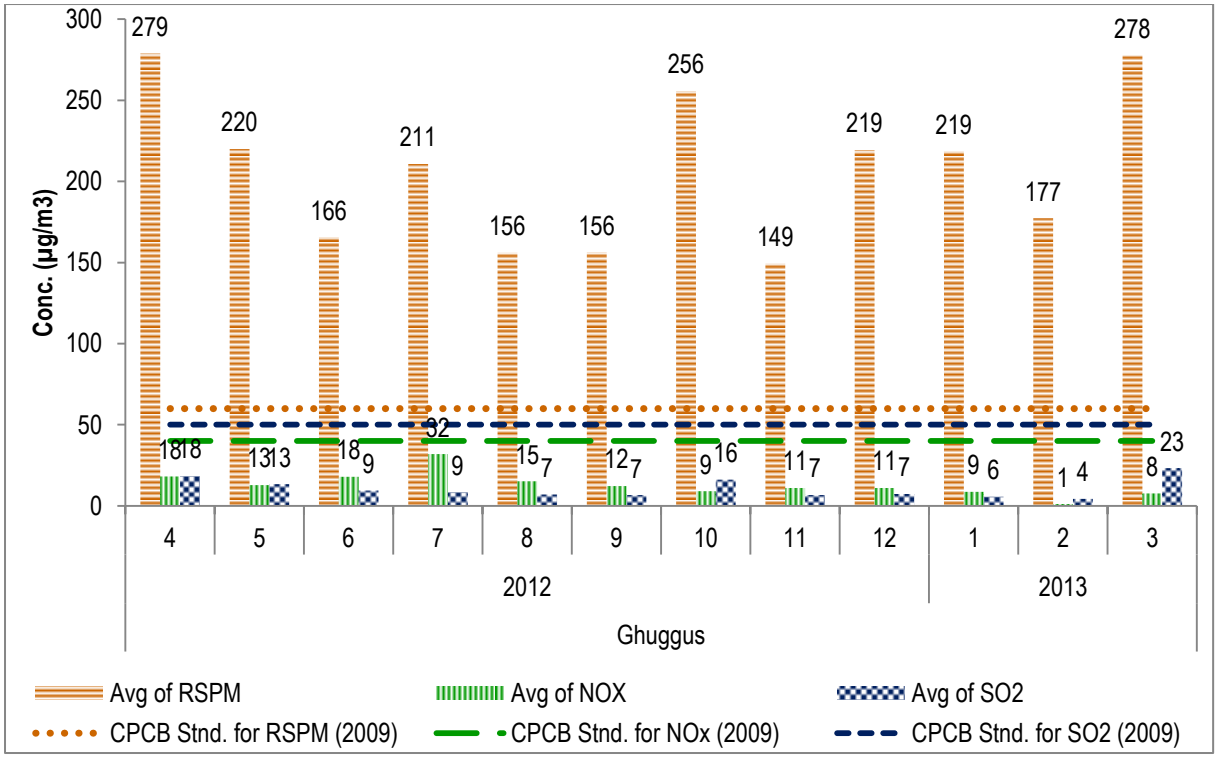


Figure No. 64: Monthly average reading recorded at Ghuggus -Chandrapur

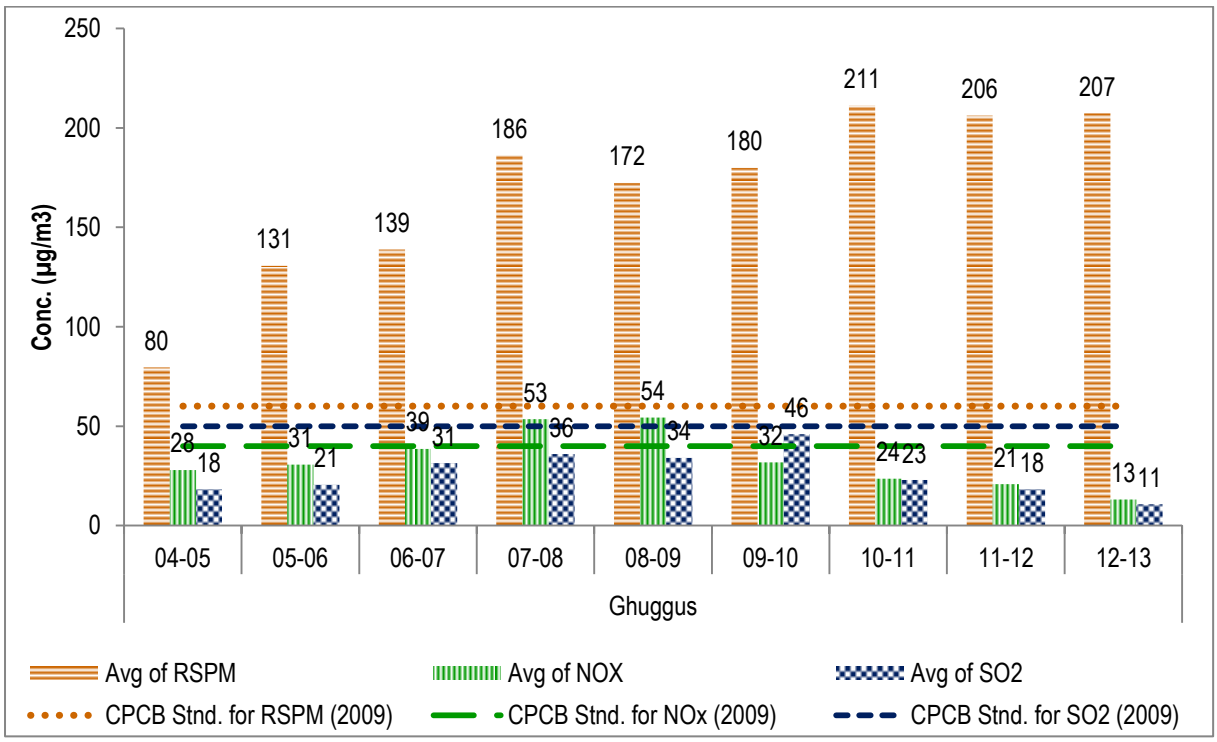


Figure No. 65: Annual average trend of SO_2, NOx and RSPM at Ghuggus -Chandrapur

Chandrapur - Chandrapur - MIDC

Table No. 55: Data for monthly average reading recorded at Chandrapur - MIDC

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	10	117.1	15.5	13.4
May	5	139.4	12.0	26.6
Jun	9	98.9	15.4	35.9
Jul	10	139.9	24.3	6.5
Aug	10	170.4	13.7	8.8
Sep	10	117.8	10.2	5.0
Oct	9	75.0	9.2	7.9
Nov	10	88.4	10.8	8.9
Dec	10	89.1	23.9	20.0
Jan	8	60.4	26.6	10.1
Feb	3	52.7	22.0	6.0
Mar	6	53.8	29.0	20.5
	Total N		% of exceedence	
	100	44.0	0.0	2.0

Table No. 56: Data for annual average trend of RSPM, NO_X and SO_2 at Chandrapur - MIDC

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	95	109.6	36.8	25.5
05-06	92	130.3	37.2	26.4
06-07	97	122.7	41.3	37.7
07-08	98	124.8	49.8	36.7
08-09	81	148.4	53.3	34.0
09-10	79	140.9	30.8	62.9
10-11	102	149.6	25.0	24.8
11-12	108	131.2	35.0	21.3
12-13	100	104.5	17.2	13.8

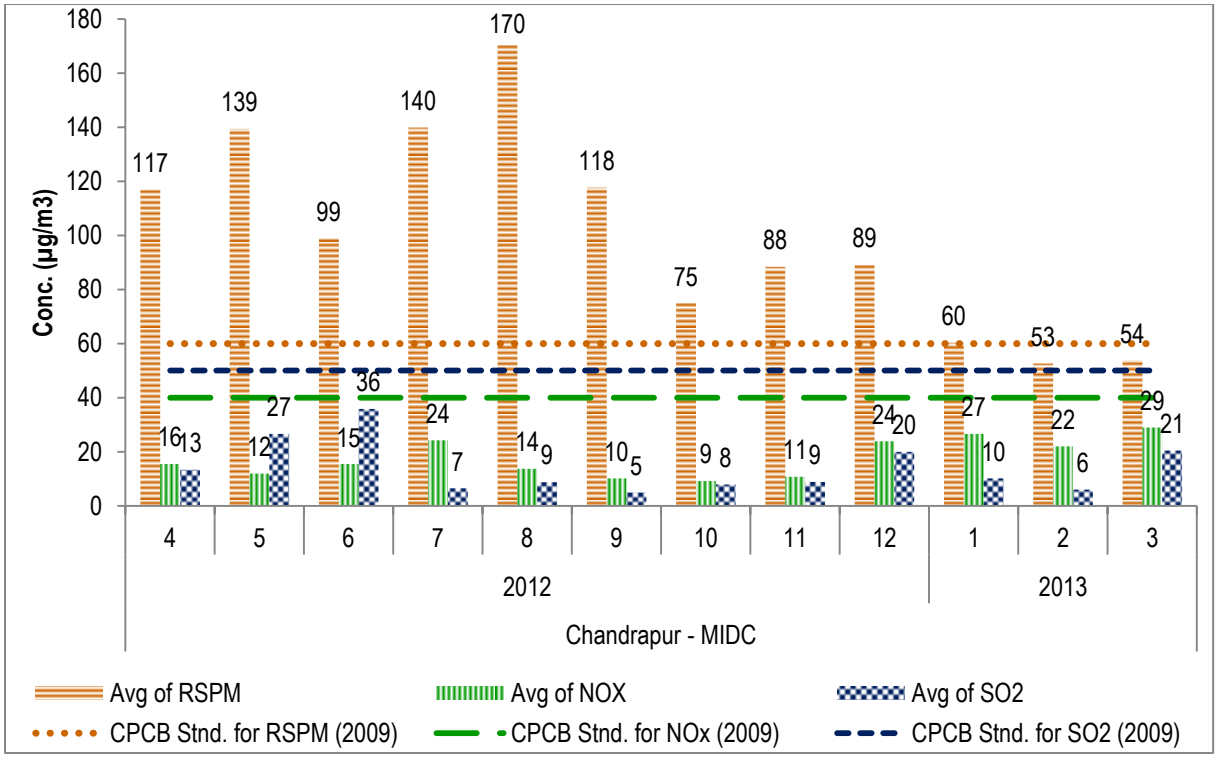


Figure No. 66: Monthly average reading recorded at Chandrapur -MIDC

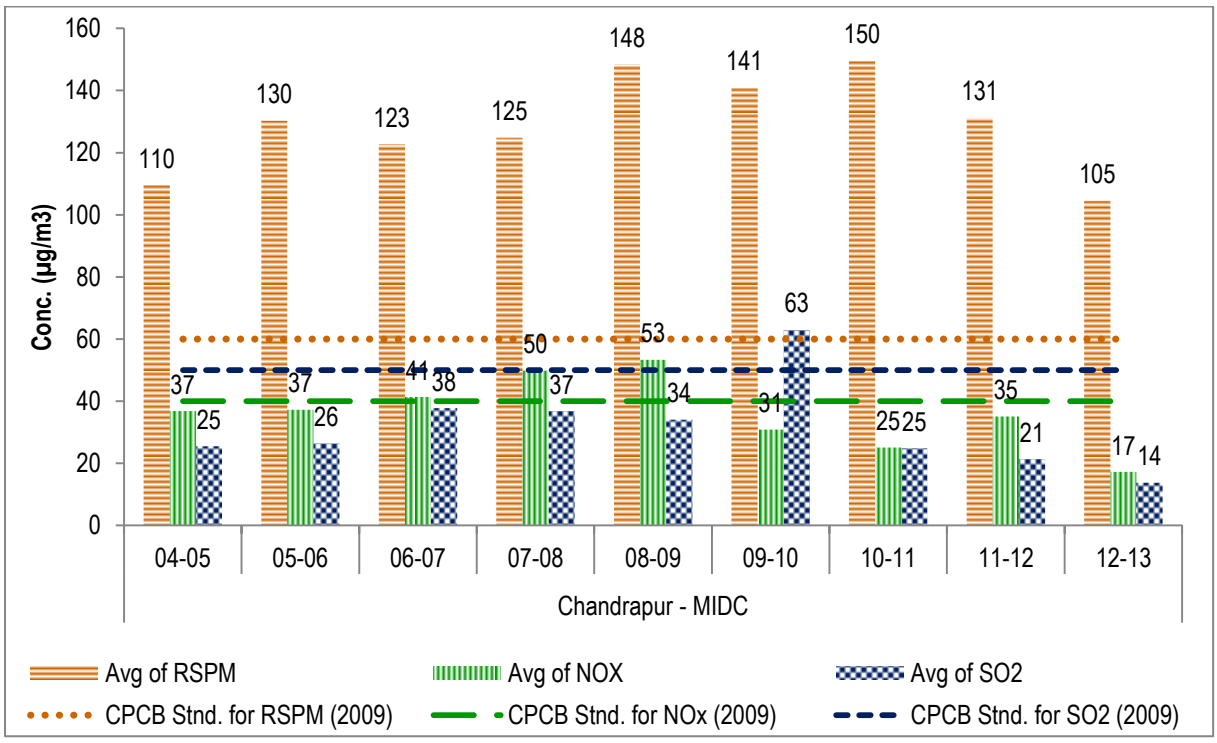


Figure No. 67: Annual average trend of SO_2, NOx and RSPM at Chandrapur -MIDC

Chandrapur - Chandrapur - SRO MPCB

Table No. 57: Data for monthly average reading recorded at Chandrapur - SRO MPCB

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	10	74.3	22.2	12.1
May	10	103.8	10.3	12.3
Jun	10	63.3	24.0	38.9
Jul	10	87.1	19.3	9.3
Aug	10	85.4	22.2	14.0
Sep	10	50.7	12.2	5.7
Oct	10	51.4	8.2	5.4
Nov	10	57.9	9.7	7.1
Dec	10	82.4	22.4	20.6
Jan	10	97.5	19.9	10.8
Feb	8	66.5	17.4	6.1
Mar	10	73.9	16.8	18.7
	Total N		% of exceedence	
	118	24.6	0.0	0.8

Table No. 58: Data for annual average trend of RSPM, NO_X and SO_2 at Chandrapur - SRO MPCB

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	70	107.1	33.9	22.8
05-06	90	116.1	29.7	19.8
06-07	88	129.9	38.4	31.2
07-08	98	160.6	46.4	29.5
08-09	82	158.7	44.8	26.2
09-10	76	74.4	34.7	41.4
10-11	102	91.9	26.9	20.9
11-12	100	65.6	31.0	18.3
12-13	118	74.7	17.0	13.5

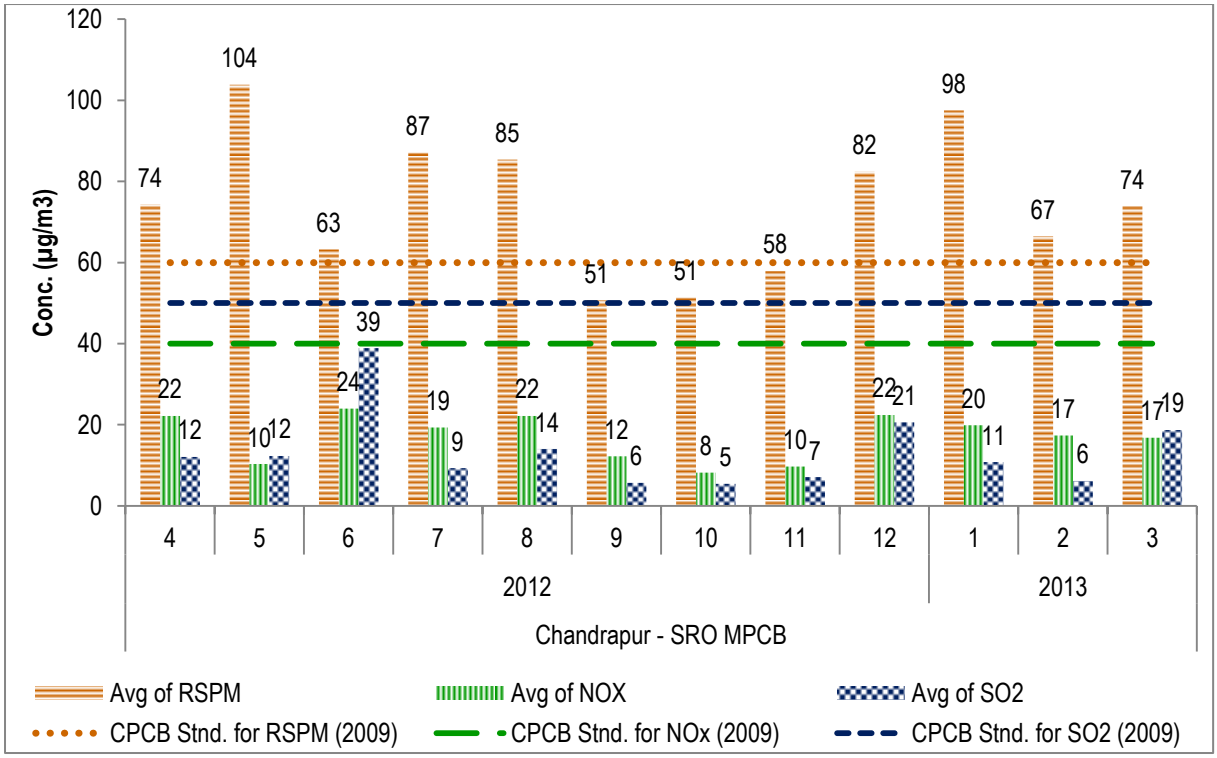


Figure No. 68: Monthly average reading recorded at Chandrapur –SRO MPCB

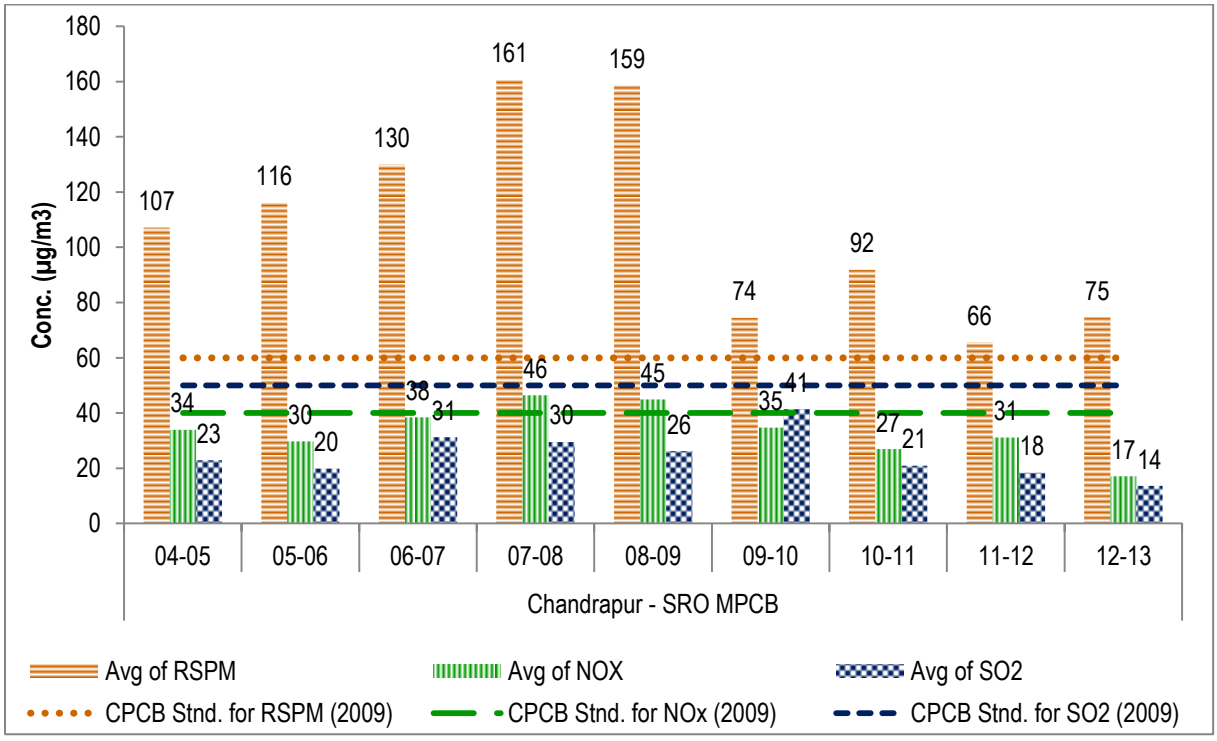


Figure No. 69: Annual average trend of SO_2, NOx and RSPM at Chandrapur –SRO MPCB

Chandrapur - Ballarshah

Table No. 59: Data for monthly average reading recorded at Ballarshah

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	10	201.1	15.8	7.5
May	10	202.6	14.0	12.3
Jun	8	85.4	16.0	7.4
Jul	8	105.0	12.3	8.3
Aug	8	140.5	17.1	8.3
Sep	8	91.5	13.1	6.0
Oct	8	227.1	11.5	6.0
Nov	8	352.8	12.4	6.0
Dec	8	246.9	29.1	12.0
Jan	8	241.0	25.9	12.5
Feb	8	209.4	34.6	4.9
Mar	8	199.1	32.0	13.9
	Total N		% of exceedence	
	100	80.0	0.0	0.0

Table No. 60: Data for annual average trend of RSPM, NOx and SO_2 at Ballarshah

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	65	121.7	34.9	32.1
10-11	107	128.6	31.6	17.5
11-12	68	123.3	23.9	19.2
12-13	100	192.3	19.3	8.8

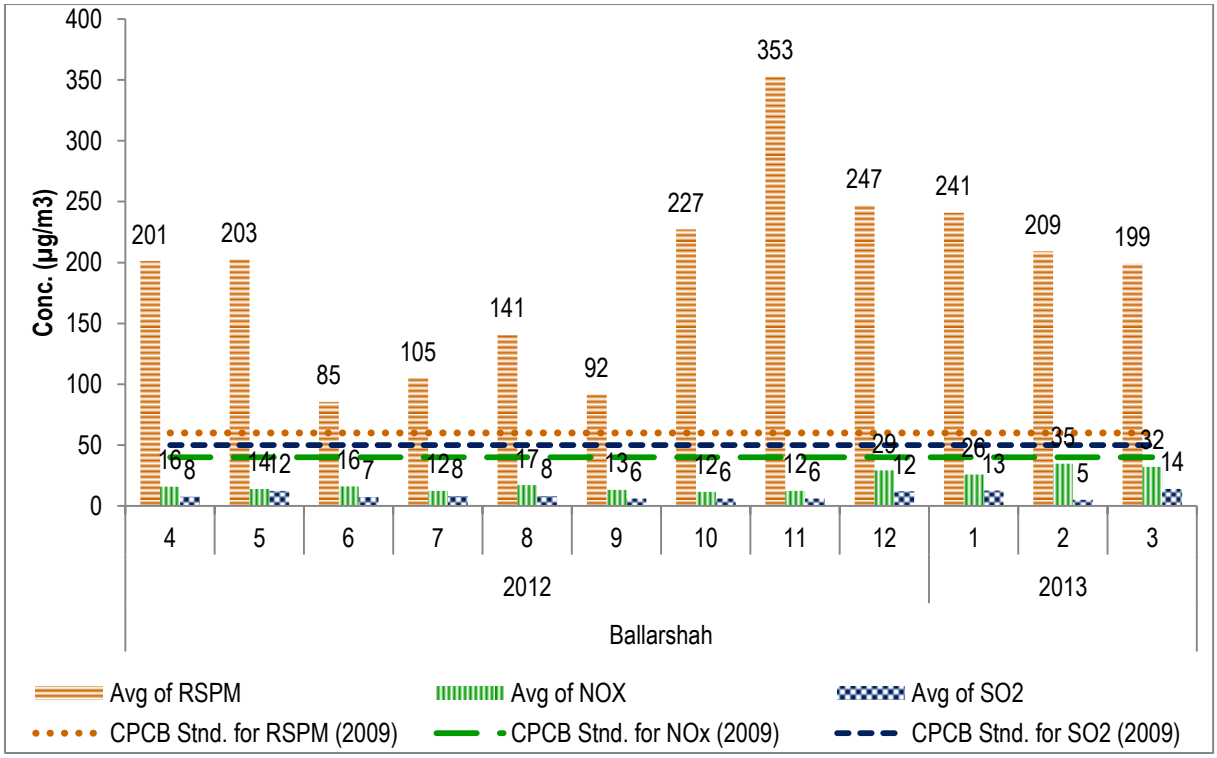


Figure No. 70: Monthly average reading recorded at Ballarshah

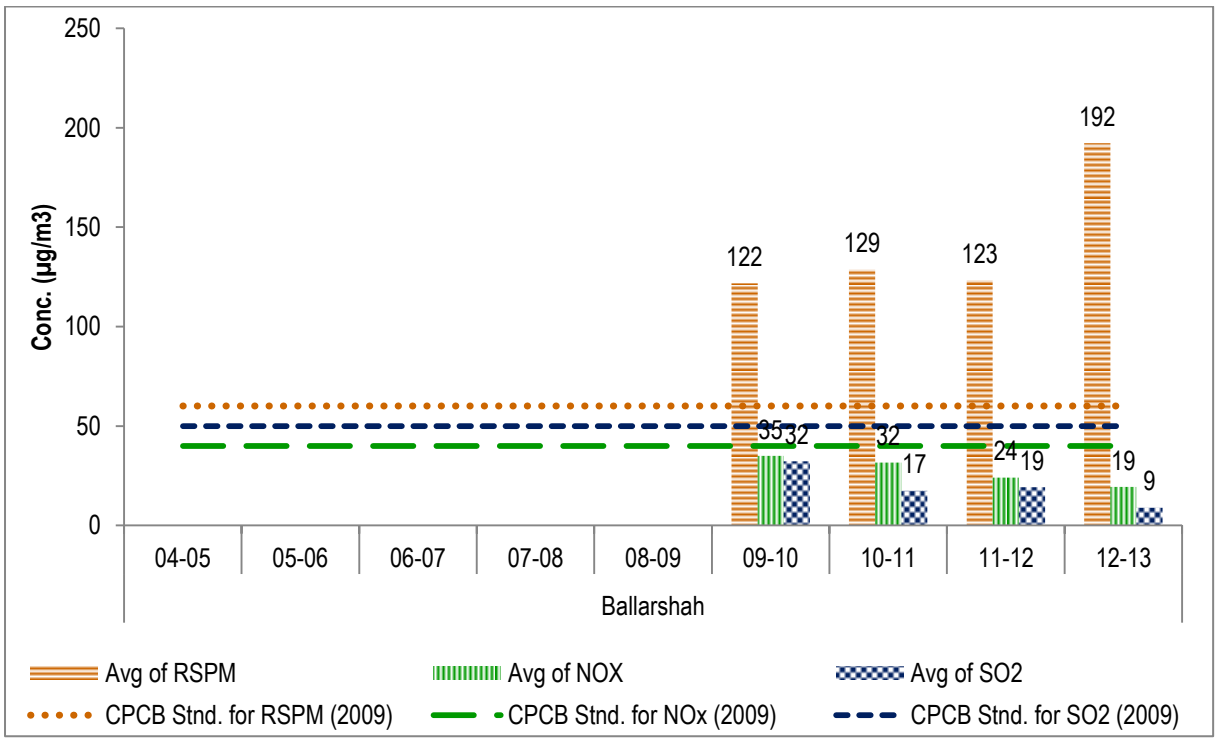


Figure No. 71: Annual average trend of SO_2, NOx and RSPM at BAllarshah

Chandrapur - Rajura

Table No. 61: Data for monthly average reading recorded at Rajura

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	-	-	-	-
May	-	-	-	-
Jun	8	126.6	16.8	6.8
Jul	6	98.5	14.8	11.3
Aug	10	106.3	15.2	6.9
Sep	8	99.0	9.9	5.0
Oct	6	325.0	10.7	16.8
Nov	6	294.3	16.5	5.7
Dec	8	284.3	32.8	13.0
Jan	8	286.9	28.1	11.5
Feb	6	207.3	31.3	5.7
Mar	6	188.8	41.5	11.2
	Total N		% of exceedence	
	72	77.8	0.0	0.0

Table No. 62: Data for annual average trend of RSPM, NOx and SO_2 at Rajura

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	30	118.8	37.2	34.0
10-11	93	114.5	18.9	16.6
11-12	71	158.8	19.4	15.9
12-13	72	196.1	21.4	9.2

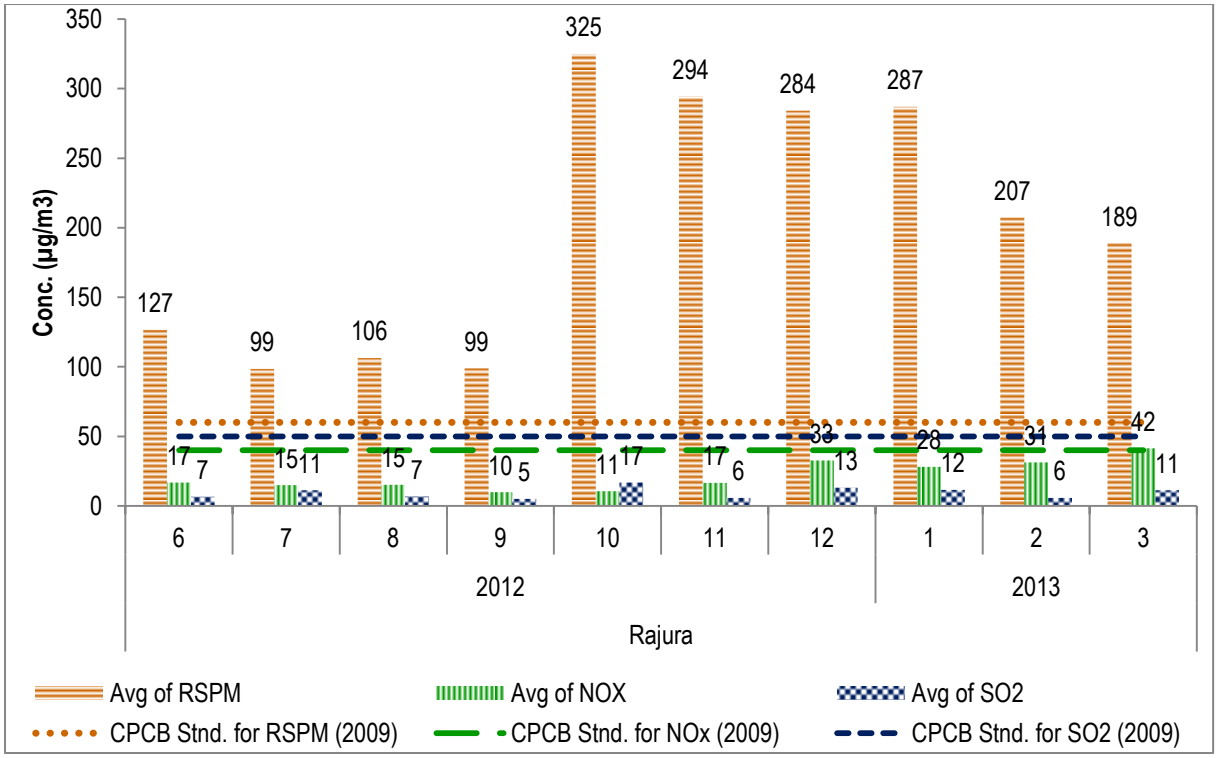


Figure No. 72: Monthly average reading recorded at Rajura

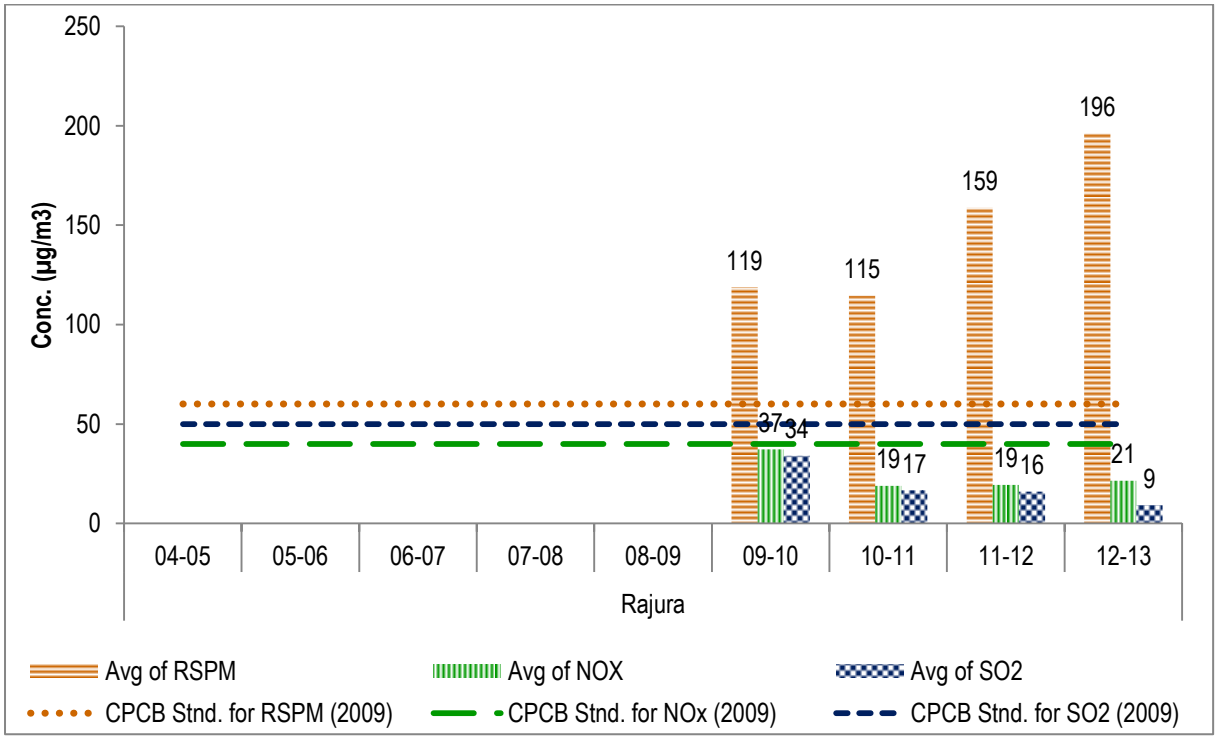


Figure No. 73: : Annual average trend of SO_2, NOx and RSPM at Rajura

Chandrapur - Tadali MIDC

Table No. 63: Data for monthly average reading recorded at Tadali MIDC

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	8	173.0	14.3	15.6
May	10	190.6	11.4	12.3
Jun	8	167.3	14.5	5.0
Jul	8	122.1	19.3	7.4
Aug	10	135.9	11.0	5.4
Sep	8	136.6	8.3	7.4
Oct	8	165.5	9.4	10.9
Nov	8	133.6	10.5	6.8
Dec	8	162.3	11.5	7.3
Jan	12	215.3	24.3	10.7
Feb	8	250.6	4.5	4.3
Mar	8	207.1	7.0	13.5
	Total N		% of exceedence	
	104	94.2	0.0	0.0

Table No. 64: Data for annual average trend of RSPM, NOx and SO_2 at Tadali MIDC

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	59	169.3	19.2	28.8
10-11	65	216.4	19.7	17.9
11-12	88	151.0	18.3	15.6
12-13	104	173.0	12.6	8.9

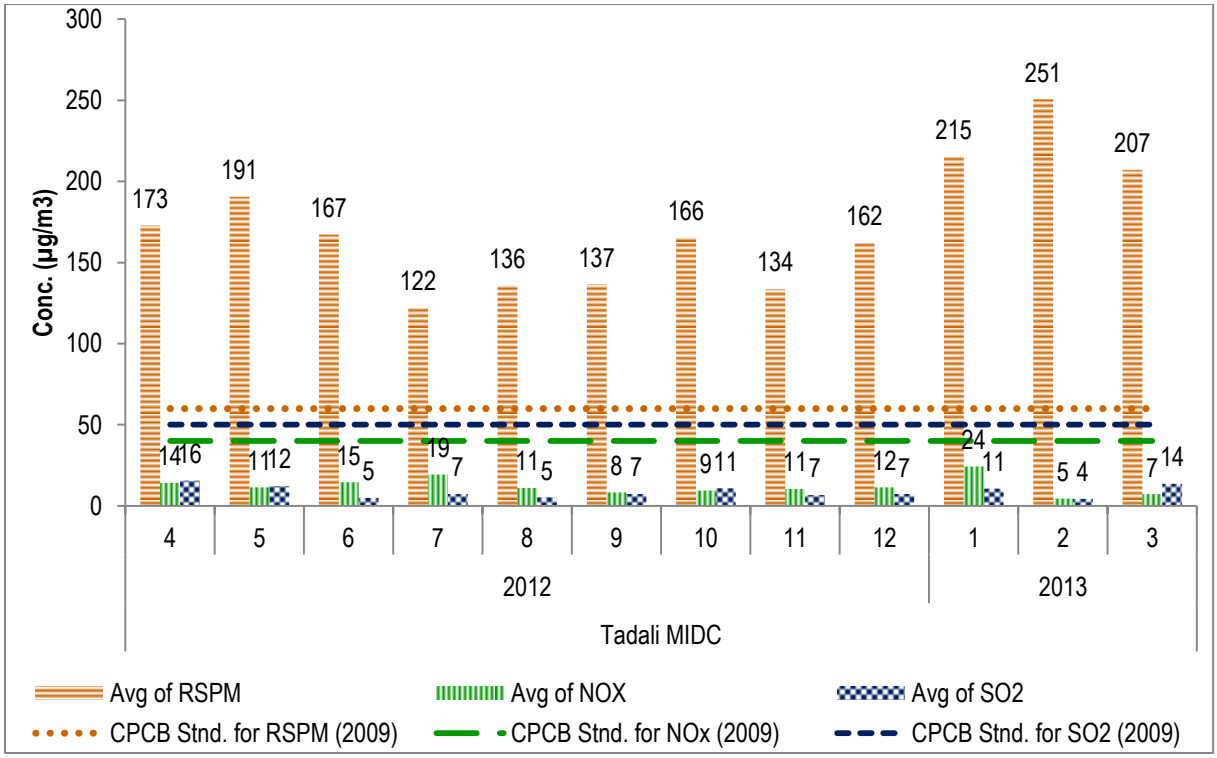


Figure No. 74: Monthly average reading recorded at Taladi MIDC

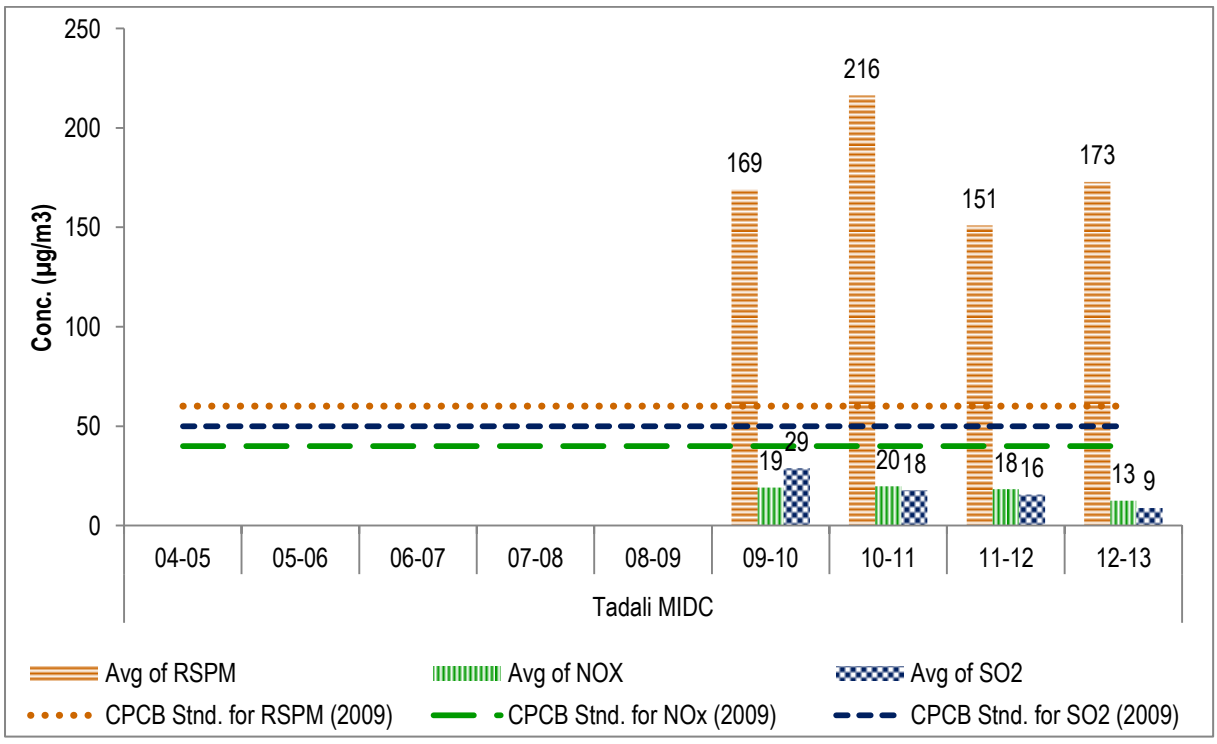


Figure No. 75: Annual average trend of SO_2, NOx and RSPM at Taladi MIDC

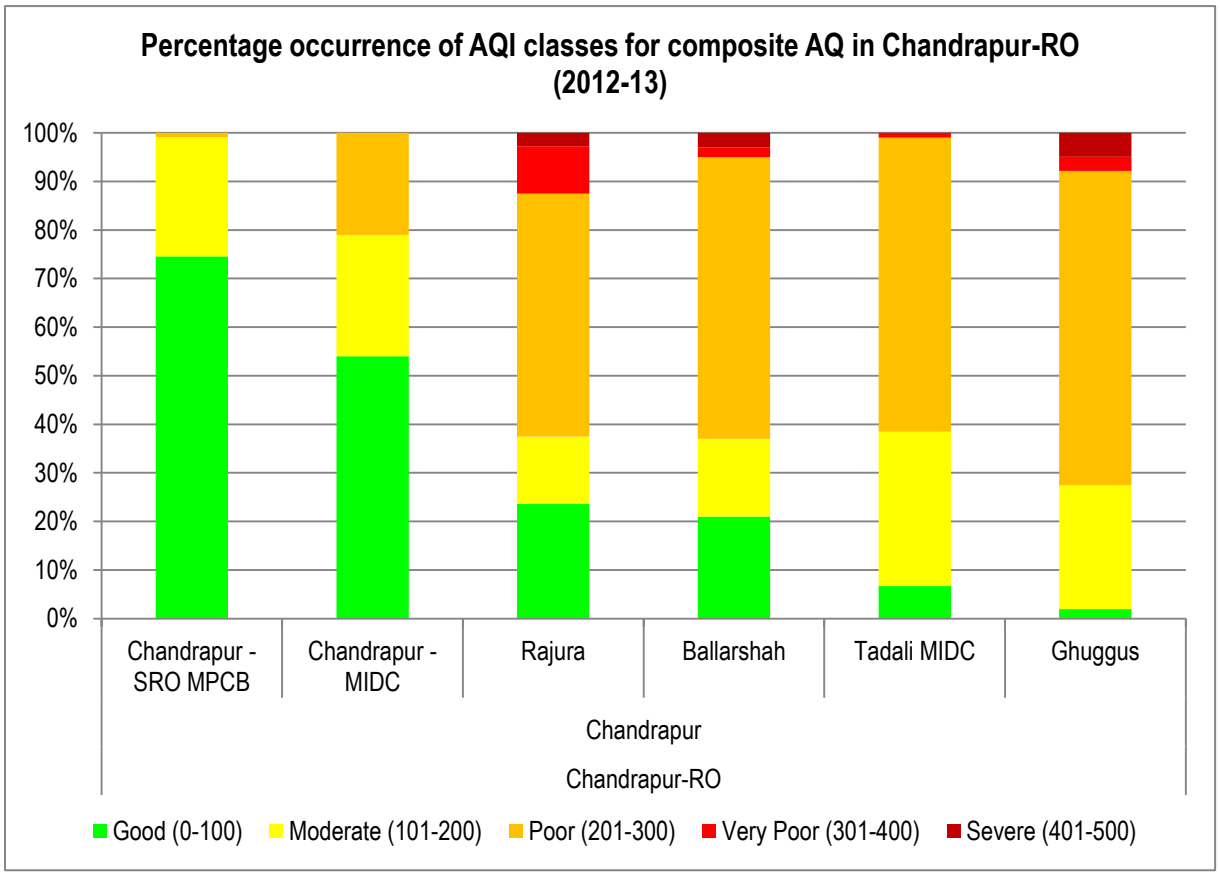
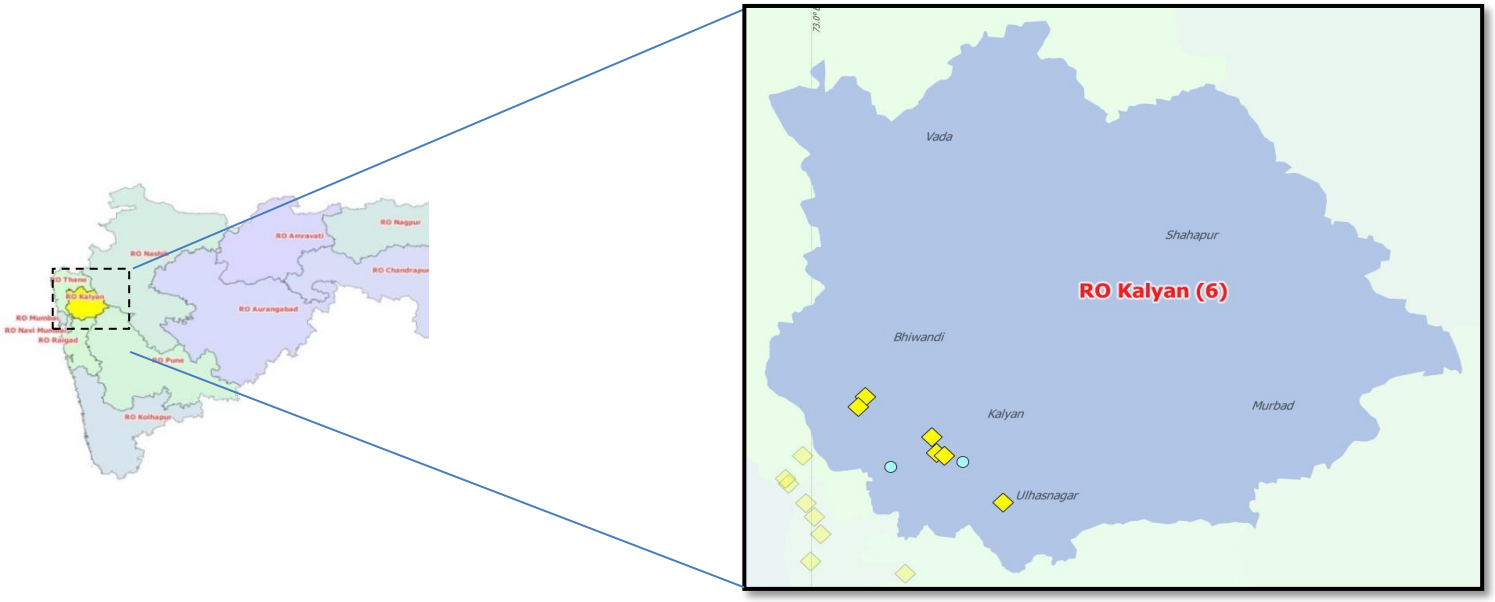


Figure No. 76: Percentage occurrence of AQI classes for composite AQ in Chandrapur-RO (2012-13)

RO – Kalyan



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Ambernath	NAMP	1	Ambernath	Two Days In A Week	19° 13' 26.2" N	73° 09' 15.0" E
Badlapur	NAMP	649	Badlapur - BIWA House	Two Days In A Week	19° 09' 22.2" N	73° 14' 16.0" E
Bhiwandi	SAMP	4	I.G.MHospital	Two times in a week	19° 17' 57.2" N	73° 04' 00.4" E
		5	Premataihall	Two times in a week	19° 17' 07.7" N	73° 03' 27.8" E
Dombivali	NAMP	6	Dombivali*	Two Days In A Week	19° 12' 15.8" N	73° 05' 53.9" E
	SAMP	7	MIDC Office Domdivali	Two Days In A Week	19° 12' 47.0" N	73° 06' 17.4" E
Kalyan	SAMP	8	MPCB Ro Kalyan office	Two times in a week	19° 14' 42.0" N	73° 08' 58.6" E
Ulhasnagar	NAMP	647	Smt. CHM College Campus	Two Days In A Week	19° 13' 12.4" N	73° 09' 51.3" E
		648	Powai Chowk	Two Days In A Week	19° 13' 26.0" N	73° 09' 16.2" E

Ambernath

Table No. 65: Data for monthly average reading recorded at Ambernath

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	-	-	-	-
May	9	185.6	165.3	58.4
Jun	8	144.8	102.9	46.3
Jul	9	114.7	84.1	55.8
Aug	9	102.0	74.1	42.8
Sep	8	140.1	105.6	49.8
Oct	9	87.1	77.6	50.7
Nov	10	88.5	78.6	45.6
Dec	9	131.2	93.8	31.0
Jan	5	118.6	83.6	28.6
Feb	8	81.3	55.1	22.4
Mar	8	103.3	72.3	26.9
	Total N		% of exceedence	
	92	63.0	51.1	2.2

Table No. 66: Data for annual average trend of RSPM, NO_X and SO_2 at Ambernath

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	63	96.6	36.0	31.2
05-06	85	83.2	52.4	30.1
06-07	86	92.6	43.8	23.9
07-08	101	106.3	40.5	31.3
08-09	26	70.2	52.8	29.3
09-10	-	-	-	-
10-11	-	-	-	-
11-12	-	-	-	-
12-13	92	117.6	90.7	42.5

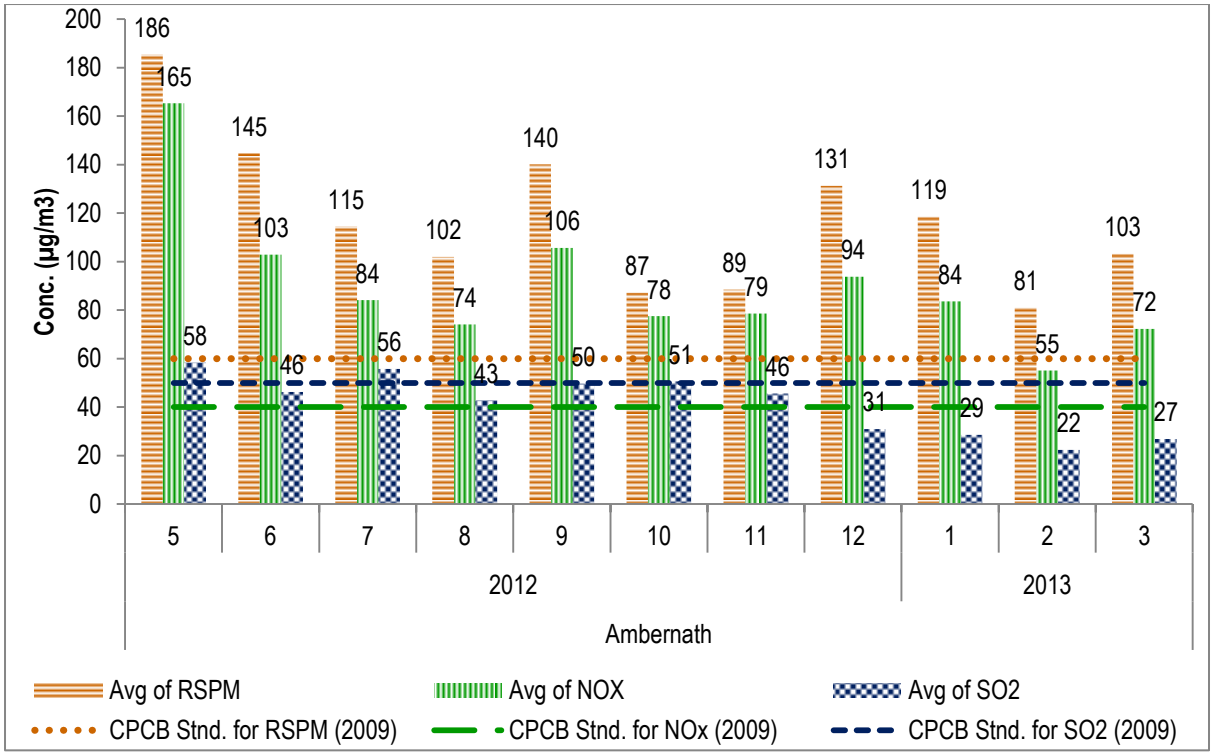


Figure No. 77: Monthly average reading recorded at Ambernath

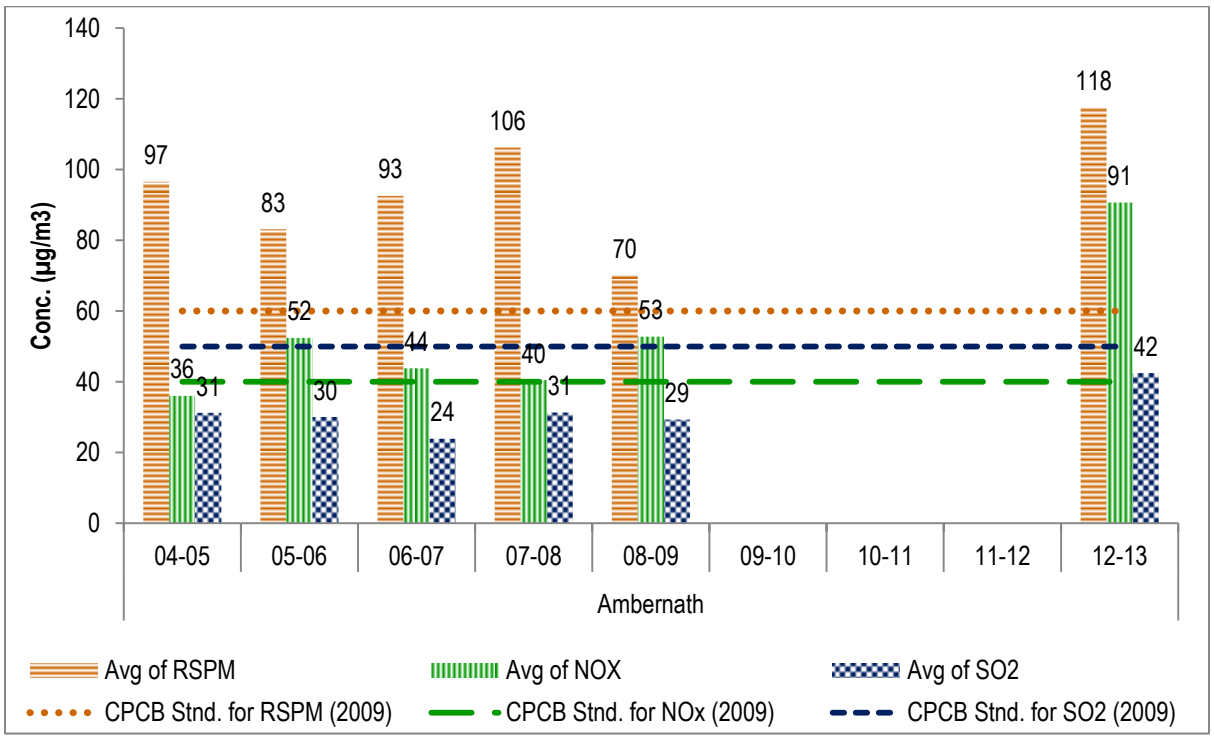


Figure No. 78: Annual average trend of SO_2, NOx and RSPM at Ambernath

Badlapur - Badlapur - BIWA House

Table No. 67: Data for monthly average reading recorded at Badlapur - BIWA House

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	8	133.5	78.8	33.9
May	8	57.6	12.8	19.4
Jun	8	126.0	87.3	47.4
Jul	9	108.8	79.8	64.2
Aug	9	107.3	78.4	49.4
Sep	8	91.6	67.3	50.5
Oct	7	95.7	85.4	64.1
Nov	8	93.5	83.6	49.9
Dec	6	102.3	71.2	26.7
Jan	6	112.2	78.5	28.2
Feb	8	78.1	52.5	24.6
Mar	8	88.6	60.8	26.0
Total N		% of exceedence		
93		44.1	35.5	4.3

Table No. 68: Data for annual average trend of RSPM, NO_X and SO_2 at Badlapur - BIWA House

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	80	140.5	39.0	27.0
07-08	104	93.1	41.5	30.2
08-09	102	98.0	76.3	35.0
09-10	84	103.4	84.6	55.2
10-11	94	118.2	73.6	35.6
11-12	95	120.9	67.9	41.0
12-13	93	99.5	69.5	41.0

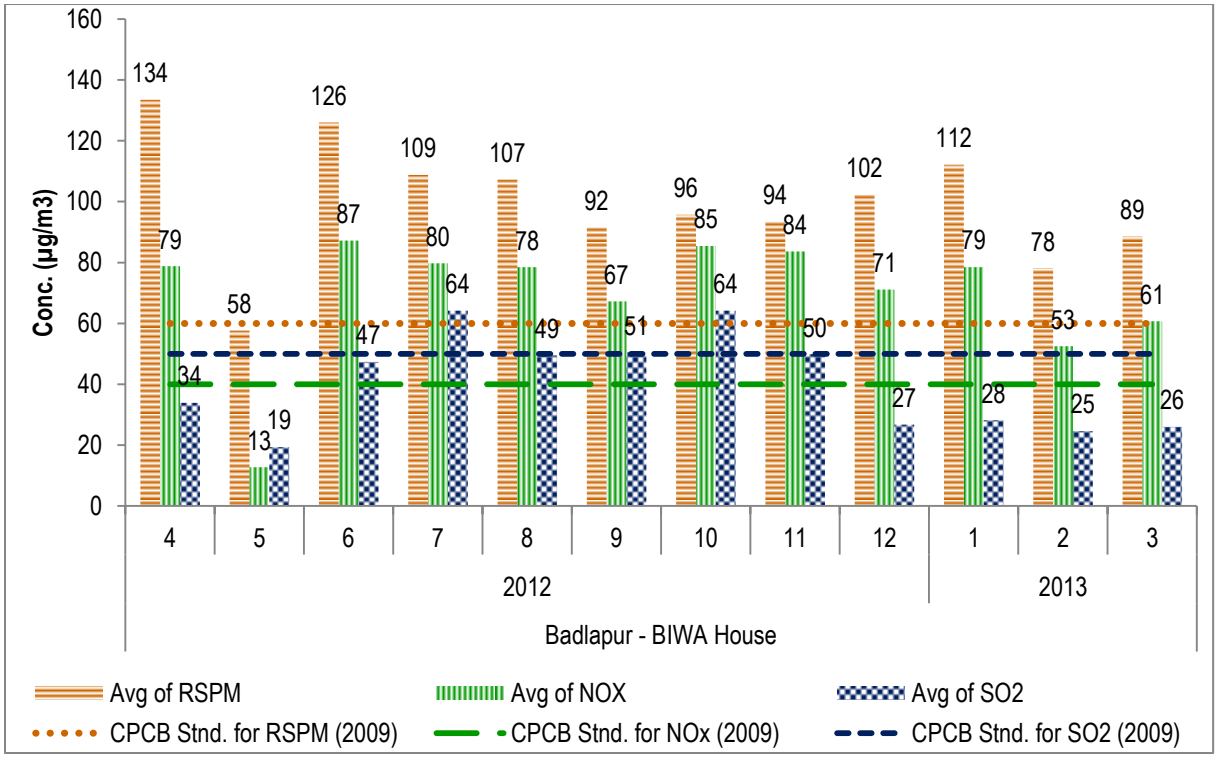


Figure No. 79: Monthly average reading recorded at Badlapur –BIWA House

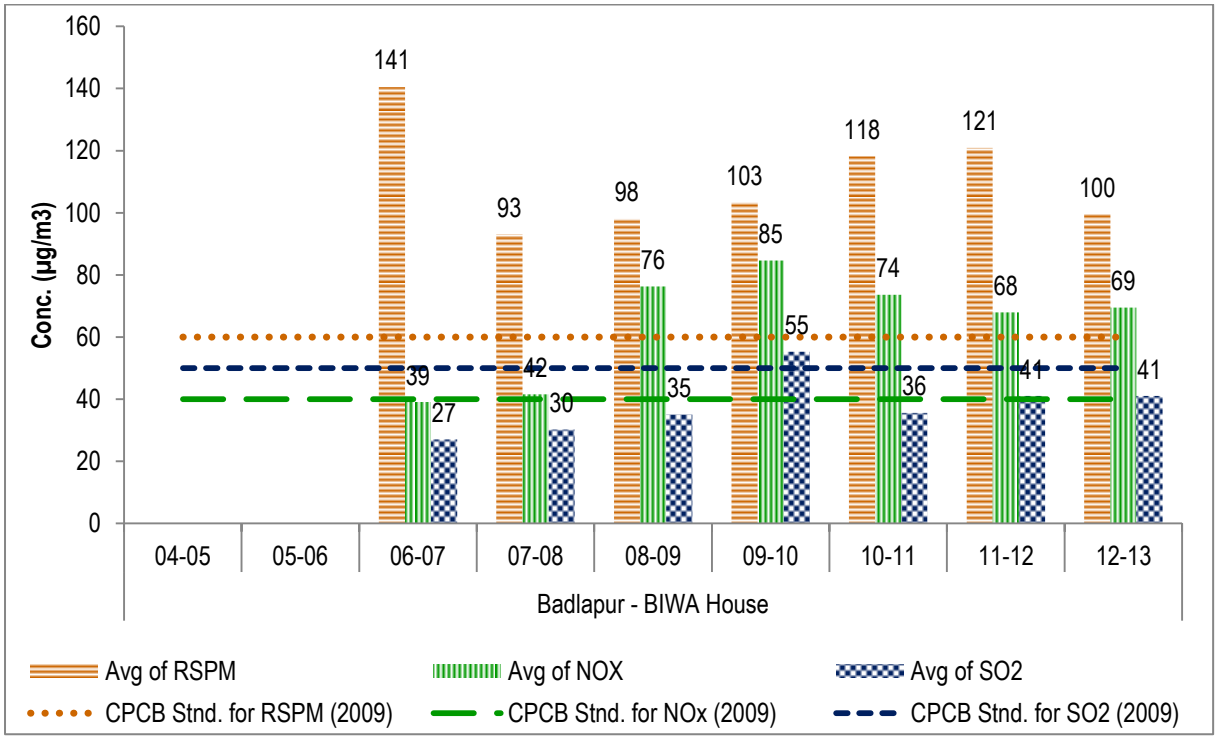


Figure No. 80: Annual average trend of SO_2, NOx and RSPM at Badlapur –BIWA House

Bhiwandi - Prematai hall

Table No. 69: Data for monthly average reading recorded at Prematai hall

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	10	58.9	34.0	20.3
May	10	58.9	33.9	21.4
Jun	8	45.3	21.5	14.6
Jul	9	48.2	22.6	16.2
Aug	8	52.0	24.0	19.3
Sep	9	62.8	35.6	25.9
Oct	8	65.1	36.6	28.3
Nov	8	62.9	35.3	26.0
Dec	10	61.3	36.1	29.3
Jan	8	62.0	39.4	29.8
Feb	6	64.2	41.2	31.5
Mar	8	62.3	40.5	31.5
	Total N		% of exceedence	
	102	0.0	0.0	0.0

Table No. 70: Data for annual average trend of RSPM, NO_X and SO_2 at Prematai hall

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	-	-	-	-
10-11	-	-	-	-
11-12	103	52.0	23.4	14.9
12-13	102	58.5	33.2	24.2

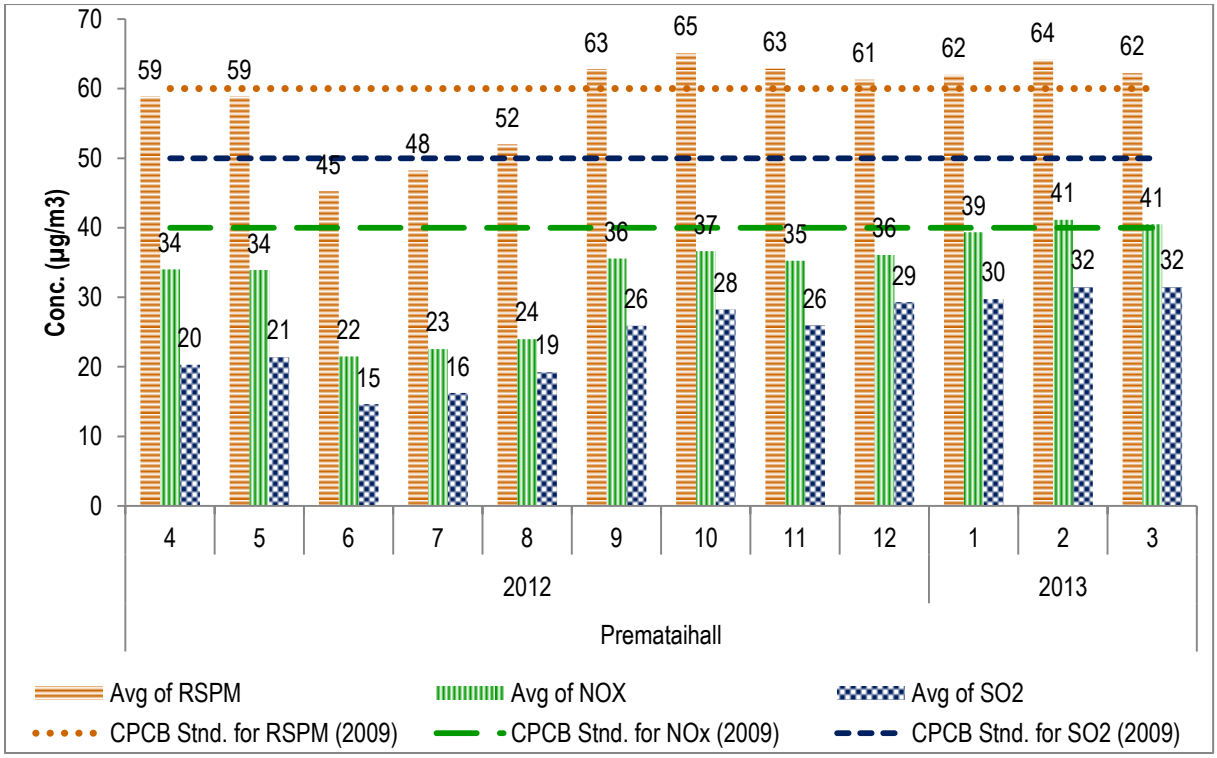


Figure No. 81: Monthly average reading recorded at Prematahall -Bhiwandi

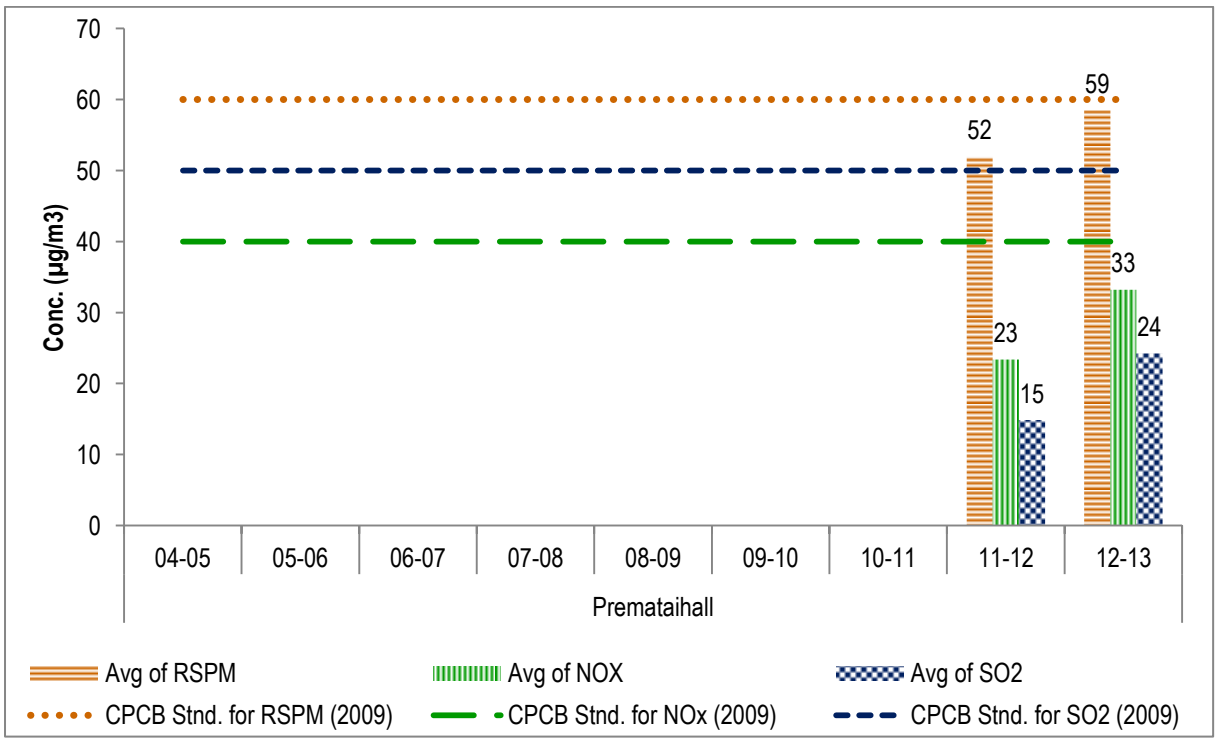


Figure No. 82: Annual average trend of SO_2, NOx and RSPM at Prematahall -Bhiwandi

Bhiwandi - I.G.M. Hospital

Table No. 71: Data for monthly average reading recorded at I.G.M. Hospital

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	8	70.4	29.3	17.8
May	8	70.5	29.3	18.0
Jun	10	56.9	30.6	23.3
Jul	8	57.4	31.4	23.9
Aug	10	61.1	33.7	23.6
Sep	8	53.6	26.1	23.1
Oct	8	61.4	30.5	31.0
Nov	8	64.8	41.6	27.9
Dec	8	66.1	41.9	30.6
Jan	8	65.8	41.6	31.0
Feb	4	67.5	42.8	31.3
Mar	8	66.5	42.0	31.3
	Total N		% of exceedence	
	96	0.0	0.0	0.0

Table No. 72: Data for annual average trend of RSPM, NO_X and SO_2 at I.G.M. Hospital

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	-	-	-	-
10-11	-	-	-	-
11-12	26	62.2	29.3	22.6
12-13	96	63.1	34.6	25.7

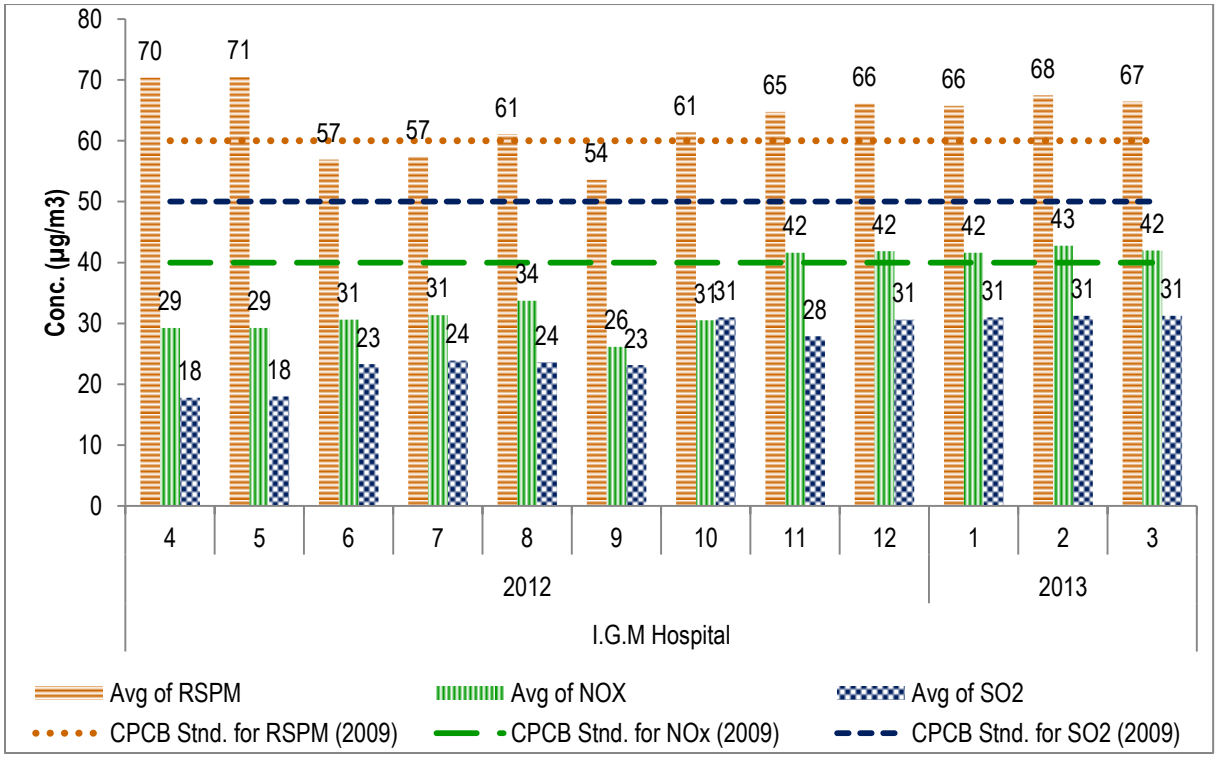


Figure No. 83: Monthly average reading recorded at IGM Hospital -Bhiwandi

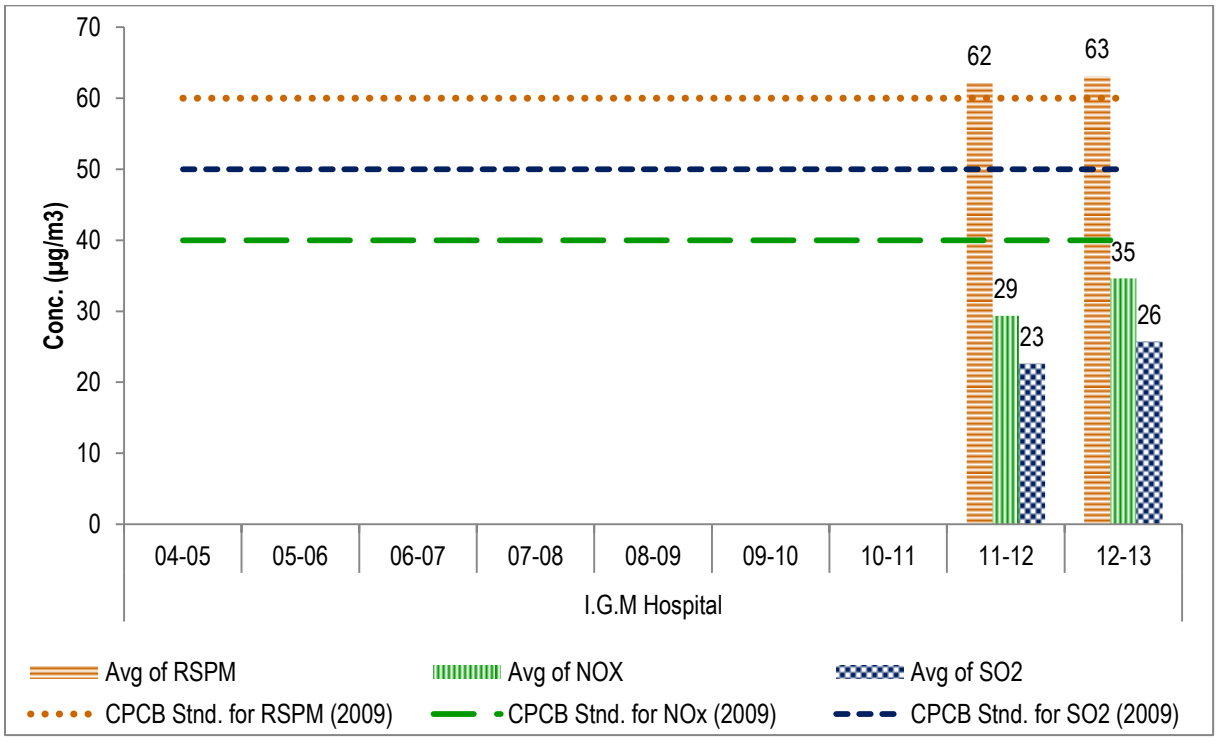


Figure No. 84: Annual average trend of SO_2, NOx and RSPM at IGM Hospital -Bhiwandi

Dombivali – MIDC Phase - II

Table No. 73: Data for monthly average reading recorded at Dombivali

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	8	244.5	218.3	73.4
May	9	135.0	94.3	60.0
Jun	9	107.2	78.4	58.6
Jul	9	123.6	90.6	59.3
Aug	8	123.0	86.1	53.4
Sep	9	93.6	83.3	53.6
Oct	8	107.6	96.1	65.1
Nov	9	114.7	80.8	37.3
Dec	6	108.8	76.5	29.8
Jan	8	93.3	64.3	22.4
Feb	9	105.1	73.4	28.4
Mar	8	244.5	218.3	73.4
Total N		% of exceedence		
100		29.4	26.8	3.1

Table No. 74: Data for annual average trend of RSPM, NO_X and SO_2 at Dombivali

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	55	70.9	38.4	42.1
05-06	96	109.2	51.6	35.2
06-07	93	120.1	38.2	23.8
07-08	96	98.3	40.7	37.5
08-09	25	67.8	55.0	34.5
09-10	-	-	-	-
10-11	-	-	-	-
11-12	-	-	-	-
12-13	92	123.0	94.4	49.7

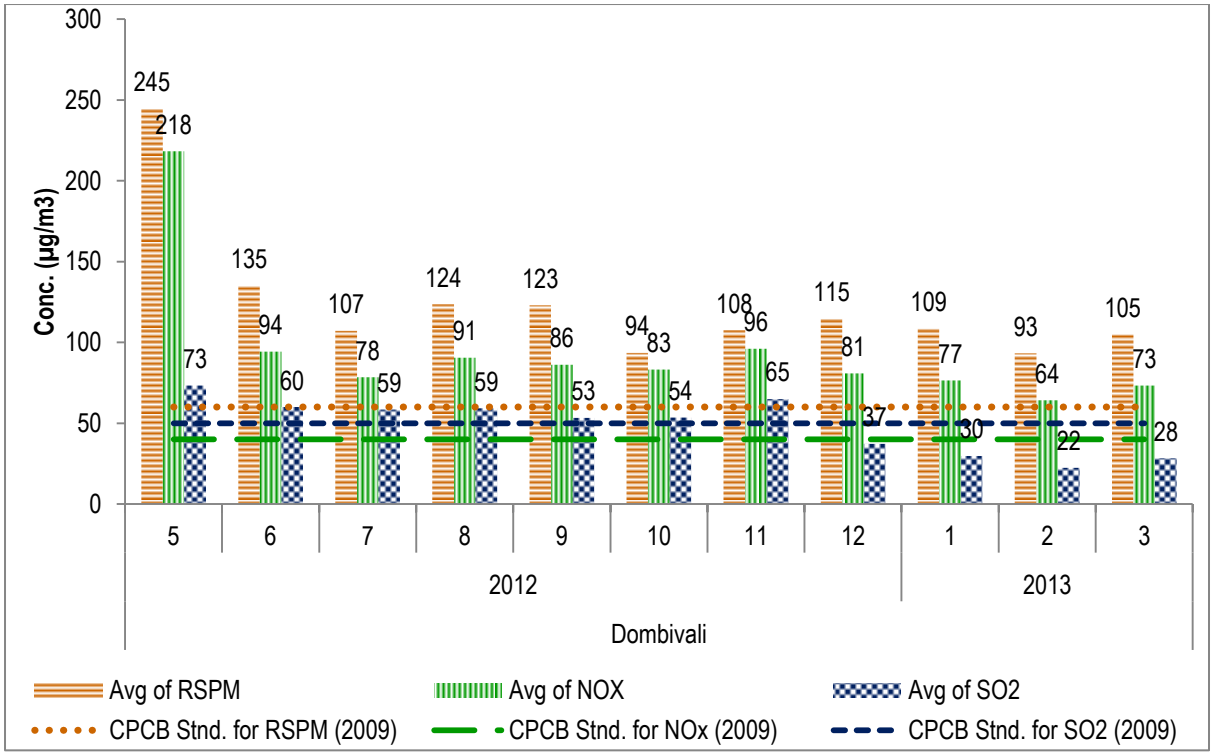


Figure No. 85: Monthly average reading recorded at Dombivali

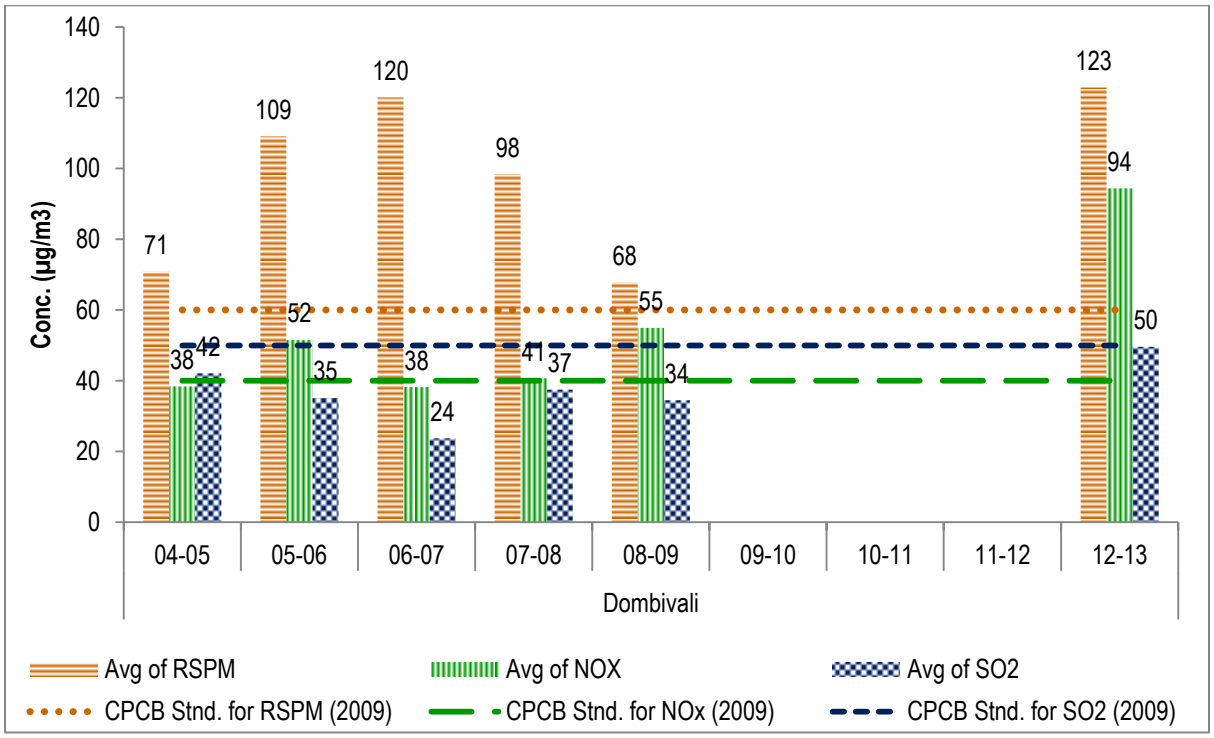


Figure No. 86: Annual average trend of SO_2, NOx and RSPM at Dombivali

Dombivali - MIDC Office Dombivali

Table No. 75: Data for monthly average reading recorded at MIDC Office Dombivali

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_x	SO_2
Apr	-	-	-	-
May	-	-	-	-
Jun	-	-	-	-
Jul	9	104.7	76.8	60.2
Aug	8	63.0	21.1	8.5
Sep	9	97.9	70.1	49.9
Oct	9	63.6	56.8	44.7
Nov	8	114.1	101.9	56.9
Dec	9	84.3	57.2	31.7
Jan	5	83.2	56.6	28.4
Feb	8	85.6	58.1	19.1
Mar	9	77.1	51.6	22.9
Total N		% of exceedence		
	74	28.4	23.0	4.1

Table No. 76: Data for annual average trend of RSPM, NO_x and SO_2 at MIDC Office Dombivali

Year	N	Annual average (µg/m³)		
		RSPM	NO_x	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	-	-	-	-
10-11	-	-	-	-
11-12	-	-	-	-
12-13	74	86.0	61.4	36.5

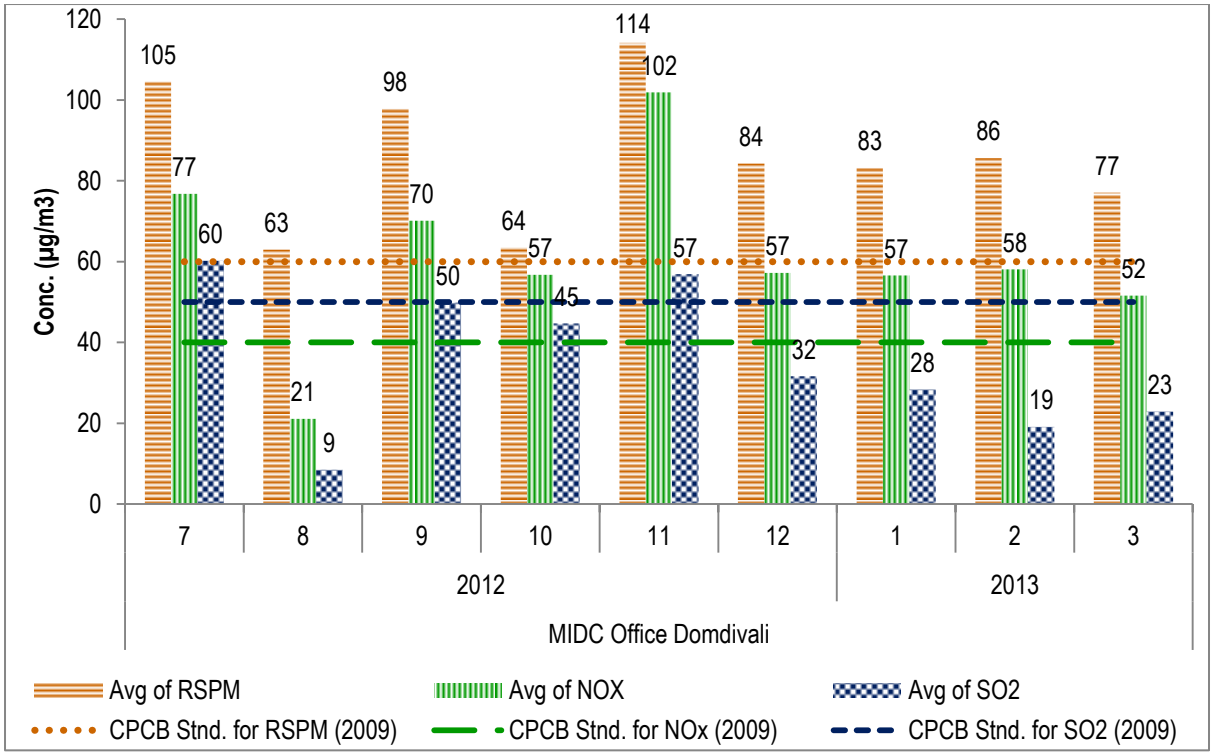


Figure No. 87: Monthly average reading recorded at MIDC Office -Dombivali

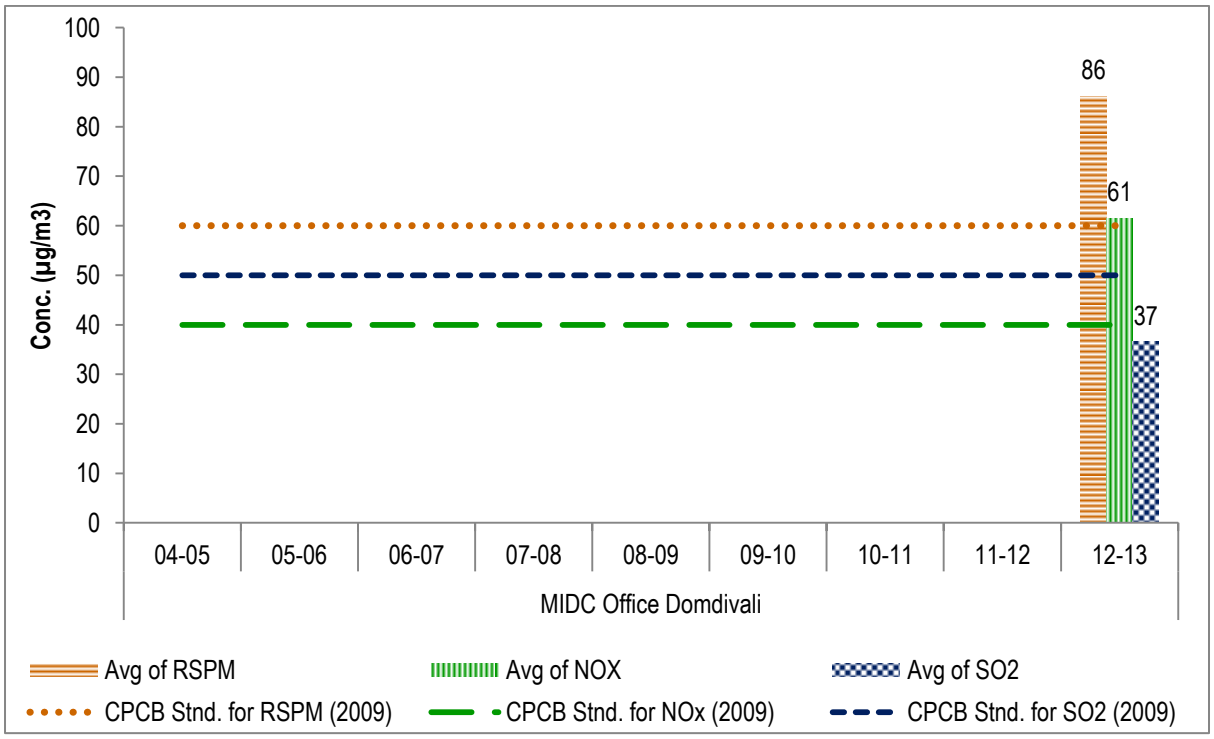


Figure No. 88: Annual average trend of SO_2, NOx and RSPM at MIDC Office -Dombivali

Kalyan - MPCB RO Kalyan office

Table No. 77: Data for monthly average reading recorded at MPCB RO Kalyan office

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	7	73.9	38.0	24.3
May	8	73.5	37.6	24.5
Jun	8	67.0	32.0	24.1
Jul	10	57.7	31.6	24.0
Aug	8	62.6	33.3	25.3
Sep	8	64.5	33.6	25.5
Oct	10	65.4	36.2	29.0
Nov	10	62.6	39.4	32.5
Dec	8	64.4	43.0	33.6
Jan	10	65.1	43.0	34.3
Feb	6	67.8	43.7	36.0
Mar	10	65.2	43.0	33.5
Total N		% of exceedence		
103		0.0	0.0	0.0

Table No. 78: Data for annual average trend of RSPM, NO_X and SO_2 at MPCB RO Kalyan office

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	-	-	-	-
10-11	-	-	-	-
11-12	82	71.2	33.8	21.5
12-13	103	65.4	37.8	29.0

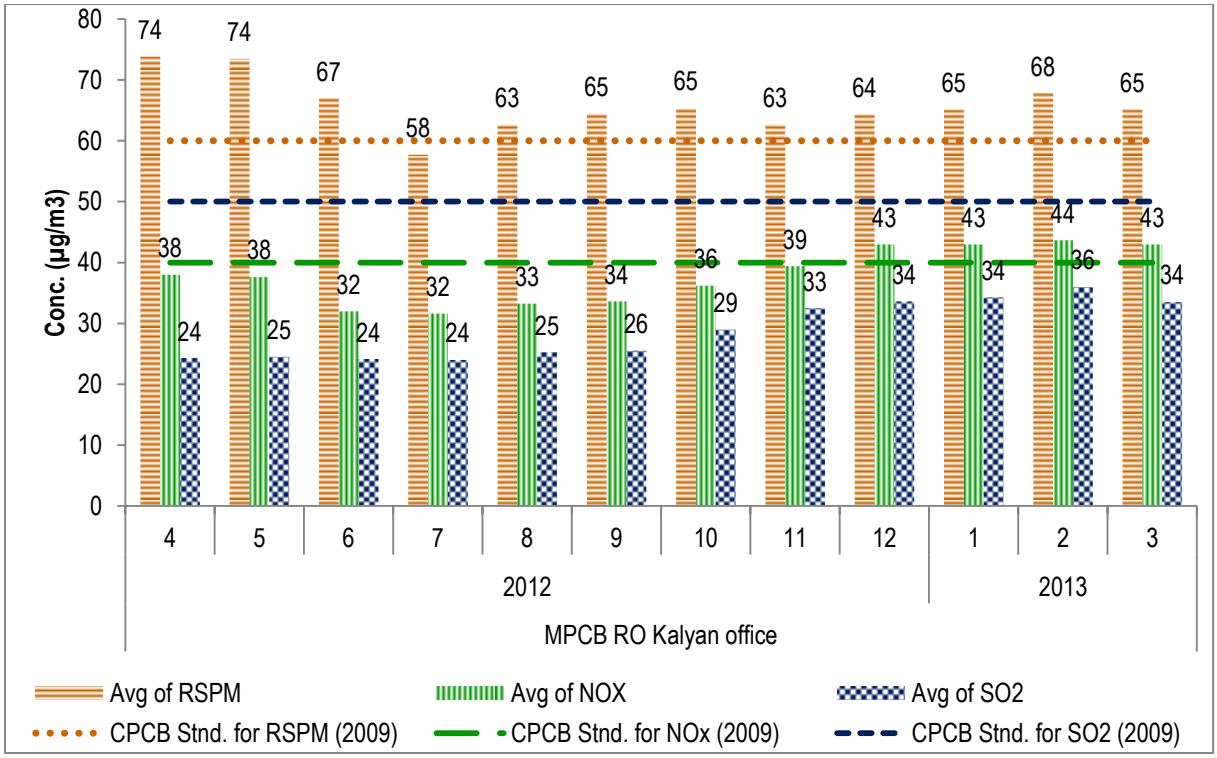


Figure No. 89: Monthly average reading recorded at MPCB RO Kalyan Office

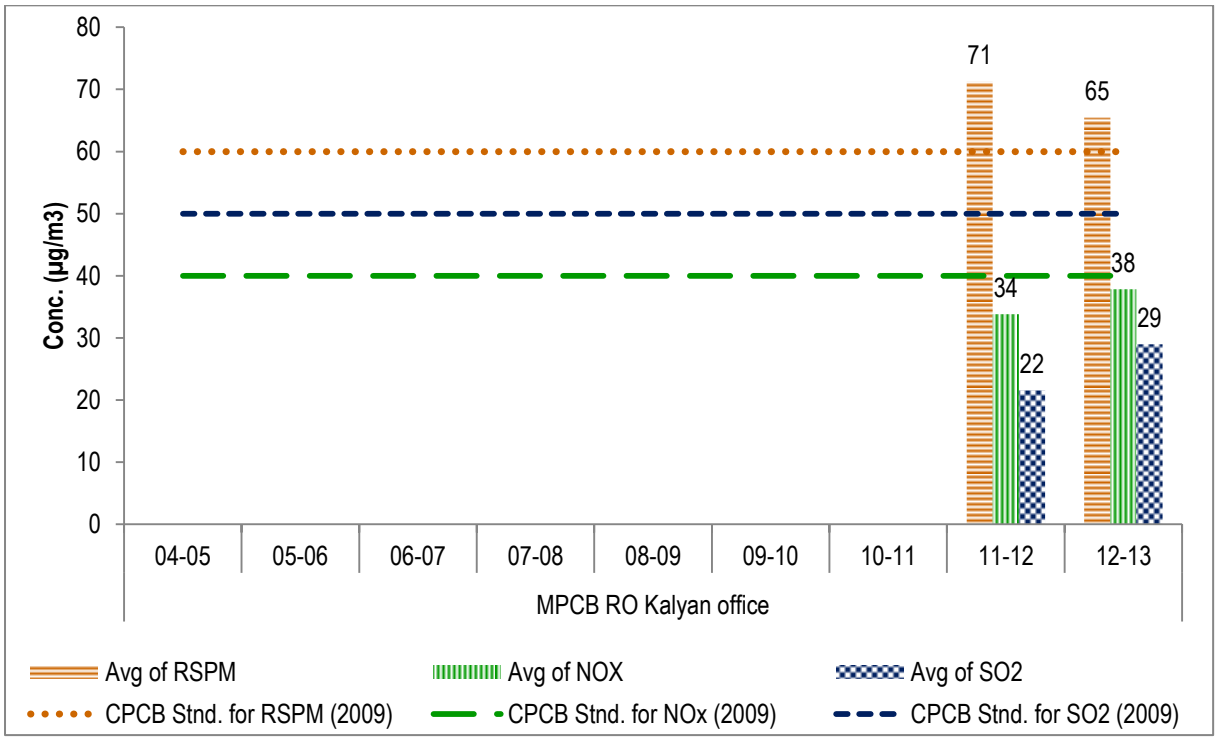


Figure No. 90: Annual average trend of SO_2, NOx and RSPM at MPCB RO Kalyan Office

Ulhasnagar - Smt. CHM College Campus

Table No. 79: Data for monthly average reading recorded at Smt. CHM College Campus, Ulhasnagar

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	9	118.3	61.4	35.4
May	9	146.0	93.1	51.2
Jun	8	83.6	54.9	38.6
Jul	9	84.0	57.1	45.2
Aug	9	84.8	59.6	26.4
Sep	8	80.0	61.0	36.6
Oct	10	52.6	47.2	32.5
Nov	8	73.6	65.6	32.6
Dec	9	69.8	45.8	25.9
Jan	5	85.0	57.8	23.0
Feb	8	67.4	44.3	20.4
Mar	8	72.1	48.0	29.1
Total N		% of exceedence		
100		22.0	14.0	0.0

Table No. 80: Data for annual average trend of RSPM, NOx and SO_2 at Smt. CHM College Campus, Ulhasnagar

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	75	158.6	45.8	27.7
07-08	53	90.4	42.2	30.5
08-09	92	86.6	57.5	30.1
09-10	88	92.3	70.0	46.4
10-11	99	98.6	61.3	30.4
11-12	102	108.9	64.1	36.9
12-13	100	84.9	58.0	33.6

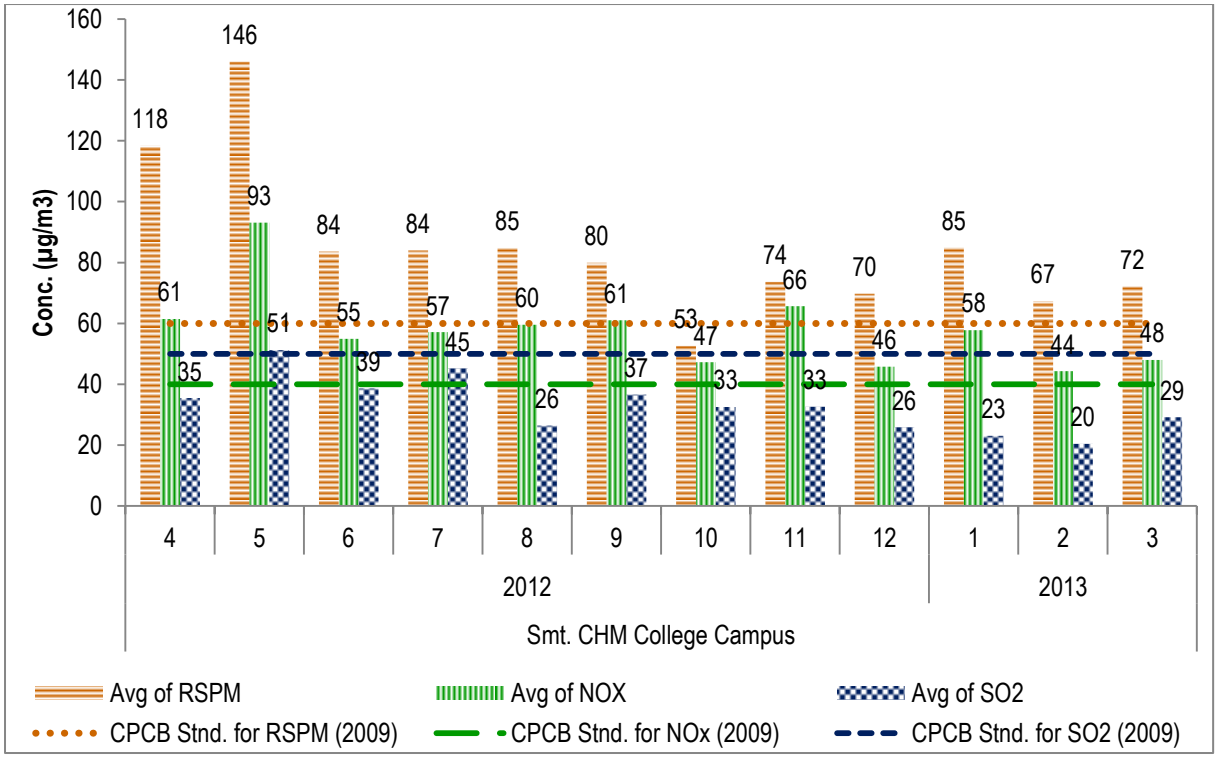


Figure No. 91: Monthly average reading recorded at -Smt.CHM Collage Campus, Ulhasnagar

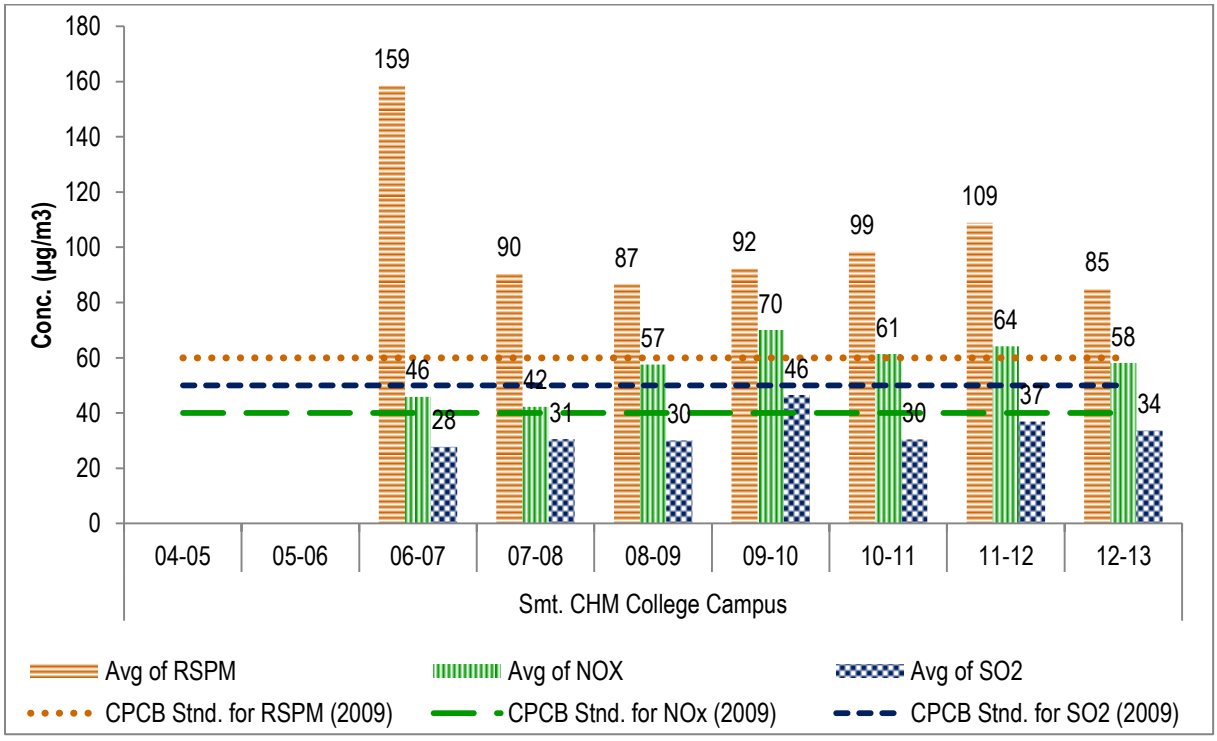


Figure No. 92: Annual average trend of SO_2, NOx and RSPM at -Smt.CHM Collage Campus, Ulhasnagar

Ulhasnagar - Powai Chowk

Table No. 81: Data for monthly average reading recorded at Powai Chowk, Ulhasnagar

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	9	118.8	86.8	45.9
May	9	132.6	104.0	54.9
Jun	8	117.0	104.4	48.1
Jul	9	146.4	108.6	63.4
Aug	9	120.4	89.0	47.4
Sep	9	111.1	80.6	47.9
Oct	9	97.9	87.3	49.1
Nov	8	89.6	80.0	50.9
Dec	9	78.9	53.1	29.4
Jan	5	87.6	59.6	25.0
Feb	8	83.6	56.6	22.4
Mar	9	74.1	49.7	25.3
Total N		% of exceedence		
	101	53.5	53.5	1.0

Table No. 82: Data for annual average trend of RSPM, NO_X and SO_2 at Powai Chowk, Ulhasnagar

	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	89	120.9	38.0	23.7
07-08	98	90.5	37.0	25.4
08-09	98	94.7	68.9	32.8
09-10	89	119.1	95.6	52.9
10-11	96	113.7	68.5	30.9
11-12	102	122.3	74.1	43.3
12-13	101	105.8	80.8	43.2

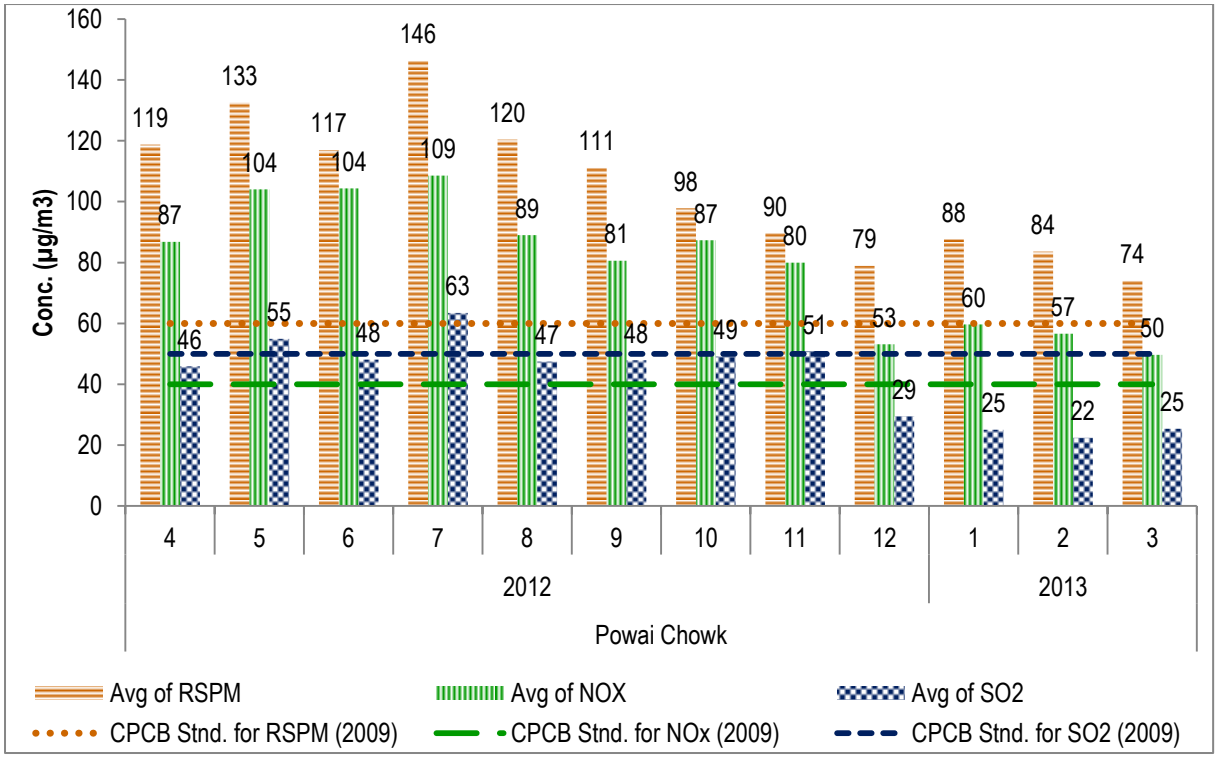


Figure No. 93: Monthly average reading recorded at -Pawai Chowk, Ulhasnagar

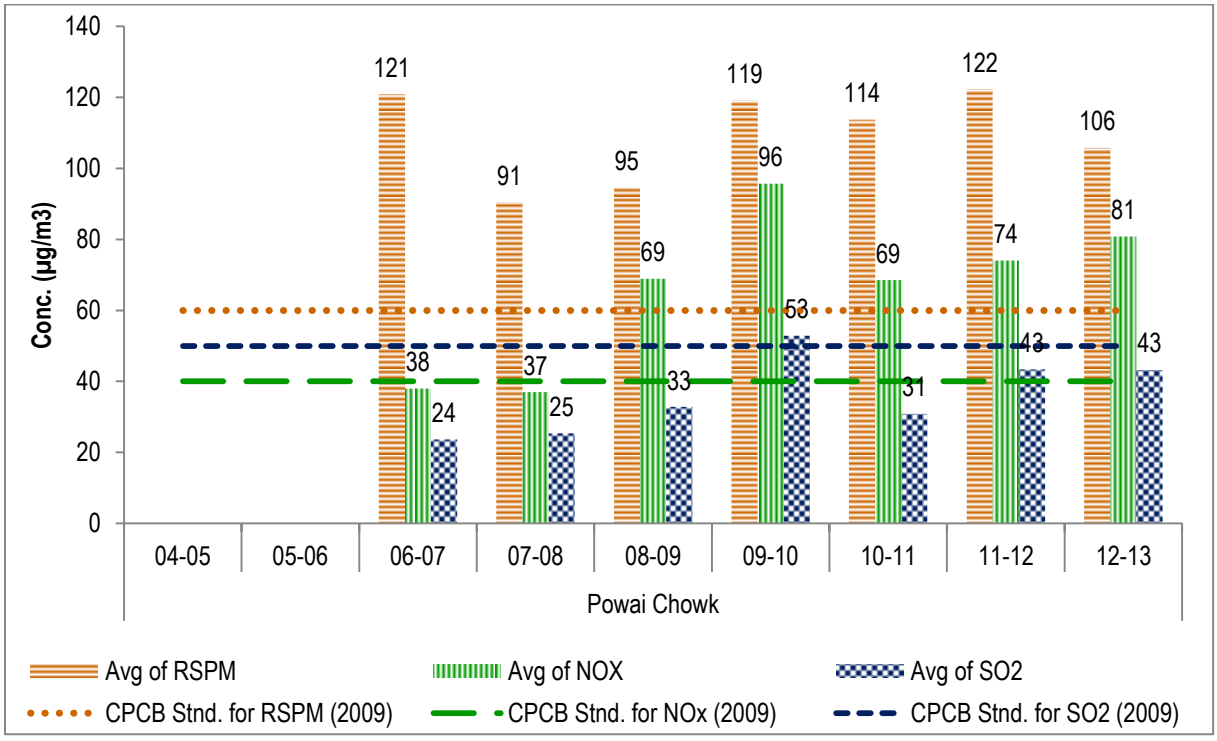


Figure No. 94: Annual average trend of SO_2, NOx and RSPM at -Pawai Chowk, Ulhasnagar

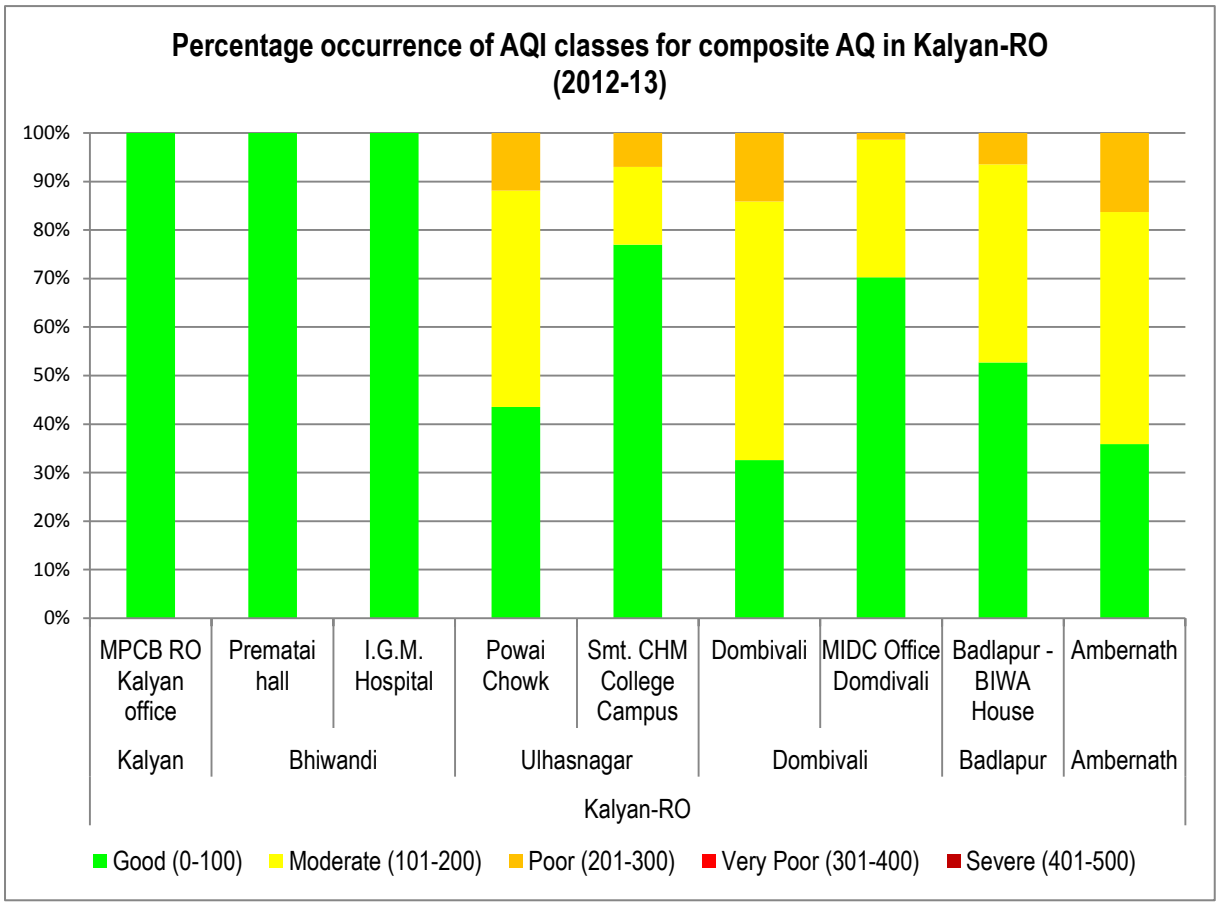
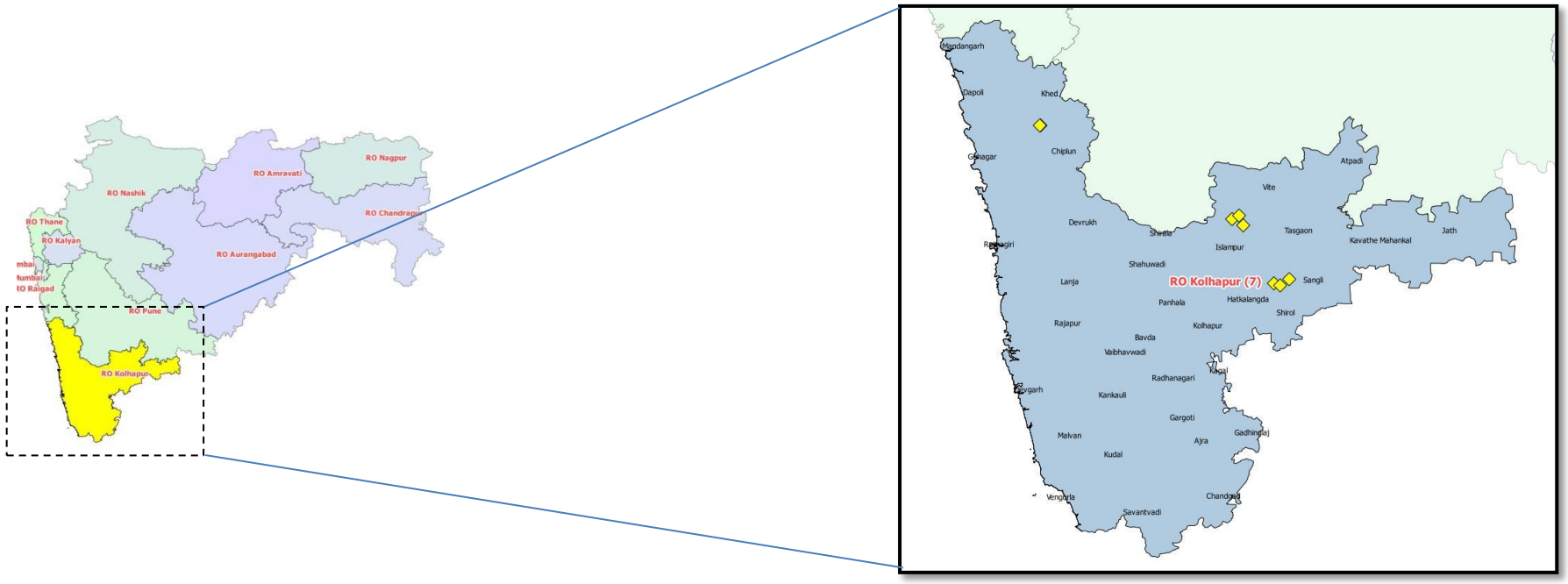


Figure No. 95:. Percentage occurrence of AQI classes for composite AQ in Kalyan-RO (2012-13)

RO – Kolhapur



Region	Program name	Station Codes	Station	Frequency	Latitude	Longitude
Chiplun	NAMP	489	MIDC Chalkewadi	Two Days In A Week	17° 35' 16.8" N	73° 29' 25.0" E
		490	Chiplun - Water Treatment	Two Days In A Week	17° 35' 15.2" N	73° 29' 13.7" E
Kolhapur	NAMP	508	Shivaji University Campus	Two Days In A Week	17° 07' 40.1" N	74° 25' 16.9" E
		509	Ruikar Trust	Two Days In A Week	17° 10' 25.4" N	74° 24' 10.1" E
		510	Mahadwar Road	Two Days In A Week	17° 09' 27.0" N	74° 22' 10.6" E
Sangli	NAMP	574	Terrace of SRO-Sangli, Udyog Bhavan	Twice a week	16° 51' 11.8" N	74° 35' 28.9" E
		575	Sangli-Miraj Primary Municipal school	Twice a week	16° 51' 39.4" N	74° 33' 52.5" E
		576	Krishna Valley school	Twice a week	16° 52' 49.4" N	74° 38' 02.3" E

Chiplun - Chiplun - MIDC Chalkewadi

Table No. 83: Data for monthly average reading recorded at Chiplun - MIDC Chalkewadi, Chiplun

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	-	-	-	-
May	-	-	-	-
Jun	-	-	-	-
Jul	-	-	-	-
Aug	-	-	-	-
Sep	-	-	-	-
Oct	-	-	-	-
Nov	-	-	-	-
Dec	-	-	-	-
Jan	-	-	-	-
Feb	-	-	-	-
Mar	-	-	-	-
Total N		% of exceedence		
	-	-	-	-

Table No. 84: Data for annual average trend of RSPM, NO_X and SO_2 at Chiplun - MIDC Chalkewadi, Chiplun

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	43	85.3	10.5	12.1
07-08	83	87.0	27.7	23.1
08-09	26	61.9	23.7	25.1
09-10	-	-	-	-
10-11	36	143.9	33.1	58.7
11-12	24	38.3	14.5	23.8
12-13	-	-	-	-

NO data

Figure No. 96: Monthly average reading recorded at -MIDC Chalkewadi, Chiplun

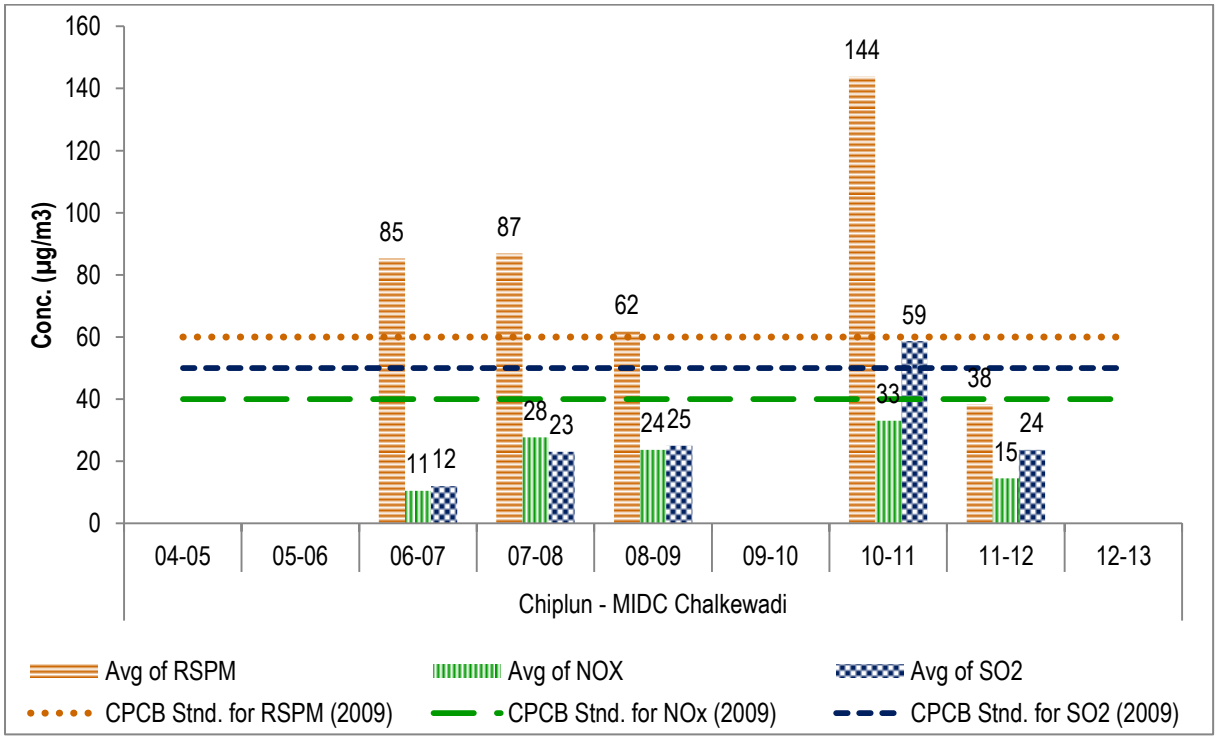


Figure No. 97: Annual average trend of SO_2, NOx and RSPM at -MIDC Chalkewadi, Chiplun

Chiplun - Chiplun - Water Treatment

Table No. 85: Data for monthly average reading recorded at Chiplun - Water Treatment

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	-	-	-	-
May	-	-	-	-
Jun	-	-	-	-
Jul	-	-	-	-
Aug	-	-	-	-
Sep	-	-	-	-
Oct	-	-	-	-
Nov	-	-	-	-
Dec	-	-	-	-
Jan	-	-	-	-
Feb	-	-	-	-
Mar	-	-	-	-
Total N		% of exceedence		
	-	-	-	-

Table No. 86: Data for annual average trend of RSPM, NO_X and SO_2 at Chiplun - Water Treatment

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	2	54.0	0.0	20.5
06-07	105	66.9	10.1	32.4
07-08	105	72.5	22.8	19.7
08-09	25	44.1	21.6	25.2
09-10	-	-	-	-
10-11	44	128.5	30.5	53.6
11-12	33	44.8	15.2	24.8
12-13	-	-	-	-

NO data

Figure No. 98: Monthly average reading recorded at - Chiplun - Water Treatment

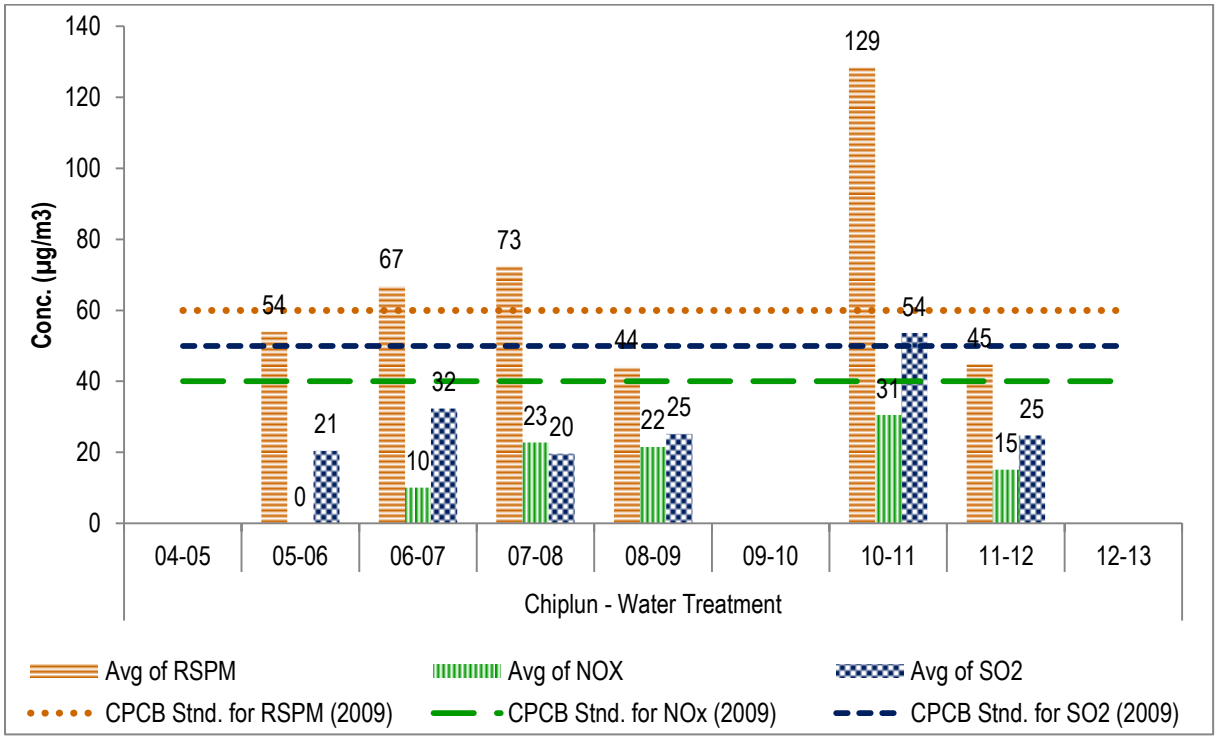


Figure No. 99: Annual average trend of SO_2, NOx and RSPM at Chiplun - Water Treatment

Kolhapur - Shivaji University Campus

Table No. 87: Data for monthly average reading recorded at Shivaji University Campus

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	9	60.2	17.4	11.6
May	9	58.6	18.2	11.0
Jun	8	50.0	15.1	8.1
Jul	9	49.2	14.1	8.2
Aug	9	53.3	15.0	8.3
Sep	8	53.8	14.4	9.5
Oct	9	54.7	13.9	8.8
Nov	9	63.3	15.7	11.9
Dec	9	69.8	18.6	14.6
Jan	9	77.1	24.6	17.2
Feb	8	78.6	26.6	19.9
Mar	8	68.8	22.1	15.9
Total N		% of exceedence		
104		0.0	0.0	0.0

Table No. 88: Data for annual average trend of RSPM, NO_X and SO_2 at Shivaji University Campus

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	88	39.5	7.5	4.4
06-07	101	43.6	6.8	5.1
07-08	104	45.9	3.0	5.3
08-09	80	62.2	10.3	8.2
09-10	96	54.9	4.2	8.0
10-11	104	56.0	9.3	9.0
11-12	113	60.2	13.1	9.8
12-13	104	61.4	17.9	12.0

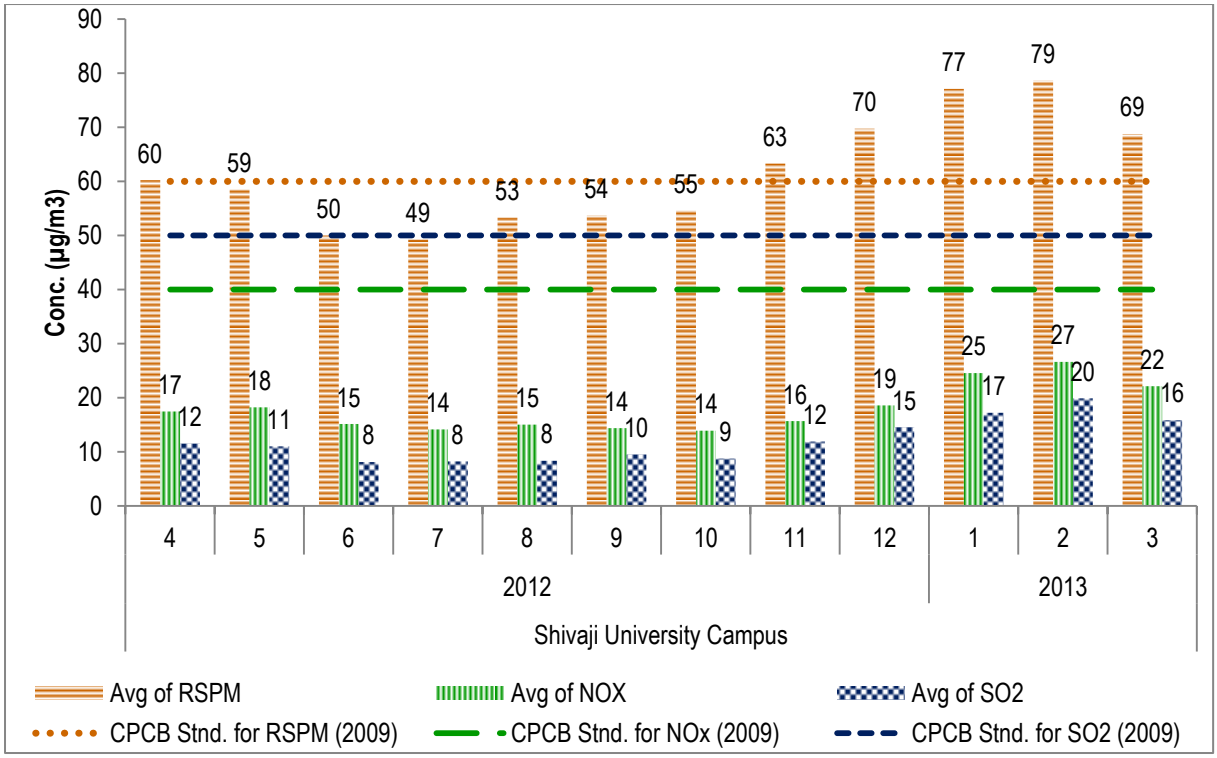


Figure No. 100: Monthly average reading recorded at - Shivaji University Campus

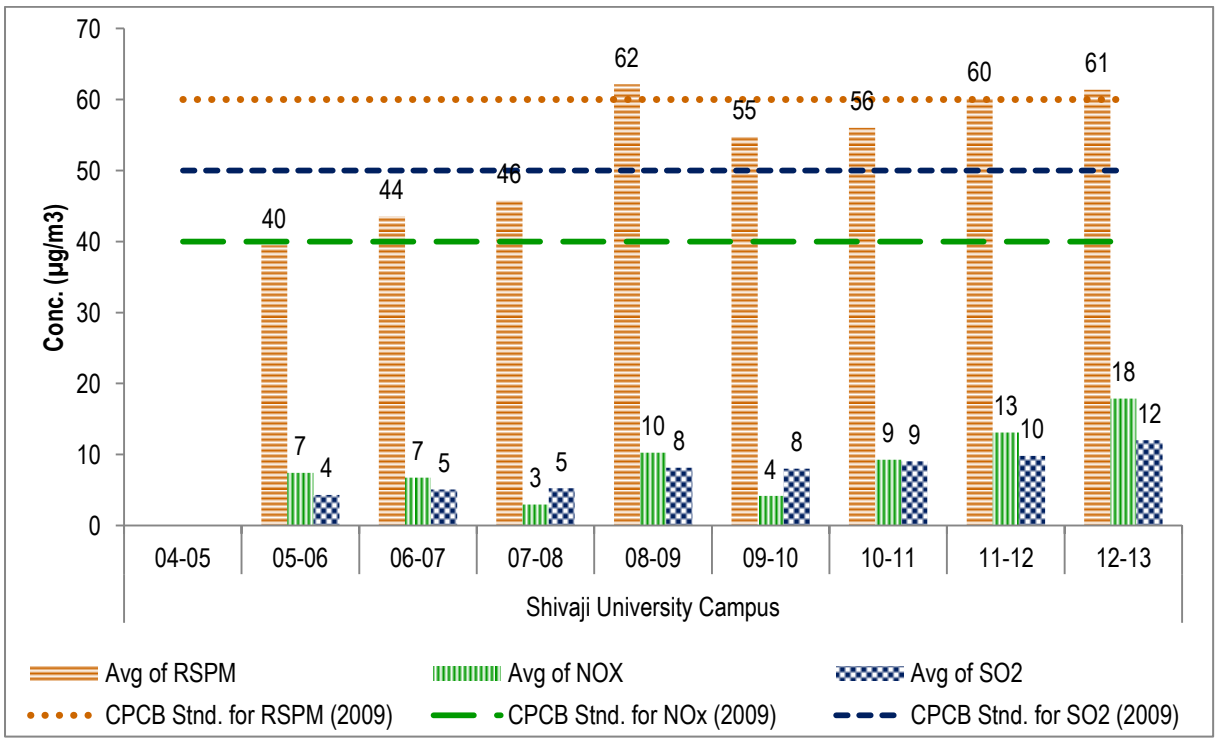


Figure No. 101: Annual average trend of SO_2, NOx and RSPM at -Shivaji University Campus

Kolhapur - Ruikar Trust

Table No. 89: Data for monthly average reading recorded at -Ruikar Trust, Kolhapur

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	177.8	51.0	31.0
May	9	176.7	47.3	30.7
Jun	9	148.1	39.8	26.2
Jul	9	98.1	27.6	19.7
Aug	9	121.1	30.9	23.2
Sep	8	118.4	32.5	23.9
Oct	9	136.0	33.0	22.9
Nov	9	145.1	34.6	25.6
Dec	8	177.9	41.0	29.4
Jan	9	219.1	54.2	34.6
Feb	8	246.5	63.8	33.1
Mar	8	153.6	53.6	26.8
	Total N		% of exceedence	
	103	90.3	0.0	0.0

Table No. 90: Data for annual average trend of RSPM, NO_X and SO_2 at Ruikar Trust, Kolhapur

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	84	107.5	45.4	12.0
06-07	101	96.5	39.1	10.9
07-08	103	95.5	27.0	10.1
08-09	102	100.2	26.7	16.3
09-10	92	99.2	19.8	15.9
10-11	102	104.9	27.4	21.2
11-12	105	116.1	33.5	23.9
12-13	103	159.1	42.1	27.2

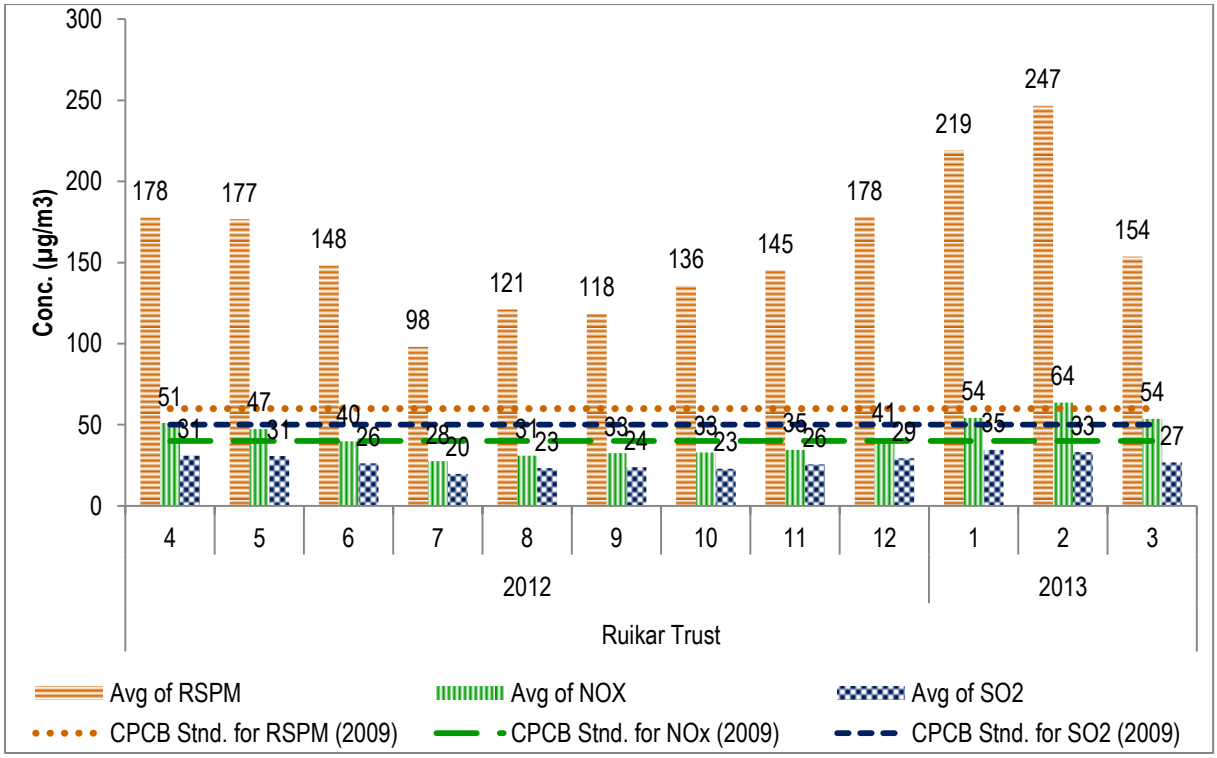


Figure No. 102: **Monthly average reading recorded at -Ruikar Trust Kolhapur**

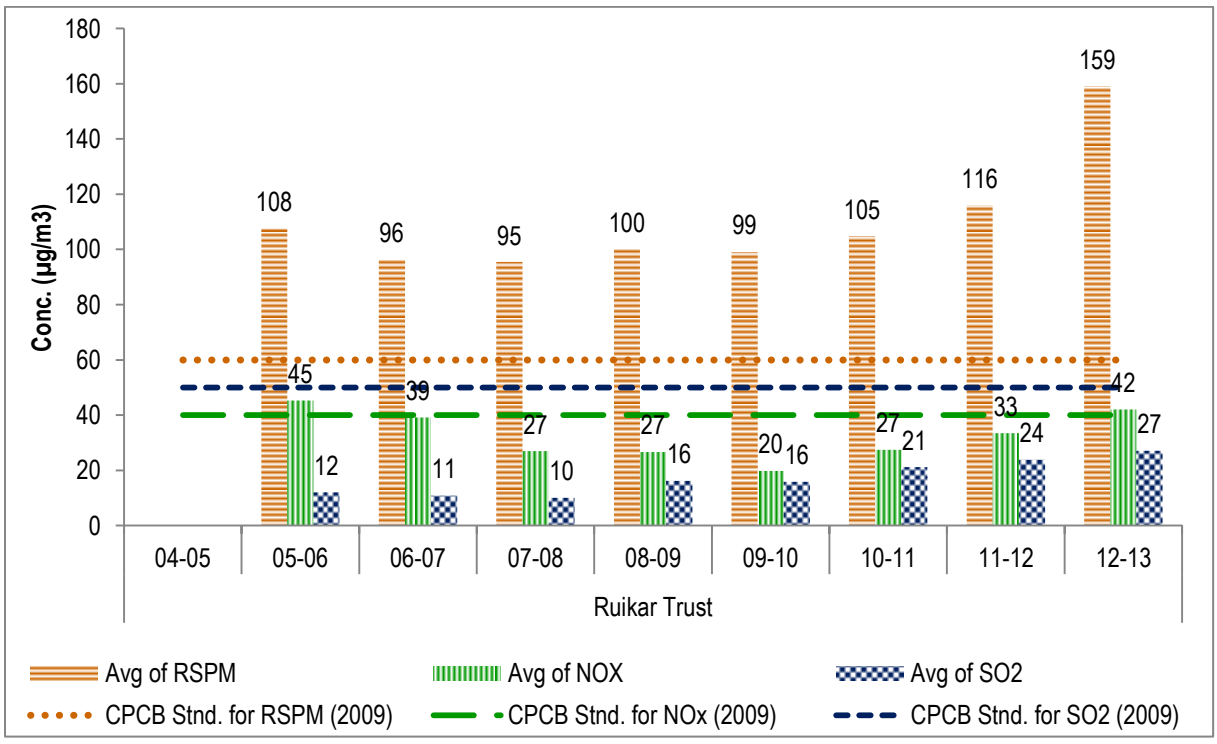


Figure No. 103: Annual average trend of SO_2, NOx and RSPM at - Ruikar Trust Kolhapur

Kolhapur - Mahadwar Road

Table No. 91: Data for monthly average reading recorded at -Mahadwar Road Kolhapur

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_x	SO_2
Apr	8	151.0	41.1	28.4
May	9	150.1	38.3	31.9
Jun	9	112.4	32.9	23.1
Jul	8	87.3	22.1	16.5
Aug	9	103.9	26.1	21.0
Sep	9	108.4	25.8	21.0
Oct	9	120.4	27.3	20.6
Nov	8	138.9	31.5	24.4
Dec	8	149.5	35.4	27.0
Jan	9	191.2	46.0	31.1
Feb	8	196.6	52.6	30.3
Mar	8	127.0	44.4	23.4
Total N		% of exceedence		
	102	85.3	0.0	0.0

Table No. 92: Data for annual average trend of RSPM, NO_x and SO_2 at -Mahadwar Road Kolhapur

Year	N	Annual average (µg/m³)		
		RSPM	NO_x	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	79	68.8	28.1	7.8
06-07	99	64.0	21.0	8.2
07-08	91	75.5	11.4	7.7
08-09	100	84.3	17.4	11.5
09-10	103	86.5	14.7	13.3
10-11	104	92.5	20.9	16.8
11-12	97	101.8	25.7	20.1
12-13	102	136.1	35.1	24.9

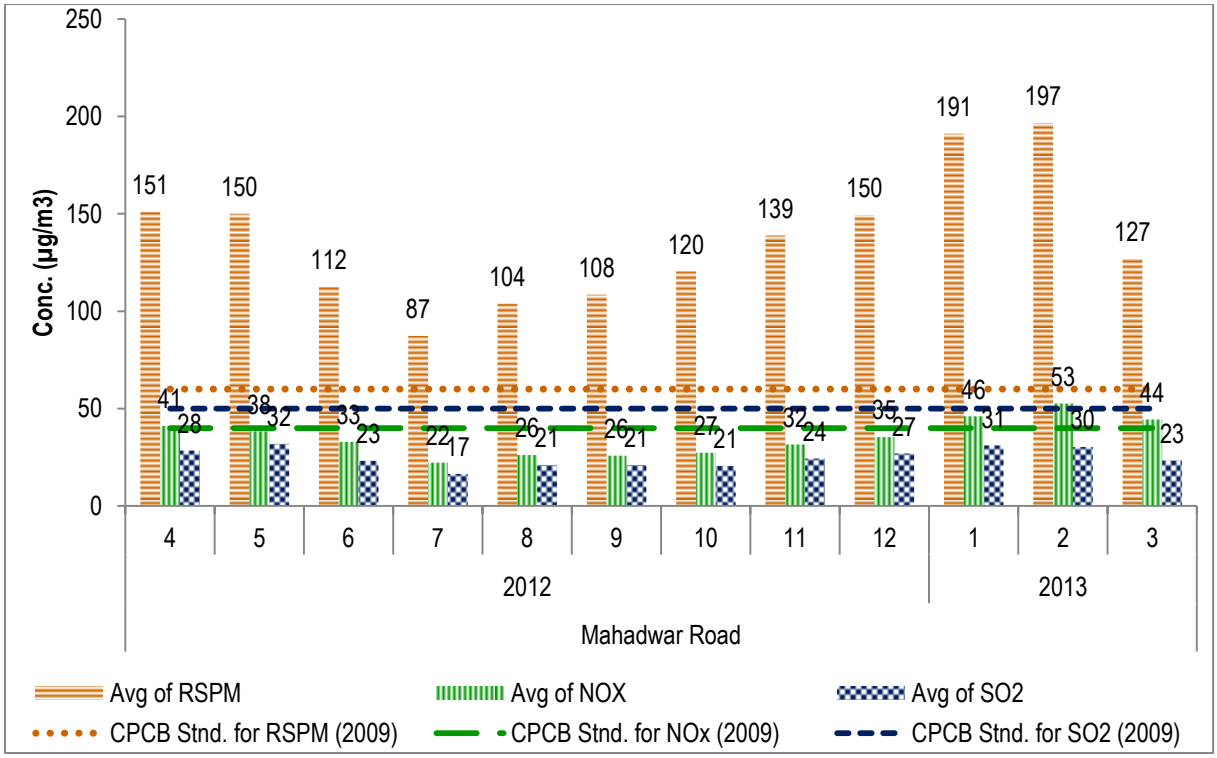


Figure No. 104: Monthly average reading recorded at –Mahadwar Road

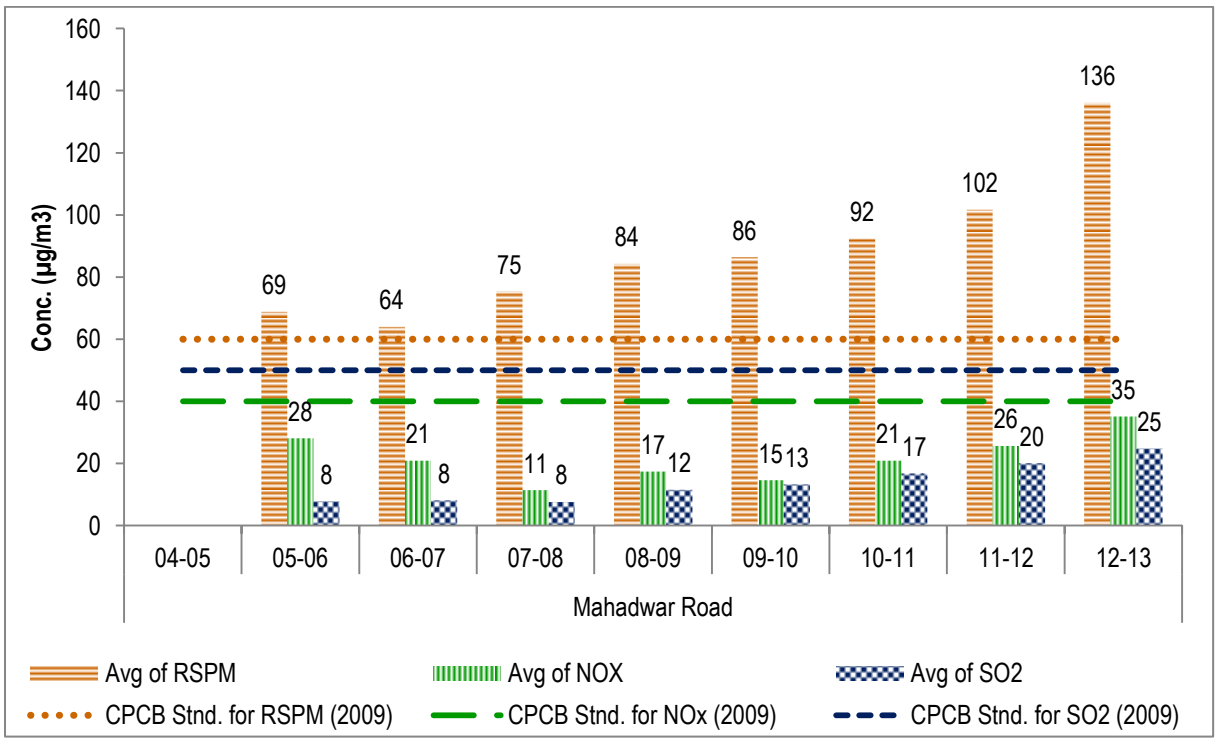


Figure No. 105: Annual average trend of SO_2, NOx and RSPM at –Mahadwar Road

Sangli - Terrace of SRO-Sangli, Udyog Bhavan

Table No. 93: Data for monthly average reading recorded at Terrace of SRO-Sangli, Udyog Bhavan

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	9	69.8	36.6	8.9
May	8	63.8	32.5	9.0
Jun	9	46.1	27.7	8.4
Jul	9	42.6	27.4	9.6
Aug	9	38.0	22.0	7.9
Sep	8	44.1	25.0	8.0
Oct	9	46.1	37.6	11.4
Nov	9	76.4	40.3	10.9
Dec	9	103.3	48.8	13.2
Jan	8	125.4	62.1	11.1
Feb	8	100.8	56.9	9.8
Mar	9	86.8	48.1	10.7
Total N		% of exceedence		
	104	19.2	1.0	0.0

Table No. 94: Data for annual average trend of RSPM, NO_X and SO_2 at Terrace of SRO-Sangli, Udyog Bhavan

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	69	57.3	19.3	25.5
09-10	102	53.7	26.6	21.7
10-11	104	54.0	29.3	11.7
11-12	105	63.4	35.9	10.0
12-13	104	69.8	38.5	9.9

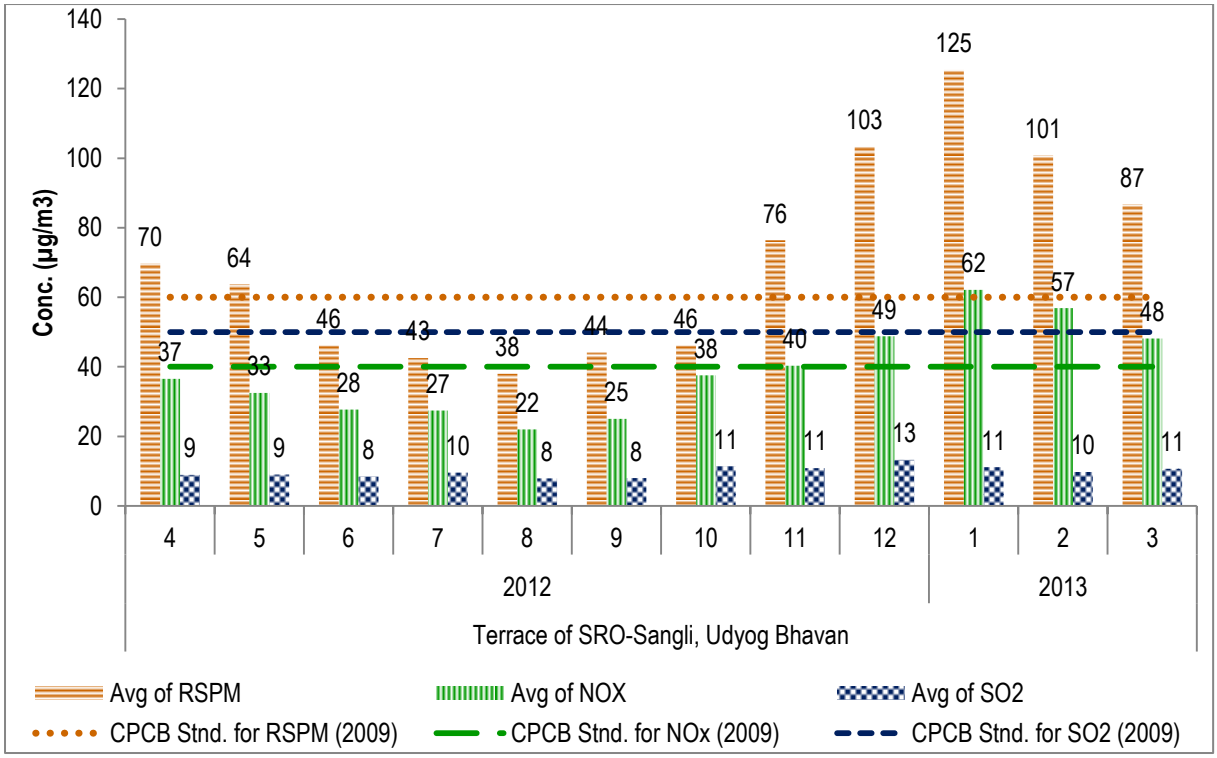


Figure No. 106: **Monthly average reading recorded at –Terrece of SRO-Sangli, Udyog Bhavan**

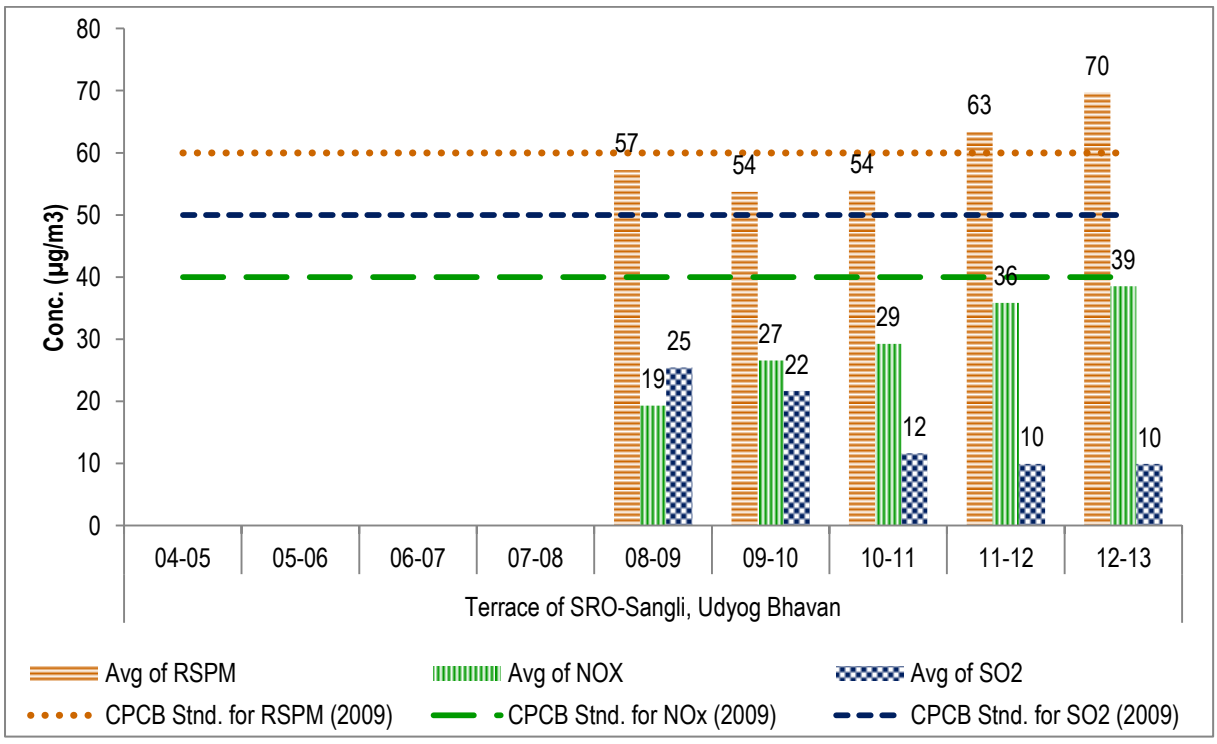


Figure No. 107: Annual average trend of SO_2, NOx and RSPM at -Terrece of SRO-Sangli, Udyog Bhavan

Sangli - Sangli-Miraj Primary Municipal school

Table No. 95: Data for monthly average reading recorded at Sangli-Miraj Primary Municipal school

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	9	77.9	43.1	10.2
May	9	59.2	30.3	9.0
Jun	8	54.9	32.6	9.4
Jul	9	36.2	25.3	9.3
Aug	9	35.0	24.3	8.3
Sep	6	37.7	25.3	11.0
Oct	8	61.6	42.3	11.9
Nov	9	94.7	46.9	11.4
Dec	9	123.2	58.3	14.2
Jan	9	130.9	71.1	11.6
Feb	8	118.8	61.8	12.1
Mar	9	100.9	64.9	11.9
Total N		% of exceedence		
	102	34.3	5.9	0.0

Table No. 96: Data for annual average trend of RSPM, NO_X and SO_2 at Sangli-Miraj Primary Municipal school

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	14	87.4	23.4	22.4
09-10	101	68.3	32.0	22.8
10-11	105	69.2	31.6	12.5
11-12	104	71.6	35.9	9.7
12-13	102	78.7	44.4	10.9

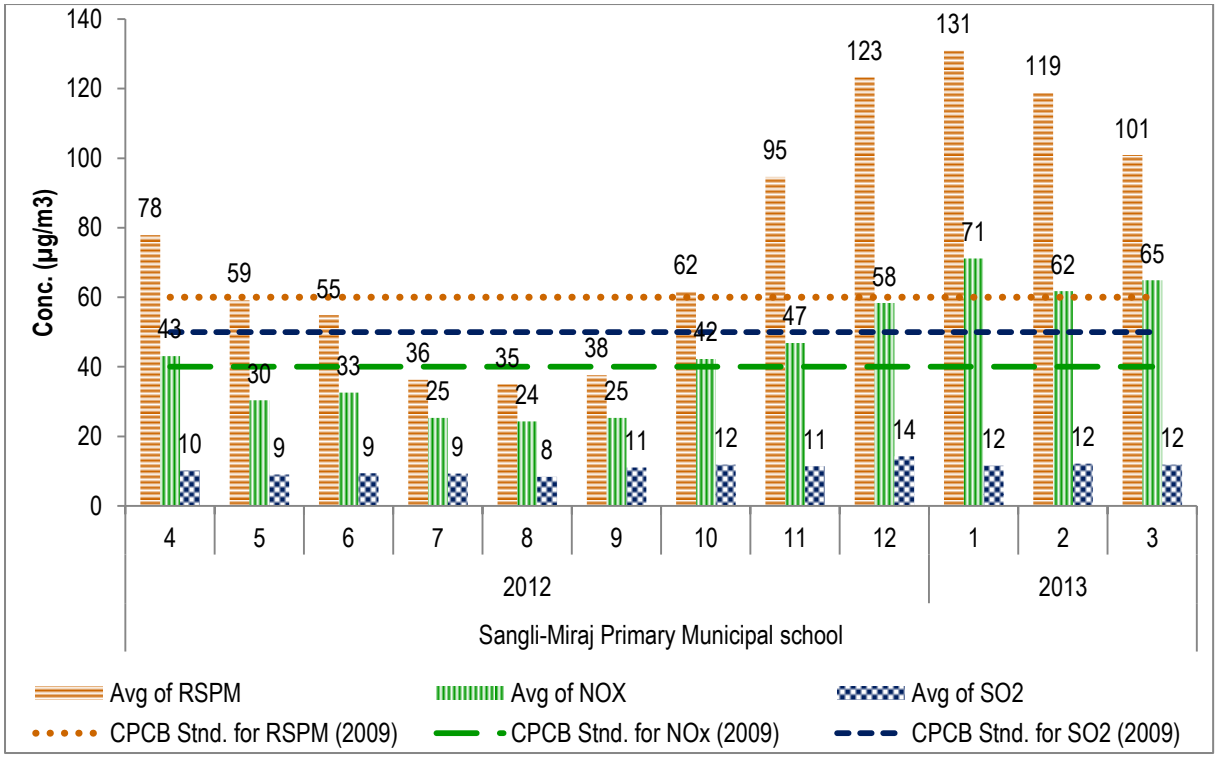


Figure No. 108: Monthly average reading recorded at - Sangli-Miraj Primary Municipal school

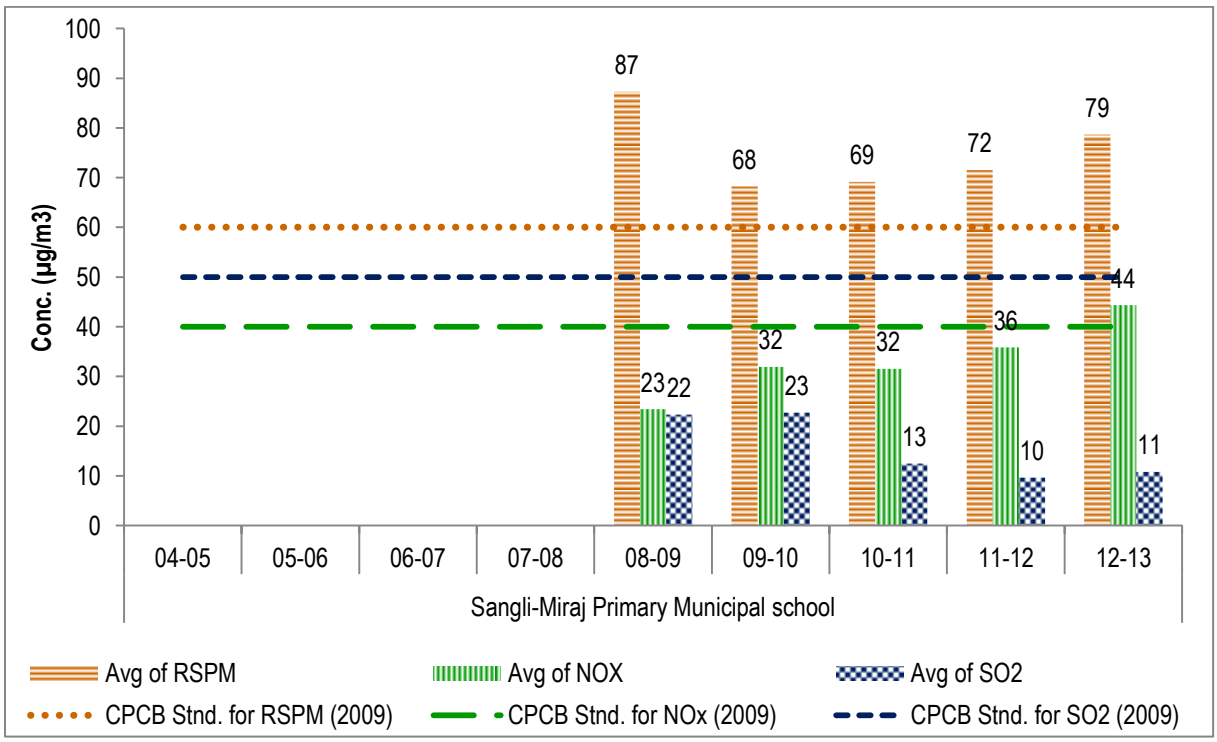


Figure No. 109: Annual average trend of SO_2, NOx and RSPM at - Sangli-Miraj Primary Municipal school

Sangli - Krishna Valley school

Table No. 97: Data for monthly average reading recorded at Krishna Valley school

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	101.5	47.4	12.8
May	9	84.1	32.7	11.3
Jun	9	61.8	33.4	10.0
Jul	8	69.0	24.9	10.4
Aug	9	61.8	26.8	10.6
Sep	9	67.9	34.6	9.6
Oct	9	80.3	41.9	12.9
Nov	7	112.1	46.7	12.4
Dec	9	126.7	55.0	16.0
Jan	9	153.3	63.6	16.6
Feb	8	143.1	49.5	14.8
Mar	9	112.6	63.6	12.0
	Total N		% of exceedence	
	103	41.7	1.9	0.0

Table No. 98: Data for annual average trend of RSPM, NO_X and SO_2 at Krishna Valley school

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	70	70.7	21.2	26.0
09-10	102	81.6	34.1	23.7
10-11	104	74.5	29.8	12.3
11-12	105	89.4	36.4	10.5
12-13	103	97.4	43.3	12.4

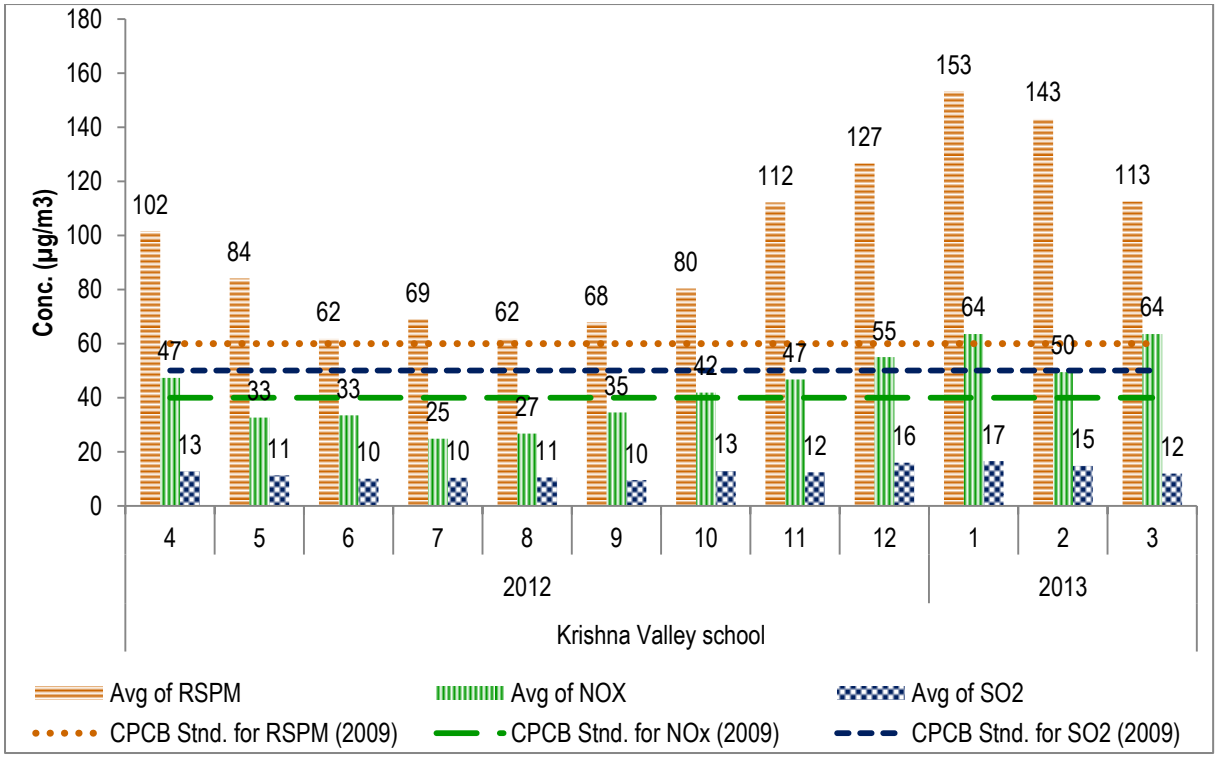


Figure No. 110: Monthly average reading recorded at -Krishna Valley School

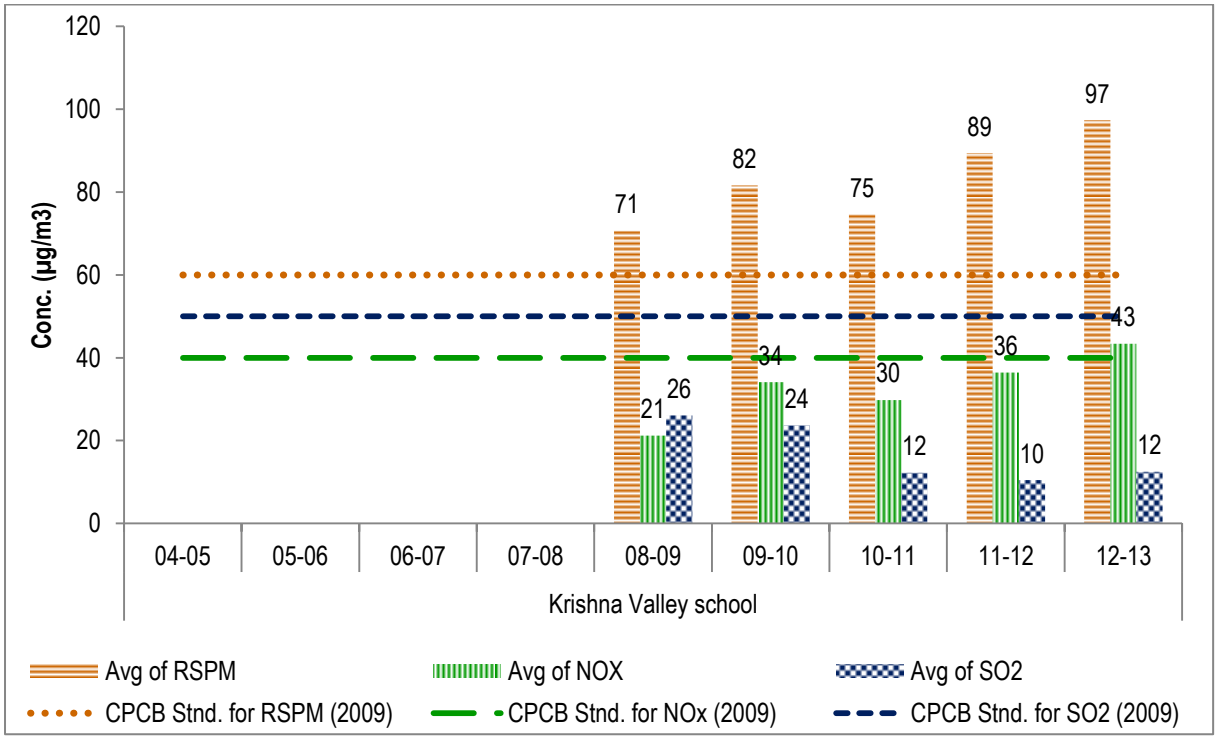


Figure No. 111: Annual average trend of SO_2, NOx and RSPM at -Krishna Valley School

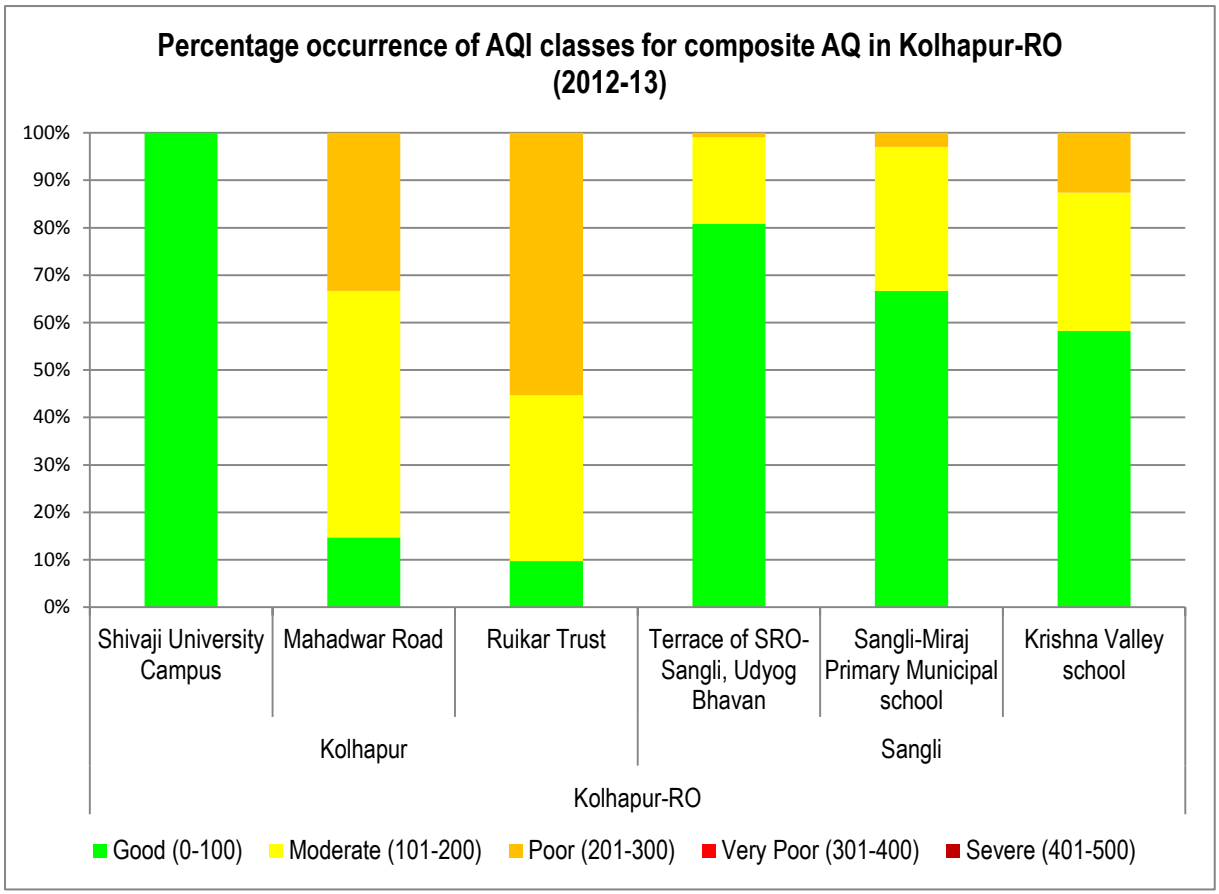
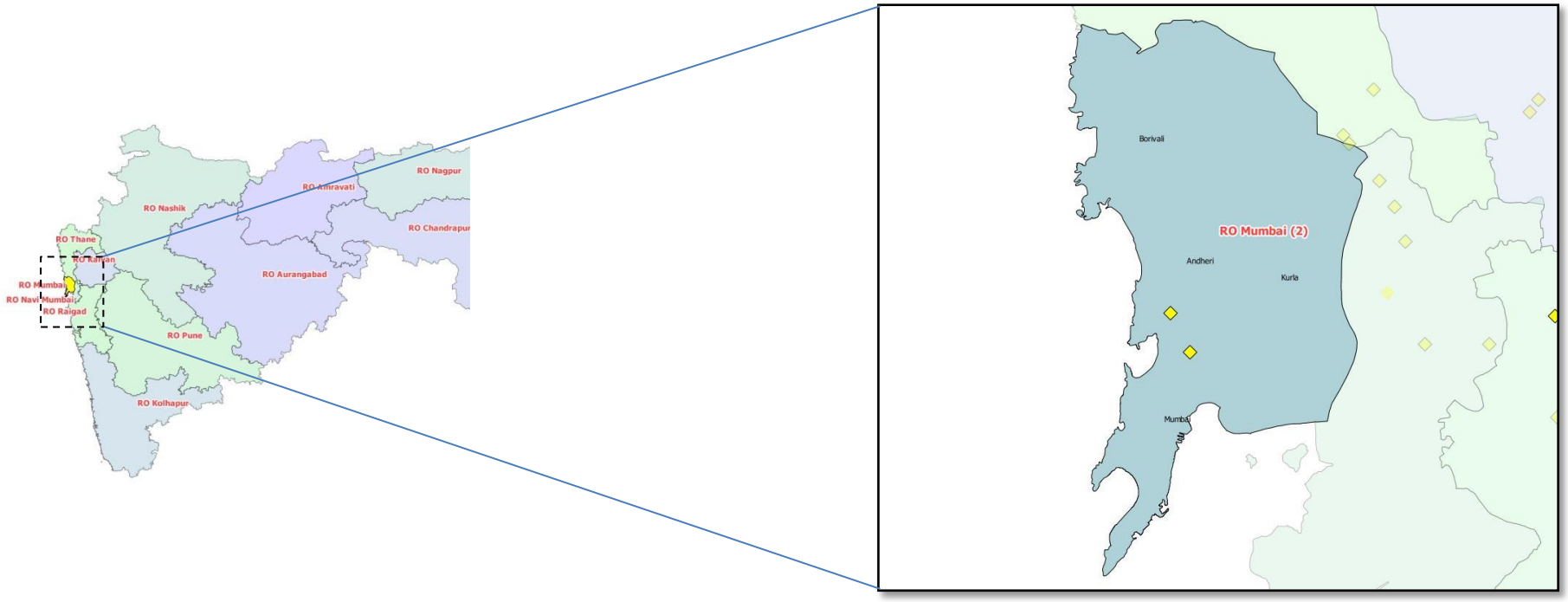


Figure No. 112:. Percentage occurrence of AQI classes for composite AQ in Kolhapur-RO (2012-13)

RO – Mumbai



Region	Program name	SN	Station	Frequency	Latitude	Longitude
Mumbai	CAAQMS	1	Bandra	Continuous Monitoring	19° 03' 47.1" N	72° 50' 47.2" E
		2	Sion	Continuous Monitoring	19° 02' 07.9" N	72° 51' 35.3" E

Mumbai - Bandra

Table No. 99: Data for monthly average reading recorded at Bandra

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	30	127.6	50.2	18.2
May	31	92.3	38.6	13.3
Jun	29	64.0	48.2	19.8
Jul	29	44.7	35.0	19.2
Aug	31	55.1	60.4	17.9
Sep	29	83.5	50.8	19.3
Oct	29	103.4	48.4	19.1
Nov	30	162.3	52.9	22.7
Dec	30	182.2	48.2	14.9
Jan	30	195.8	52.7	17.1
Feb	27	155.8	56.3	17.6
Mar	30	125.5	35.0	18.6
	Total N		% of exceedence	
	355	51.0	2.0	0.0

Table No. 100: Data for annual average trend of RSPM, NO_X and SO_2 at Bandra

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	233	157.9	58.7	19.1
08-09	335	137.2	59.7	19.0
09-10	339	139.9	90.1	17.4
10-11	349	116.1	48.1	19.1
11-12	353	130.8	65.4	20.6
12-13	355	115.9	48.0	18.1

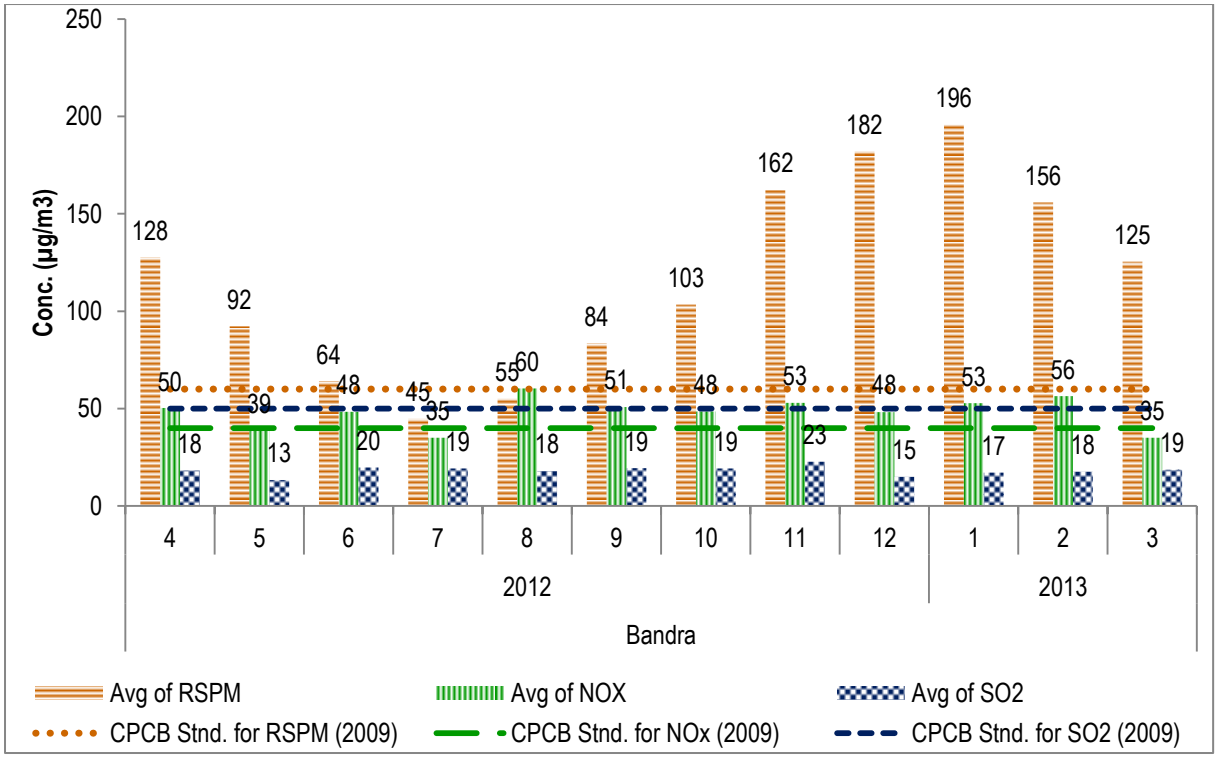


Figure No. 113: Monthly average reading recorded at -Bandra

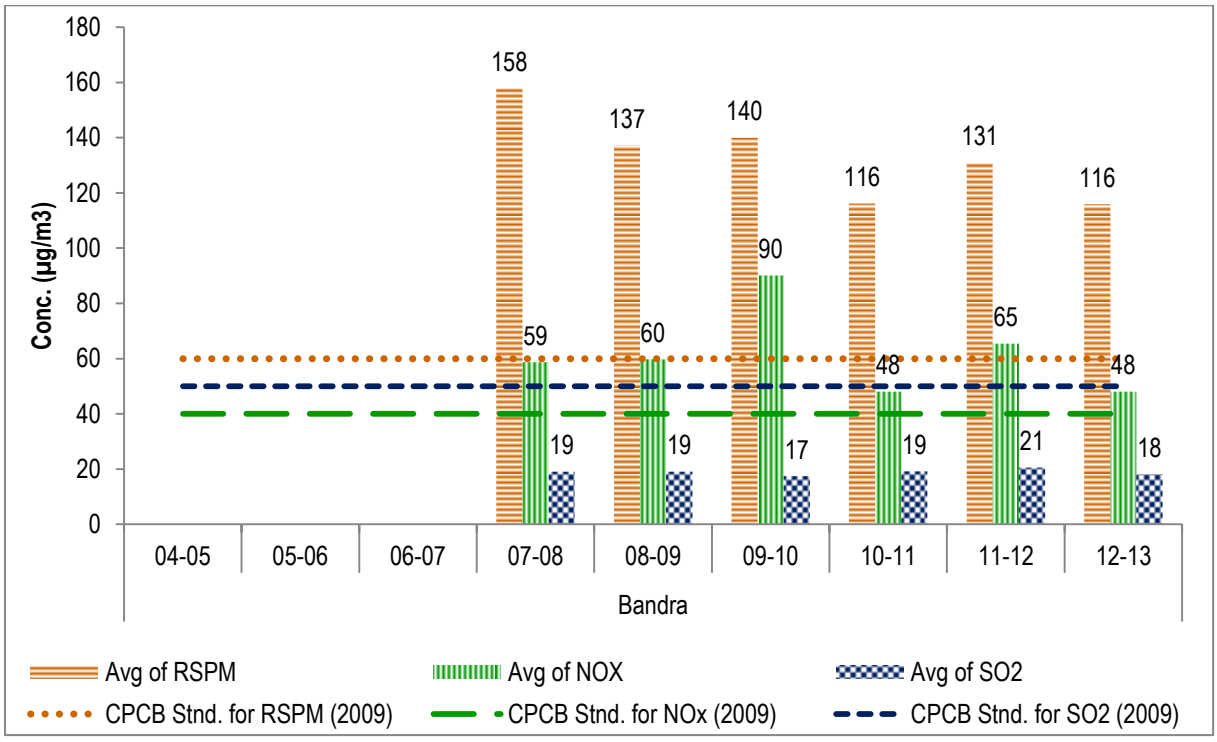


Figure No. 114: Annual average trend of SO_2, NOx and RSPM at -Bandra

Mumbai - Sion

Table No. 101: Data for monthly average reading recorded at Sion

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	18	132.8	60.6	6.9
May	23	108.5	63.7	4.6
Jun	21	85.7	62.2	5.0
Jul	22	74.1	63.3	4.2
Aug	20	68.7	64.1	5.7
Sep	19	85.5	72.8	6.4
Oct	13	102.8	111.5	12.2
Nov	18	180.1	159.3	14.9
Dec	26	144.8	134.0	11.8
Jan	21	208.7	165.4	20.8
Feb	21	236.9	163.6	26.2
Mar	23	192.3	144.1	15.8
	Total N		% of exceedence	
	245	62.4	60.4	0.0

Table No. 102: Data for annual average trend of RSPM, NO_X and SO_2 at Sion

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	280	196.8	67.4	21.2
05-06	317	231.1	104.9	26.3
06-07	278	255.4	91.1	30.0
07-08	288	294.7	139.5	27.8
08-09	84	202.2	97.0	24.2
09-10	236	223.1	109.1	18.4
10-11	259	180.8	115.5	14.1
11-12	200	149.8	65.7	10.3
12-13	245	136.5	105.9	11.2

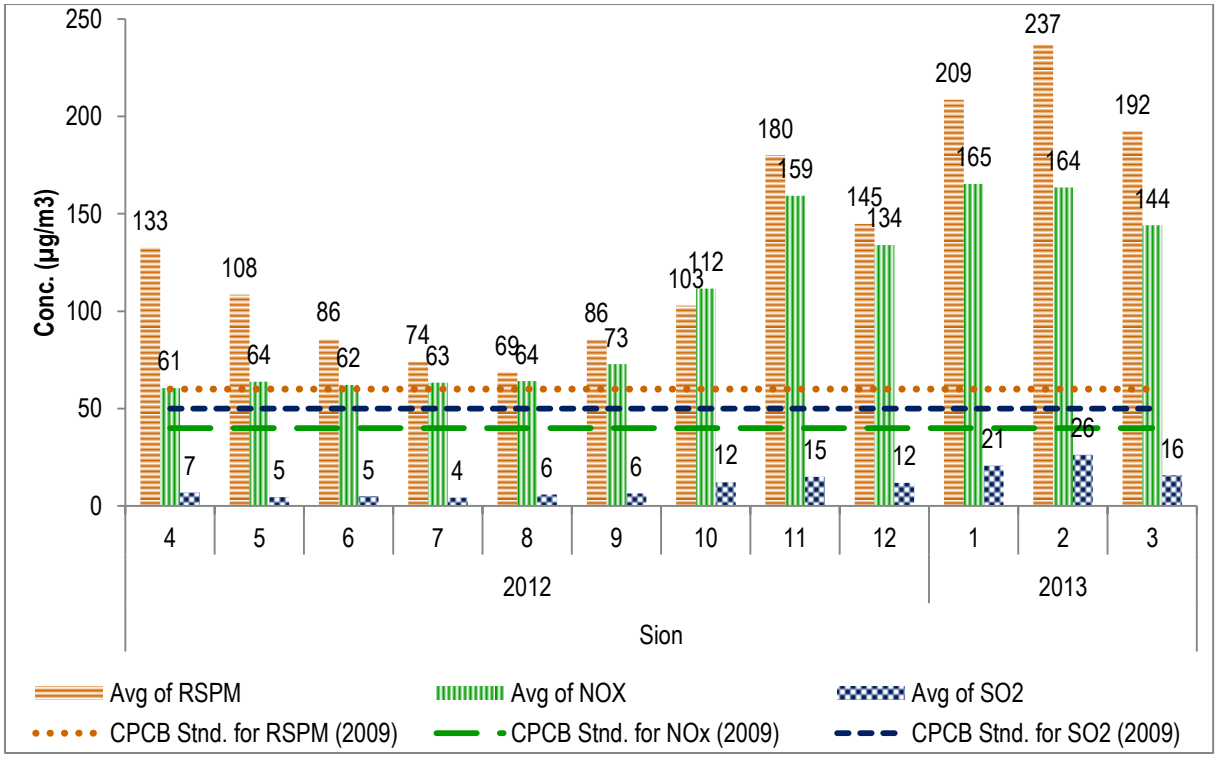


Figure No. 115: Monthly average reading recorded at Sion

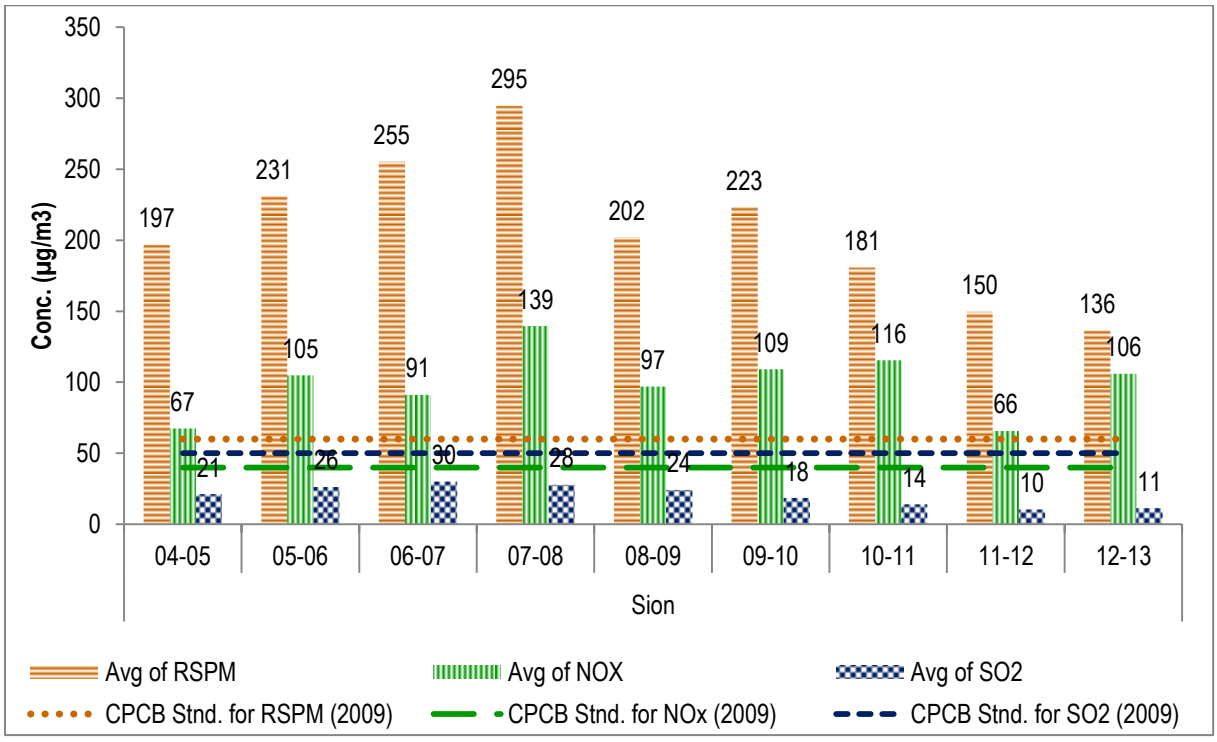


Figure No. 116: Annual average trend of SO_2, NOx and RSPM at -Sion

AAQMS monitored by NEERI in Mumbai

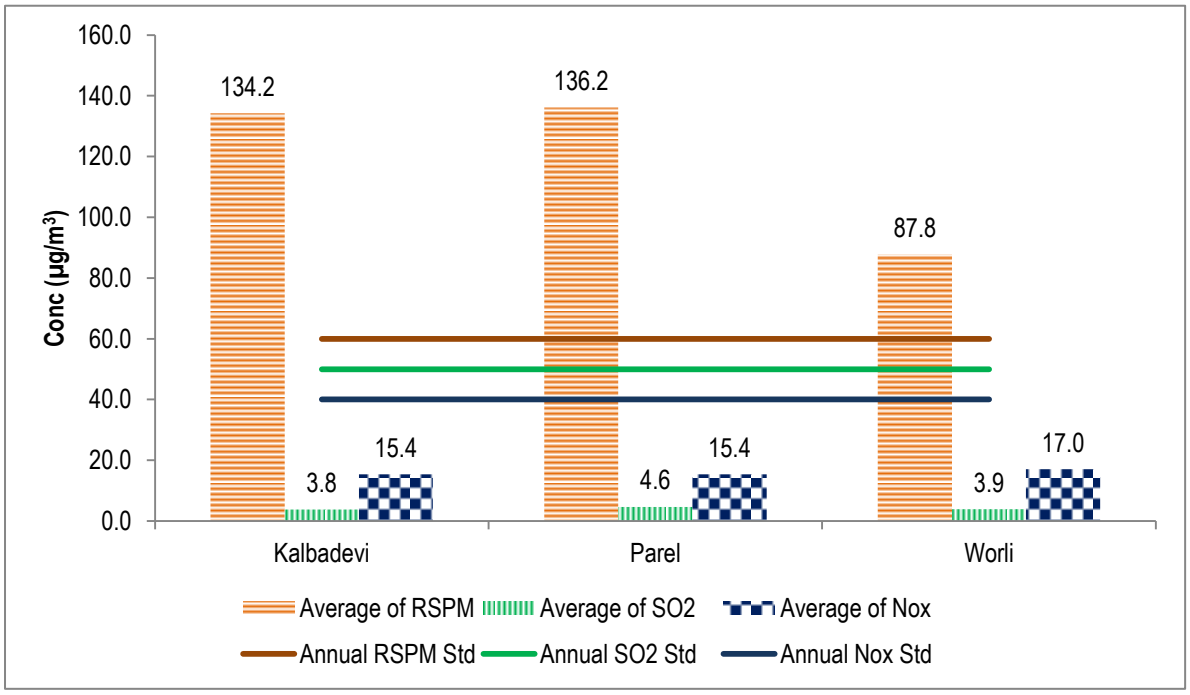


Figure No. 117: Annual average trend of SO_2, NOx and RSPM at AAQMS monitored by NEERI in Mumbai (2012-13)

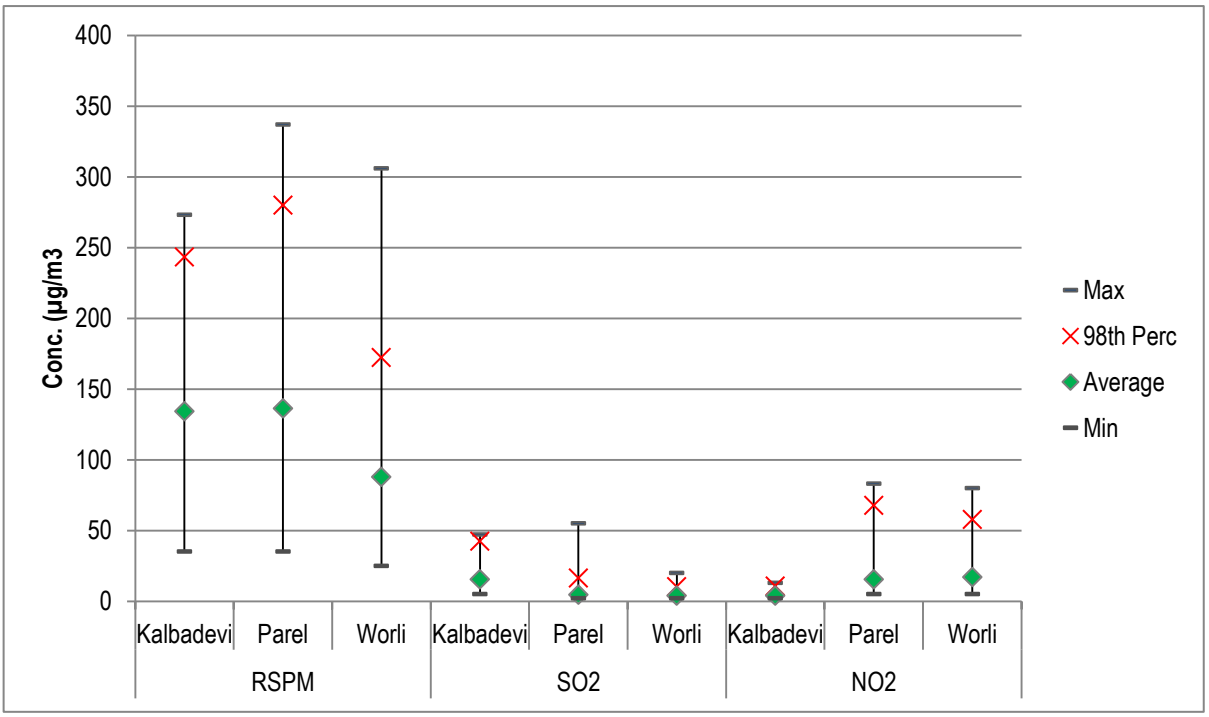


Figure No. 118: Parametric values of RSPM, SO_2 and NO_X for AAQMS monitored by NEERI in Mumbai (2012-13)

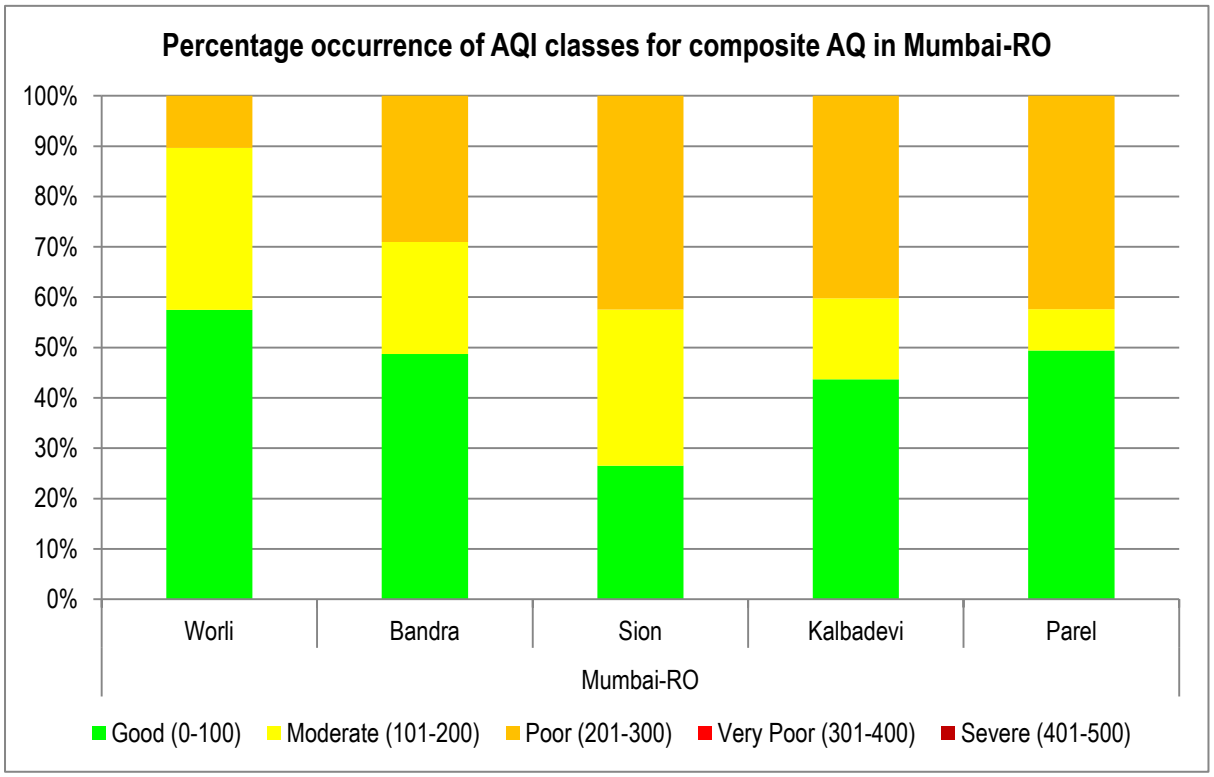
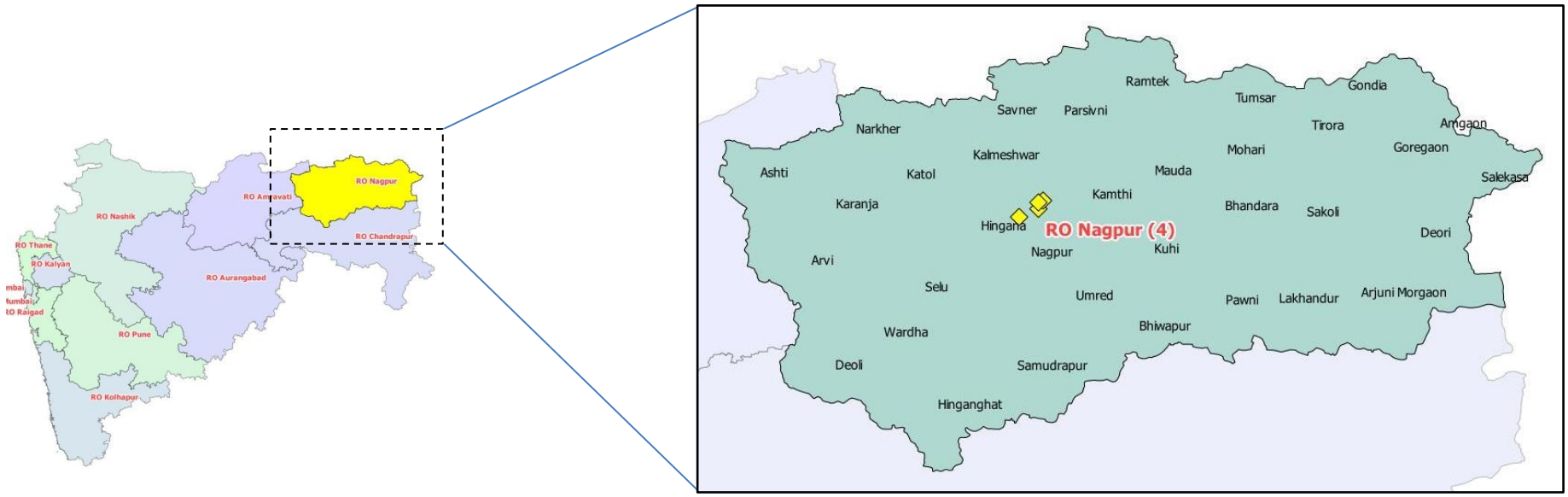


Figure No. 119: Percentage occurrence of AQI classes for composite AQ in Mumbai-RO (2012-13)

RO – Nagpur



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Nagpur	NAMP	288	MIDC Office, Hingna Road	Two Days In A Week	21° 06' 35.5" N	79° 00' 27.2" E
		287	IOE North Ambazari road	Two Days In A Week	21° 08' 10.0" N	79° 04' 08.5" E
		314	Govt Polytechnic Col, Sadar	Two Days In A Week	21° 09' 47.6" N	79° 04' 57.6" E
		711	Civil lines Nagpur	Six days in a week	21° 09' 28.6" N	79° 04' 12.1" E

Nagpur - MIDC Office, Hingna Road

Table No. 103: Data for monthly average reading recorded at MIDC Office, Hingna Road

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	115.4	37.8	10.6
May	9	127.3	27.6	9.4
Jun	8	98.0	35.9	10.5
Jul	7	99.4	35.4	10.3
Aug	8	97.9	32.3	9.6
Sep	8	154.9	37.5	10.6
Oct	9	159.6	48.8	12.2
Nov	8	190.4	57.1	14.1
Dec	10	136.2	46.0	12.5
Jan	8	109.5	45.9	12.1
Feb	8	110.1	50.3	12.0
Mar	9	91.7	33.6	10.3
Total N		% of exceedence		
	100	56.0	0.0	0.0

Table No. 104: Data for annual average trend of RSPM, NO_X and SO_2 at MIDC Office, Hingna Road

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	75	50.7	22.3	9.1
05-06	81	39.9	34.3	9.8
06-07	78	89.5	25.4	9.3
07-08	92	160.1	23.8	8.7
08-09	96	118.1	30.4	8.6
09-10	104	128.3	37.7	10.0
10-11	95	112.6	34.5	9.6
11-12	99	104.9	35.4	10.4
12-13	100	124.7	40.7	11.2

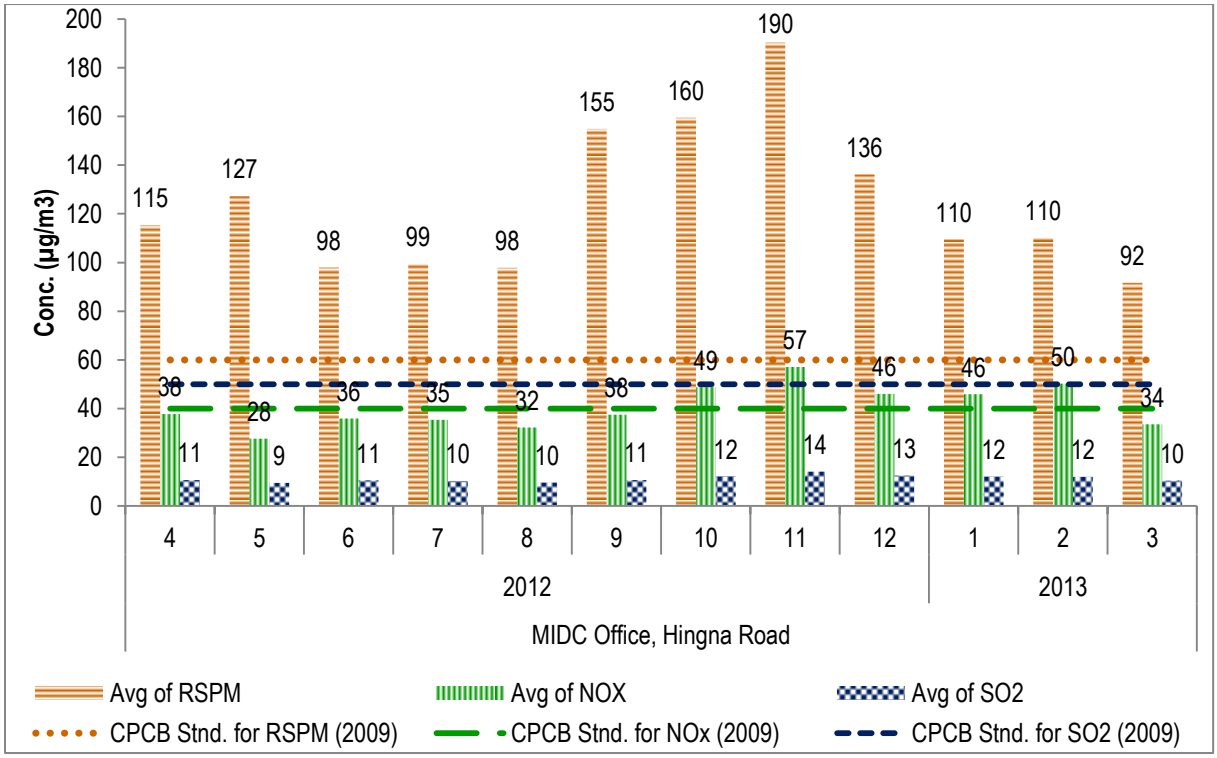


Figure No. 120: Monthly average reading recorded at -MIDC Office, Hingna Road

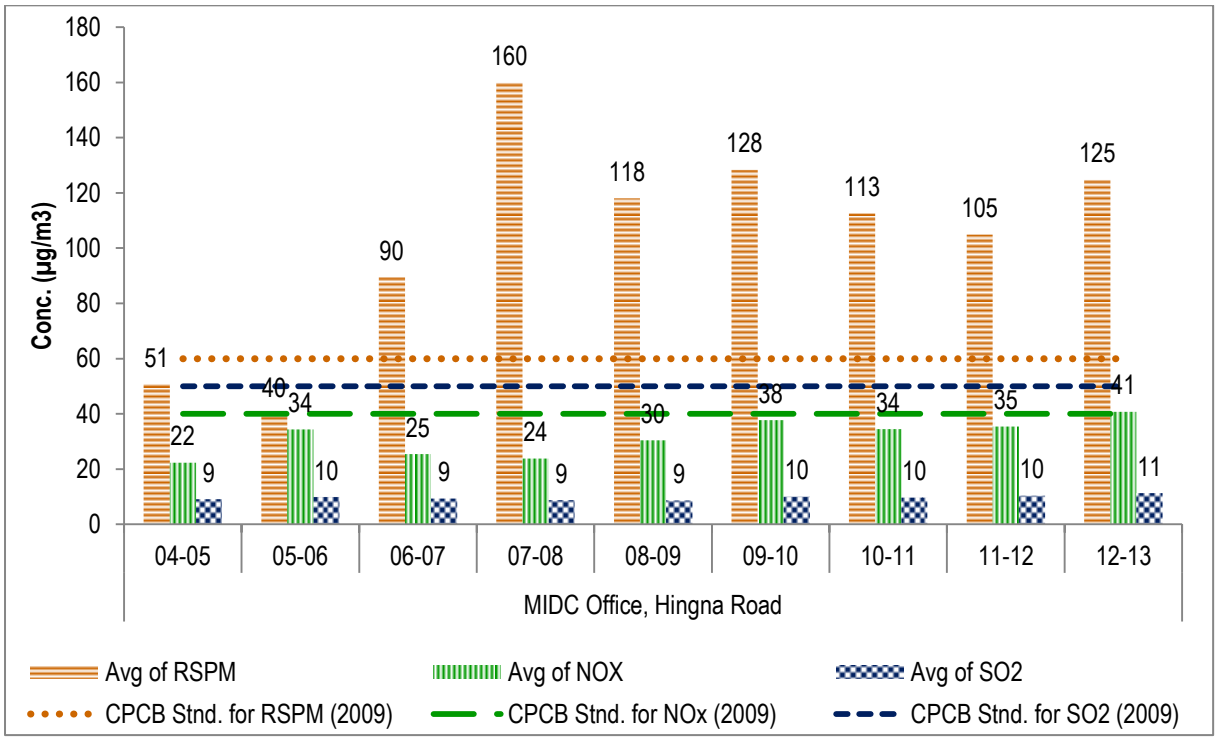


Figure No. 121: Annual average trend of SO_2, NOx and RSPM at -MIDC Office, Hingna Road

Nagpur - IOE North Ambazari road

Table No. 105: Data for monthly average reading recorded at IOE North Ambazari road

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	7	76.4	36.0	10.1
May	9	76.0	26.6	9.0
Jun	8	93.8	30.8	9.6
Jul	8	93.9	33.0	10.5
Aug	9	85.9	34.3	10.2
Sep	9	100.9	33.6	9.9
Oct	10	101.4	38.1	10.7
Nov	9	148.3	72.2	17.0
Dec	9	91.3	43.0	11.3
Jan	10	87.6	43.1	11.6
Feb	8	95.9	37.0	10.0
Mar	9	91.6	31.8	9.9
	Total N		% of exceedence	
	105	36.2	3.8	0.0

Table No. 106: Data for annual average trend of RSPM, NO_X and SO_2 at IOE North Ambazari road

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	77	51.6	20.7	8.3
05-06	66	44.3	29.8	8.8
06-07	85	66.5	26.9	9.6
07-08	95	125.3	22.2	8.4
08-09	99	114.0	30.1	8.4
09-10	107	108.8	36.5	9.9
10-11	101	96.0	32.8	9.6
11-12	99	83.8	33.9	9.8
12-13	105	95.6	38.5	10.9

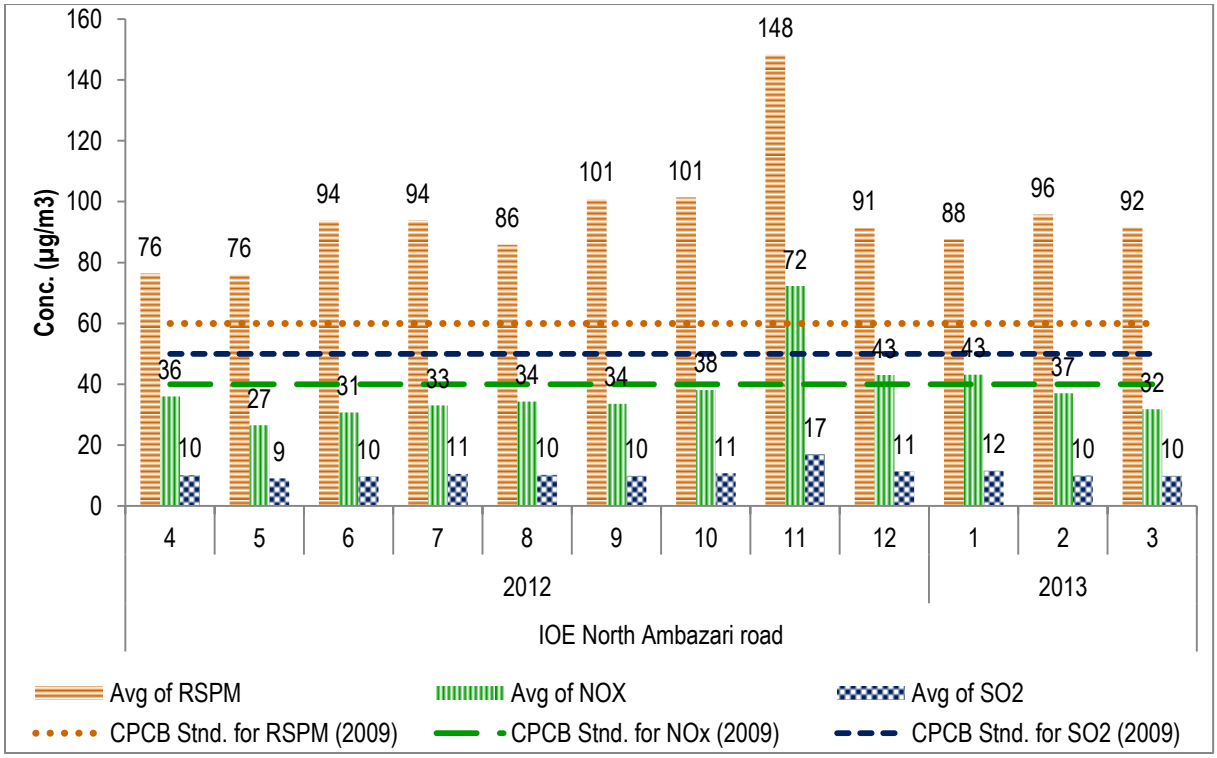


Figure No. 122: Monthly average reading recorded at -IOE North Ambazari road

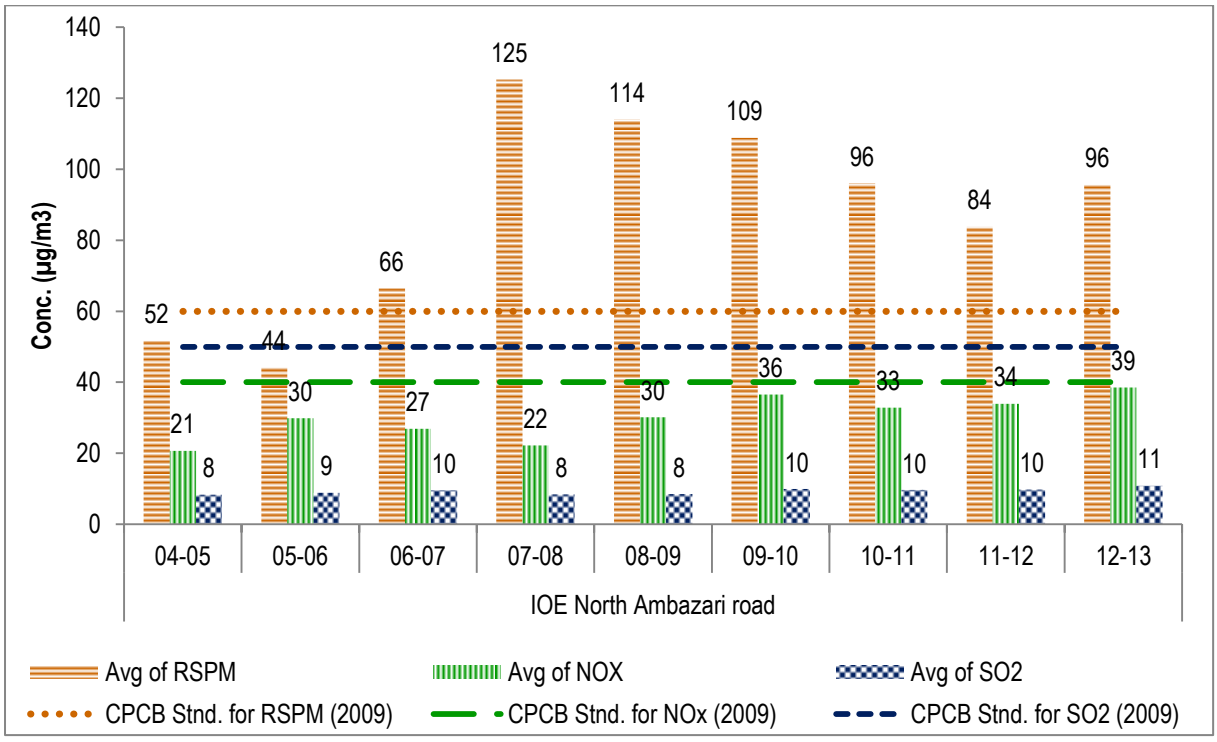


Figure No. 123: Annual average trend of SO_2, NOx and RSPM at -IOE North Ambazari road

Nagpur - Govt Polytechnic Col, Sadar

Table No. 107: Data for monthly average reading recorded at Govt Polytechnic Col, Sadar

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	93.1	41.8	11.3
May	9	74.1	26.4	8.8
Jun	9	71.7	29.0	9.0
Jul	6	50.0	35.5	9.3
Aug	8	71.0	26.8	7.9
Sep	9	66.0	27.3	8.7
Oct	10	92.5	41.1	10.9
Nov	10	113.6	55.1	14.2
Dec	8	98.8	33.6	9.8
Jan	9	76.9	32.9	9.6
Feb	8	84.4	41.8	10.1
Mar	9	78.0	24.8	8.3
	Total N		% of exceedence	
	103	22.3	2.9	0.0

Table No. 108: Data for annual average trend of RSPM, NO_X and SO_2 at Govt Polytechnic Col, Sadar

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	75	44.8	20.8	8.6
05-06	76	51.9	31.6	9.4
06-07	84	70.0	25.7	8.8
07-08	93	106.8	21.1	7.8
08-09	81	101.1	27.2	8.0
09-10	102	92.6	30.9	8.7
10-11	102	86.6	30.1	9.0
11-12	113	80.5	30.2	9.3
12-13	103	81.9	34.9	9.9

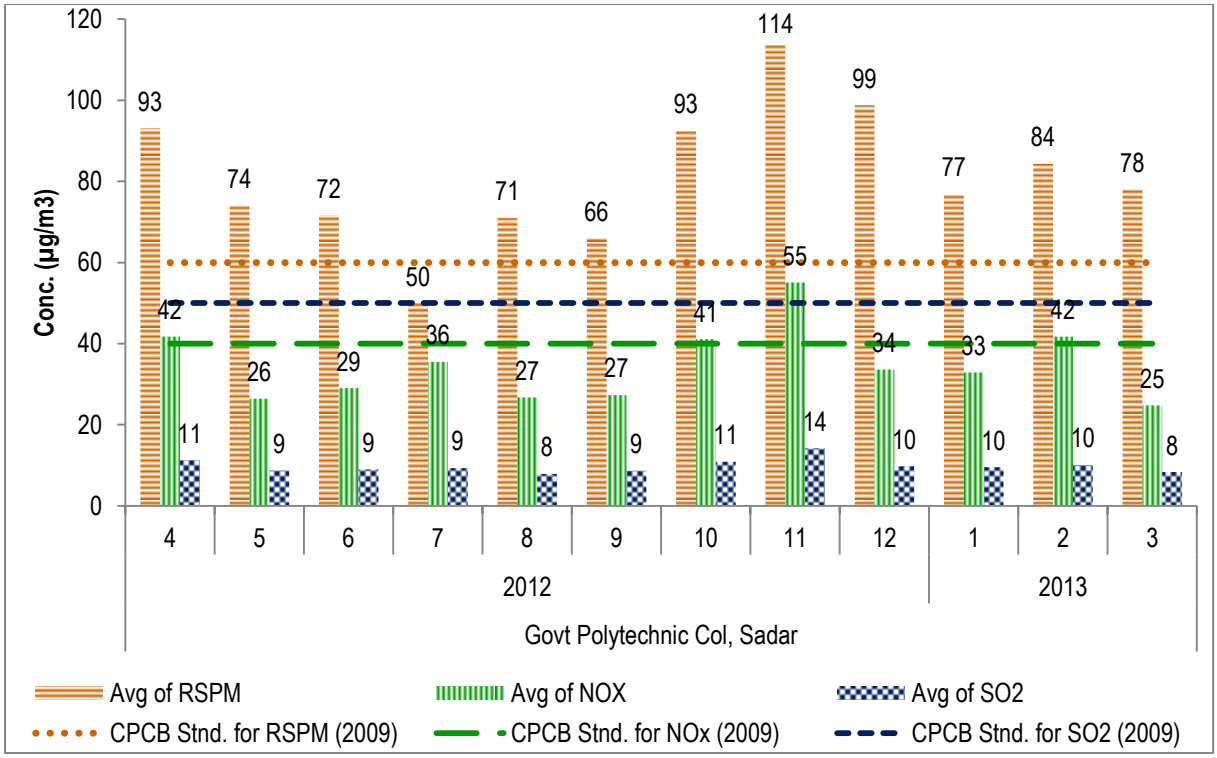


Figure No. 124: Monthly average reading recorded at -Govt Polytechnic Col, Sadar

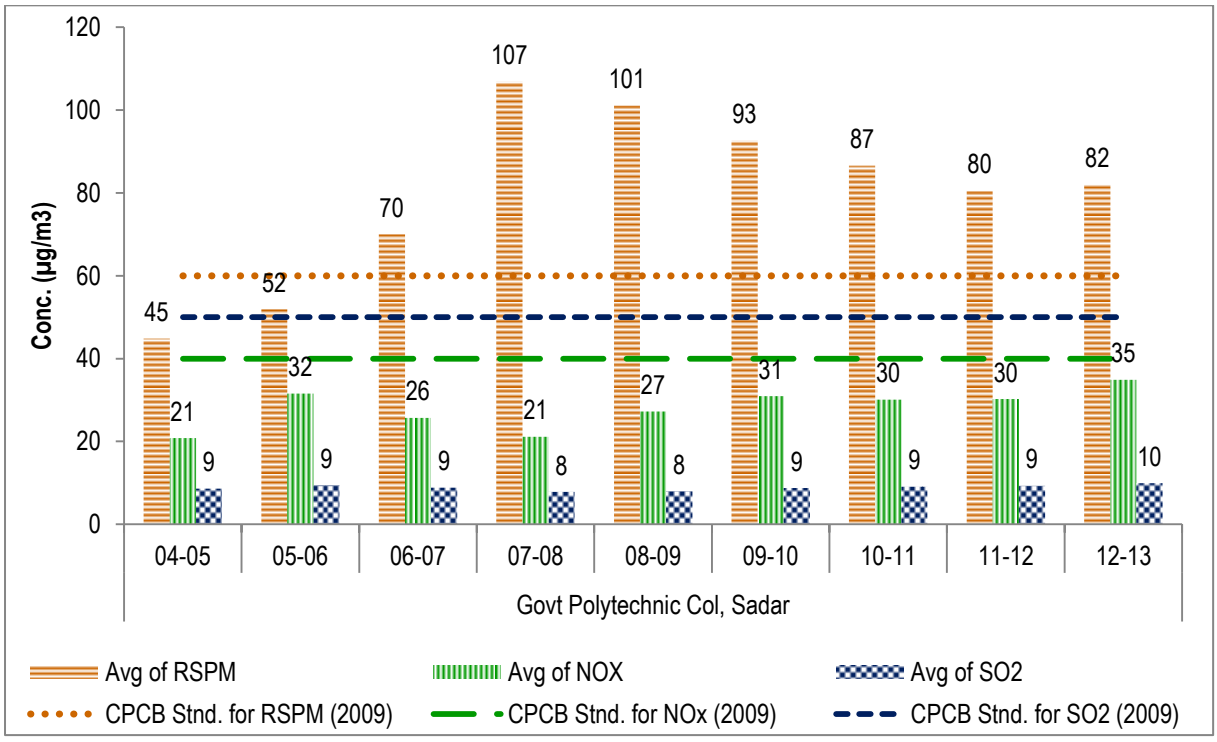


Figure No. 125: Annual average trend of SO_2, NOx and RSPM at -Govt Polytechnic Col, Sadar

Nagpur - Civil lines Nagpur

Table No. 109: Data for monthly average reading recorded at Civil lines Nagpur

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	18	50.8	30.3	9.8
May	26	42.6	24.5	9.0
Jun	15	51.7	29.3	9.3
Jul	20	34.7	30.5	9.6
Aug	18	47.2	25.1	8.3
Sep	22	51.1	27.6	8.6
Oct	24	58.0	32.3	10.0
Nov	22	70.8	40.3	11.0
Dec	25	65.4	38.0	10.7
Jan	23	50.3	29.8	9.4
Feb	21	61.5	26.8	9.1
Mar	24	56.8	25.3	8.5
Total N		% of exceedence		
	258	1.6	0.4	0.0

Table No. 110: Data for annual average trend of RSPM, NO_X and SO_2 at Civil lines Nagpur

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	207	52.6	25.2	16.8
05-06	313	66.3	22.3	15.1
06-07	277	76.3	28.5	13.5
07-08	288	70.2	30.4	13.7
08-09	280	83.8	30.5	17.9
09-10	269	85.2	35.0	13.3
10-11	273	65.8	27.8	9.0
11-12	243	54.6	26.3	8.6
12-13	258	53.7	30.1	9.5

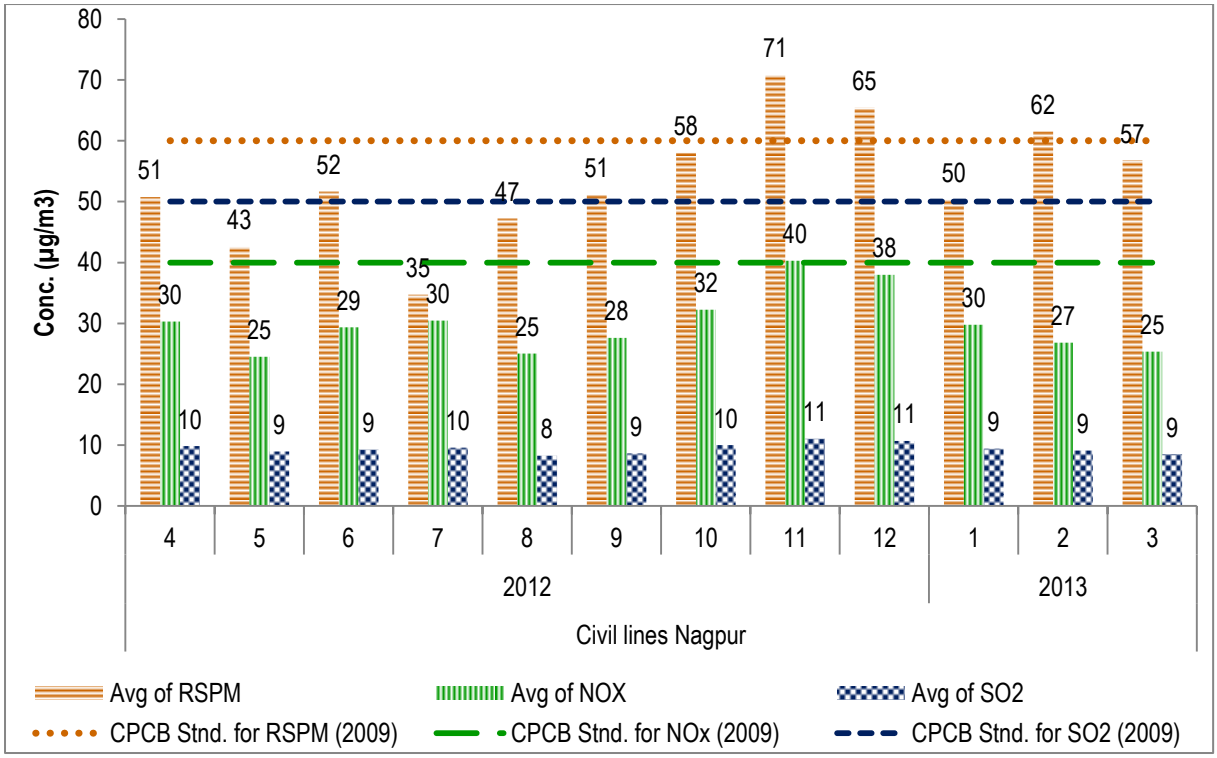


Figure No. 126: Monthly average reading recorded at -Civil lines Nagpur

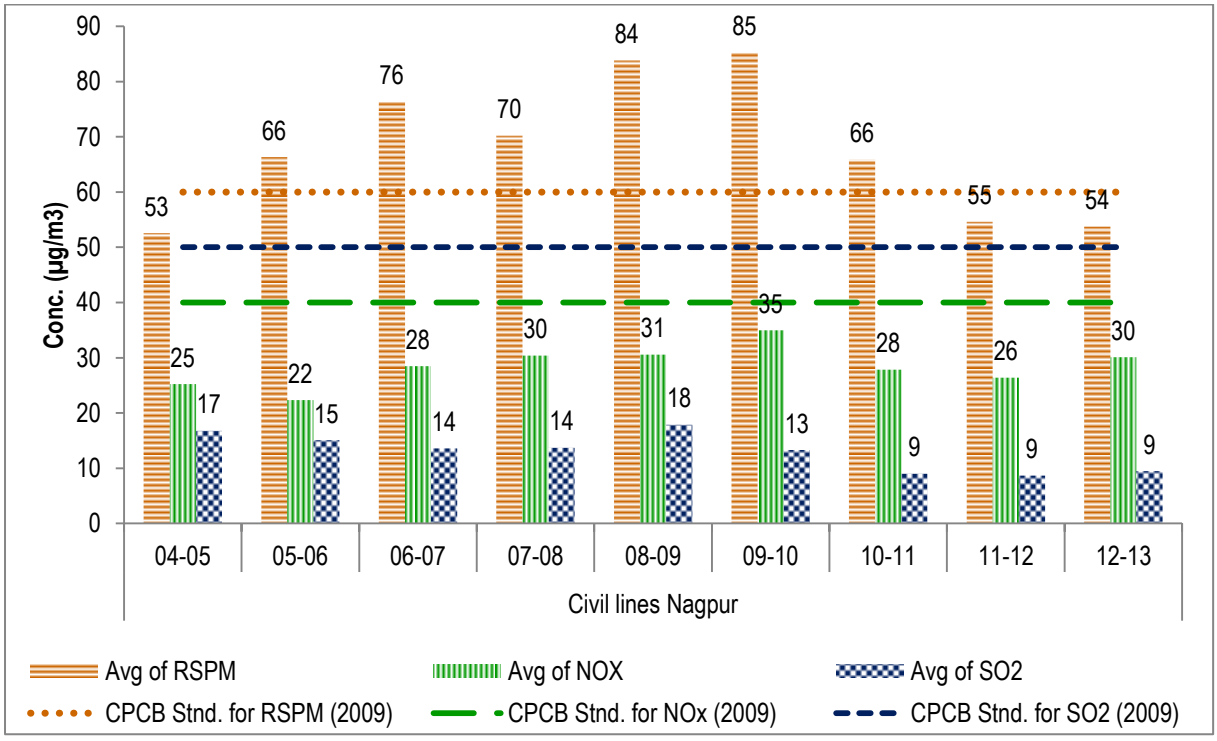


Figure No. 127: Annual average trend of SO_2, NOx and RSPM at -Civil lines

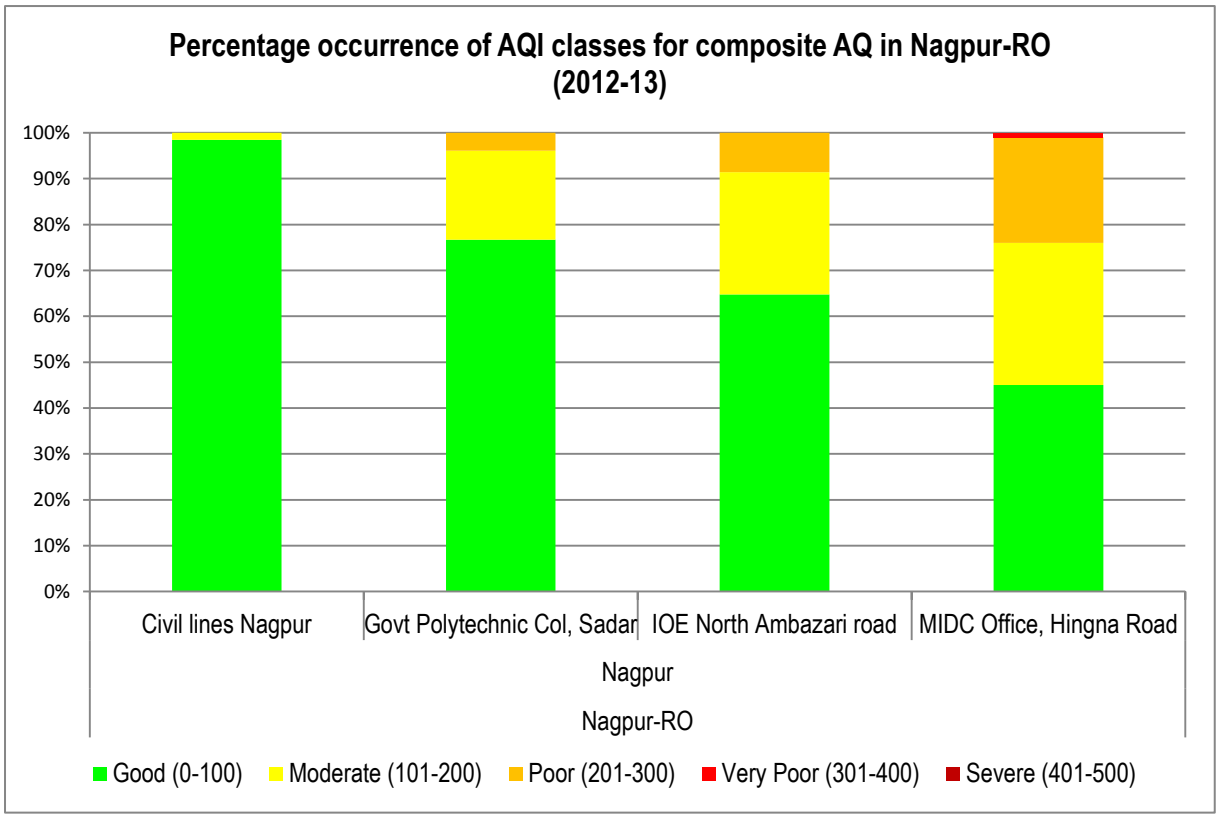
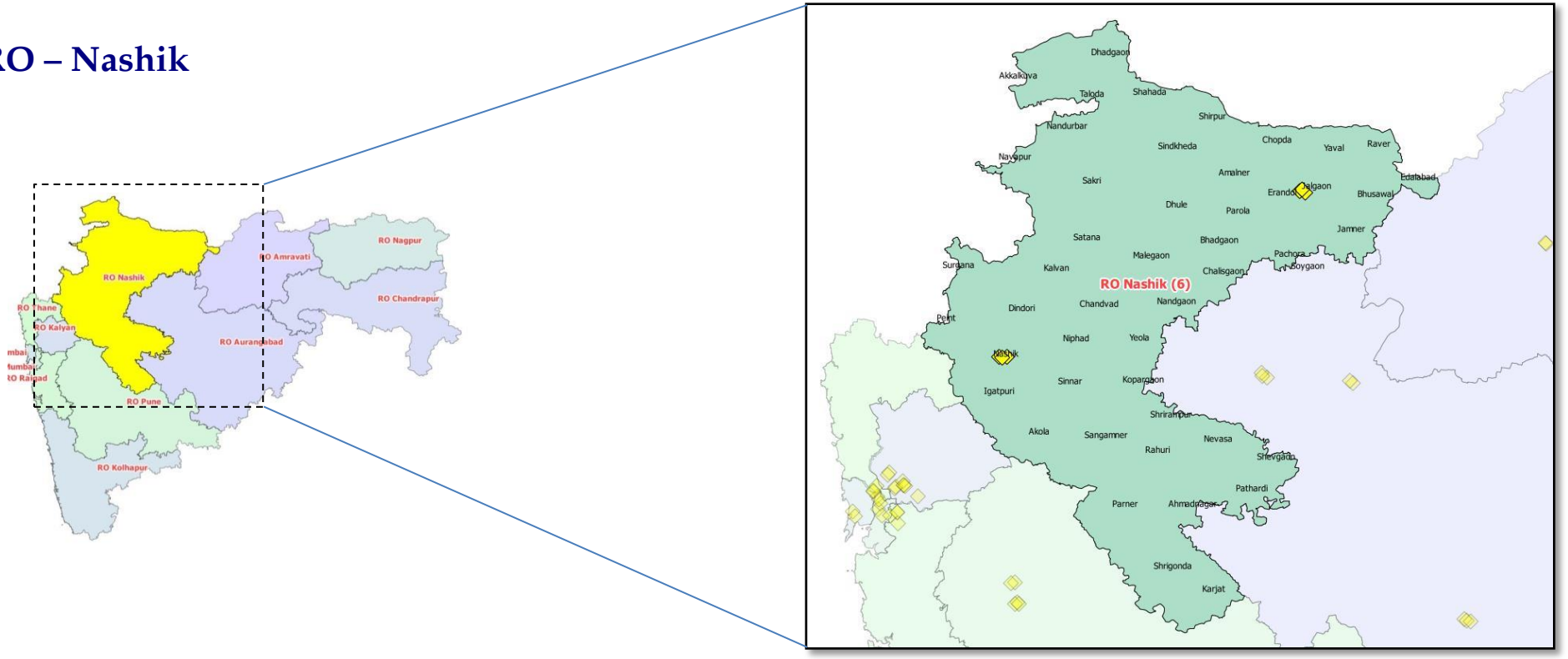


Figure No. 128: Percentage occurrence of AQI classes for composite AQ in Nagpur-RO (2012-13)

RO – Nashik



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Jalgaon	NAMP	644	Old B. J. Market	Twice in week	21° 00' 37.2" N	75° 34' 01.4" E
		645	Girna Water Tank	Twice in week	20° 59' 49.3" N	75° 33' 04.7" E
		646	MIDC Jalgaon	Twice in week	20° 59' 20.2" N	75° 35' 04.1" E
Nashik	NAMP	269	MIDC Satpur - VIP	Two Days In A Week	19° 59' 54.2" N	73° 43' 41.2" E
		259	RTO Colony	Two Days In A Week	19° 59' 48.9" N	73° 46' 35.3" E
		710	SRO Office Nashik	Six days in a week	19° 59' 32.9" N	73° 45' 01.1" E

Jalgaon - Old B. J. Market

Table No. 111: Data for monthly average reading recorded at Old B. J. Market

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	9	147.4	47.3	18.1
May	9	142.9	45.6	17.8
Jun	8	129.8	44.8	16.4
Jul	10	90.7	32.8	11.9
Aug	8	97.8	33.8	14.9
Sep	8	102.5	35.1	16.0
Oct	9	113.3	38.7	16.6
Nov	8	118.1	45.1	17.6
Dec	8	113.0	48.4	22.5
Jan	9	120.3	49.0	21.3
Feb	6	155.7	55.7	24.8
Mar	8	159.8	51.6	21.8
Total N		% of exceedence		
	100	81.0	0.0	0.0

Table No. 112: Data for annual average trend of RSPM, NO_X and SO_2 at Old B. J. Market

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	31	117.3	48.4	14.0
09-10	104	108.8	45.4	14.8
10-11	95	122.4	44.6	17.6
11-12	96	110.7	42.9	16.5
12-13	100	123.2	43.6	18.1

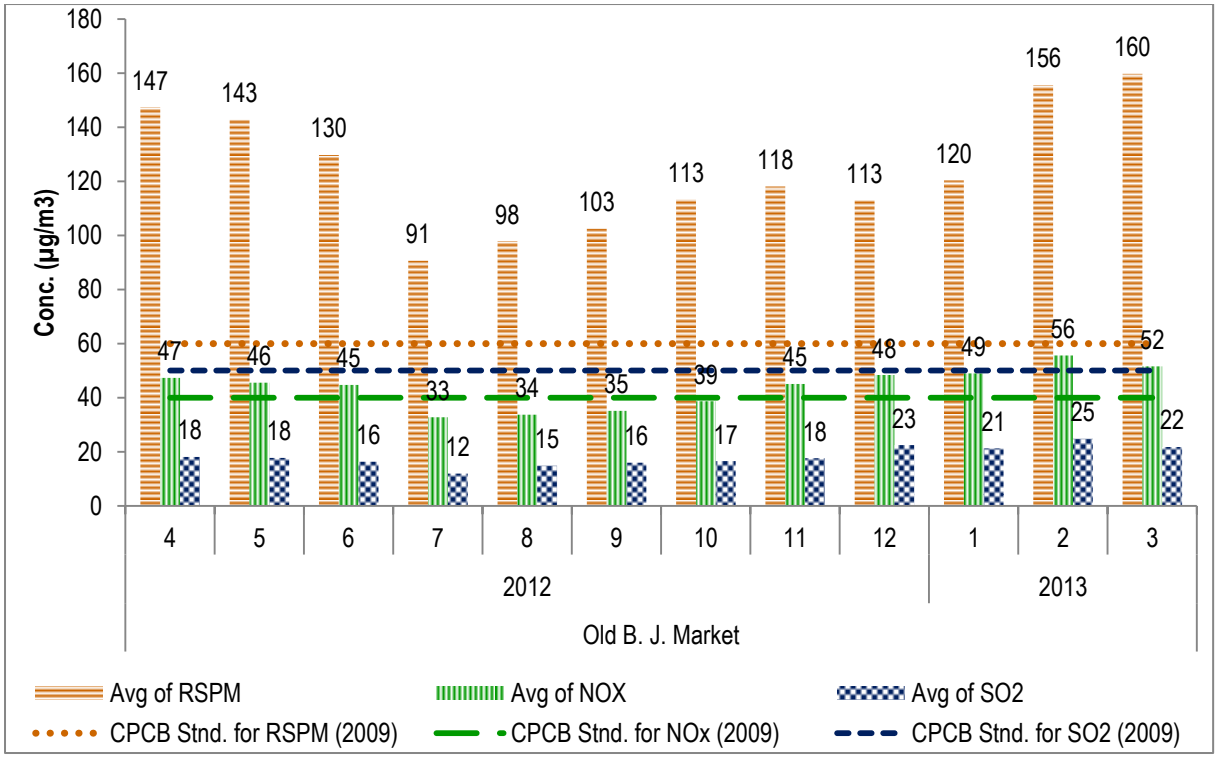


Figure No. 129: Monthly average reading recorded at- Old B. J. Market

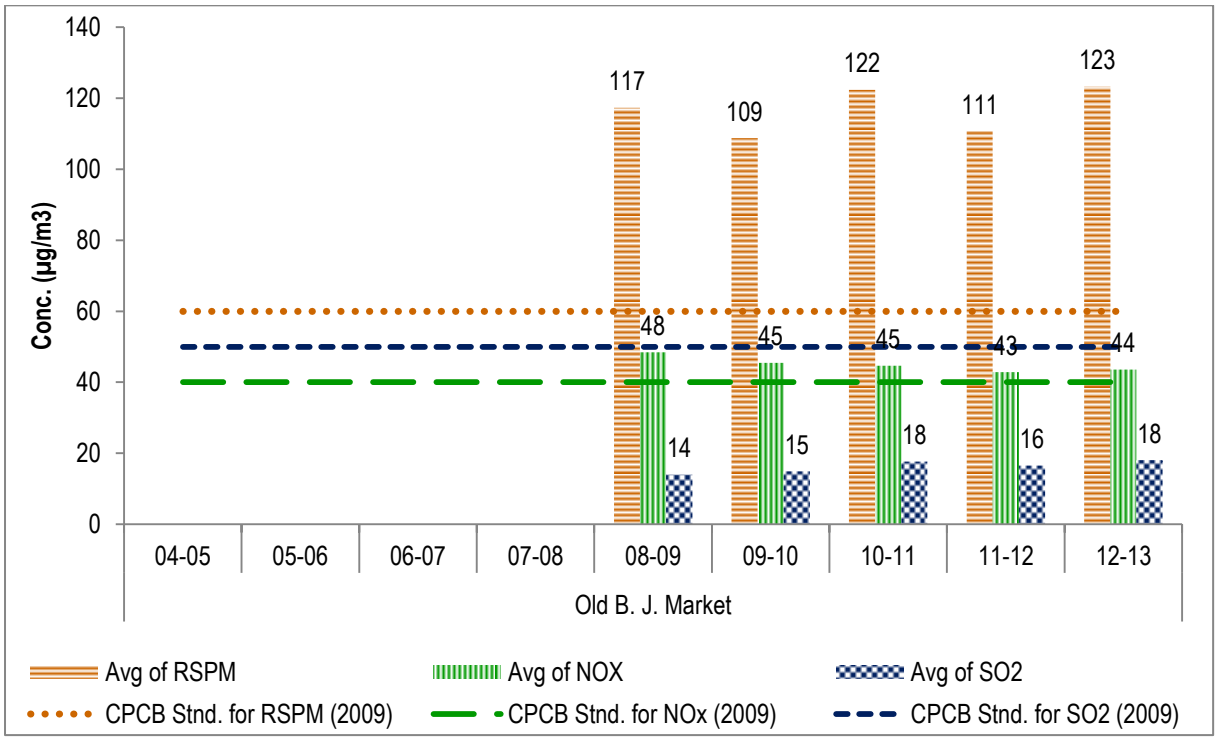


Figure No. 130: Annual average trend of SO_2, NOx and RSPM at -Old B. J. Market

Jalgaon - Girna Water Tank

Table No. 113: Data for monthly average reading recorded at Girna Water Tank

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	8	142.8	43.3	15.6
May	8	146.0	43.0	15.9
Jun	10	144.5	41.7	15.8
Jul	6	92.0	30.8	12.3
Aug	9	96.6	33.6	13.7
Sep	9	99.3	34.8	15.4
Oct	8	103.5	34.0	14.6
Nov	9	112.8	37.2	13.4
Dec	9	123.7	41.2	16.7
Jan	6	119.2	41.7	16.5
Feb	8	143.1	47.9	19.0
Mar	10	149.5	47.8	17.3
Total N		% of exceedence		
	100	82.0	0.0	0.0

Table No. 114: Data for annual average trend of RSPM, NO_X and SO_2 at Girna Water Tank

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	36	102.0	40.4	10.7
09-10	104	110.5	42.8	12.8
10-11	103	122.4	42.0	15.6
11-12	94	116.3	37.7	13.3
12-13	100	123.8	40.0	15.6

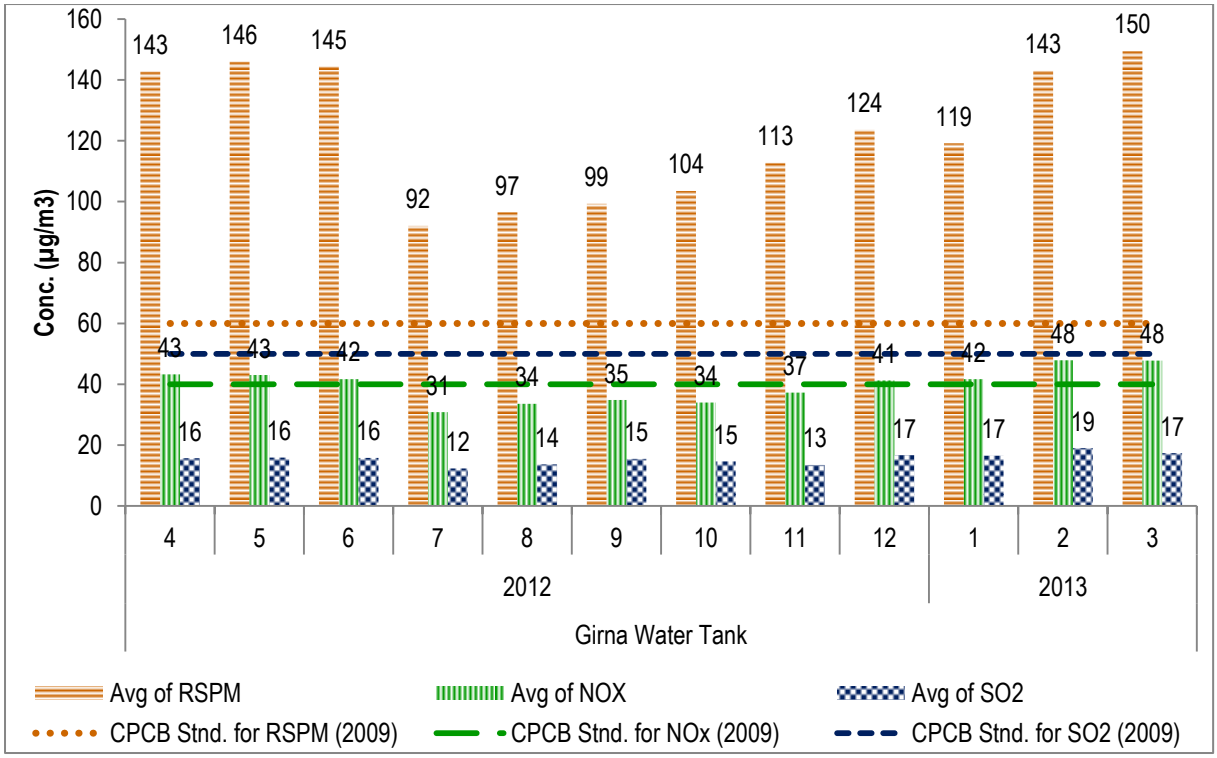


Figure No. 131: Monthly average reading recorded at -Girna Water Tank

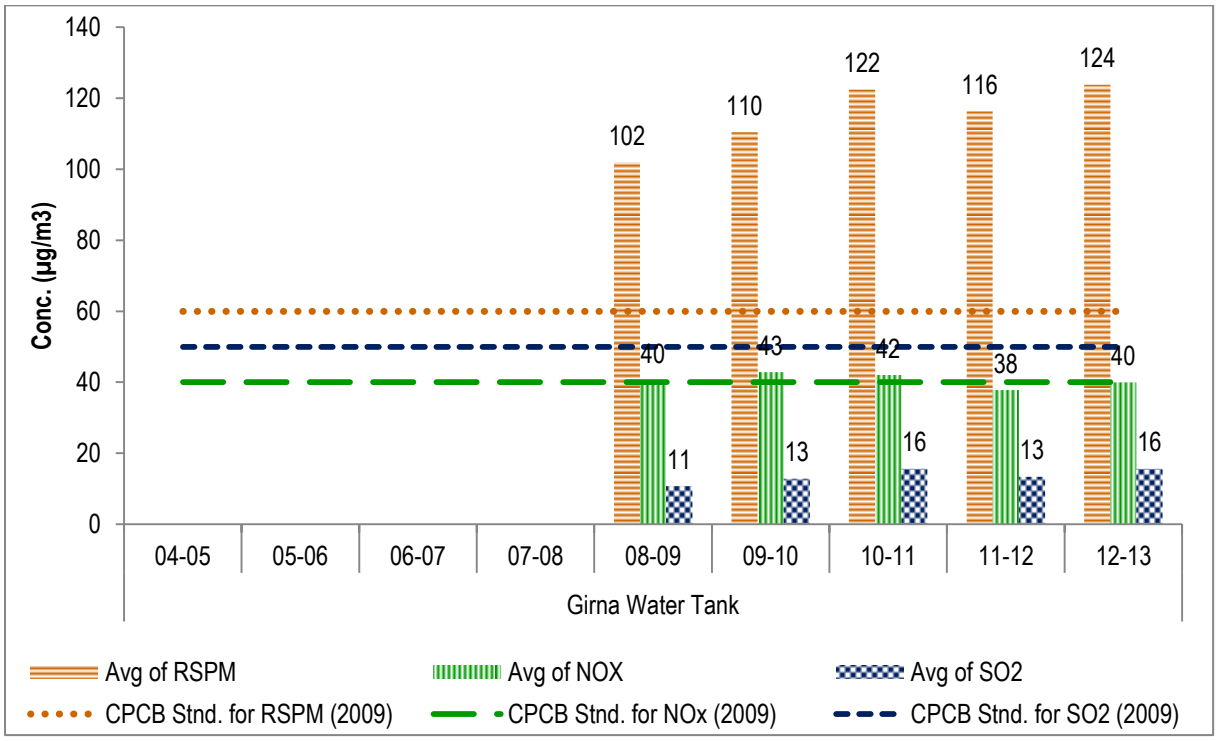


Figure No. 132: Annual average trend of SO_2, NOx and RSPM at -Girna Water Tank

Jalgaon - MIDC Jalgaon

Table No. 115: Data for monthly average reading recorded at MIDC Jalgaon

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	158.6	53.0	26.5
May	10	161.0	54.5	26.3
Jun	8	140.9	51.6	24.5
Jul	5	111.8	35.2	14.4
Aug	10	131.1	41.3	17.9
Sep	8	132.8	43.9	22.1
Oct	8	133.0	44.8	21.0
Nov	9	139.0	51.8	23.7
Dec	8	149.6	53.4	25.4
Jan	10	164.5	54.5	25.8
Feb	8	170.5	59.6	31.0
Mar	9	183.2	57.9	29.0
Total N		% of exceedence		
	101	100.0	0.0	0.0

Table No. 116: Data for annual average trend of RSPM, NO_X and SO_2 at MIDC Jalgaon

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N ≥ 104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	24	119.8	53.9	15.2
09-10	97	119.7	48.9	16.4
10-11	105	141.5	50.8	22.2
11-12	92	136.5	49.2	22.5
12-13	101	149.6	50.7	24.3

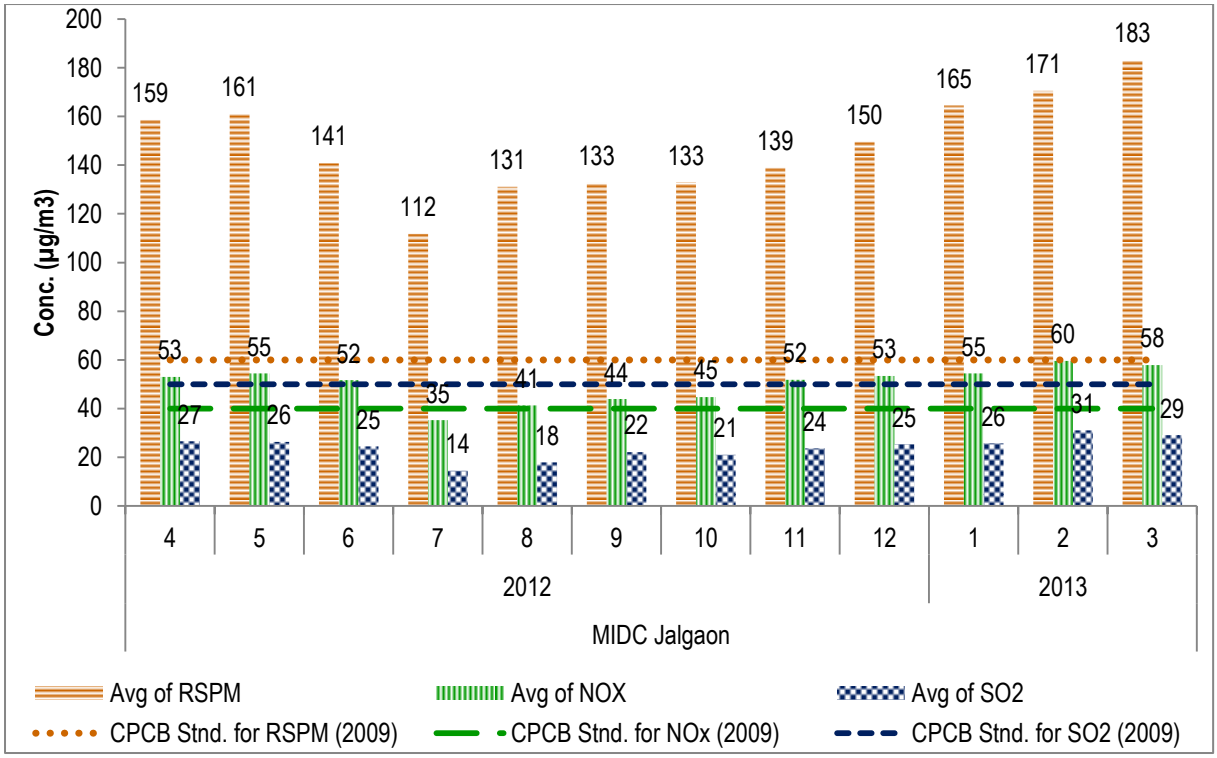


Figure No. 133: Monthly average reading recorded at -MIDC Jalgaon

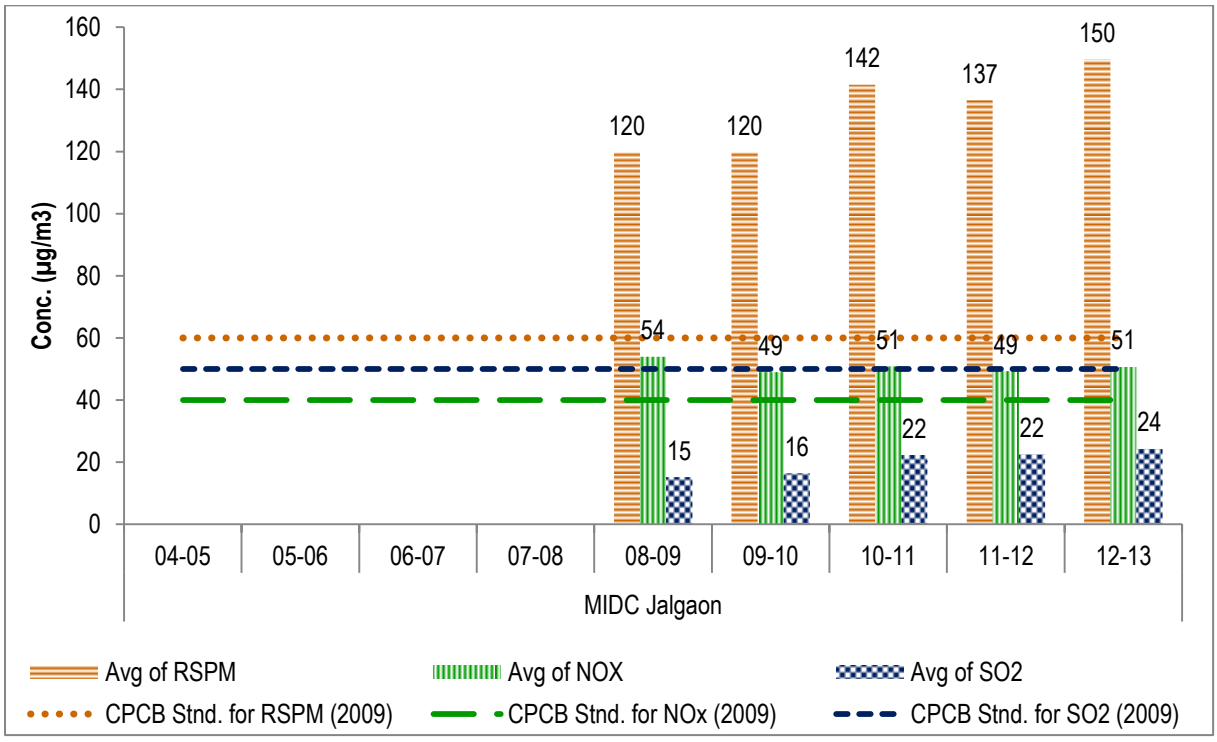


Figure No. 134: Annual average trend of SO_2, NOx and RSPM at -MIDC Jalgaon

Nashik - MIDC Satpur - VIP

Table No. 117: Data for monthly average reading recorded at MIDC Satpur - VIP

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_x	SO_2
Apr	8	108.0	25.6	22.8
May	9	84.9	24.1	21.9
Jun	9	74.3	25.6	23.1
Jul	8	77.8	25.8	23.1
Aug	8	73.4	25.6	24.4
Sep	9	79.3	27.3	25.4
Oct	9	92.6	26.8	24.8
Nov	8	81.1	27.9	27.0
Dec	9	69.6	26.4	24.7
Jan	8	103.4	27.4	24.6
Feb	8	132.0	28.8	27.3
Mar	9	128.0	31.8	30.1
	Total N		% of exceedence	
	102	28.4	0.0	0.0

Table No. 118: Data for annual average trend of RSPM, NO_x and SO_2 at MIDC Satpur - VIP

Year	N	Annual average (µg/m³)		
		RSPM	NO_x	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	25	89.8	26.8	36.4
05-06	68	98.0	28.3	33.4
06-07	101	57.5	27.7	33.5
07-08	101	51.8	34.1	40.7
08-09	104	90.7	27.2	29.5
09-10	104	85.0	28.6	22.7
10-11	103	69.7	25.0	23.0
11-12	105	98.0	28.1	25.4
12-13	102	91.8	26.9	24.9

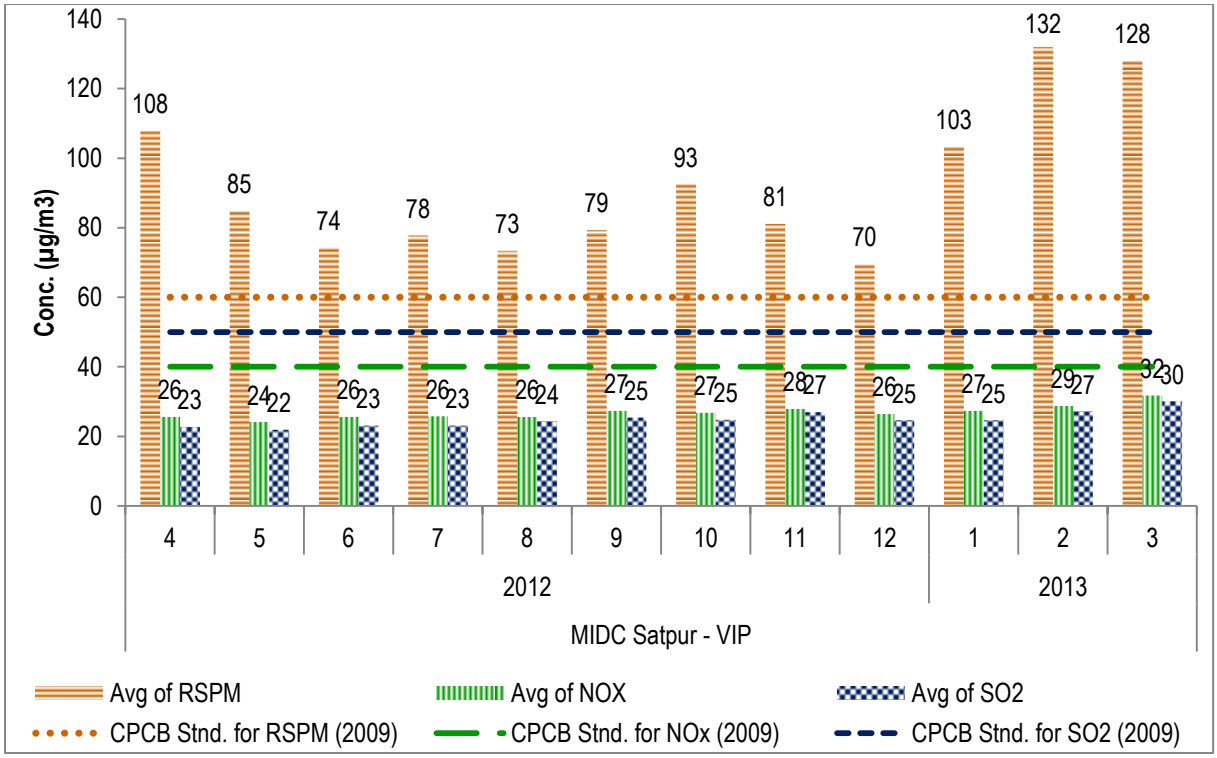


Figure No. 135: Monthly average reading recorded at MIDC Satpur - VIP

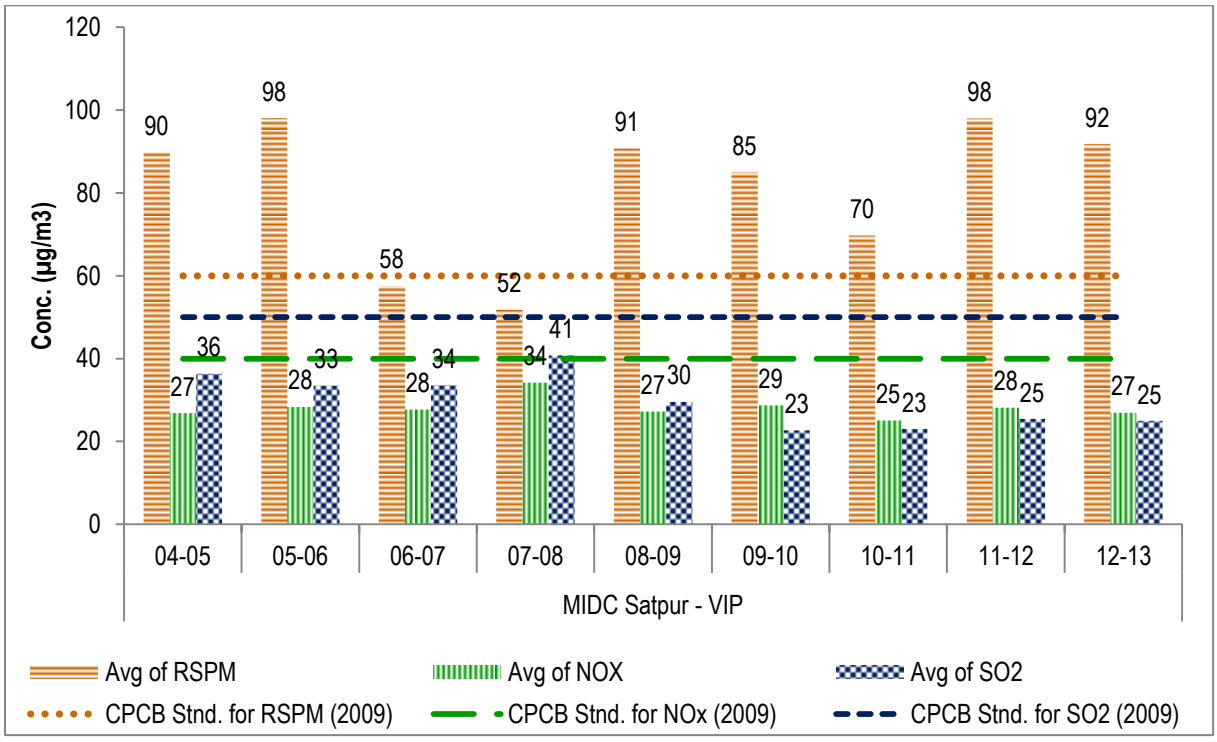


Figure No. 136: Annual average trend of SO_2, NOx and RSPM at MIDC Satpur - VIP

Nashik - RTO Colony

Table No. 119: Data for monthly average reading recorded at RTO Colony

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	16	105.5	25.3	22.8
May	18	86.0	24.9	22.3
Jun	18	83.4	26.6	22.0
Jul	18	71.7	25.0	23.9
Aug	18	72.4	26.6	23.9
Sep	16	78.6	29.0	27.5
Oct	36	78.4	26.2	23.7
Nov	18	79.3	28.9	27.0
Dec	16	84.8	25.6	24.3
Jan	18	107.6	26.2	25.8
Feb	16	120.3	29.5	27.5
Mar	18	121.9	29.7	26.8
	Total N		% of exceedence	
	226	30.1	0.0	0.0

Table No. 120: Data for annual average trend of RSPM, NO_X and SO_2 at RTO Colony

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	50	79.2	24.9	33.4
05-06	138	91.5	24.8	29.3
06-07	172	51.0	26.0	32.5
07-08	188	42.3	27.3	33.8
08-09	208	87.7	25.0	25.9
09-10	188	80.9	29.2	21.3
10-11	208	74.5	23.2	20.7
11-12	210	97.7	27.5	24.4
12-13	226	89.6	26.9	24.7

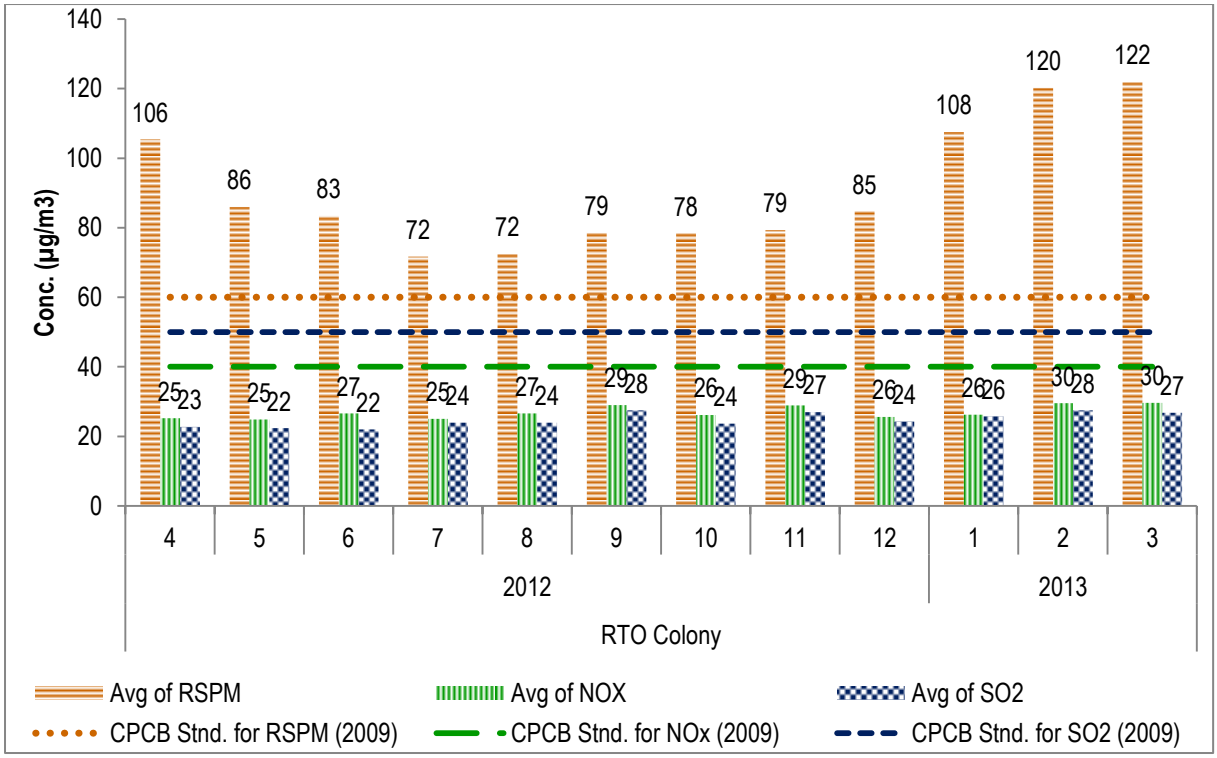


Figure No. 137: Monthly average reading recorded at -RTO Colony

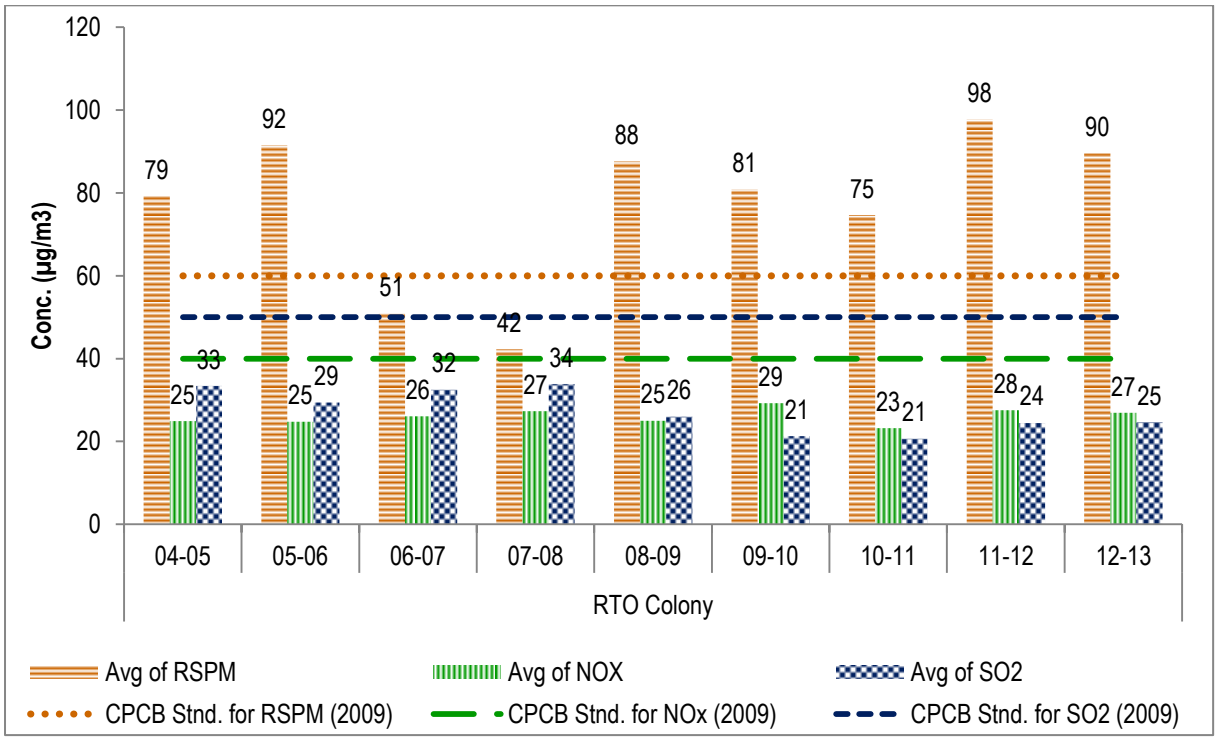


Figure No. 138: Annual average trend of SO_2, NOx and RSPM at -RTO Colony

Nashik - SRO Office Nashik

Table No. 121: Data for monthly average reading recorded at- SRO Office Nashik

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_x	SO_2
Apr	25	104.3	25.5	23.3
May	27	85.5	24.4	22.6
Jun	26	73.2	26.8	22.9
Jul	26	75.2	25.2	23.9
Aug	25	75.5	25.9	23.5
Sep	25	72.4	28.2	26.5
Oct	27	75.0	26.9	23.7
Nov	26	98.4	29.9	27.3
Dec	26	75.1	26.9	23.6
Jan	26	99.0	24.2	22.6
Feb	24	113.9	29.3	26.8
Mar	26	129.1	29.7	27.3
Total N		% of exceedence		
	309	29.8	0.0	0.0

Table No. 122: Data for annual average trend of RSPM, NO_X and SO_2 at -SRO Office Nashik

Year	N	Annual average (µg/m³)		
		RSPM	NO_x	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	167	69.0	30.5	18.7
05-06	319	78.5	27.2	14.1
06-07	276	101.7	26.8	15.9
07-08	290	114.1	26.0	16.5
08-09	253	103.6	29.4	23.0
09-10	297	86.0	27.4	21.4
10-11	294	85.2	22.9	20.2
11-12	232	113.6	27.6	23.7
12-13	309	89.6	26.9	24.5

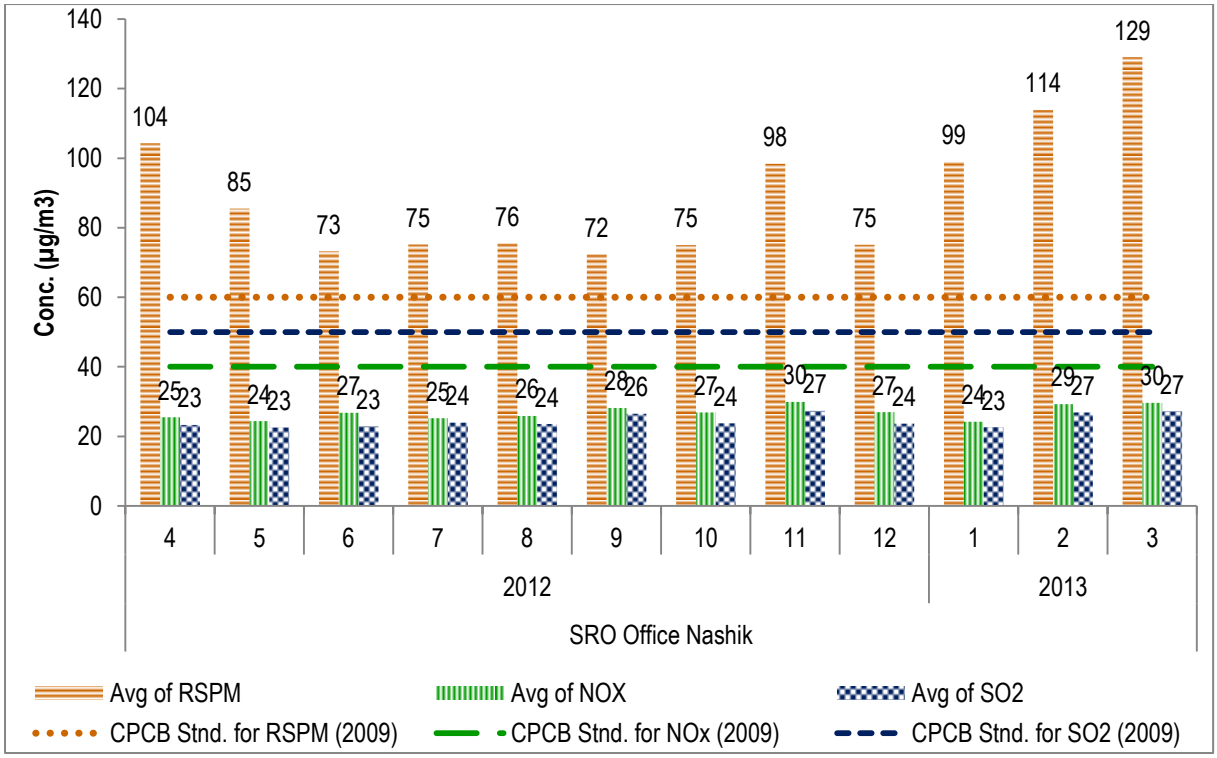


Figure No. 139: Monthly average reading recorded at -SRO Office Nashik

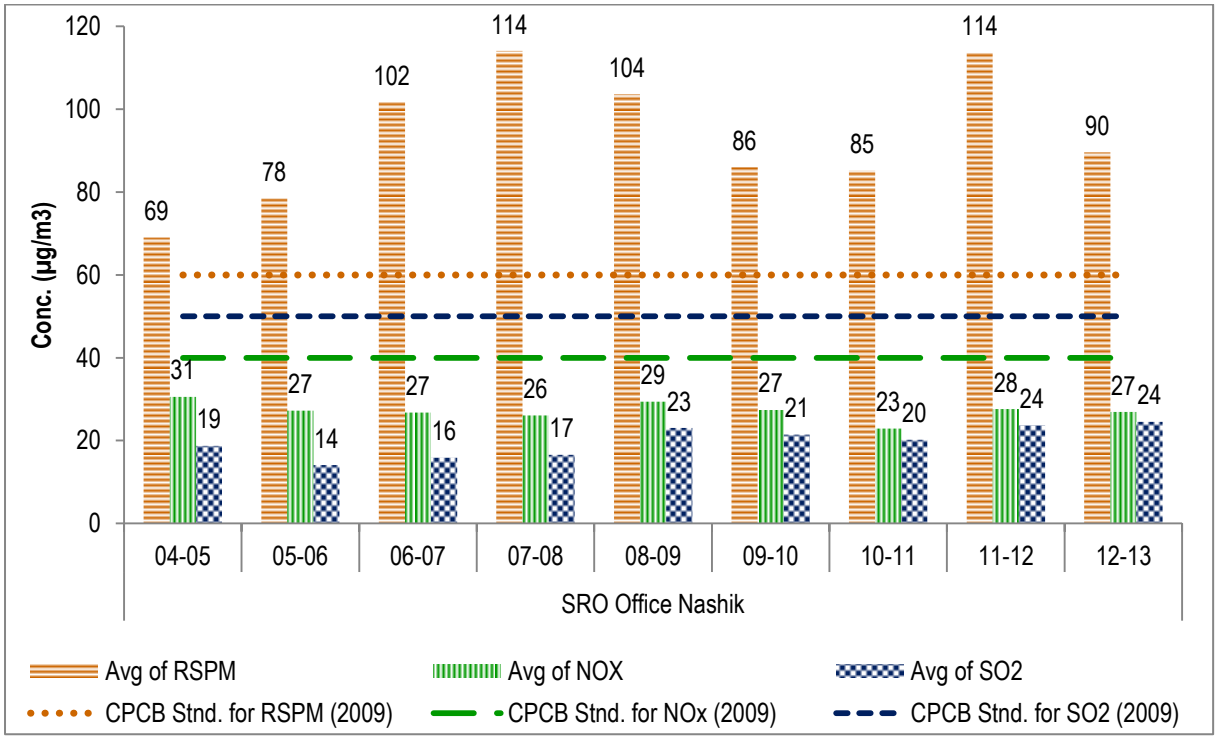


Figure No. 140: Annual average trend of SO_2, NOx and RSPM at -SRO Office Nashik

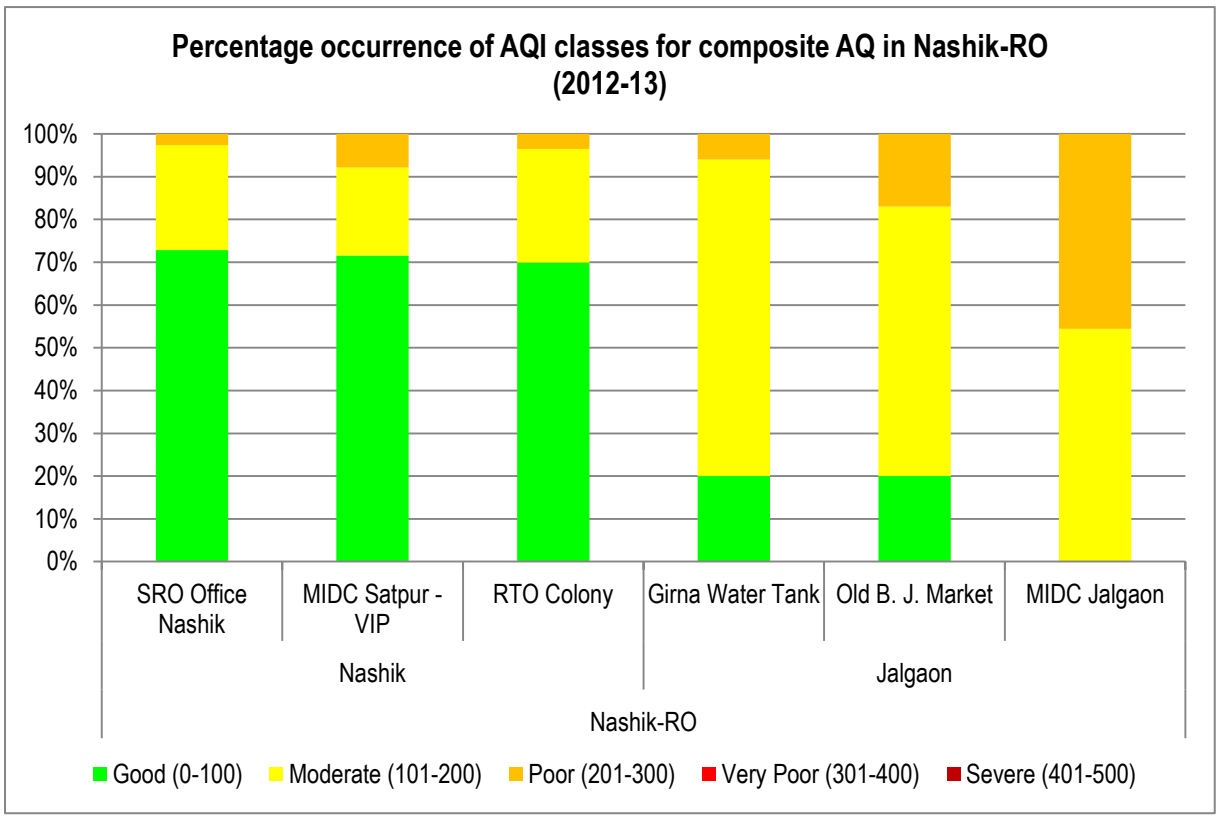
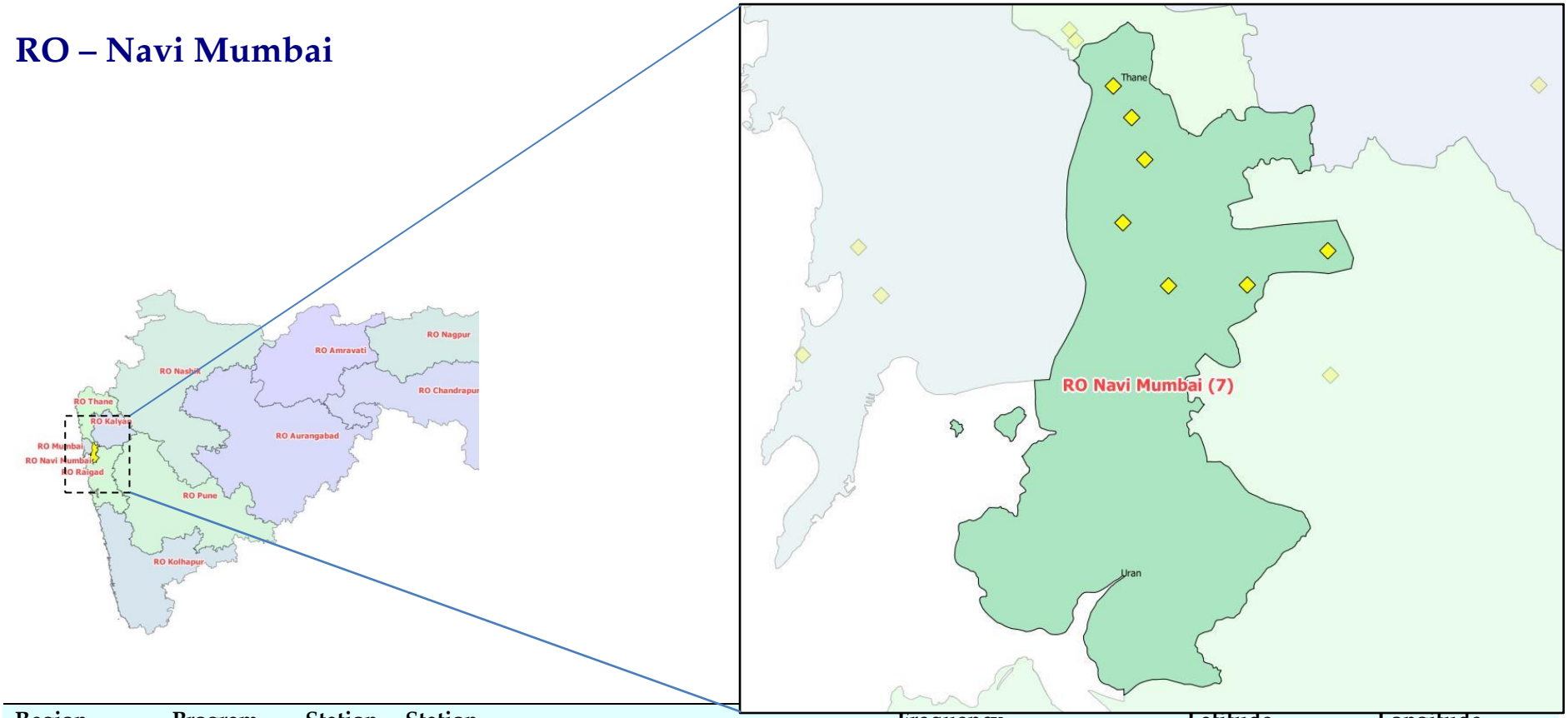


Figure No. 141: Percentage occurrence of AQI classes for composite AQ in Nashik-RO (2012-13)

RO – Navi Mumbai



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Navi Mumbai	CAAQMS		Airoli	ContinuousMonitoring	19° 09' 21.4" N	72° 59' 35.4" E
			Vashi	Continuous Monitoring	19° 03' 20.4" N	72° 55' 19.5" E
	NAMP	491	Rabale	Two Days In A Week	19° 08' 15.2" N	73° 00' 13.1" E
		492	Nerul - DY Patil	Two Days In A Week	19° 02' 28.1" N	73° 01' 29.5" E
		493	MPCB-Nirmal Bhavan, Mahape	Two Days In A Week	19° 06' 49.0" N	73° 00' 40.1" E
Taloja	NAMP	494	Kharghar - CIDCO Nodal Office	Two Days In A Week	19° 02' 29.4" N	73° 04' 11.8" E
		496	MIDC Taloja	Two Days In A Week	19° 03' 40.0" N	73° 06' 58.6" E

Navi Mumbai - Airoli

Table No. 123: Data for monthly average reading recorded at Airoli

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	29	137.7	63.5	4.9
May	26	80.7	31.6	11.7
Jun	30	67.2	47.6	16.6
Jul	30	61.2	55.2	13.1
Aug	26	52.3	33.7	9.5
Sep	25	66.5	32.9	10.4
Oct	21	117.4	34.1	49.2
Nov	23	188.6	50.8	32.7
Dec	15	174.1	53.0	33.6
Jan	23	173.4	48.8	34.4
Feb	26	131.9	31.4	29.6
Mar	23	110.4	27.8	18.0
	Total N		% of exceedence	
	297	48.5	6.1	1.0

Table No. 124: Data for annual average trend of RSPM, NO_X and SO_2 at Airoli

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	80	86.8	111.8	31.3
09-10	335	120.2	88.8	23.3
10-11	343	128.2	66.6	27.3
11-12	250	180.8	75.4	13.0
12-13	297	108.9	42.8	20.6

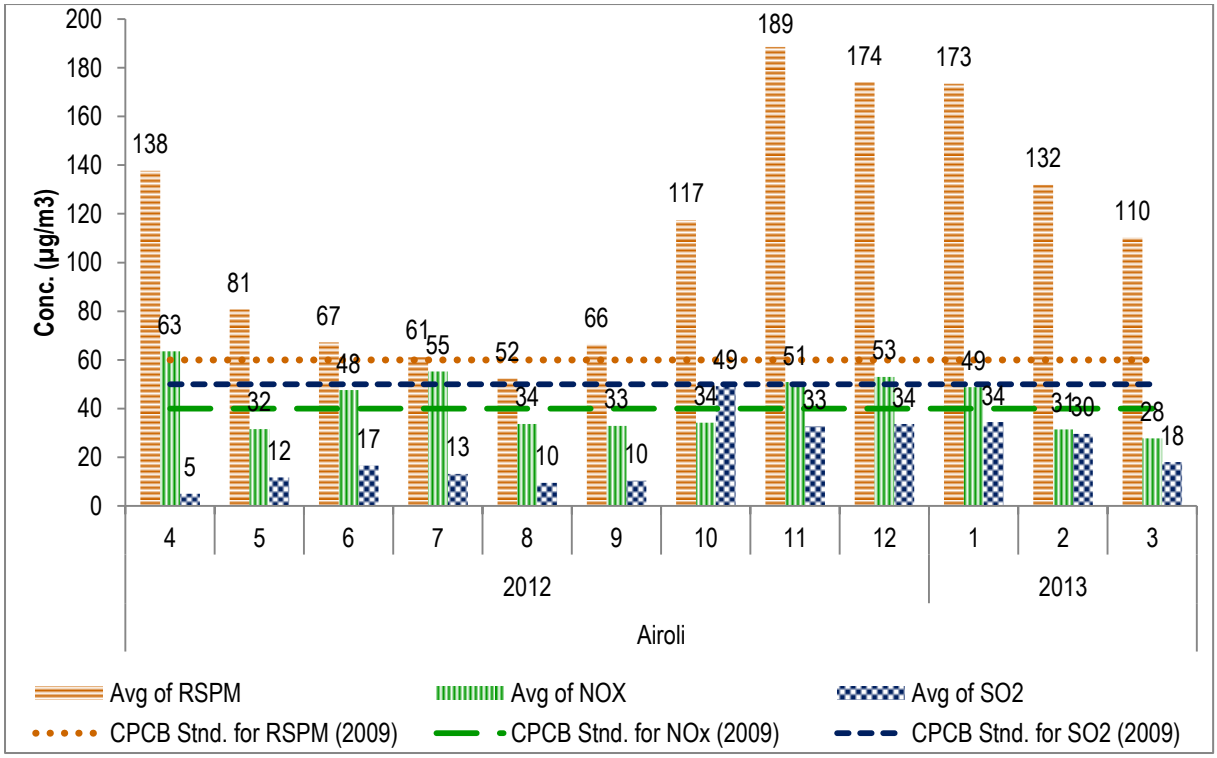


Figure No. 142: Monthly average reading recorded at -Airoli

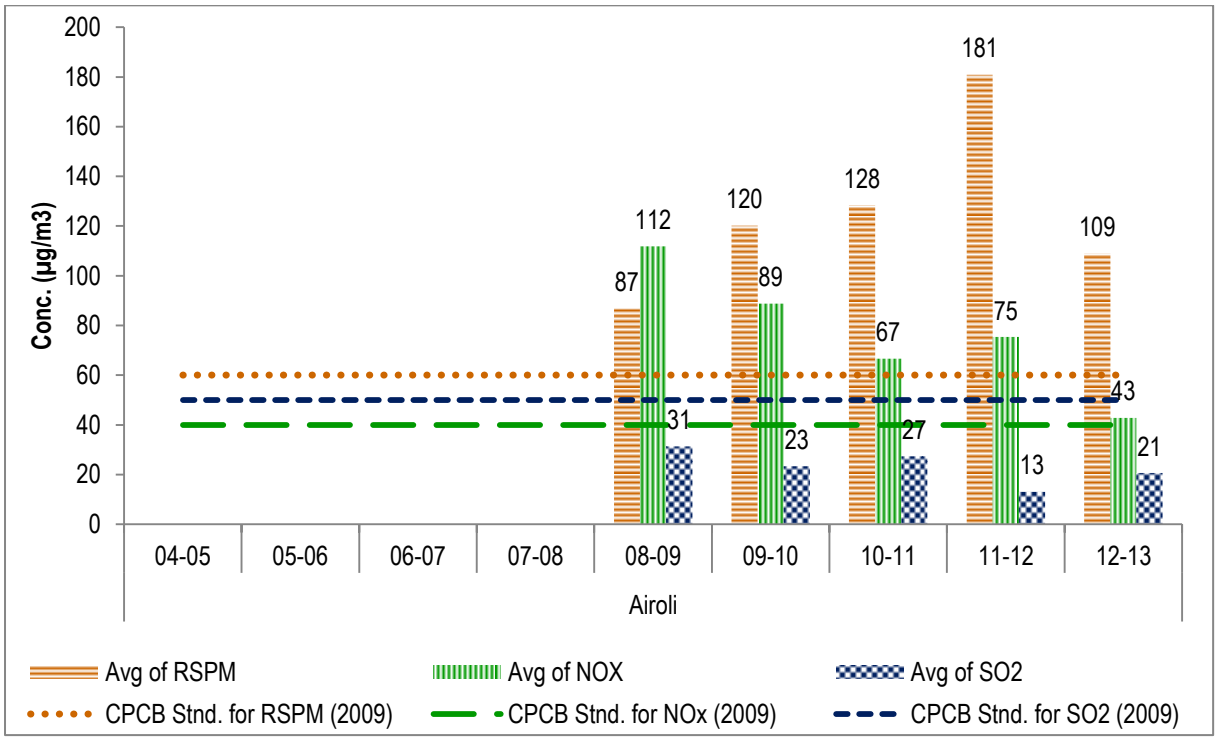


Figure No. 143: Annual average trend of SO_2, NOx and RSPM at -Airoli

Navi Mumbai - Vashi

Table No. 125: Data for monthly average reading recorded at Vashi

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	27	125.9	44.8	32.7
May	24	84.1	31.2	17.4
Jun	25	68.2	65.9	11.8
Jul	25	65.7	75.7	13.5
Aug	23	53.5	65.0	17.3
Sep	19	32.9	58.4	27.7
Oct	7	49.4	128.3	35.1
Nov	19	84.1	70.4	20.2
Dec	23	131.9	37.1	23.5
Jan	23	167.4	46.2	31.3
Feb	15	144.0	71.9	61.8
Mar	20	292.9	35.1	53.5
	Total N	% of exceedence		
	250	40.4	10.8	4.0

Table No. 126: Data for annual average trend of RSPM, NO_X and SO_2 at Vashi

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	137	101.2	70.9	62.1
07-08	269	92.8	50.1	50.0
08-09	289	124.2	51.2	22.3
09-10	329	96.0	56.7	25.6
10-11	296	91.9	44.6	18.5
11-12	186	111.4	42.9	18.8
12-13	250	110.3	56.1	27.0

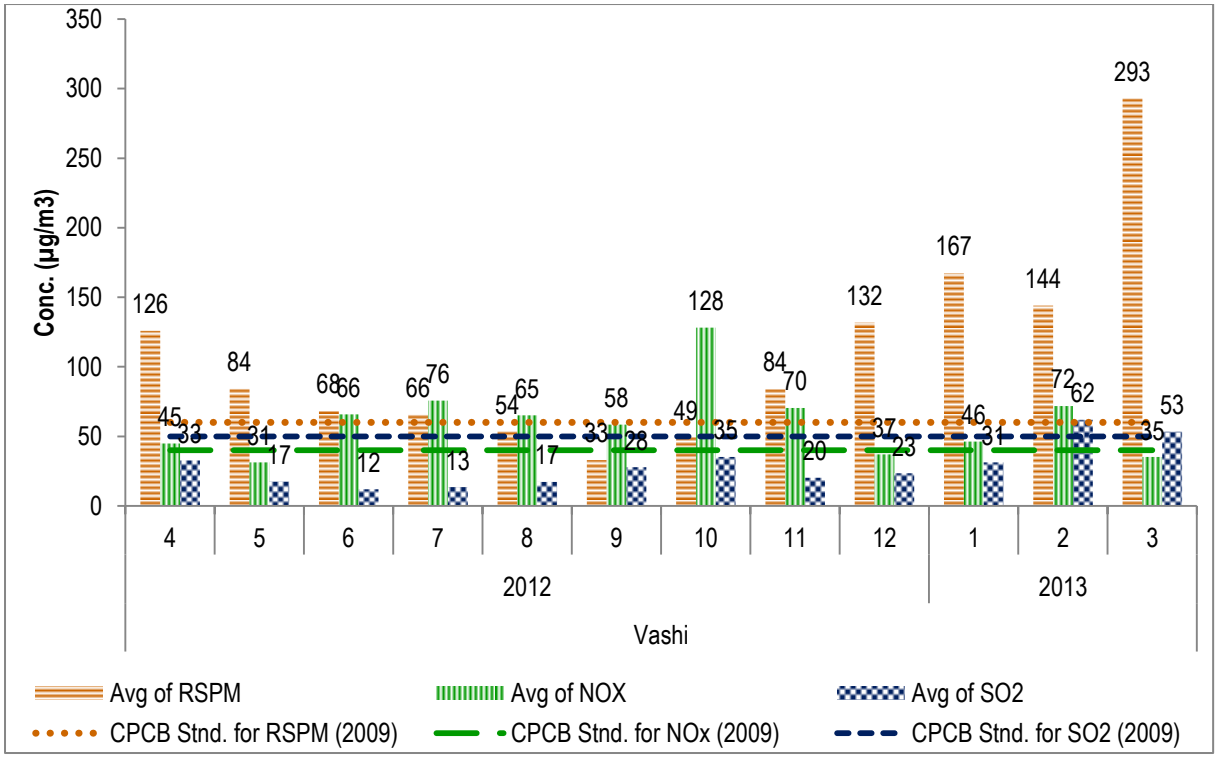


Figure No. 144: Monthly average reading recorded at -Vashi

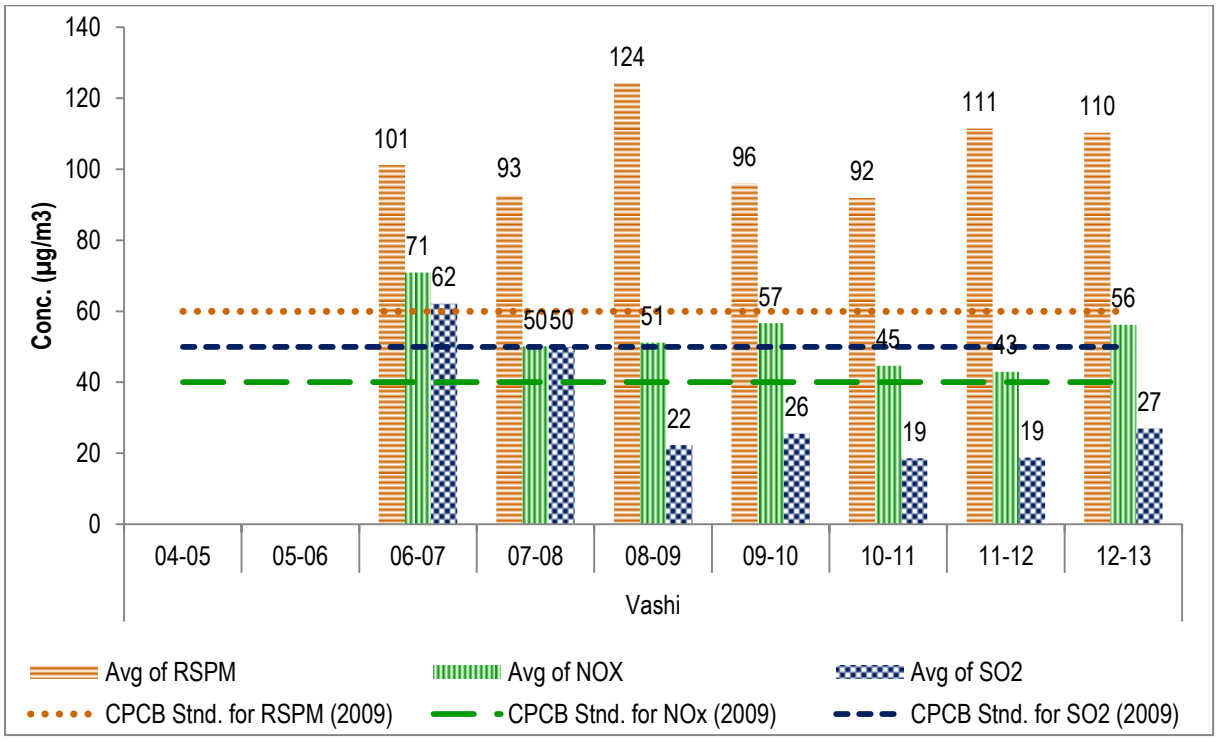


Figure No. 145: Annual average trend of SO_2, NOx and RSPM at -Vashi

Navi Mumbai - Rabale

Table No. 127: Data for monthly average reading recorded at Rabale

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_x	SO_2
Apr	8	82.8	49.9	18.9
May	9	103.6	49.2	18.0
Jun	9	110.9	46.9	19.9
Jul	8	30.3	33.3	12.9
Aug	9	38.1	40.2	14.6
Sep	8	47.5	37.8	14.0
Oct	9	53.9	45.3	17.4
Nov	9	89.2	49.4	19.9
Dec	8	66.5	48.8	20.1
Jan	9	95.8	51.4	22.2
Feb	8	65.5	52.8	20.8
Mar	9	65.4	45.9	19.7
Total N		% of exceedence		
	103	16.5	1.0	0.0

Table No. 128: Data for annual average trend of RSPM, NO_x and SO_2 at Rabale

Year	N	Annual average (µg/m³)		
		RSPM	NO_x	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	65	105.8	31.2	24.9
07-08	101	79.4	27.0	12.3
08-09	107	93.6	30.8	16.2
09-10	103	82.9	36.2	13.1
10-11	100	125.5	43.2	22.0
11-12	97	100.1	46.8	18.1
12-13	103	71.4	46.0	18.2

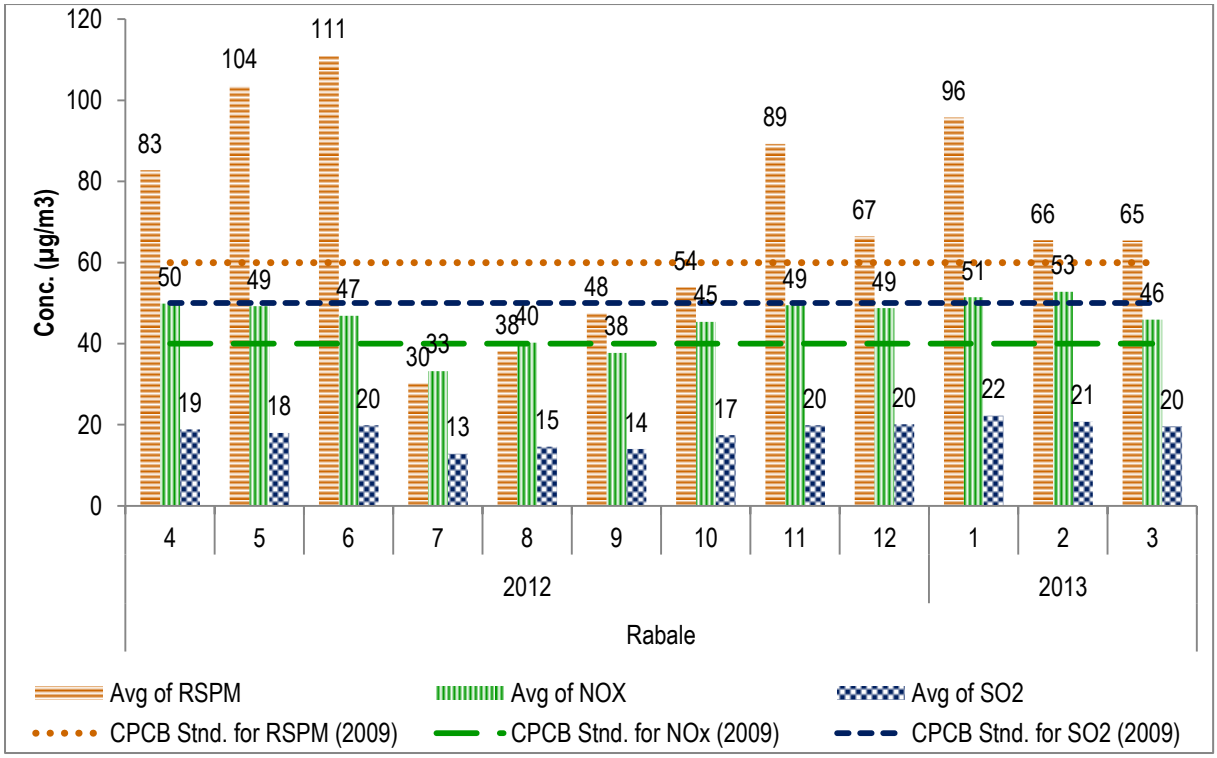


Figure No. 146: Monthly average reading recorded at -Rabale

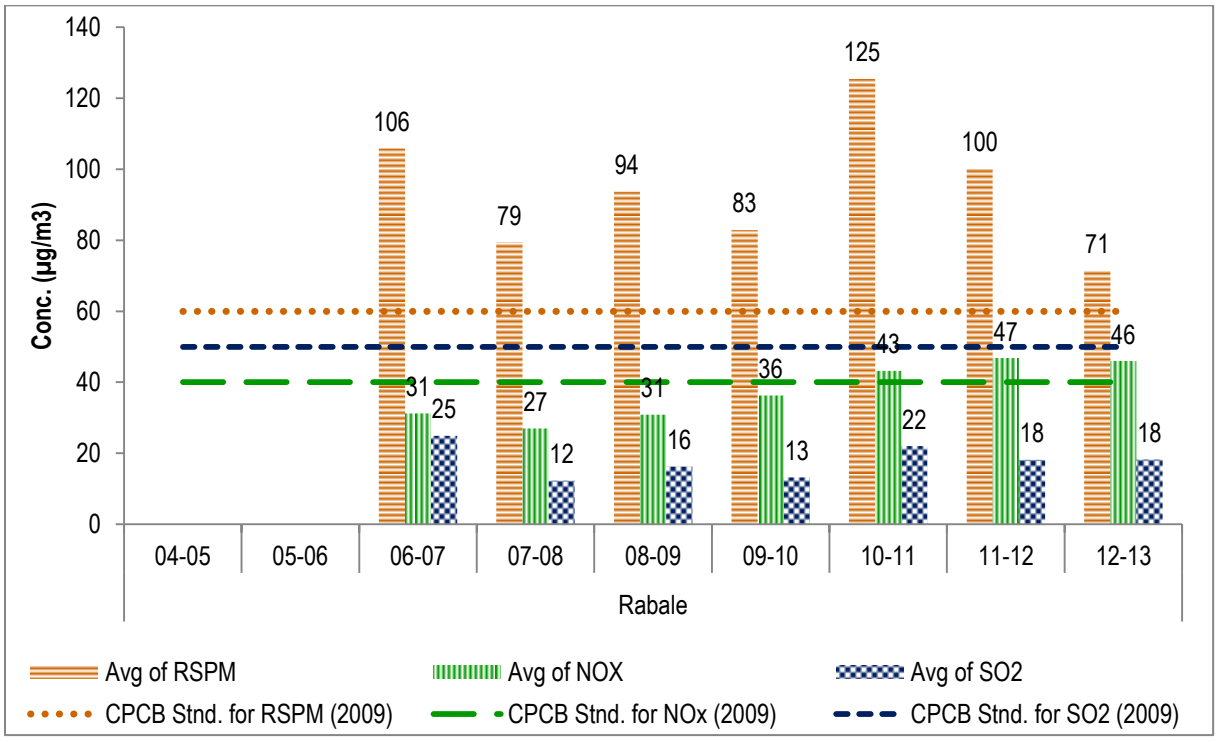


Figure No. 147: Annual average trend of SO_2, NOx and RSPM at -Rabale

Navi Mumbai - Nerul - DY Patil

Table No. 129: Data for monthly average reading recorded at Nerul - DY Patil

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	9	67.4	45.7	16.6
May	9	55.8	41.6	16.0
Jun	8	135.1	39.0	14.4
Jul	9	28.2	28.3	11.0
Aug	9	23.1	37.2	12.8
Sep	8	26.3	32.6	13.5
Oct	9	161.0	40.1	16.7
Nov	1	122.0	45.0	20.0
Dec	9	112.2	42.7	16.9
Jan	9	150.1	44.6	16.6
Feb	7	164.4	46.1	18.4
Mar	8	139.9	46.0	17.0
Total N		% of exceedence		
	95	42.1	0.0	0.0

Table No. 130: Data for annual average trend of RSPM, NO_X and SO_2 at Nerul - DY Patil

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	78	107.2	31.1	24.9
07-08	105	89.7	32.7	16.7
08-09	113	97.7	40.5	19.7
09-10	104	70.8	36.5	10.4
10-11	96	119.5	33.3	14.0
11-12	98	117.9	43.2	15.4
12-13	95	95.4	40.3	15.4

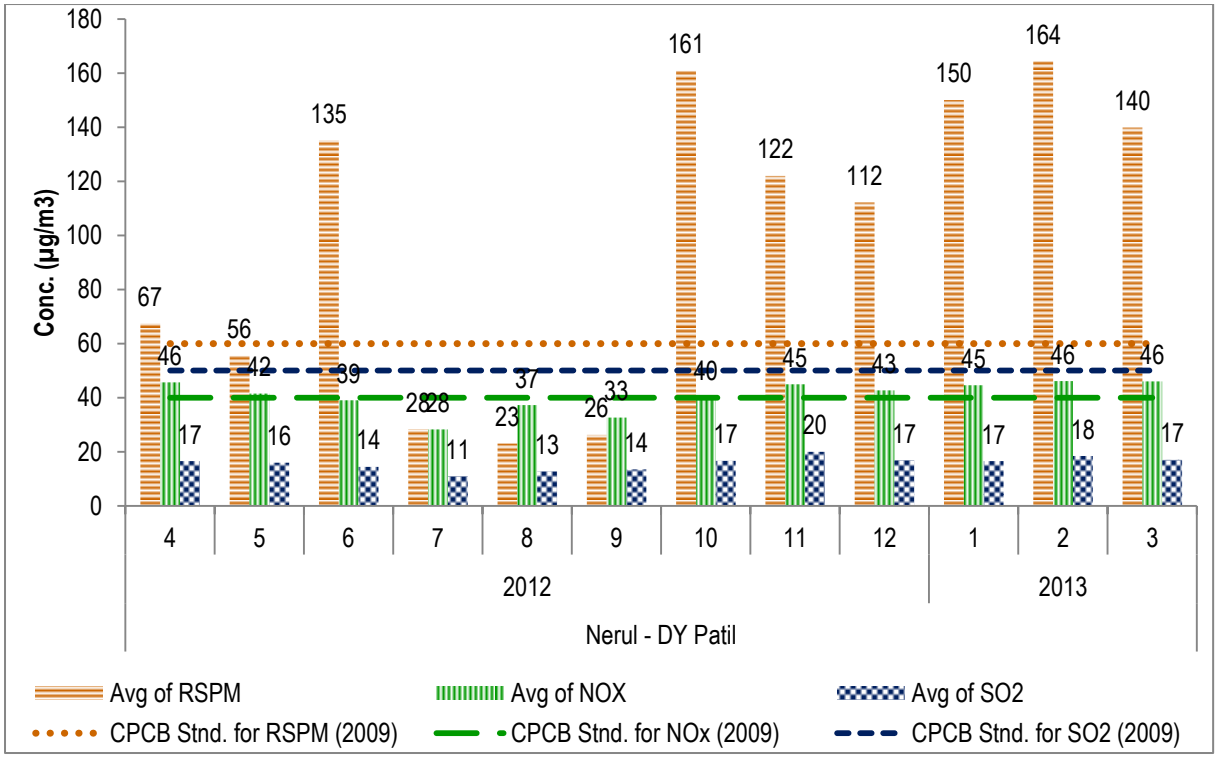


Figure No. 148: Monthly average reading recorded at Nerul - DY Patil

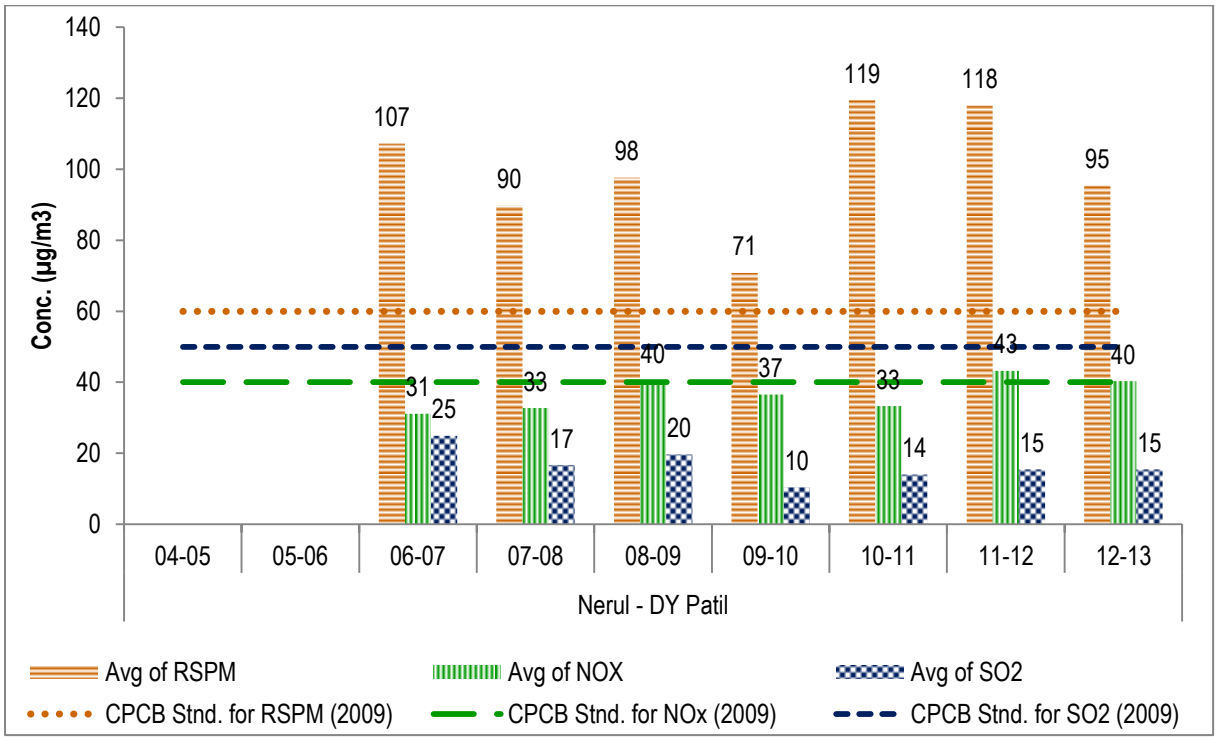


Figure No. 149: Annual average trend of SO_2, NOx and RSPM at Nerul - DY Patil

Navi Mumbai - Mahape, MPCB-Nirmal Bhavan

Table No. 131: Data for monthly average reading recorded at Mahape, MPCB-Nirmal Bhavan

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_x	SO_2
Apr	8	82.3	48.0	18.0
May	14	71.4	46.6	17.4
Jun	9	52.0	42.3	16.6
Jul	7	47.9	31.1	12.7
Aug	8	46.8	41.6	16.5
Sep	10	67.4	38.6	16.4
Oct	9	126.4	45.2	17.1
Nov	17	167.9	47.2	19.3
Dec	9	200.2	49.2	18.4
Jan	8	218.8	46.6	19.9
Feb	9	167.1	47.6	19.4
Mar	9	181.8	49.8	18.2
Total N		% of exceedence		
	117	53.0	1.7	0.0

Table No. 132: Data for annual average trend of RSPM, NO_x and SO_2 at Mahape, MPCB-Nirmal Bhavan

Year	N	Annual average (µg/m³)		
		RSPM	NO_x	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	57	105.7	27.2	36.9
07-08	98	93.7	31.6	17.5
08-09	88	131.1	43.5	21.9
09-10	105	94.9	42.3	15.3
10-11	90	100.5	41.2	22.0
11-12	69	132.8	43.9	17.1
12-13	117	121.3	44.9	17.7

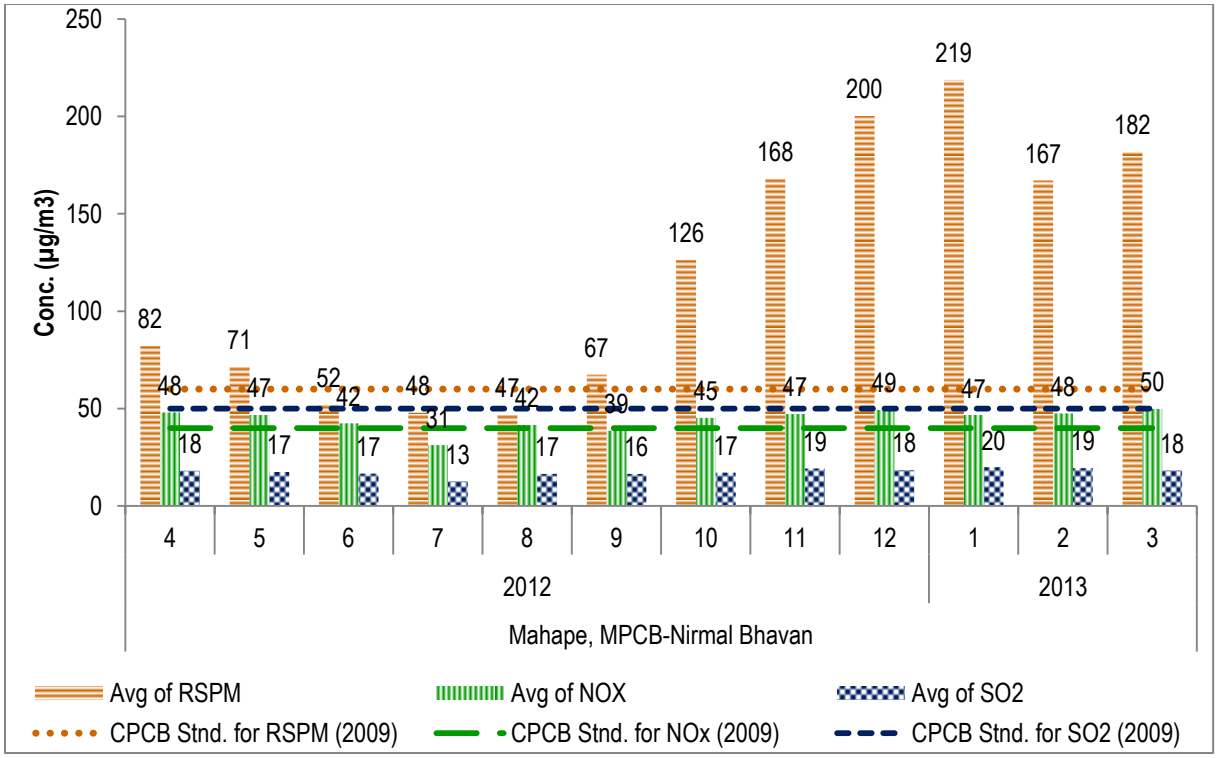


Figure No. 150: Monthly average reading recorded at Mahape, MPCB-Nirmal Bhavan

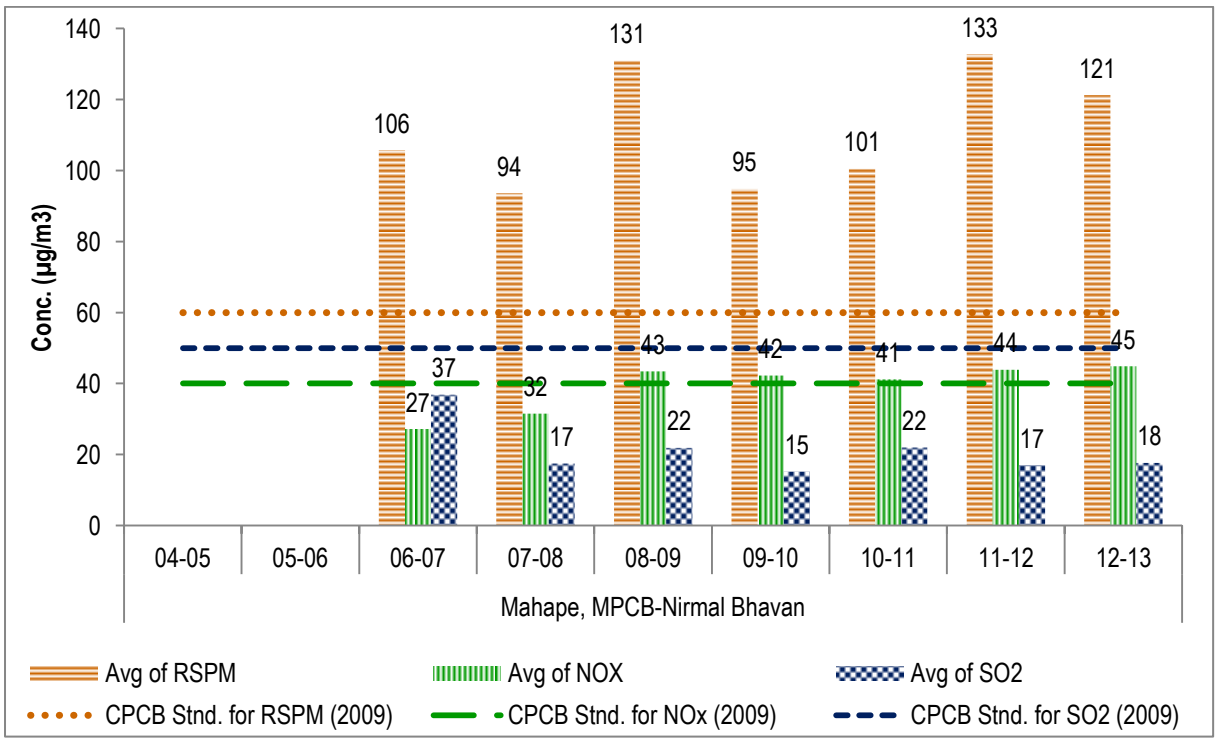


Figure No. 151: Annual average trend of SO_2, NOx and RSPM at Mahape, MPCB-Nirmal Bhavan

Taloja - Kharghar - CIDCO Nodal Office

Table No. 133: Data for monthly average reading recorded at Kharghar - CIDCO Nodal Office

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	8	125.1	47.4	17.0
May	8	84.0	43.6	16.0
Jun	9	97.6	42.8	15.3
Jul	9	56.0	30.1	12.2
Aug	9	58.4	35.7	13.8
Sep	8	76.9	35.4	12.9
Oct	9	99.0	39.4	15.9
Nov	9	153.0	40.4	18.8
Dec	8	169.1	44.0	17.3
Jan	9	216.8	44.9	17.1
Feb	7	166.6	44.4	16.7
Mar	9	166.6	45.8	16.8
Total N		% of exceedence		
	102	55.9	0.0	0.0

Table No. 134: Data for annual average trend of RSPM, NO_X and SO_2 at Kharghar - CIDCO Nodal Office

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	76	96.4	33.3	17.5
07-08	94	108.3	30.8	9.8
08-09	94	115.4	39.9	13.1
09-10	111	75.3	34.9	9.7
10-11	105	122.0	36.5	16.6
11-12	95	122.3	43.1	16.0
12-13	102	121.9	41.0	15.8

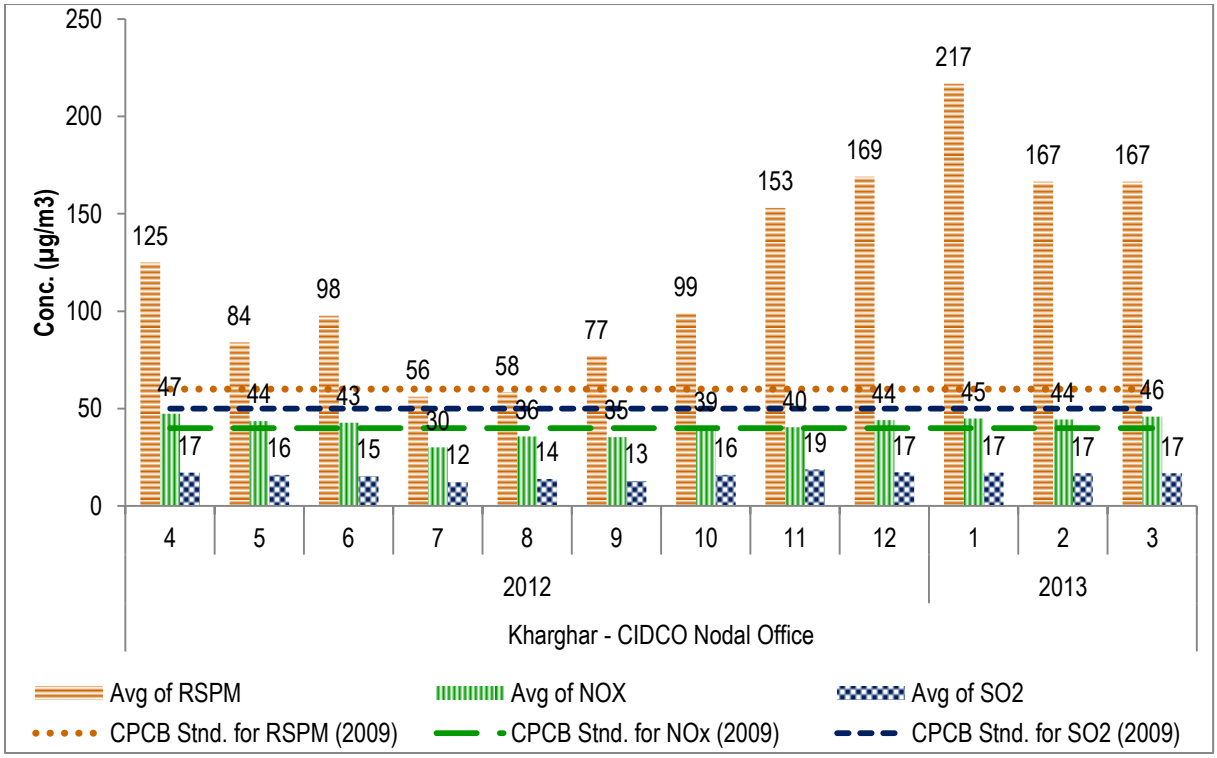


Figure No. 152: Monthly average reading recorded at Kharghar - CIDCO Nodal Office

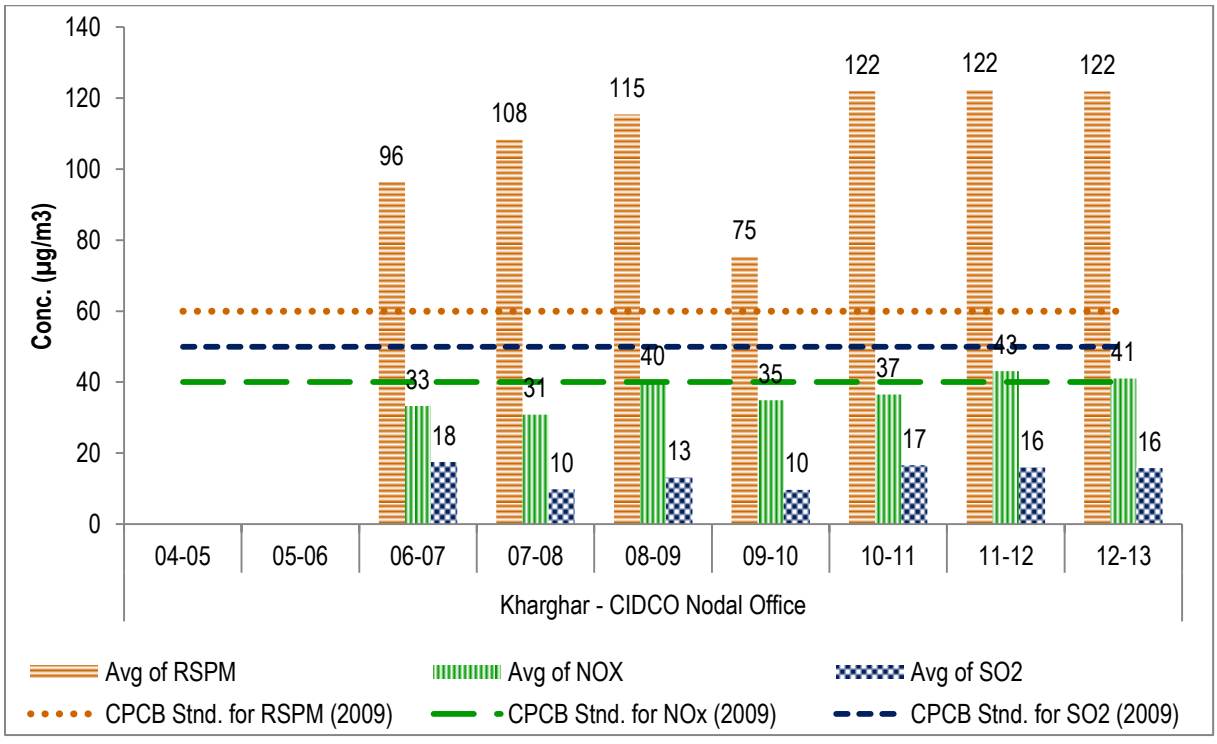


Figure No. 153: Annual average trend of SO_2, NOx and RSPM at Kharghar - CIDCO Nodal Office

Taloja - MIDC Building

Table No. 135: Data for monthly average reading recorded at Taloja - MIDC Building

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	9	142.8	52.6	18.7
May	9	136.9	46.7	16.8
Jun	8	136.8	45.0	16.8
Jul	9	56.0	33.7	13.0
Aug	9	50.8	38.3	13.6
Sep	8	121.1	37.6	14.8
Oct	9	118.3	39.7	17.2
Nov	9	193.3	49.9	22.0
Dec	9	145.4	45.7	18.9
Jan	9	132.6	49.9	20.2
Feb	8	165.4	51.4	19.9
Mar	8	150.3	47.9	20.1
Total N		% of exceedence		
	104	64.4	0.0	0.0

Table No. 136: Data for annual average trend of RSPM, NO_X and SO_2 at Taloja - MIDC Building

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	65	100.9	39.6	31.8
07-08	101	112.8	39.2	22.3
08-09	107	240.8	45.8	28.9
09-10	100	199.7	54.7	22.8
10-11	106	194.3	48.4	27.4
11-12	93	148.0	50.5	19.9
12-13	104	128.6	44.8	17.6

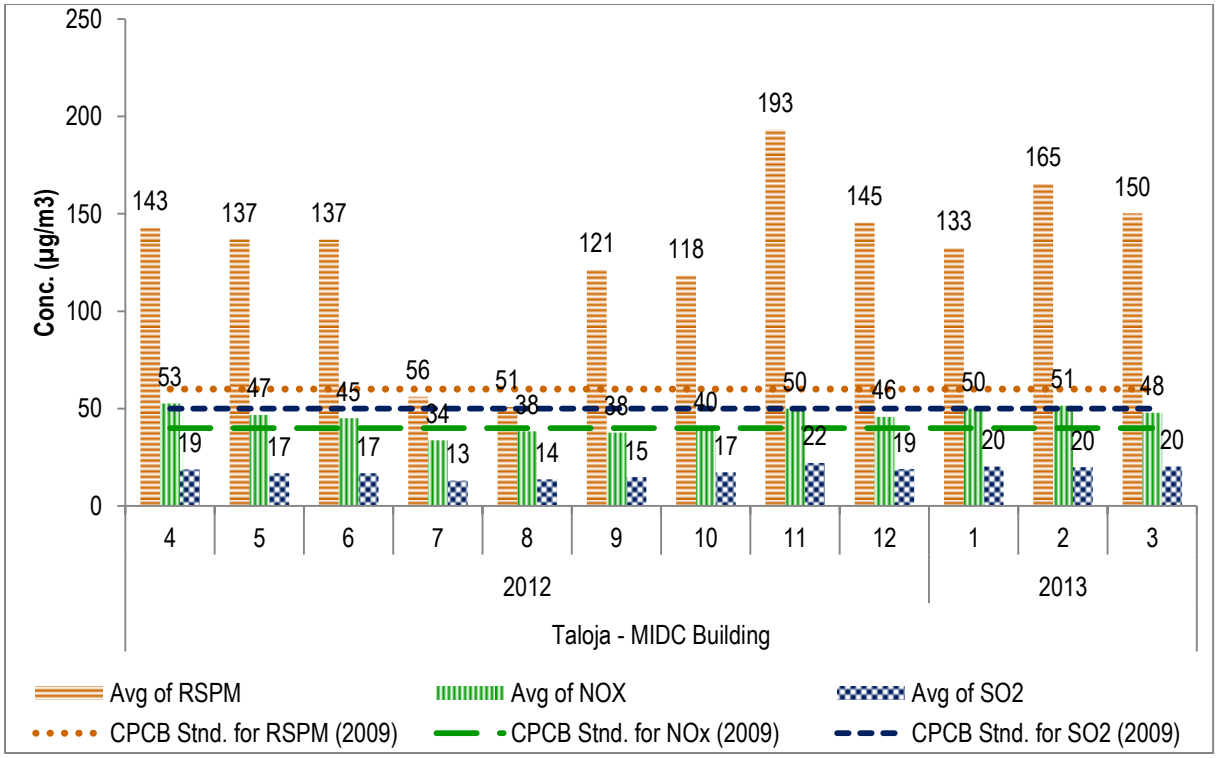


Figure No. 154: Monthly average reading recorded at Taloja - MIDC Building

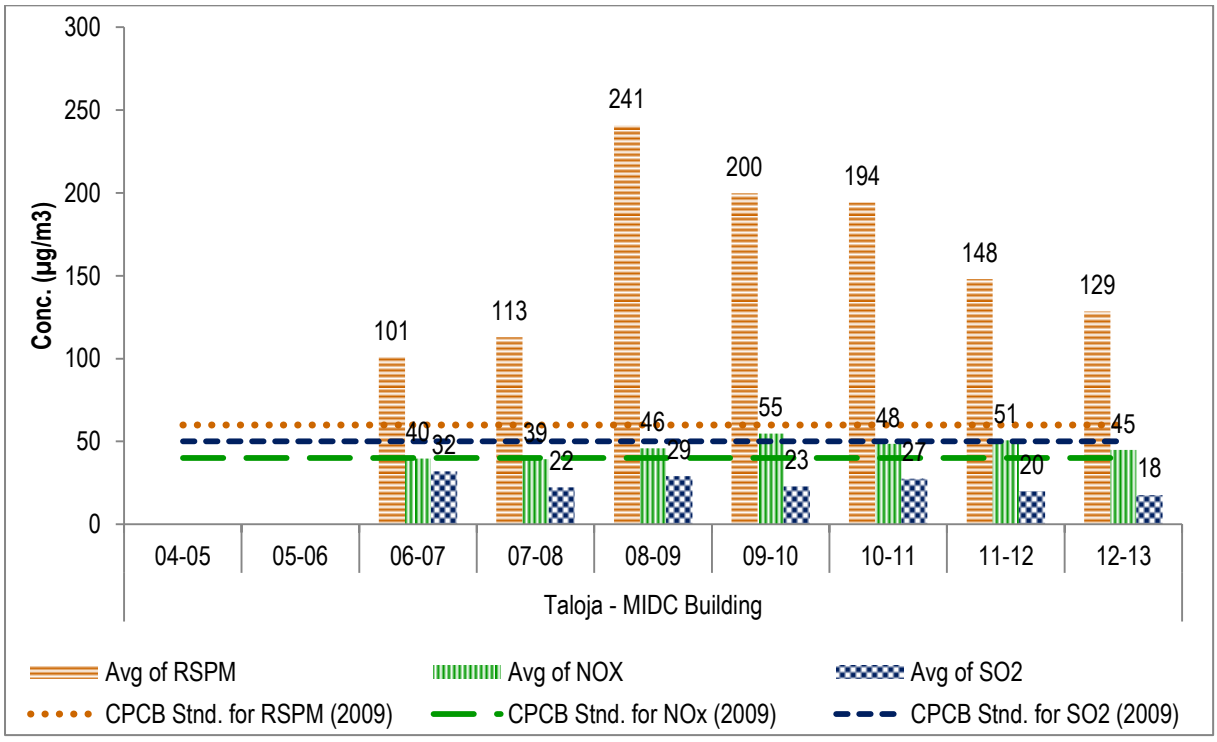


Figure No. 155: Annual average trend of SO_2, NOx and RSPM at Taloja - MIDC Building

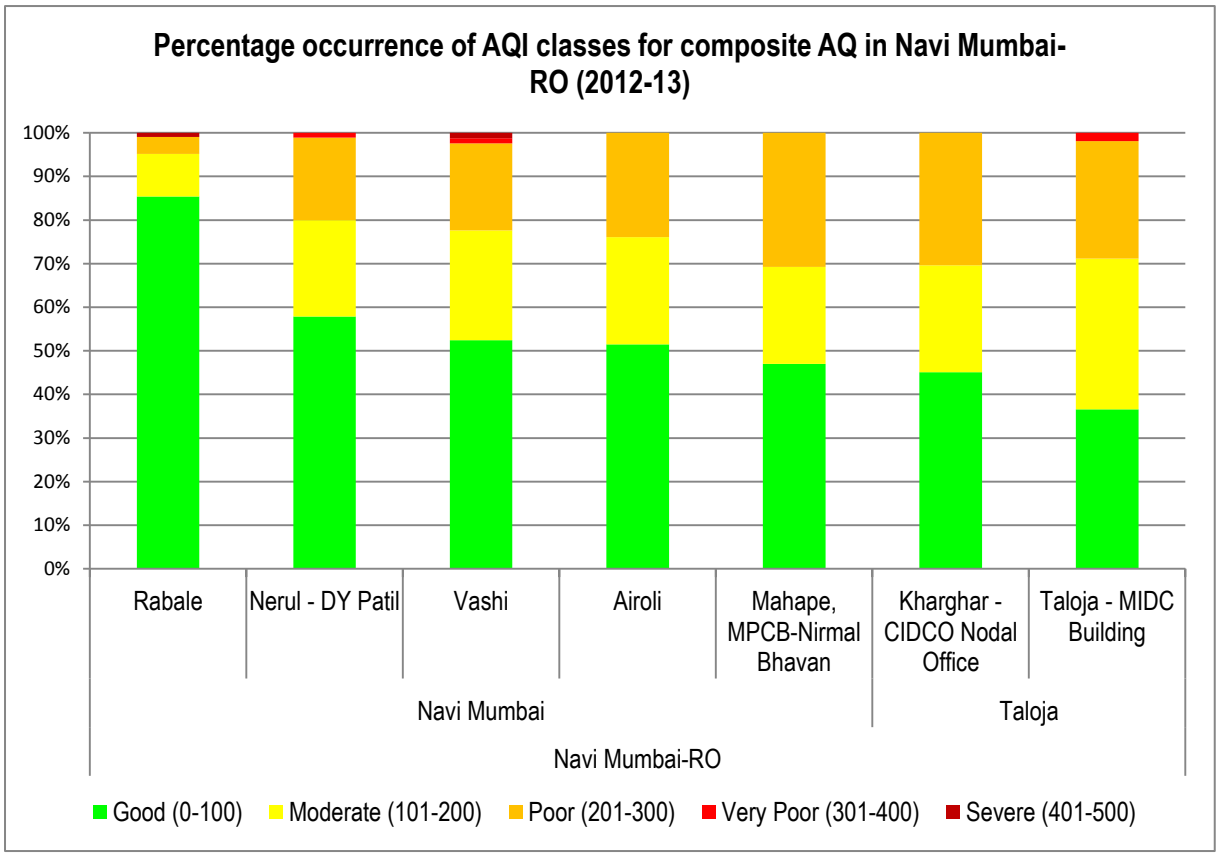
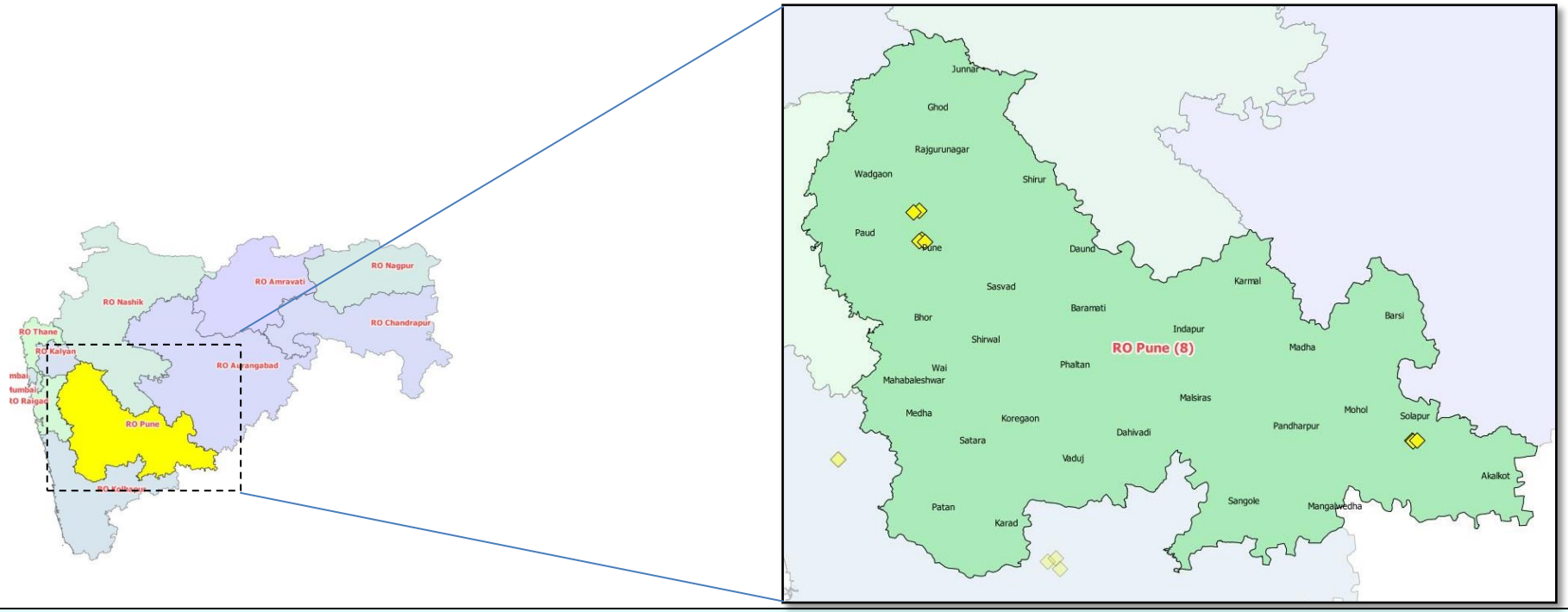


Figure No. 156:.Percentage occurrence of AQI classes for composite AQ in Navi Mumbai-RO (2012-13)

RO – Pune



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Pune	CAAQMS	1	Karve Road - CAAQMS	Continuous Monitoring	18° 30' 45.1" N	73° 50' 22.6" E
	NAMP	312	Bhosari	Two Days In A Week	18° 38' 04.1" N	73° 49' 42.0" E
		379	Nal Stop	Two Days In A Week	18° 30' 25.2" N	73° 49' 39.2" E
		381	Swargate	Two Days In A Week	18° 30' 12.6" N	73° 51' 09.4" E
		708	Pimpri-Chinchwad - BOB Building	Six days in a week	18° 37' 41.0" N	73° 48' 17.0" E
Solapur	CAAQMS	6	Solapur	Continuous Monitoring	17° 40' 07.1" N	75° 54' 05.2" E
	NAMP	299	WIT Campus	Two Days In A Week	17° 40' 06.6" N	75° 55' 19.3" E
		300	Saat Rasta- Chithale Clinic	Two Days In A Week	17° 39' 57.6" N	75° 54' 23.4" E

Pune - Karve Road - CAAQMS

Table No. 137: Data for monthly average reading recorded at Karve Road - CAAQMS

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	29	137.2	75.5	23.3
May	31	112.4	66.8	24.9
Jun	30	67.6	49.2	19.0
Jul	31	65.6	31.8	10.5
Aug	31	51.3	33.4	7.4
Sep	30	65.4	45.6	6.9
Oct	30	97.6	82.2	7.2
Nov	30	162.9	69.0	27.7
Dec	31	200.5	90.9	32.3
Jan	31	192.7	89.5	33.8
Feb	28	174.6	85.7	32.3
Mar	29	164.9	79.0	36.6
	Total N		% of exceedence	
	361	60.7	37.1	0.0

Table No. 138: Data for annual average trend of RSPM, NO_X and SO_2 at Karve Road - CAAQMS

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	247	71.0	43.3	13.1
08-09	266	121.0	39.1	24.8
09-10	280	109.1	35.3	11.5
10-11	354	128.2	38.6	12.1
11-12	351	131.4	49.3	11.3
12-13	361	124.0	66.3	21.7

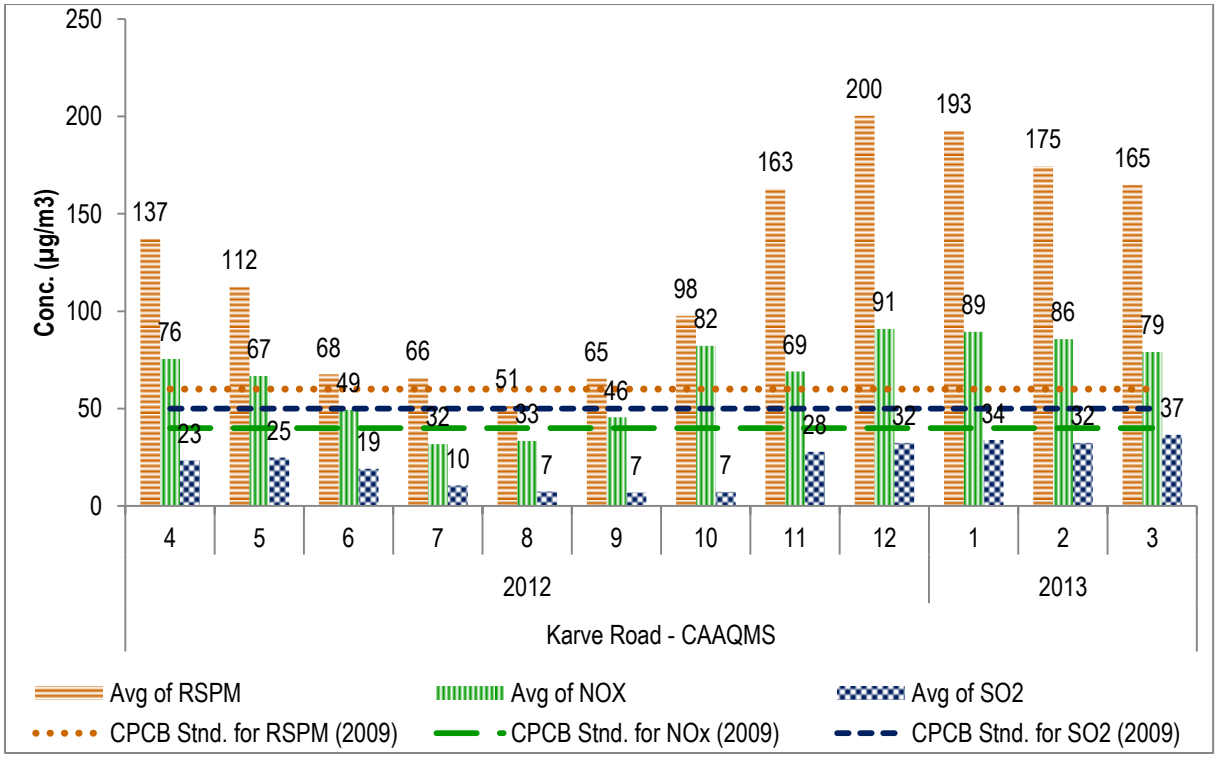


Figure No. 157: Monthly average reading recorded at Karve Road - CAAQMS

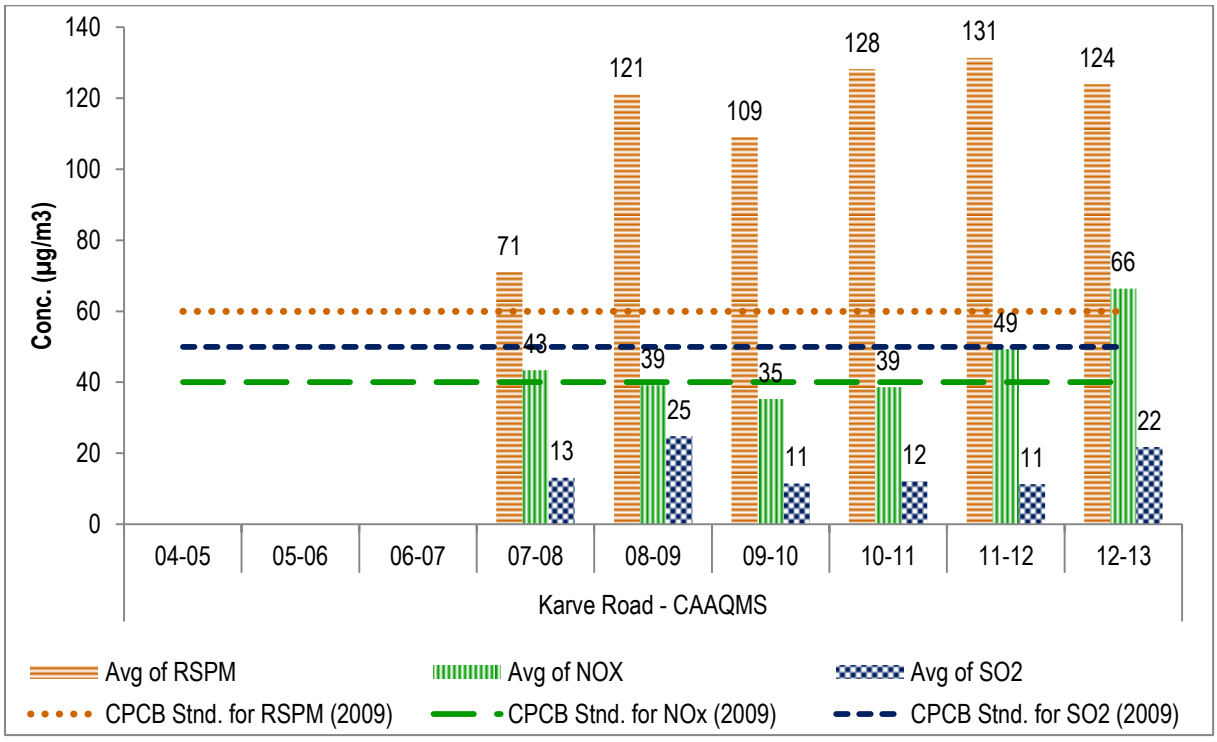


Figure No. 158: Annual average trend of SO_2, NOx and RSPM at Karve Road – CAAQMS

Pune - Bhosari

Table No. 139: Data for monthly average reading recorded at Bhosari

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	9	111.0	37.1	34.0
May	9	69.2	24.7	25.8
Jun	9	45.0	24.0	21.6
Jul	8	39.9	22.8	17.5
Aug	9	34.1	22.7	16.0
Sep	9	54.1	29.6	17.0
Oct	9	85.6	36.8	29.1
Nov	8	131.8	48.0	25.4
Dec	6	145.5	56.3	33.3
Jan	12	206.3	60.3	27.1
Feb	8	131.3	54.5	26.1
Mar	9	132.3	53.9	26.9
Total N		% of exceedence		
	105	46.7	3.8	0.0

Table No. 140: Data for annual average trend of RSPM, NO_X and SO_2 at Bhosari

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	40	144.3	42.1	26.6
06-07	99	126.5	42.3	24.4
07-08	100	111.1	42.0	19.9
08-09	106	109.3	36.5	24.0
09-10	103	87.8	36.1	42.3
10-11	97	84.1	37.6	30.2
11-12	103	130.3	49.1	37.5
12-13	105	100.5	39.2	24.9

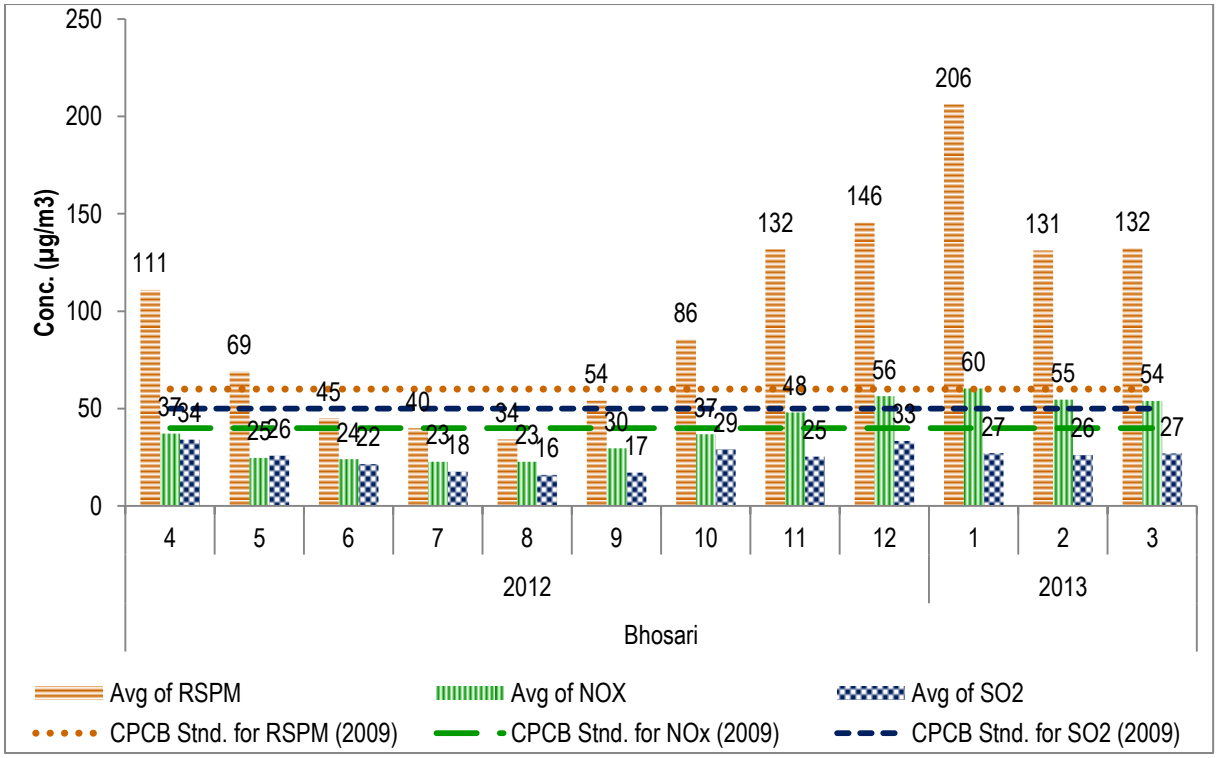


Figure No. 159: Monthly average reading recorded at Bhosari

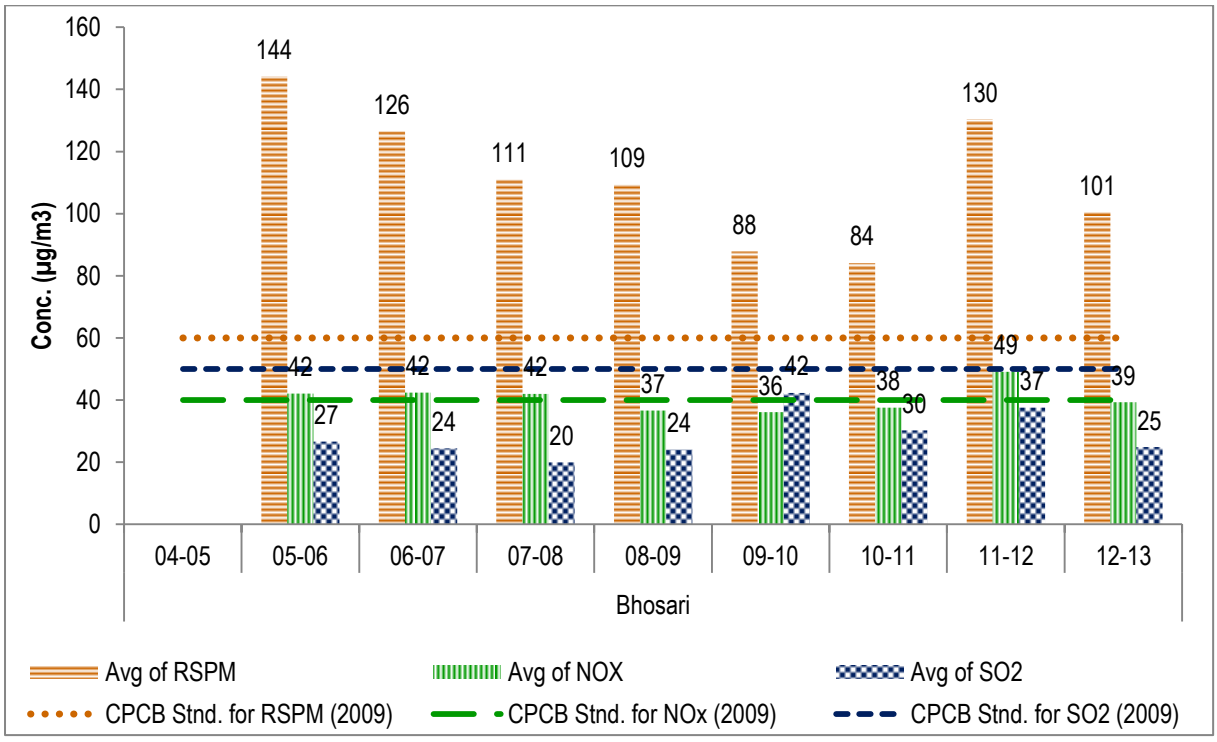


Figure No. 160: Annual average trend of SO_2, NOx and RSPM at Bhosari

Pune - Pimpri-Chinchwad - BOB Building

Table No. 141: Data for monthly average reading recorded at Pimpri-Chinchwad - BOB Building

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_x	SO_2
Apr	17	78.6	48.2	30.2
May	23	60.8	33.2	24.1
Jun	20	39.6	26.8	21.1
Jul	17	34.9	33.2	16.6
Aug	25	25.6	30.2	15.4
Sep	23	40.9	36.1	16.0
Oct	23	64.5	45.0	19.1
Nov	23	119.0	59.7	16.8
Dec	21	114.8	64.5	19.9
Jan	25	157.7	82.9	17.9
Feb	24	134.7	64.5	20.5
Mar	25	112.6	55.0	24.5
Total N		% of exceedence		
	266	33.1	10.9	0.0

Table No. 142: Data for annual average trend of RSPM, NO_x and SO_2 at Pimpri-Chinchwad - BOB Building

Year	N	Annual average (µg/m³)		
		RSPM	NO_x	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	173	113.8	35.1	20.7
06-07	277	127.1	42.5	23.7
07-08	291	105.1	40.9	19.1
08-09	283	96.4	39.3	23.1
09-10	265	89.2	42.8	30.9
10-11	300	86.5	49.0	26.3
11-12	270	117.2	57.5	32.7
12-13	266	83.9	49.0	20.0

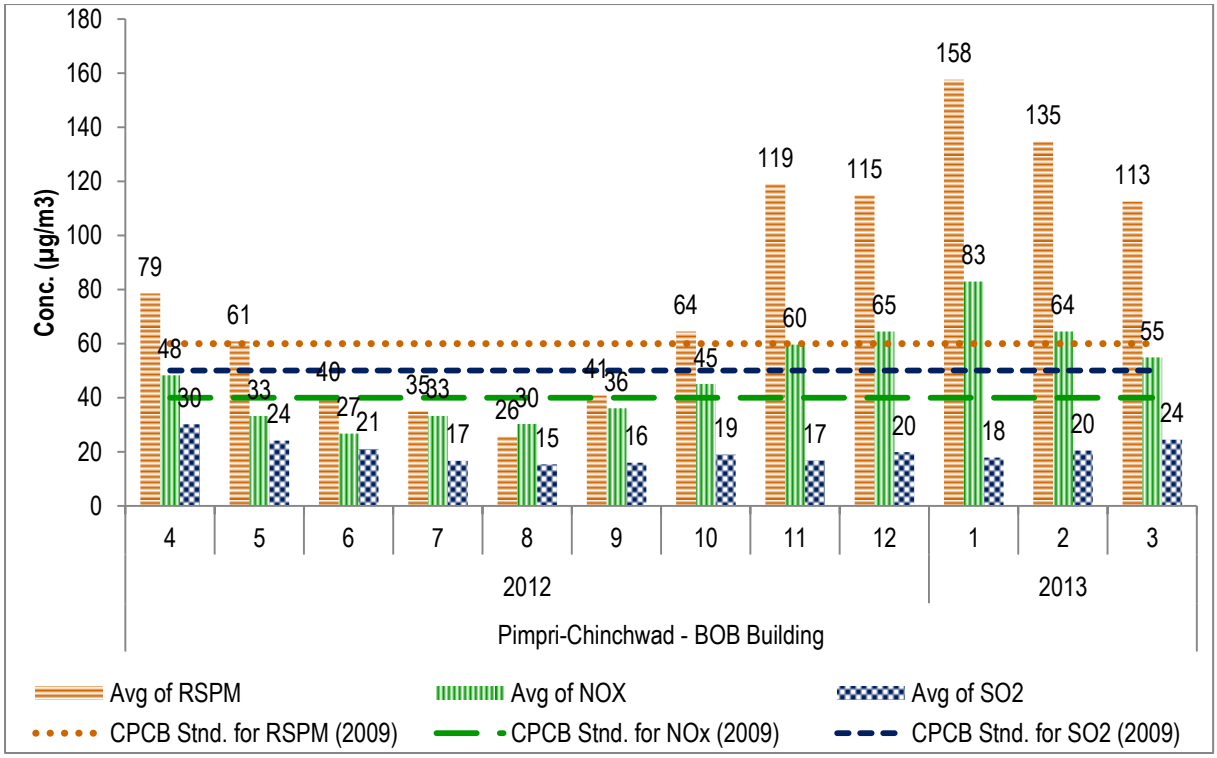


Figure No. 161: Monthly average reading recorded at Pimpri-Chinchwad - BOB Building

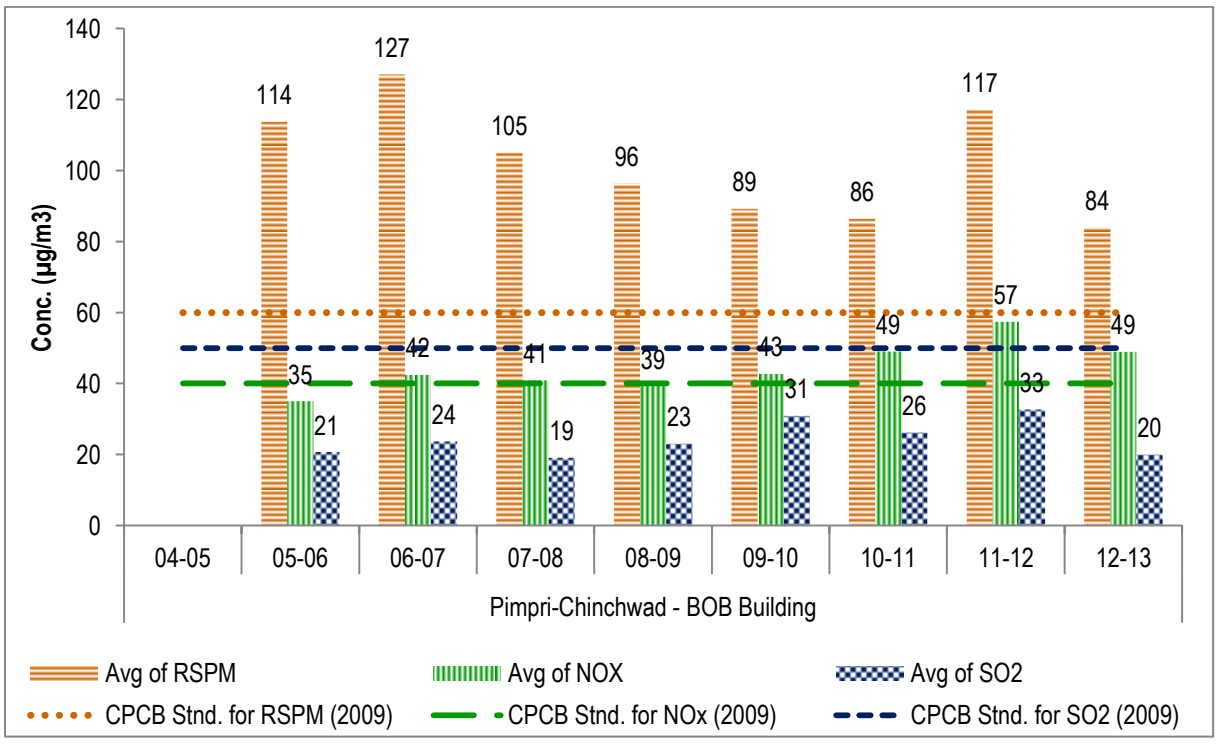


Figure No. 162: Annual average trend of SO_2, NOx and RSPM at Pimpri-Chinchwad - BOB Building

Pune - Swargate, Pune

Table No. 143: Data for monthly average reading recorded at Swargate, Pune

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	9	77.3	46.8	28.9
May	9	64.1	30.4	26.1
Jun	8	32.9	25.0	18.6
Jul	9	31.2	26.4	17.1
Aug	9	21.1	26.9	14.9
Sep	8	21.1	28.9	15.6
Oct	9	81.0	65.6	16.3
Nov	8	126.3	72.9	18.4
Dec	9	117.6	84.9	13.9
Jan	8	121.1	88.0	14.5
Feb	8	103.8	76.3	18.4
Mar	8	113.9	66.0	25.3
Total N		% of exceedence		
	102	29.4	18.6	0.0

Table No. 144: Data for annual average trend of RSPM, NO_X and SO_2 at Swargate, Pune

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	44	152.1	43.0	27.3
06-07	95	137.6	43.4	24.8
07-08	97	101.4	46.4	19.6
08-09	112	100.0	43.6	22.5
09-10	107	81.3	39.1	23.6
10-11	105	79.8	49.7	22.9
11-12	91	94.7	63.4	27.9
12-13	102	75.3	52.8	19.0

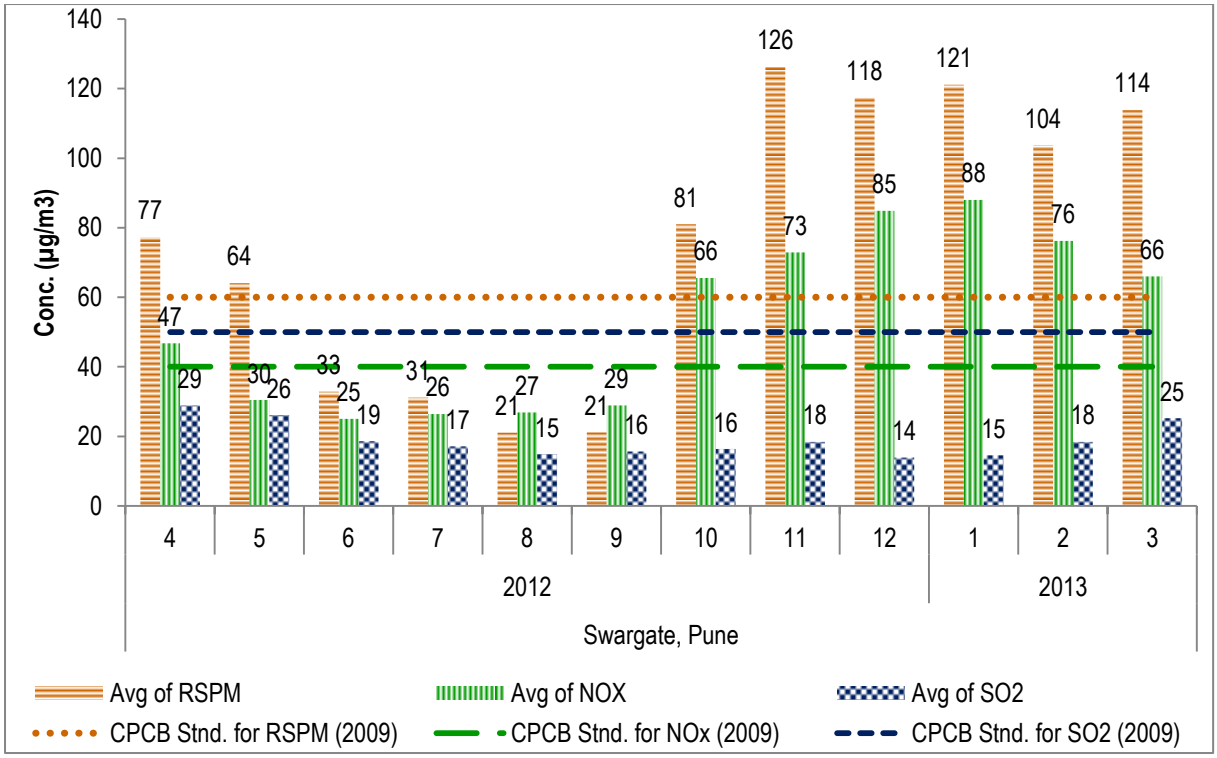


Figure No. 163: Monthly average reading recorded at Swargate, Pune

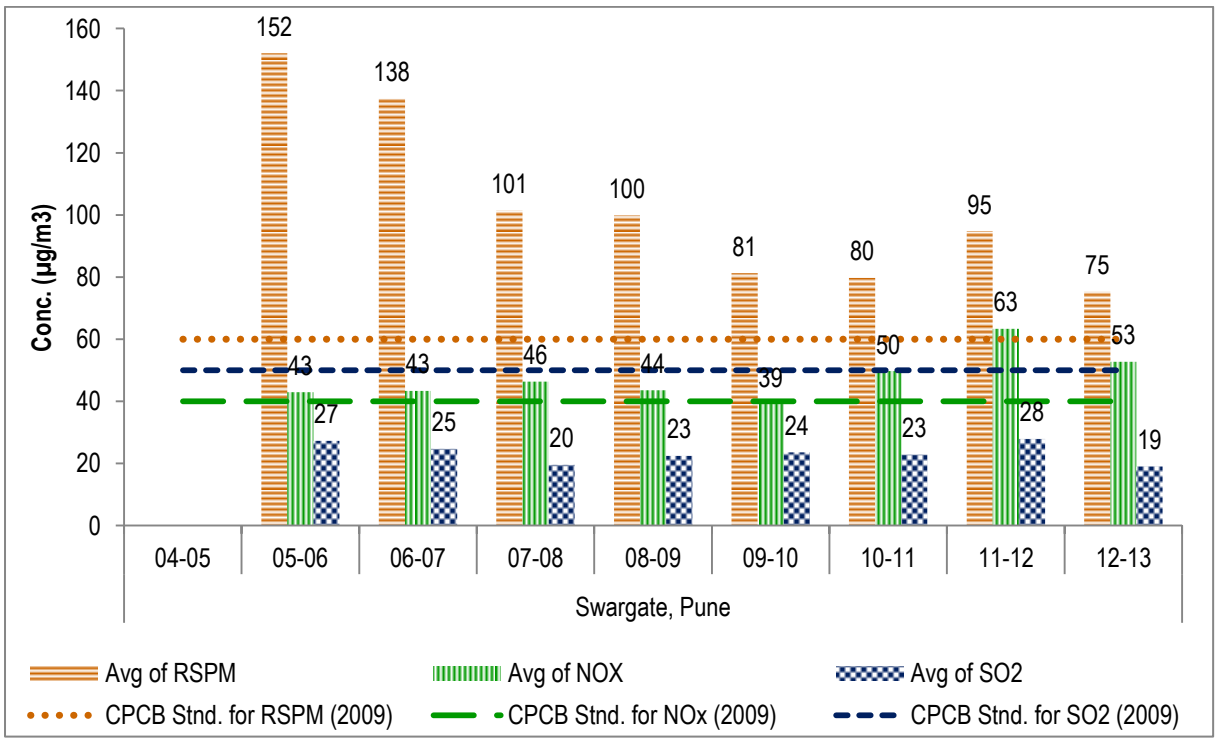


Figure No. 164: Annual average trend of SO_2, NOx and RSPM at Swargate, Pune

Pune - Nal Stop

Table No. 145: Data for monthly average reading recorded at Nal Stop

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	97.9	39.9	30.8
May	8	77.0	27.5	23.4
Jun	8	32.9	25.0	18.6
Jul	9	46.4	30.7	15.8
Aug	9	33.7	29.0	15.3
Sep	8	45.1	34.0	15.5
Oct	8	73.9	45.9	17.4
Nov	9	121.0	54.8	19.6
Dec	8	107.8	64.4	16.4
Jan	9	111.2	70.4	17.6
Feb	8	113.4	57.0	13.3
Mar	9	115.9	63.4	21.8
Total N		% of exceedence		
101		30.7	4.0	0.0

Table No. 146: Data for annual average trend of RSPM, NO_X and SO_2 at Nal Stop

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	44	152.0	42.6	26.6
06-07	93	128.8	41.9	23.4
07-08	101	107.5	41.9	19.3
08-09	107	91.4	41.2	21.2
09-10	102	81.8	39.3	23.4
10-11	102	87.8	43.0	21.3
11-12	104	100.3	61.6	30.4
12-13	101	81.6	45.4	18.7

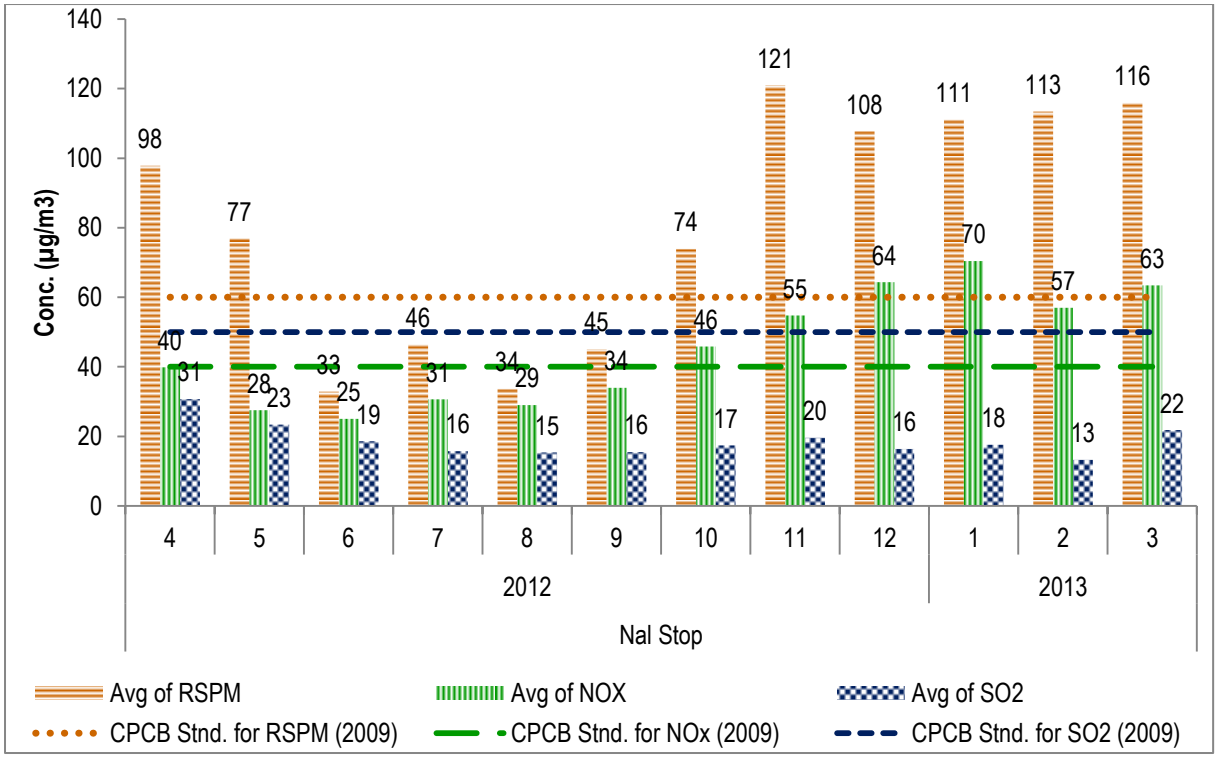


Figure No. 165: Monthly average reading recorded at Nal Stop

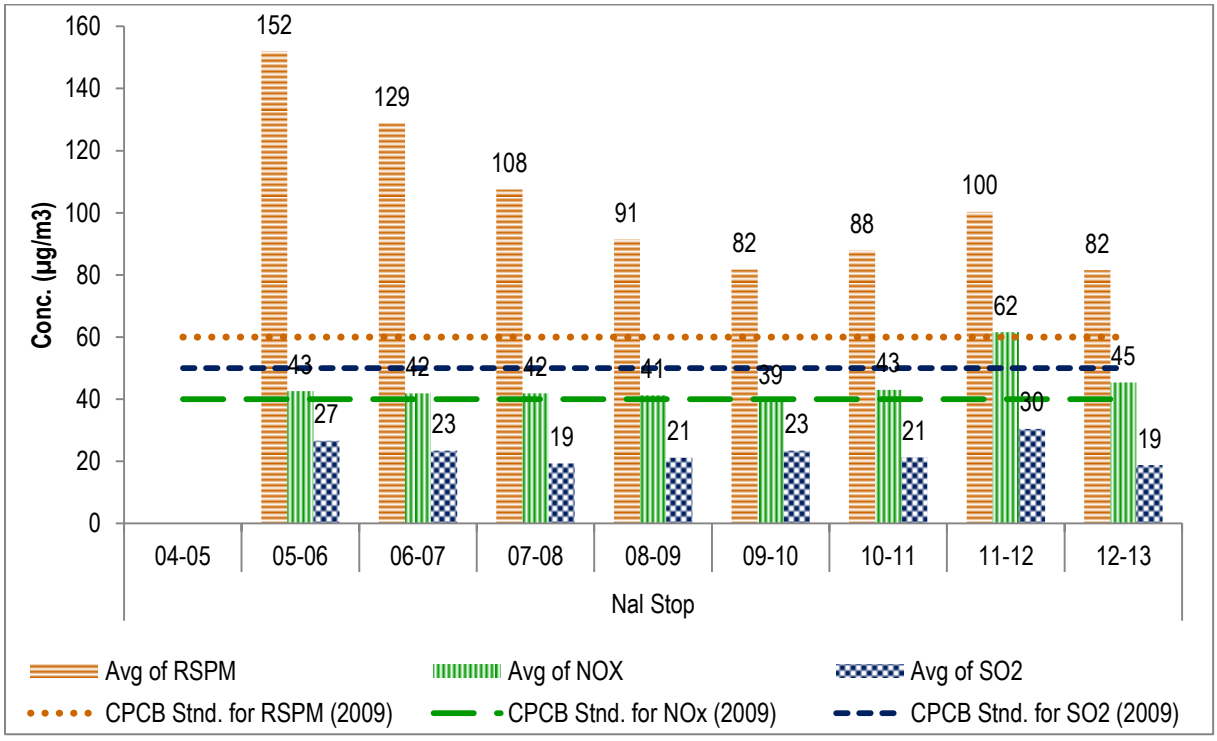


Figure No. 166: Annual average trend of SO_2, NOx and RSPM at Nal Stop

Solapur - Saat Rasta- Chithale Clinic

Table No. 147: Data for monthly average reading recorded at Saat Rasta- Chithale Clinic

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	8	89.1	35.6	17.1
May	9	79.6	34.3	16.6
Jun	-	-	-	-
Jul	9	71.3	34.8	16.3
Aug	9	65.2	36.2	16.6
Sep	8	76.4	33.9	16.1
Oct	9	82.3	33.4	15.6
Nov	9	95.9	36.3	17.2
Dec	8	75.0	35.6	17.4
Jan	9	83.3	35.2	17.4
Feb	8	87.6	33.8	16.6
Mar	9	85.7	34.7	16.9
Total N		% of exceedence		
	95	4.2	0.0	0.0

Table No. 148: Data for annual average trend of RSPM, NO_X and SO_2 at Saat Rasta- Chithale Clinic

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	104	143.9	39.9	18.3
05-06	95	124.9	38.1	17.5
06-07	104	106.6	35.9	17.4
07-08	100	95.6	34.3	17.5
08-09	105	74.3	36.3	18.0
09-10	103	66.5	35.6	17.2
10-11	108	68.9	34.4	16.7
11-12	96	77.1	35.2	16.9
12-13	95	81.0	34.9	16.7

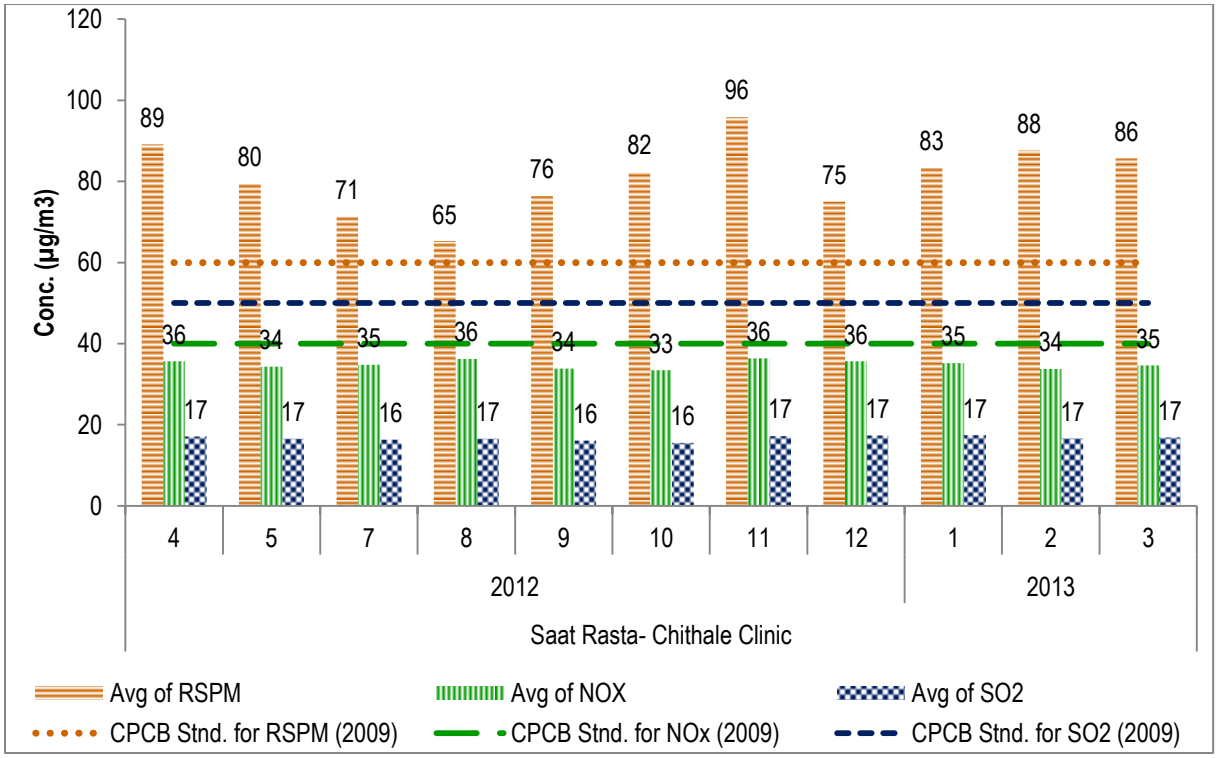


Figure No. 167: Monthly average reading recorded at Saat Rasta- Chithale Clinic

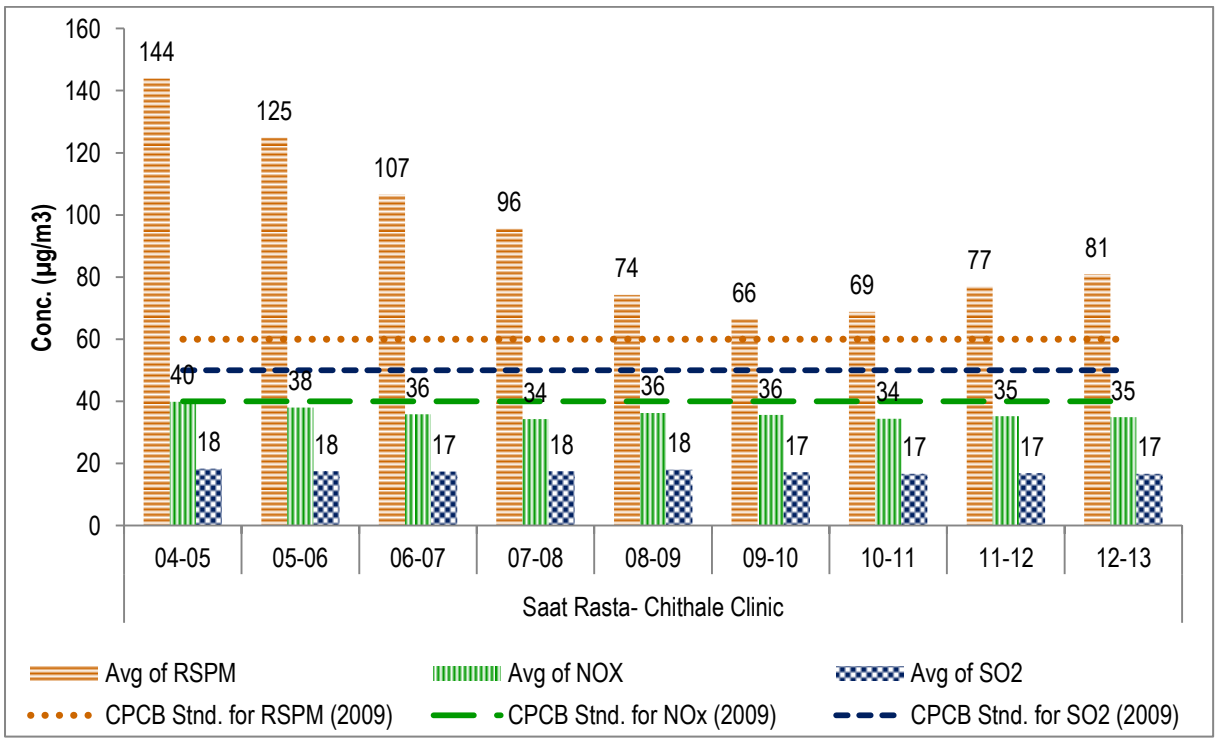


Figure No. 168: Annual average trend of SO_2, NOx and RSPM at Saat Rasta- Chithale Clinic

Solapur - Solapur

Table No. 149: Data for monthly average reading recorded at Solapur

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	26	134.9	41.5	11.5
May	31	110.8	44.5	11.8
Jun	29	70.0	40.5	12.6
Jul	27	71.4	28.9	11.9
Aug	29	60.2	37.3	12.0
Sep	30	76.3	39.0	12.3
Oct	31	102.4	36.7	12.3
Nov	30	141.4	44.1	12.9
Dec	29	157.1	45.7	23.0
Jan	31	119.8	46.1	26.0
Feb	28	114.2	47.2	19.7
Mar	30	110.6	49.0	20.2
	Total N		% of exceedence	
	351	61.0	0.3	0.0

Table No. 150: Data for annual average trend of RSPM, NO_X and SO_2 at Solapur

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	195	102.3	31.3	15.2
08-09	231	95.8	30.2	15.4
09-10	-	-	-	-
10-11	250	111.7	36.9	12.8
11-12	359	115.7	40.2	12.2
12-13	351	105.8	41.8	15.6

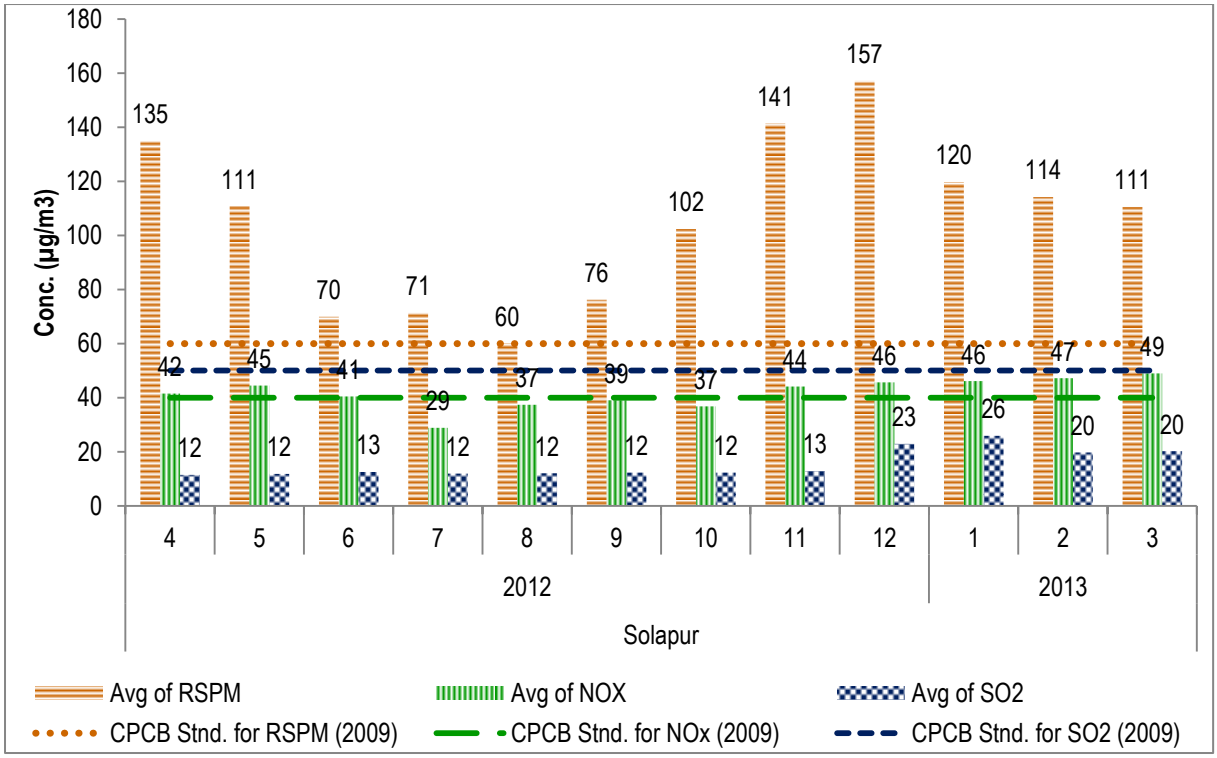


Figure No. 169: Monthly average reading recorded at Solapur

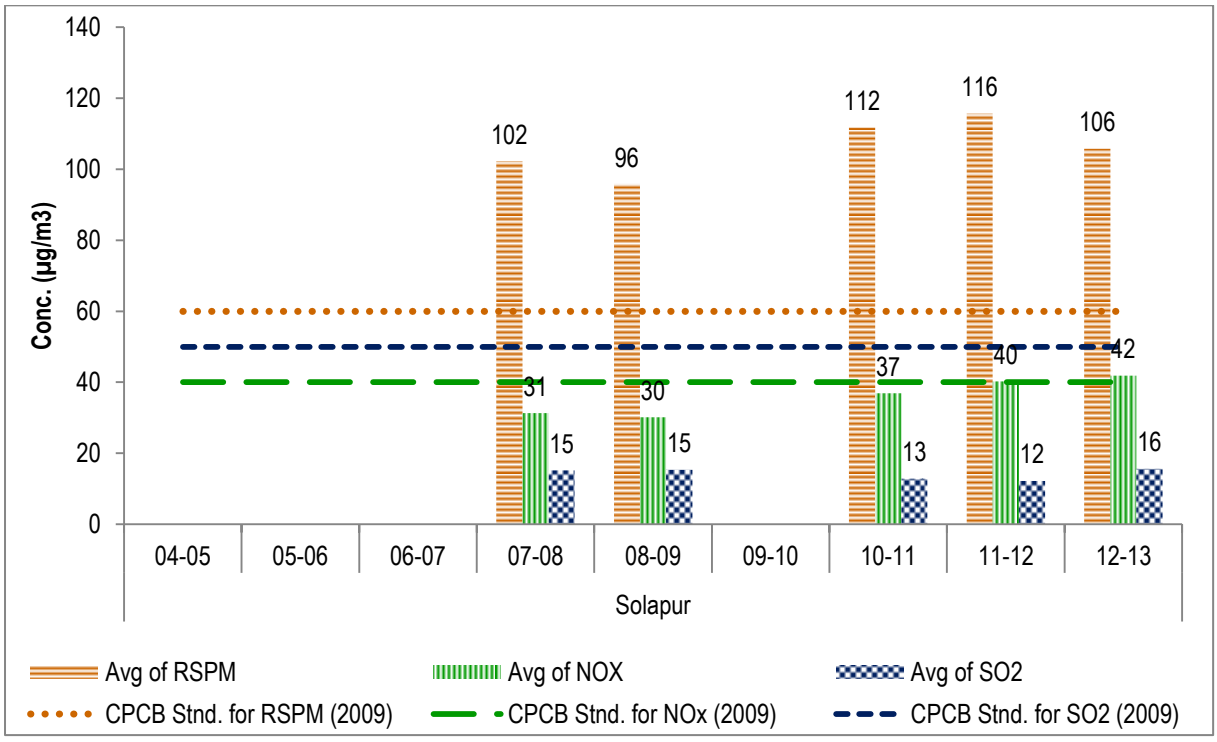


Figure No. 170: Annual average trend of SO_2, NOx and RSPM at Solapur

Solapur - WIT Campus

Table No. 151: Data for monthly average reading recorded at WIT Campus

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	9	94.3	36.0	17.1
May	9	72.6	35.9	16.9
Jun	8	81.6	34.4	16.4
Jul	9	71.3	34.4	15.4
Aug	9	67.2	34.9	16.9
Sep	8	75.4	34.8	16.6
Oct	9	73.8	34.7	16.4
Nov	9	92.9	37.2	17.3
Dec	9	72.3	35.6	17.3
Jan	9	74.0	34.7	16.9
Feb	8	83.8	35.4	16.5
Mar	8	77.8	34.4	17.1
Total N		% of exceedence		
	104	2.9	0.0	0.0

Table No. 152: Data for annual average trend of RSPM, NO_X and SO_2 at WIT Campus

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	106	137.4	39.7	18.1
05-06	95	115.1	37.2	17.2
06-07	104	97.4	34.9	15.6
07-08	106	86.0	34.2	16.6
08-09	103	76.5	35.0	17.5
09-10	103	70.7	35.2	17.2
10-11	107	73.5	35.3	16.6
11-12	103	77.2	35.2	16.8
12-13	104	78.0	35.2	16.8

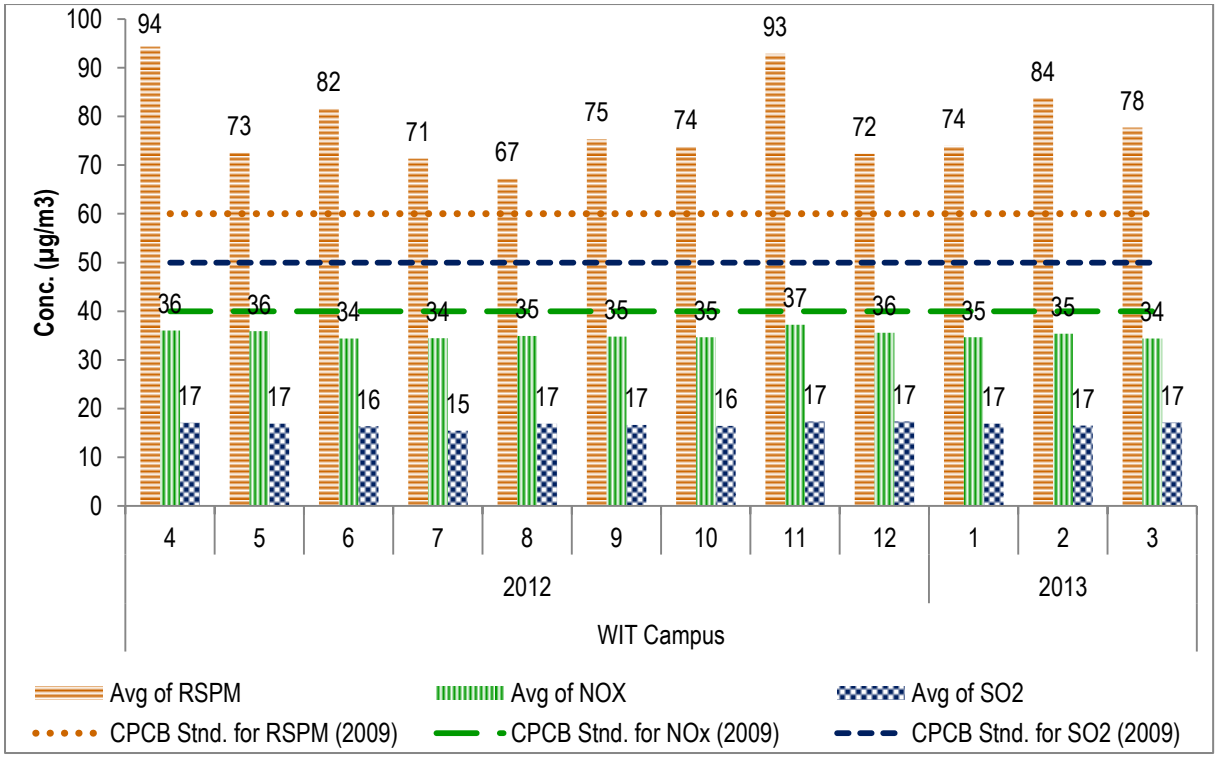


Figure No. 171: Monthly average reading recorded at WIT Campus

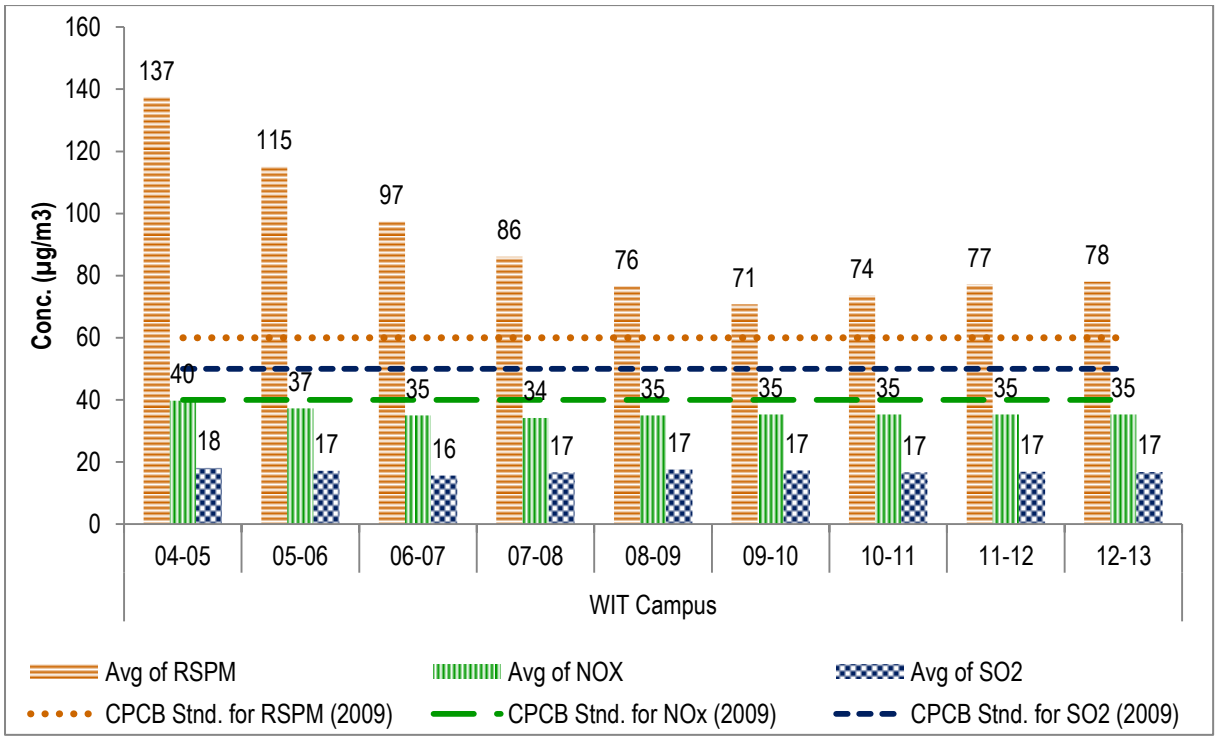


Figure No. 172: Annual average trend of SO_2, NOx and RSPM at WIT Campus

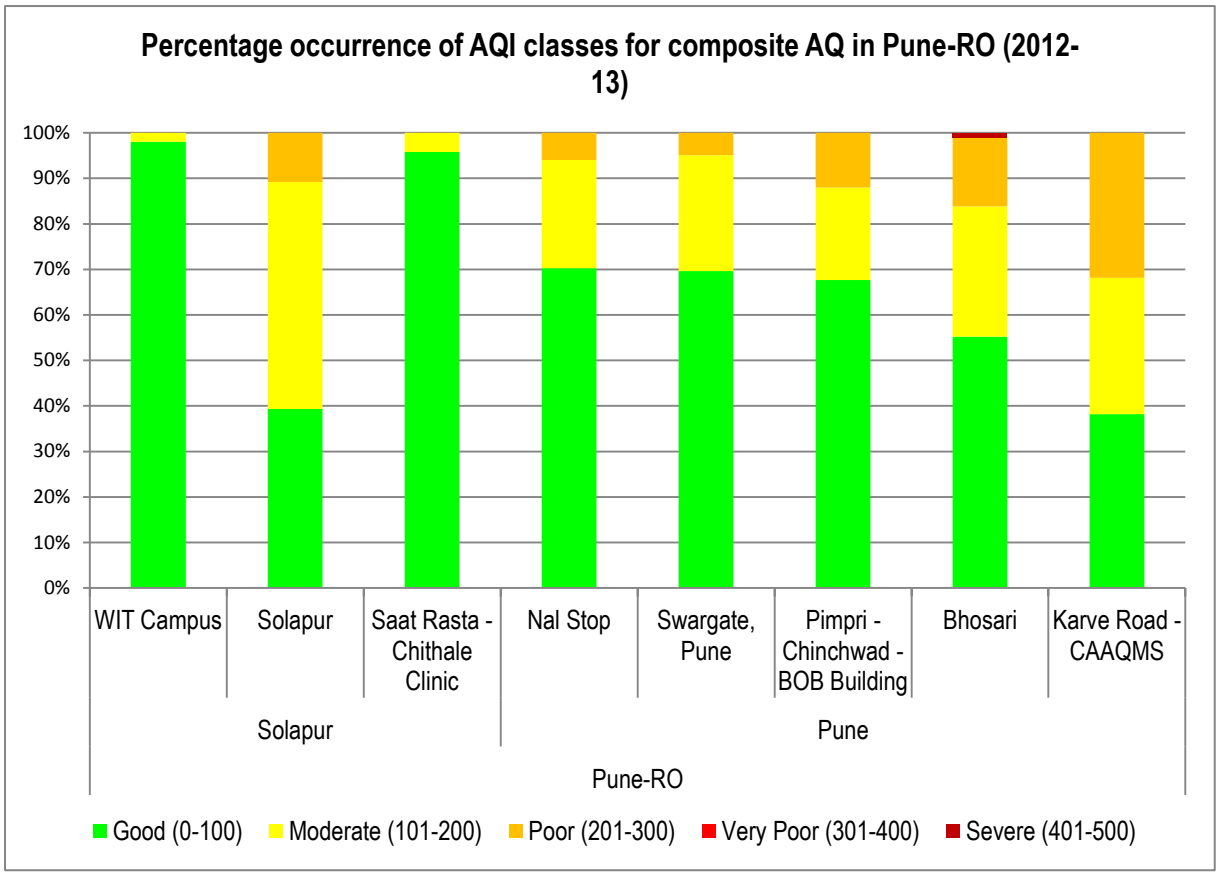
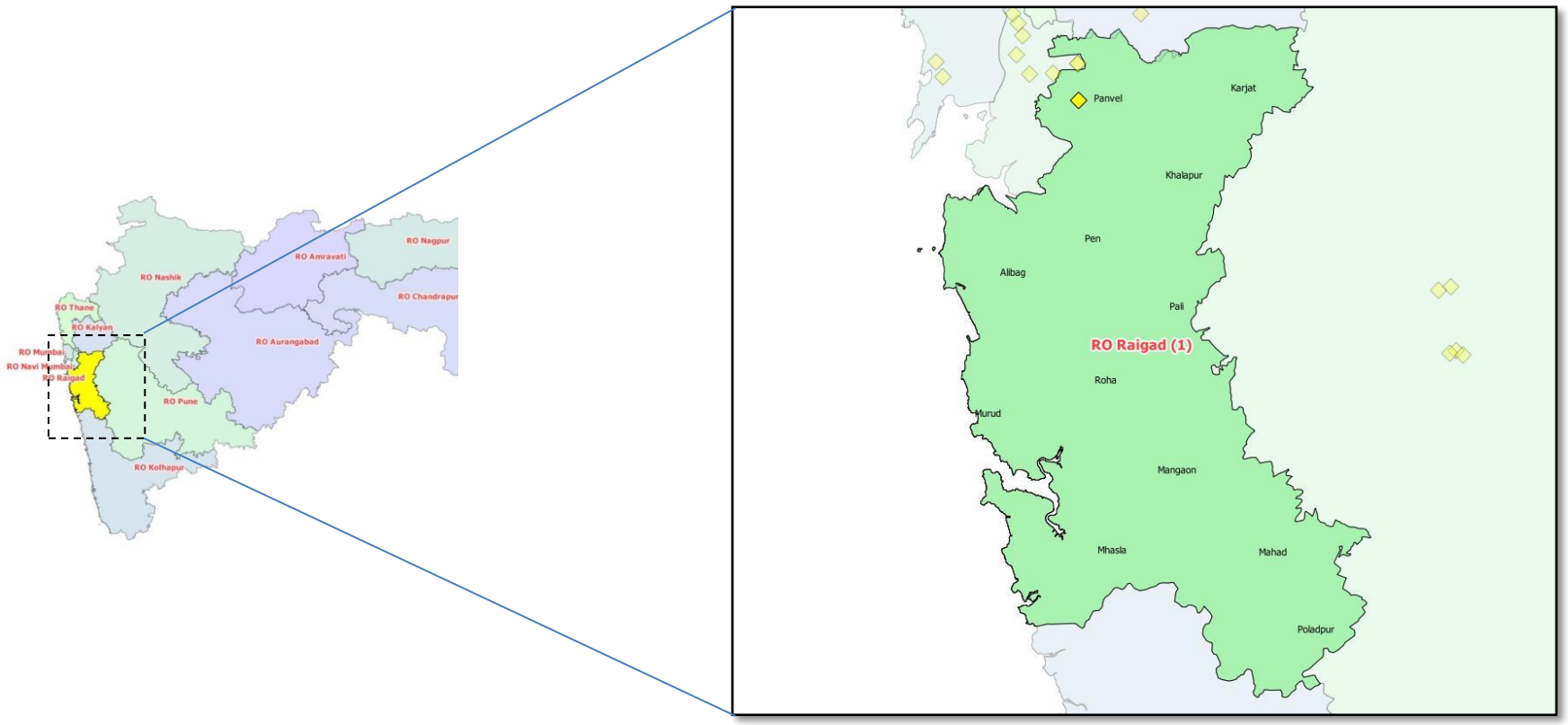


Figure No. 173:.Percentage occurrence of AQI classes for composite AQ in Pune-RO (2012-13)

RO – Raigad



Region	Program name	SN	Station	Frequency	Latitude	Longitude
Panvel	NAMP	495	Panvel Water Supply Plant	Two Days In A Week	18° 59' 23.8" N	73° 07' 03.5" E

Panvel - Panvel- Water Supply Plant

Table No. 153: Data for monthly average reading recorded at Panvel- Water Supply Plant

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	8	120.5	46.6	16.0
May	9	175.1	42.9	15.4
Jun	9	134.4	40.0	15.7
Jul	8	63.3	29.5	11.6
Aug	8	72.4	33.3	11.8
Sep	9	88.3	31.3	13.0
Oct	9	161.0	41.8	16.7
Nov	9	232.9	50.7	20.4
Dec	9	155.6	44.9	18.0
Jan	8	198.4	45.0	18.3
Feb	8	235.4	48.9	17.4
Mar	9	362.6	44.2	17.4
Total N		% of exceedence		
103		69.9	1.0	0.0

Table No. 154: Data for annual average trend of RSPM, NO_X and SO_2 at Panvel- Water Supply Plant

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	-	-	-	-
05-06	-	-	-	-
06-07	71	115.3	35.2	13.9
07-08	119	142.5	37.3	12.4
08-09	106	131.7	39.8	14.0
09-10	102	70.6	41.7	12.5
10-11	100	119.4	34.8	15.2
11-12	97	139.6	42.0	15.2
12-13	103	168.0	41.6	16.0

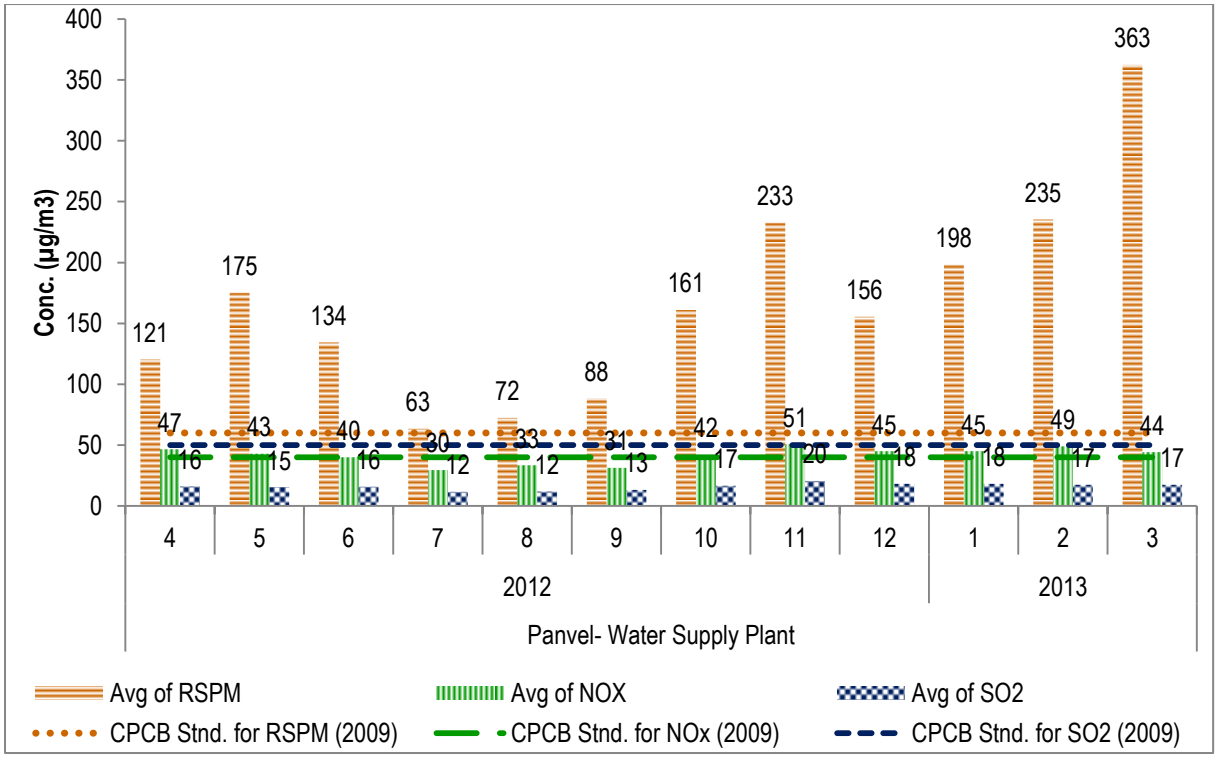


Figure No. 174: Monthly average reading recorded at Panvel- Water Supply Plant

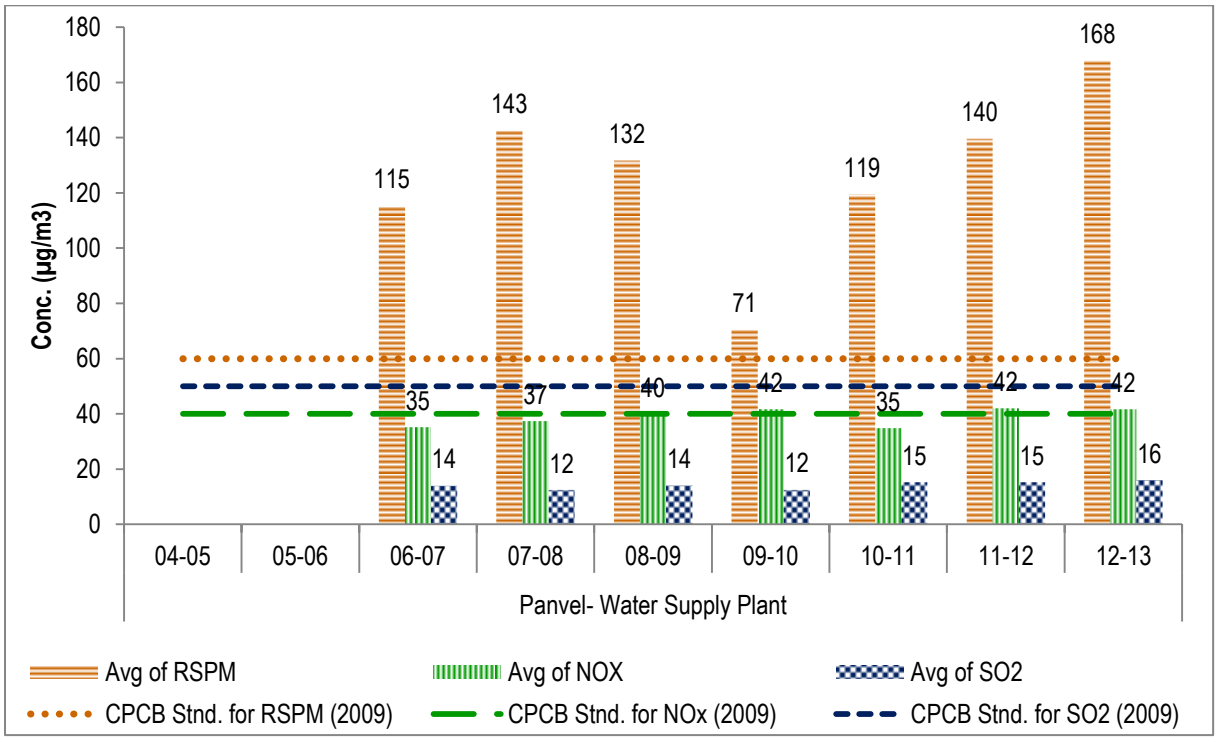


Figure No. 175: Annual average trend of SO_2, NOx and RSPM at Panvel- Water Supply Plant

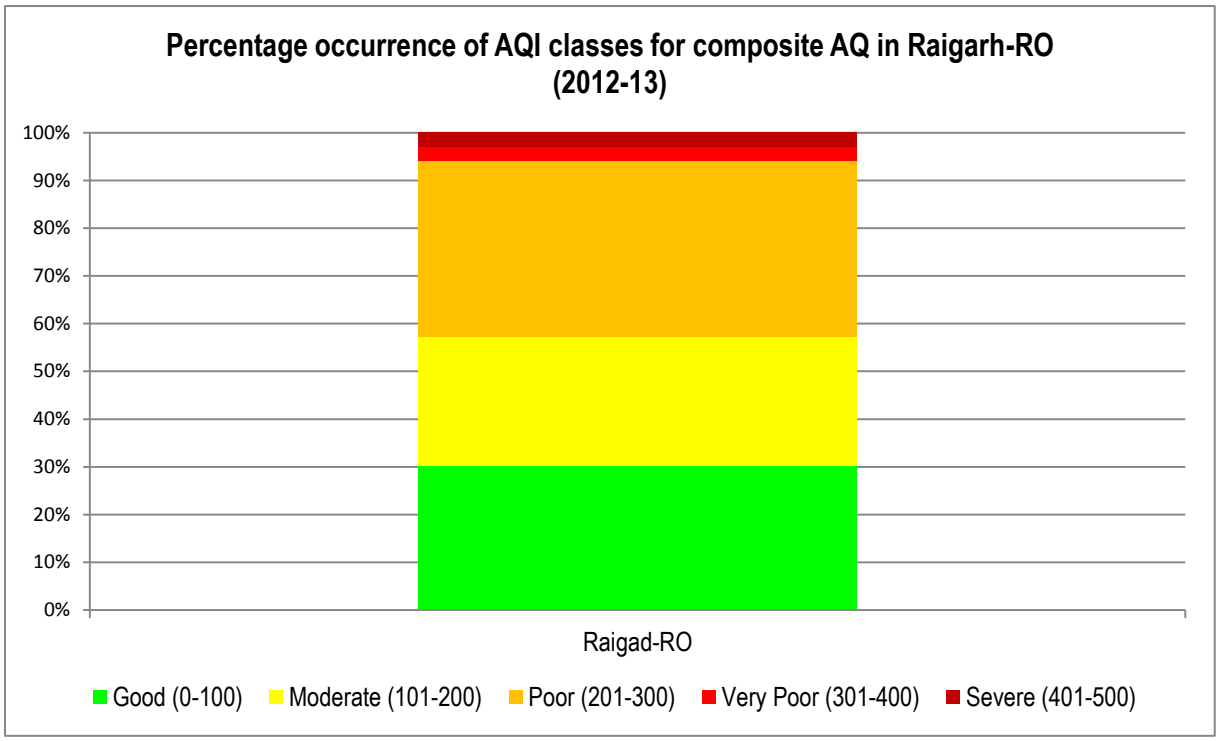
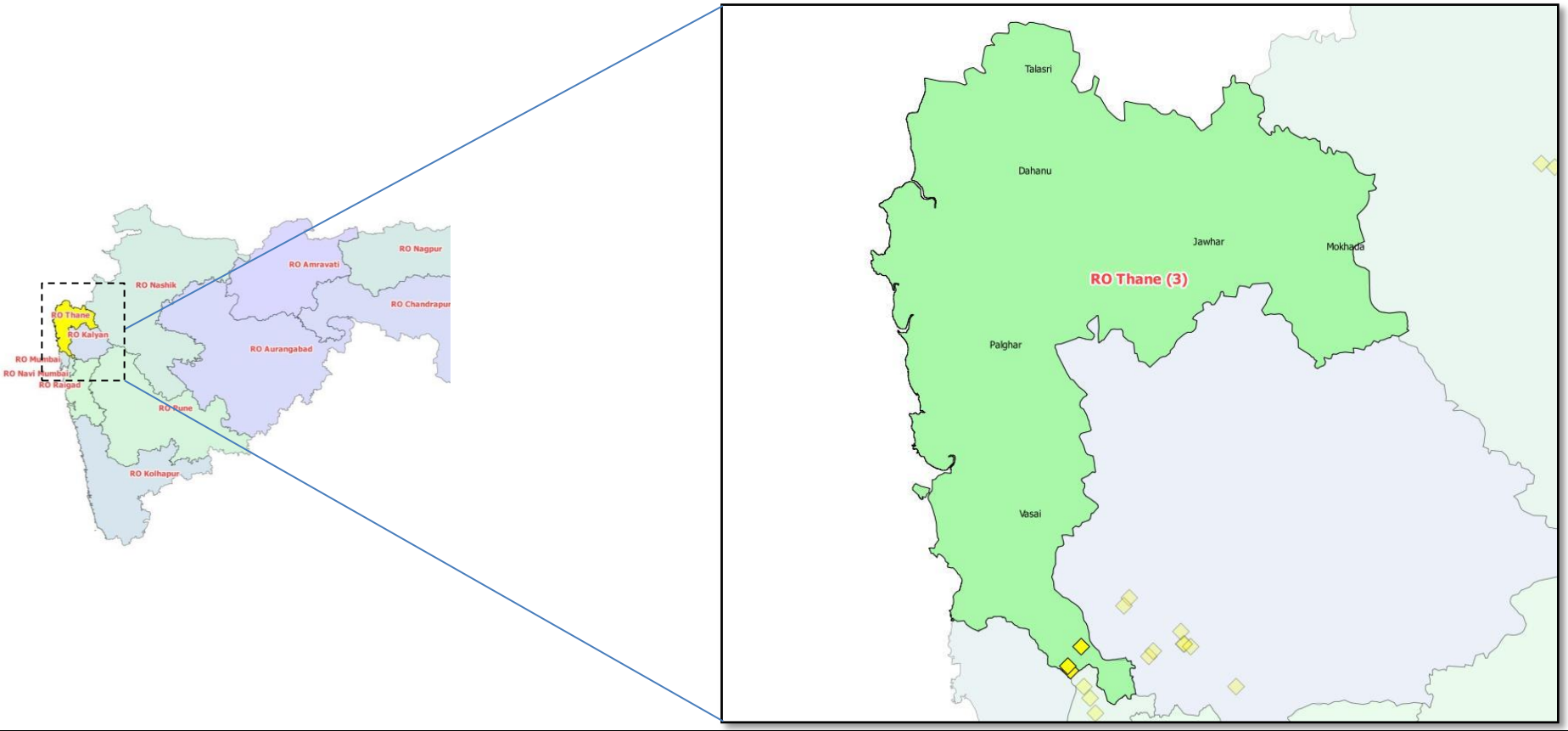


Figure No. 176:. Percentage occurrence of AQI classes for composite AQ in Raigarh-RO (2012-13)

RO – Thane



Region	Program	SN	Station	Frequency	Latitude	Longitude
Thane	NAMP	303	Kopri	Two Days In A Week	19° 10' 55.3" N	72° 58' 17.1" E
		304	Naupada	Two Days In A Week	19° 11' 17.4" N	72° 58' 04.1" E
		305	Kolshet	One day in a Week	19° 13' 12.4" N	72° 59' 19.4" E

Thane - Kopri

Table No. 155: Panvel- Water Supply Plant: Data for monthly average reading recorded at Kopri

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	8	55.3	12.6	19.3
May	8	57.6	12.8	19.4
Jun	9	59.2	12.2	19.2
Jul	8	58.8	12.4	19.6
Aug	10	60.5	11.8	19.7
Sep	8	62.0	11.6	20.3
Oct	17	62.4	11.3	18.2
Nov	8	69.3	11.5	20.5
Dec	8	92.6	12.6	21.9
Jan	8	137.9	18.3	22.0
Feb	6	157.5	25.3	21.8
Mar	12	169.3	30.4	22.3
Total N		% of exceedence		
	110	25.5	0.0	0.0

Table No. 156: Data for annual average trend of RSPM, NO_X and SO_2 at Kopri

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	62	45.4	10.7	7.5
05-06	97	51.0	9.0	5.6
06-07	111	51.1	9.9	12.2
07-08	111	50.3	10.5	11.1
08-09	103	59.5	16.3	11.4
09-10	97	49.9	12.8	10.6
10-11	117	46.2	11.1	11.6
11-12	123	59.6	8.8	12.2
12-13	110	85.8	15.2	20.2

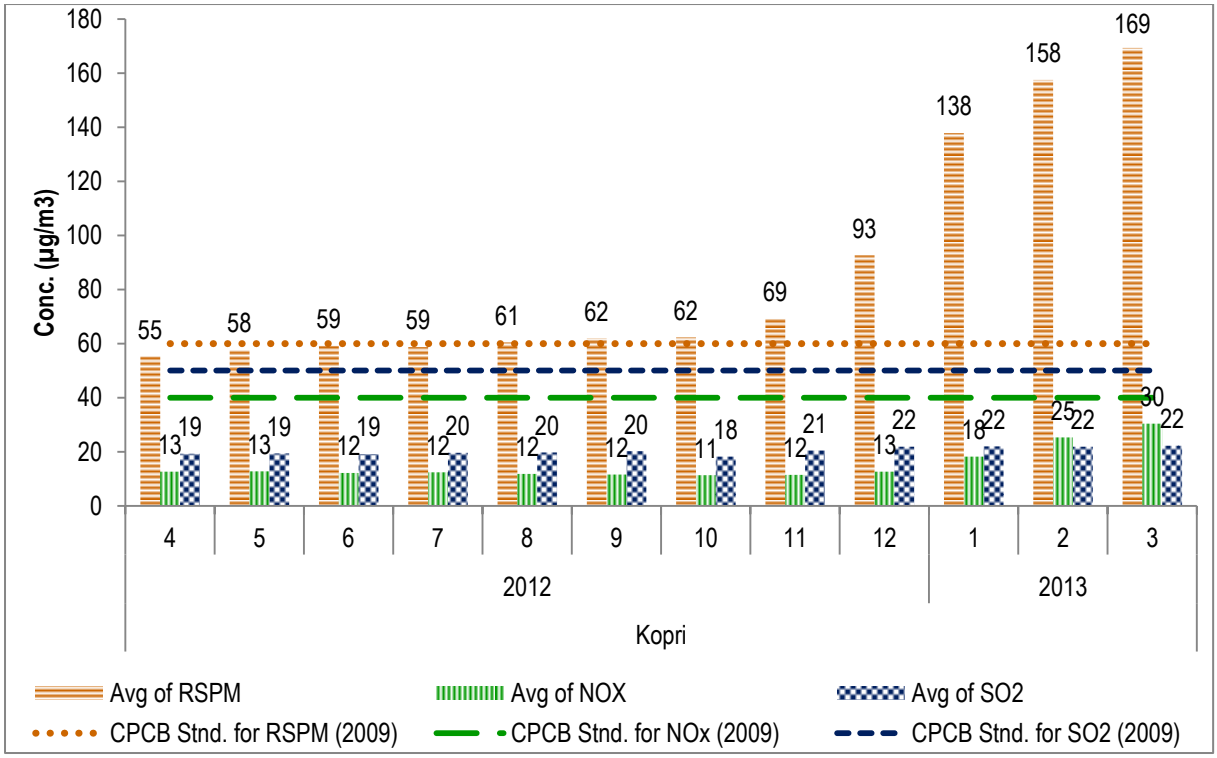


Figure No. 177: Monthly average reading recorded at -Kopri

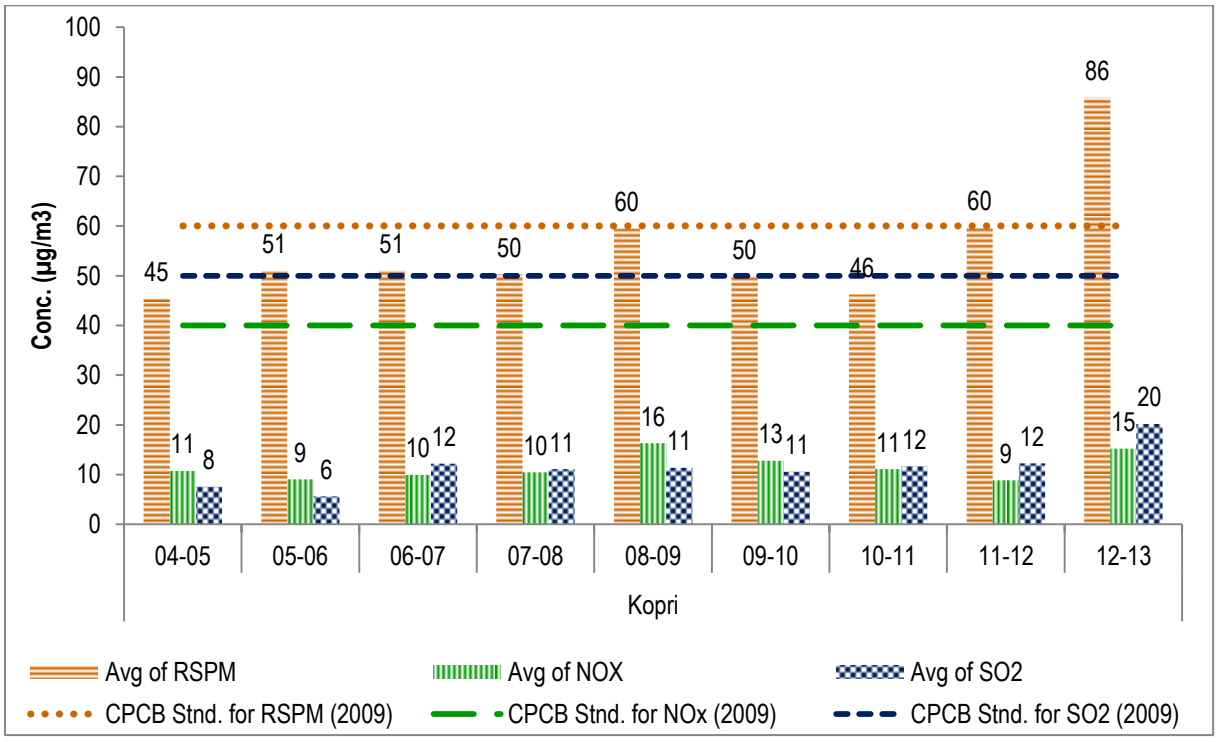


Figure No. 178: Annual average trend of SO_2, NOx and RSPM at -Kopri

Thane - Naupada

Table No. 157: Data for monthly average reading recorded at Naupada

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NO_X	SO_2
Apr	9	62.9	12.4	19.8
May	8	62.0	13.1	20.1
Jun	9	67.2	12.9	19.8
Jul	10	66.4	12.5	19.9
Aug	8	69.3	12.0	19.3
Sep	9	71.8	12.4	20.1
Oct	9	74.0	13.3	20.7
Nov	8	80.9	13.6	21.0
Dec	10	101.2	14.4	22.2
Jan	8	145.0	22.5	22.6
Feb	6	166.3	26.5	20.3
Mar	9	175.2	30.0	21.8
	Total N		% of exceedence	
	103	27.2	0.0	0.0

Table No. 158: Data for annual average trend of RSPM, NO_X and SO_2 at Naupada

Year	N	Annual average (µg/m³)		
		RSPM	NO_X	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	58	46.1	10.8	7.9
05-06	98	50.9	10.1	5.7
06-07	105	51.9	9.0	11.7
07-08	104	50.2	10.0	11.1
08-09	100	59.6	15.5	11.3
09-10	112	54.6	20.6	14.3
10-11	122	47.5	13.4	14.0
11-12	123	56.0	10.3	13.3
12-13	103	93.1	16.0	20.6

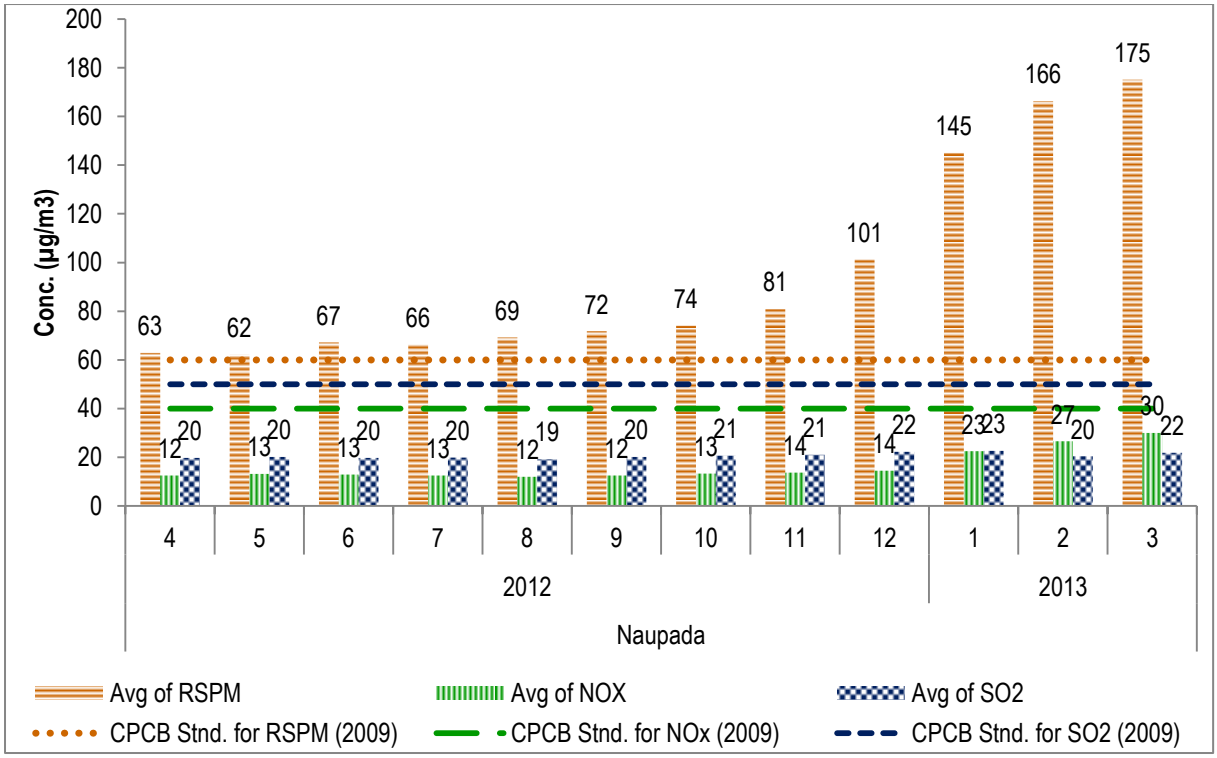


Figure No. 179: Monthly average reading recorded at Naupada

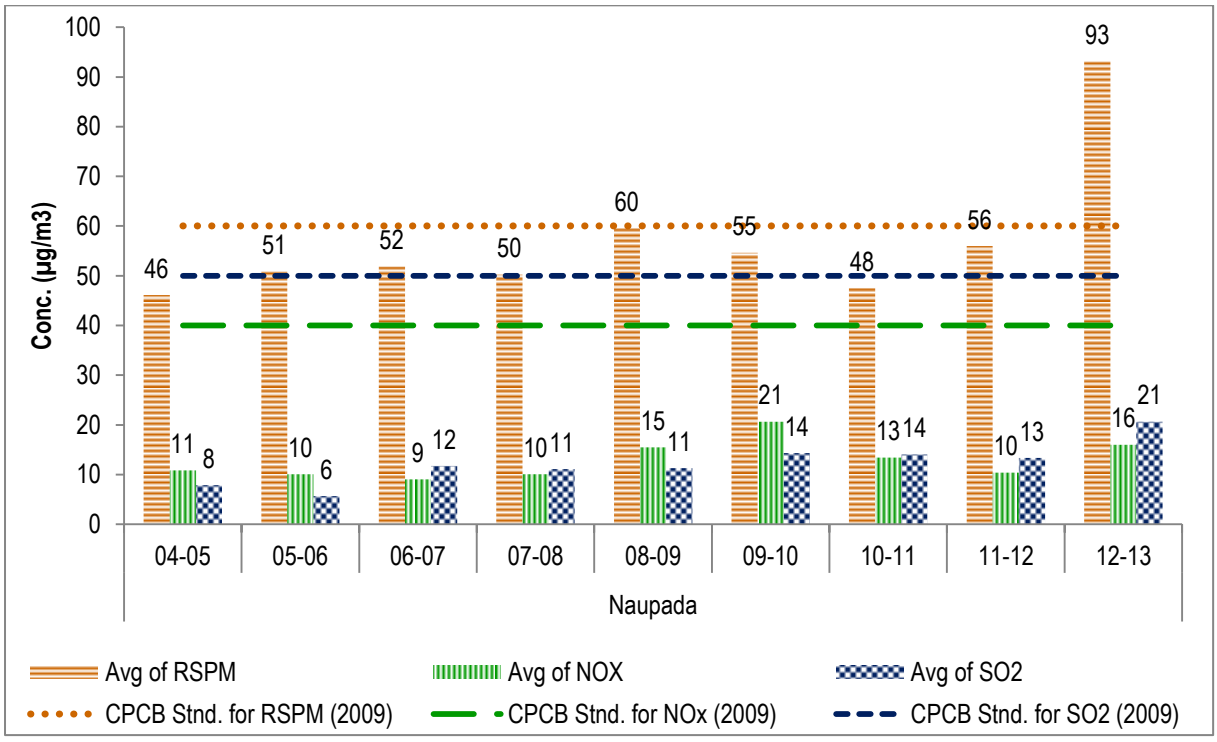


Figure No. 180: Annual average trend of SO_2, NOx and RSPM at Naupada

Thane - Kolshet

Table No. 159: Data for monthly average reading recorded at Kolshet

FY	N	Monthly average (µg/m³)		
2012-13		RSPM	NOx	SO_2
Apr	8	55.3	12.3	19.1
May	10	56.0	11.9	19.6
Jun	8	57.9	12.4	20.1
Jul	8	57.9	12.0	19.9
Aug	8	60.0	12.6	19.9
Sep	8	61.9	11.0	20.3
Oct	8	60.0	10.6	15.5
Nov	10	60.2	10.8	16.0
Dec	8	72.6	12.0	14.4
Jan	9	107.6	16.0	17.3
Feb	4	120.8	21.8	16.0
Mar	8	132.4	23.9	17.9
Total N		% of exceedence		
	97	20.6	0.0	0.0

Table No. 160: Data for annual average trend of RSPM, NO_X and SO_2 at Kolshet

Year	N	Annual average (µg/m³)		
		RSPM	NOx	SO_2
Annual Stnd (for N≥104)		*60*	*40*	*50*
04-05	62	48.2	12.2	9.1
05-06	85	51.3	10.2	6.2
06-07	91	63.5	10.7	12.8
07-08	96	53.3	14.1	13.8
08-09	94	62.9	20.9	14.8
09-10	80	57.2	20.8	13.3
10-11	21	48.5	13.1	12.0
11-12	45	57.5	12.8	19.3
12-13	97	72.9	13.5	18.1

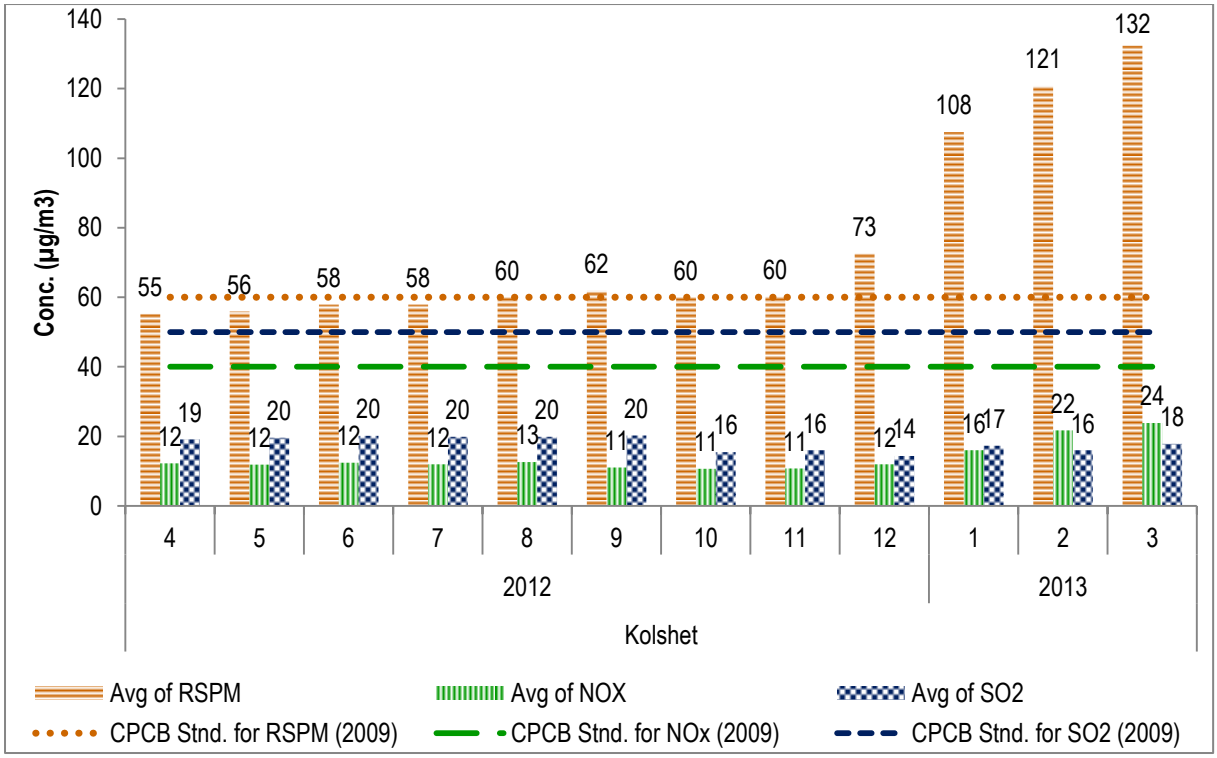


Figure No. 181: Monthly average reading recorded at Kolshet

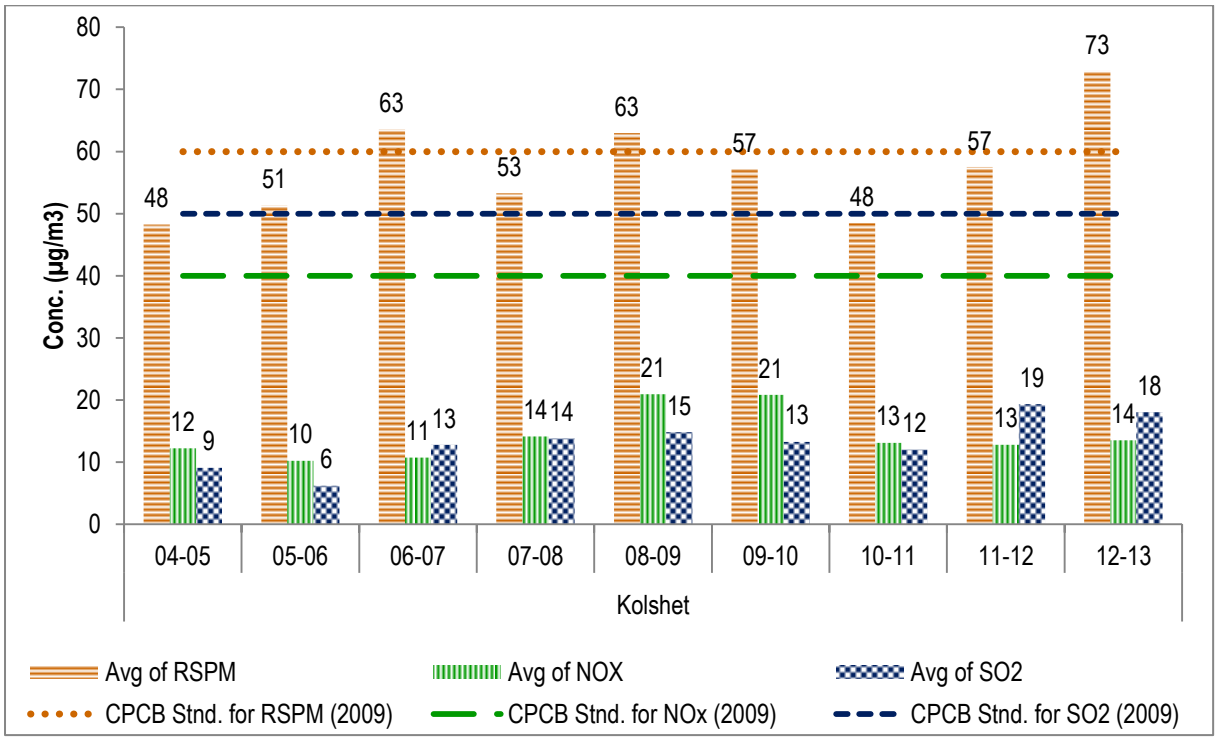


Figure No. 182: Annual average trend of SO_2, NOx and RSPM at Kolshet

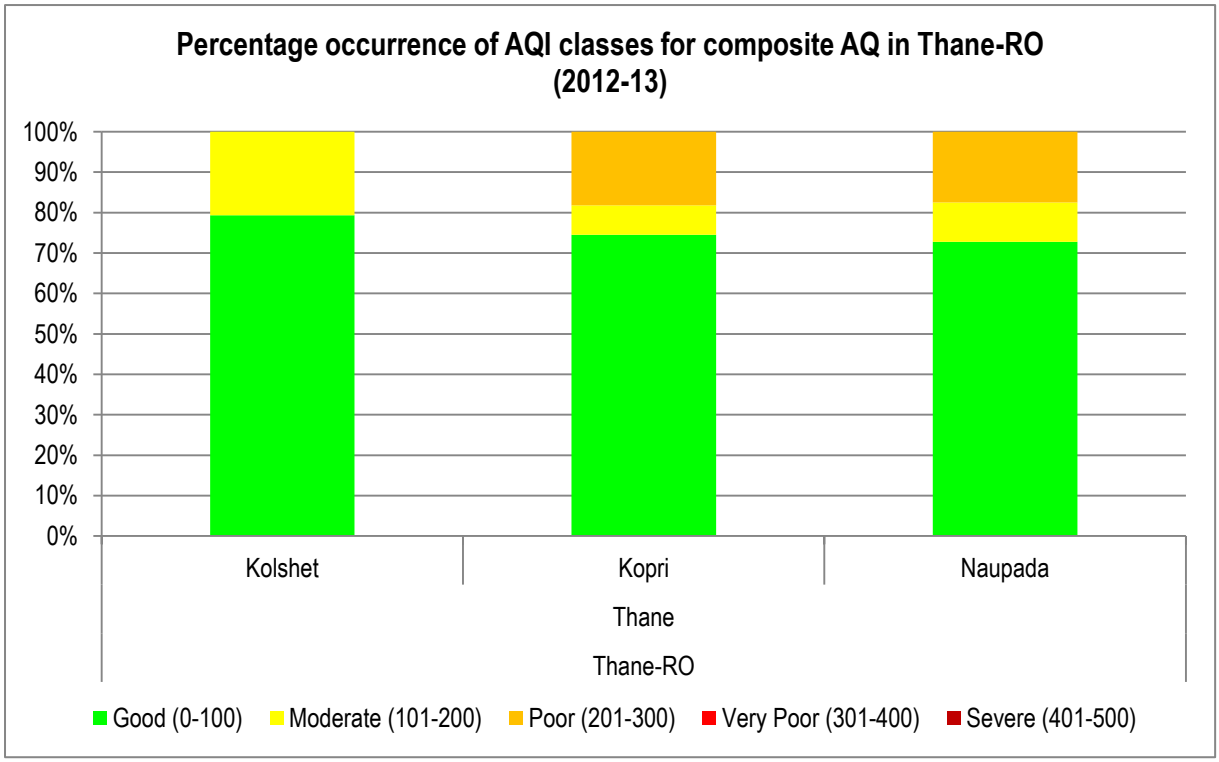


Figure No. 183: Percentage occurrence of AQI classes for composite AQ in Thane-RO (2012-13)

Appendix – A: Revised NAAQS 2009

रजिस्ट्री सं० डी० एल०-33004/99 REGD. NO. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

असाधारण
EXTRAORDINARY
भाग III—खण्ड 4
PART III—Section 4
प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 217] नई दिल्ली, बुधवार, नवम्बर 18, 2009/कार्तिक 27, 1931
No. 217] NEW DELHI, WEDNESDAY, NOVEMBER 18, 2009/KARTIKA 27, 1931

राष्ट्रीय परिवेशी वायु गुणवत्ता मानक
केन्द्रीय प्रदूषण नियंत्रण बोर्ड
अधिसूचना
नई दिल्ली, 18 नवम्बर, 2009

सं. बी-29016/20/90/पी.सी.आई.-I.—वायु (प्रदूषण निवारण एवं नियंत्रण) अधिनियम, 1981 (1981 का 14) की धारा 16 की उपधारा (2) (एच) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए तथा अधिसूचना संख्या का.आ. 384(ई), दिनांक 11 अप्रैल, 1994 और का.आ. 935 (ई) दिनांक 14 अक्टूबर, 1998 के अधिक्रमण में केन्द्रीय प्रदूषण नियंत्रण बोर्ड इसके द्वारा तत्काल प्रभाव से राष्ट्रीय परिवेशी वायु गुणवत्ता मानक अधिसूचित करता है, जो इस प्रकार है:-

राष्ट्रीय परिवेशी वायु गुणवत्ता मानक

क्र. सं.	प्रदूषक	समय आधारित औसत	परिवेशी वायु में सान्द्रण		
			औद्योगिक, रिहायशी, ग्रामीण और अन्य क्षेत्र	पारिस्थितिकी य संवेदनशील क्षेत्र (केन्द्र सरकार द्वारा अधिसूचित)	प्रवोधन की पद्धति
(1)	(2)	(3)	(4)	(5)	(6)
1	सल्फर डाई आक्साइड (SO_2), $\mu g/m^3$	वार्षिक*	50	20	-उन्नत वैस्ट और गाईक
		24 घंटे**	80	80	-पराबैंगनी परिदीप्ती
2	नाइट्रोजन डाई आक्साइड (NO_2), $\mu g/m^3$	वार्षिक*	40	30	-उपांतरित जैकब और हॉवाइजर (सोडियम-आर्सेनाईट)
		24 घंटे**	80	80	-रासायनिक संदीप्ति
3	विविक्त पदार्थ (10माइक्रान से कम आकार)या PM_{10}, $\mu g/m^3$	वार्षिक*	60	60	-हरात्मक विश्लेषण
		24 घंटे**	100	100	-टेपेम
					-बीटा तनुकरण पद्धति

4	विविक्त पदार्थ (2.5 माइक्रान से कम आकार या $PM_{2.5}$, $\mu g/m^3$	वार्षिक* 24 घंटे**	40 60	40 60	-हरात्मक विश्लेषण -टोयम -बीटा तनुकरण पद्धति
5	ओजोन (O_3) $\mu g/m^3$	8 घंटे** 1 घंटा**	100 180	100 180	-पराबैगनी द्वीप्तिकाल -रासायनिक संदीप्ति -रासायनिक पद्धति
6	सीसा (Pb) $\mu g/m^3$	वार्षिक* 24 घंटे**	0.50 1.0	0.50 1.0	ई.पी.एम 2000 या समरूप फिल्टर पेपर का प्रयोग करके AAS/ICP पद्धति -टेफलॉन फिल्टर पेपर का प्रयोग करते हुए ED-XRF
7	कार्बन मोनोक्साइड (CO) mg/m^3	8 घंटे** 1 घंटा**	02 04	02 04	-अविपेक्षी अवरक्त (NDIR) स्पैक्ट्रम मापन
8	अमोनिया (NH_3) $\mu g/m^3$	वार्षिक* 24 घंटे**	100 400	100 400	-रासायनिक संदीप्ती -इण्डोफिनॉल ब्ल्यू पद्धति
9	बैन्जीन (C_6H_6) $\mu g/m^3$	वार्षिक*	05	05	- गैस क्रोमेटोग्राफी आधारित सतत् विश्लेषक -अधिशोषण तथा निशोषण के बाद गैस क्रोमेटोग्राफी
10	बैन्जो (ए) पाईरीन (BaP) केवल विविक्त कण, ng/m^3	वार्षिक*	01	01	-विलायक निष्कर्षण के बाद HPLC/GC द्वारा विश्लेषण
11	आर्सेनिक (As) ng/m^3	वार्षिक*	06	06	-असंवितरक अवरक्त स्पैक्ट्रामिती ई.पी.एम. 2000 या समरूप फिल्टर पेपर का प्रयोग करके ICP/AAS पद्धति
12	निकिल (Ni) ng/m^3	वार्षिक*	20	20	ई.पी.एम. 2000 या समरूप फिल्टर पेपर का प्रयोग करके ICP/AAS पद्धति

* वर्ष में एक समान अंतरालों पर सप्ताह में दो बार प्रति 24 घंटे तक किसी एक स्थान विशेष पर लिये गये न्यूनतम 104 मापों का वार्षिक अंकगणीतीय औसत ।

** वर्ष में 98 प्रतिशत समय पर 24 घंटे या 8 घंटे या 1 घंटा के मानीटर मापमान, जो लागू हो , अनुपालन कये जाएंगे । दो प्रतिशत समय पर यह मापमान अधिक हो सकता है, किन्तु क्रमिक दो मानीटर करने के दिनों पर नहीं ।

टिप्पणी:

1. जब कभी और जहां भी किसी अपने-अपने प्रवर्ग के लिये दो क्रमिक प्रबोधन दिनों पर मापित मूल्य, उक्त विनिर्दिष्ट सीमा से अधिक हो तो इसे नियमित या निरंतर प्रबोधन तथा अतिरिक्त अन्वेषण करवाने के लिये पर्याप्त कारण समझा जायेगा ।

संत प्रसाद गौतम, अध्यक्ष

[विज्ञापन-III/4/184/09/असा.]

टिप्पणी: राष्ट्रीय परिवेशी वायु गुणवत्ता मानक संबंधी अधिसूचनाएँ, केन्द्रीय प्रदूषण नियंत्रण बोर्ड द्वारा भारत के राजपत्र आसाधरण में अधिसूचना संख्या का.आ. 384 (ई), दिनांक 11 अप्रैल, 1994 एवं का. आ. 935 (ई), दिनांक 14 अक्टूबर, 1998 द्वारा प्रकाशित की गयी थी ।

NATIONAL AMBIENT AIR QUALITY STANDARDS
CENTRAL POLLUTION CONTROL BOARD
NOTIFICATION

New Delhi, the 18th November, 2009

No. B-29016/20/90/PCI-L—In exercise of the powers conferred by Sub-section (2) (h) of section 16 of the Air (Prevention and Control of Pollution) Act, 1981 (Act No.14 of 1981), and in supersession of the Notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998, the Central Pollution Control Board hereby notify the National Ambient Air Quality Standards with immediate effect, namely:-

NATIONAL AMBIENT AIR QUALITY STANDARDS

S. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		
			Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO_2), µg/m³	Annual*	50	20	- Improved West and Gaeke
		24 hours**	80	80	-Ultraviolet fluorescence
2	Nitrogen Dioxide (NO_2), µg/m³	Annual*	40	30	- Modified Jacob & Hochheiser (Na-Arsenite)
		24 hours**	80	80	- Chemiluminescence
3	Particulate Matter (size less than 10µm) or PM_{10} µg/m³	Annual*	60	60	- Gravimetric - TOEM
		24 hours**	100	100	- Beta attenuation
4	Particulate Matter (size less than 2.5µm) or $PM_{2.5}$ µg/m³	Annual*	40	40	- Gravimetric - TOEM
		24 hours**	60	60	- Beta attenuation
5	Ozone (O_3) µg/m³	8 hours**	100	100	- UV photometric - Chemilminescence
		1 hour**	180	180	- Chemical Method
6	Lead (Pb) µg/m³	Annual*	0.50	0.50	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper - ED-XRF using Teflon filter
		24 hours**	1.0	1.0	
7	Carbon Monoxide (CO) mg/m³	8 hours**	02	02	- Non Dispersive Infra Red (NDIR) spectroscopy
		1 hour**	04	04	
8	Ammonia (NH_3) µg/m³	Annual*	100	100	-Chemiluminescence
		24 hours**	400	400	-Indophenol blue method

(1)	(2)	(3)	(4)	(5)	(6)
9	Benzene (C_6H_6) $\mu g/m^3$	Annual*	05	05	- Gas chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10	Benzo(a)Pyrene (BaP) - particulate phase only, ng/m^3	Annual*	01	01	- Solvent extraction followed by HPLC/GC analysis
11	Arsenic (As), ng/m^3	Annual*	06	06	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), ng/m^3	Annual*	20	20	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper

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

** 24 hourly or 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.

SANT PRASAD GAUTAM, Chairman
[ADVT-III/4/184/09/Exty.]

Note: The notifications on National Ambient Air Quality Standards were published by the Central Pollution Control Board in the Gazette of India, Extraordinary vide notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998.

Printed by the Manager, Government of India Press, Ring Road, Mayapuri, New Delhi-110064
and Published by the Controller of Publications, Delhi-110054.

Maharashtra Pollution Control Board
महाराष्ट्र प्रदूषण नियंत्रण मंडळ

Maharashtra Pollution Control Board
Kalpataru Point, 3rd and 4th floor,
Opp. Cine Planet, Sion Circle,
Mumbai - 400 022
Telephone : +91 22 24020781 / 24014701
Fax : +91 22 24024068
Website : http://mpcb.gov.in/

The Energy and Resources Institute
Western Regional Centre,
318, Raheja Arcade, Sector-11,
Belapur CBD,
Navi Mumbai - 400614
Telephone : +91 22 27580021/ 40241615
Fax : +91 22 27580022
Website : www.teriin.org