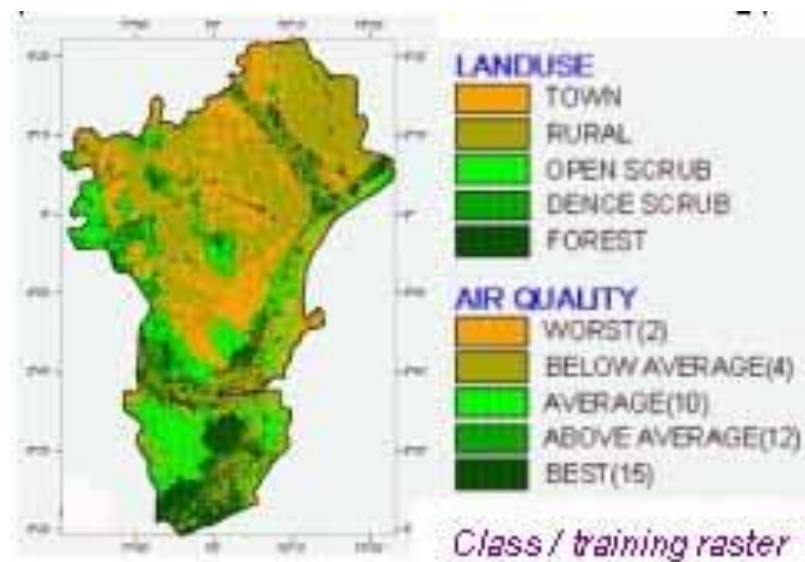


Air quality analysis in tamilnadu

Phase1-document submission
511921104039: Monish.C

PROJECT: Air quality analysis



Objective: A pollutant may cause long- or short-term damage by changing the growth rate of plant or animal species, or by interfering with resources used by humans, human health or wellbeing, or property values. Some pollutants are [biodegradable](#) and therefore will not persist in the [environment](#) in the long term. However, the degradation products of some pollutants are themselves polluting such as the products [DDE](#) and [DDD](#) produced from the degradation of [DDT](#).

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AIR POLLUTION IN TAMIL NADU

1. Introduction

It is a necessity to build a future in which humans live in harmony with nature. In order to protect our **ecological security we need to focus our attention and to take necessary steps both locally and globally for the following objectives:**

- ◆ Ensuring conservation of the country's biodiversity, major ecosystems and critical landscapes. Minimizing consumption and promotion of sustainable and wise use of natural resources by all sectors of society
- ◆ Promoting the active involvement of rural and traditional communities in the sustainable management and conservation of natural resources.
- ◆ Working towards reduction in the sources and impacts of climate change.
- ◆ Minimizing pollution by reducing the use of toxic chemicals and ensuring improved management of toxic waste
- ◆ Enhancing active participation of all sections of society in nature conservation and environmental protection through environmental education, awareness raising and capacity building
- ◆ Ensuring that environmental principles are integrated into development planning, policy and practices.
- ◆ Promoting environmental governance through legislation, policy and advocacy.

Therefore it becomes necessary to identify the gaps in the present management of resource bases. Such intervention will be realistic only if we have a strong database on the environmental matters of the state. Therefore, it is proposed to collect data from different source, compile them to bring together a Pollution Database for the State of Tamil Nadu.

2. Air Pollution

Air pollution is defined as the introduction of particulates, biological molecules, or other harmful materials into the Earth's atmosphere, possibly that cause disease, death to humans, damage to food crops, or the natural or built environment. Stratospheric ozone depletion due to air pollution has long been recognized as a threat to human health as well as to the Earth's ecosystems. Indoor air pollution and urban air quality are listed as two of the world's worst toxic pollution problems.

2.1 Sources

There are various activities or factors which are responsible for releasing pollutants into the atmosphere. These sources can be classified into two major categories.

Anthropogenic (man-made) sources:

These are mostly due to the burning of multiple types of fuel.

Anthropogenic sources include the following:

Stationary sources include stacks of power plants, manufacturing factories, waste incinerators, furnaces and other types of fuel-burning devices.

In less developed countries traditional biomass burning is the major source of air pollutants; Traditional biomass includes wood, crop waste and cow-dung.

Mobile Sources include vehicles, marine vessels, and aircrafts. Fumes from paint, hair spray, varnish, aerosol sprays and other solvents also contribute towards air pollution. Waste deposition in landfills, generate methane during the breakdown of compounds. Methane being highly flammable and forms explosive mixtures with air. Methane is also an asphyxiant and displaces oxygen in an enclosed space.

Military resources, such as nuclear weapons and toxic gases are also key sources of air pollution.

Natural sources:

Dust from natural sources, mostly large areas of land with few or no vegetation. Radon gas from radioactive decay within the Earth's crust. Radon is a naturally occurring, radioactive noble gas that is formed from the decay of radium. It is considered to be a health

hazard. Radon gas from natural sources can accumulate in buildings, especially in confined areas is the one of the most frequent cause of lung cancer. Smoke and carbon monoxide from wildfires Volcanic activity, produces sulfur, chlorine, and ash particulates. A pollutant can be of natural origin or man-made. Pollutants are classified as primary or secondary.

Primary pollutants are usually produced from a process, such as ash from a volcanic eruption. Other examples include carbon monoxide gas from motor vehicle exhaust, or the sulfur dioxide released from factories.

Secondary pollutants are not emitted directly. Rather, they form in the air when primary pollutants react or interact. Ground level ozone is a prominent example of a secondary pollutant. Some pollutants may be both primary and secondary: they are both emitted directly and formed from other primary pollutants.

In India the Major source of air pollution include Fuel wood and biomass burning in rural and urban India, Most of India uses Fuel wood and biomass cakes for cooking and general heating needs. Cook stoves using biomass are present in over 100 million Indian households, and are used two to three times a day. Majority of Indians still use traditional fuels such as dried cow dung, agricultural wastes, and firewood as cooking fuel

Major primary pollutants produced by human activity include:

Sulphur oxides (SO_x) - particularly sulfur dioxide, a chemical compound with the formula SO₂ is produced by volcanoes and various industrial processes. Coal and petroleum often contain sulfur compounds, and their combustion releases sulfur dioxide. Further oxidation of SO₂, usually in the presence of a catalyst such as NO₂, forms H₂SO₄, and leads to the formation of acid rain.

Nitrogen oxides (NO_x)-Nitrogen oxides, particularly nitrogen dioxide, are expelled from high temperature combustion, and are also produced during thunderstorms by electric discharge. It is a chemical compound with the formula NO₂. It is one of the most prominent air pollutants.

Carbon monoxide (CO)- CO is also a toxic gas. It is a product by incomplete combustion of fuel such as natural gas, coal or wood. Vehicular exhaust is a major source of carbon monoxide.

Volatile organic compounds - VOCs are a well-known outdoor air pollutant. They are categorized as either methane (CH₄) or non-methane (NMVOCs). Methane is a greenhouse gas which has contributed to enhance global warming. The aromatic NMVOCs such as benzene, toluene and xylene are suspected carcinogens and may lead to leukemia with prolonged exposure.

1,3-butadiene is another compound often associated with industrial use.

Particulate Matter

Particulates, alternatively referred to as particulate matter (PM), atmospheric particulate matter, or fine particles, are particles of solid or liquid suspended in a gas.

Aerosols

In contrast, aerosol refers to combined particles and gas. They can occur naturally, from volcanoes, dust storms, forest fires, and sea spray. Human activities, such as the burning of fossil fuels in vehicles, power plants and industrial processes also generate significant amounts of aerosols.

Chlorofluorocarbons (CFCs) - harmful to the ozone layer. These are gases which are released from air conditioners, refrigerators. CFC's on being released into the air rises to stratosphere and react with other gases and damage the ozone layer. This allows harmful ultraviolet rays to reach the earth's surface causing skin cancer and diseases to the eye.

Secondary pollutants include:

Particulates created from gaseous primary pollutants are called secondary pollutants. Smog is a kind of secondary air pollution. Smog results from large amounts of coal burning in an area caused by a mixture of smoke and sulfur dioxide. Smog also comes from vehicular and industrial emissions that are acted on in the atmosphere by ultraviolet light from the sun to form secondary pollutants that also combine with the primary emissions to form photochemical smog.

Ground level ozone (O₃) is formed from NO_x and VOCs. Ozone (O₃) is a key constituent of the troposphere. It is also an important constituent of certain regions of the stratosphere commonly known as the Ozone layer.

Peroxyacetyl nitrate (PAN) – is also formed from NO_x and VOCs.

2.2 Status of Air Quality Of Important Cities /Towns Of Tamil Nadu

**Table 2.1 Status Of Air Quality Of Important Cities /Towns Of Tamilnadu-Under National Air Quality Monitoring Programme (Namp)
Annual Average Concentration Of Air Pollutants, 2004-2005**

Sl. No	CITY & LOCATION	CATEGORY	Annual Average Concentration of Air Pollutants in µg/m ³											
			SO ₂			NO _x			TSPM			RSPM		
			Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
1	CHENNAI													
a)	Kathivakkam	Industrial	44	5	19	60	14	32	273	54	128	135	37	73
b)	Manali	Industrial	48	7	20	80	14	34	365	77	181	165	40	95
c)	Thirvottiyur	Mixed	38	6	19	54	12	31	494	56	133	279	36	85
2	COIMBATORE													
a)	DCO	Mixed	15	4	7	65	25	39	314	36	134	140	19	53
b)	Pooniyarajapuram	Residential	18	4	7	86	20	41	423	33	113	361	19	51
c)	SIDCO	Industrial	29	4	9	90	11	48	552	42	192	159	28	84
3	THOOTHUKUDI													
a)	Raja Agencies	Industrial	57	13	20	59	9	17	137	14	62	96	9	39
b)	AVM Buildings	Mixed	41	13	19	54	9	18	421	19	71	103	14	46
c)	Fisheries college	Industrial	56	12	19	89	9	18	118	18	60	83	14	38
4	MADURAI													
a)	Fenner India ltd Building	Industrial	55	8	18	54	12	28	277	64	136	44	22	52
b)	Kannathur chathiram	Mixed	17	5	9	48	11	22	1243	106	355	1038	70	177
c)	Highways project Buildings	Residential	19	5	9	44	11	30	389	33	109	224	15	51
5	SALEM													
	Sowdeswari College Building	Mixed	10	5	7	77	12	34	173	33	71	89	16	38
	Prescribed Standard													
	i)Industrial	80				80			360			120		
	II)Residential,Rural & other areas(mixed)	60				60			140			60		

Source: TNPCB Year book , 2004-2005

**Table 2.2 Status Of Air Quality Of Important Cities /Towns Of Tamilnadu-Under National Air Quality Monitoring Programme(Namp)
Annual Average Concentration Of Air Pollutants,2005-2006**

SI. No	CITY & LOCATION	CATEGORY	Annual Average Concentration of Air Pollutants in µg/m ³											
			SO ₂			NO _x			TSPM			RSPM		
			Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
1	CHENNAI													
a)	Kathivakkam	Industrial	36	4	13	45	14	25	589	64	221	120	22	71
b)	Manali	Industrial	42	4	14	57	11	27	577	65	236	188	22	79
c)	Thirvottiyur	Industrial	45	4	13	46	9	28	651	39	207	142	15	70
2	COIMBATORE													
a)	DCO	Mixed	18	4	8	62	21	43	250	27	90	96	14	39
b)	Poniyarajapuram	Residential	14	4	7	57	19	38	209	30	86	108	10	44
C)	SIDCO	Industrial	25	4	10	69	31	47	382	45	161	160	25	73
3	THOOTHUKUDI													
a)	Raja Agencies	Industrial	43	11	19	71	8	20	252	19	81	232	15	61
b)	AVM Buildings	Mixed	36	11	19	62	8	20	291	22	105	202	10	83
C)	Fisheries college	Industrial	31	11	19	71	7	22	220	16	66	209	13	54
4	MADURAI													
a)	Fennar Building	Industrial	28	6	17	70	11	29	370	15	117	120	7	37
b)	Kunnathur chatiram	Mixed	26	5	10	83	10	28	460	52	208	185	18	57
C)	Highways project Buildings	Residential	19	6	9	69	9	27	280	36	110	121	9	37
5	SALEM													
	Sowdeswari College Building	Mixed	11	5	7	69	16	33	122	20	69	82	18	42
	Prescribed Standard:													
	i)Industrial	80				80			360			120		
	II)Residential,Rural &other areas	60				60			140			60		

Source: TNPCB Year book , 2005-2006

Table 2.3 Status Of Air Quality Of Important Cities/ Towns Of Tamilnadu Under National Air Quality Monitoring Programme (Namp)
Annual Average Concentration Of Air Pollutants 2006-2007

Sl. No	City and Location	Category	Annual Average Concentrations of Air Pollutants in µg/m ³											
			SO ₂			NO _x			TSPM			RSPM		
			Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
1	CHENNAI													
a)	Kathivakkam	Industrial	31	4	14	54	11	25	392	40	140	120	27	61
b)	Manali	Industrial	28	5	14	44	6	25	332	62	151	225	34	81
c)	Thiruvottiyur	Mixed	25	4	14	41	11	24	240	39	128	155	21	66
2	COIMBATORE													
a)	DCO	Mixed	20	4	10	49	15	32	216	19	88	131	16	44
b)	Pooniyarajapuram	Residential	17	4	9	48	17	32	249	24	87	100	12	44
c)	SIDCO	Industrial	26	4	11	63	17	40	866	80	230	225	45	102
3	THOOTHUKUDI													
a)	Raja Agencies	Industrial	69	7	18	81	5	17	467	30	125	298	20	90
b)	AVM Building	Mixed	58	9	18	52	5	18	452	34	116	310	25	78
c)	Fisheries College	Industrial	37	7	17	52	7	17	358	39	90	240	23	63
4	MADURAI													
a)	M/s. Susee Cars & Trucks (P) Ltd	Industrial	24	7	12	57	13	26	190	35	94	96	28	65
b)	Avvai Girls Hr.Sec.School	Mixed	25	6	10	41	14	23	266	22	103	194	10	34
c)	Highways Project Building	Residential	24	6	9	40	13	23	226	16	98	95	9	37
5	SALEM													
a)	Sowdeswari College	Mixed	11	5	7	69	16	33	122	20	69	82	18	42
Prescribed Standard														
i) Industrial					80			80			360			120
ii) Residential, Rural & Other Areas (Mixed)					60			60			140			60

Source: TNPCB Year book , 2006-2007

**Table 2.4 Status Of Air Quality Of Important Cities /Towns Of Tamilnadu-Under National Air Quality Monitoring Programme
(Namp), Annual Average Concentration Of Air Pollutants,2008-2009**

Sl.No	CITY & LOCATION	CATEGORY	Annual Average Concentration of Air Pollutants in µg/m ³											
			SO ₂			NO _x			TSPM			RSPM		
			Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
1	CHENNAI													
a)	Kathivakkam	Industrial	16	11	13	21	16	19	305	147	196	103	54	78
b)	Manali	Industrial	18	12	14	25	18	21	252	106	177	150	45	86
c)	Thirvottiyur	Industrial	15	11	13	22	16	20	293	110	196	168	50	100
2	COIMBATORE													
a)	G.D Matric school	Mixed	7	4	5	38	19	30	183	56	107	91	28	59
b)	Pooniyarajapuram	Residential	7	4	5	44	17	31	156	44	90	80	20	50
C)	SIDCO	Industrial	8	5	6	49	25	37	332	141	221	193	85	116
3	THOOTHUKUDI													
a)	Raja Agencies	Industrial	35	15	27	33	8	19	454	147	281	223	97	166
b)	AVM Buildings	Mixed	48	22	30	33	10	17	217	115	152	185	79	99
c)	SIPCOT	Industrial	41	22	30	66	12	19	269	83	130	192	60	86
4	MADURAI													
a)	M/S Susee Cars & Trucks (p) Ltd.,	Industrial	12	9	11	26	20	24	116	66	91	67	29	45
b)	Awai Girls Higher Secondary School	Mixed	11	8	10	28	21	24	109	41	87	94	27	49
C)	Highways project Buildings	Residential	11	9	10	26	21	24	111	64	84	67	29	41
5	SALEM													
	Sowdeswari College	Mixed	9	8	9	26	23	25	159	83	118	104	53	79
	Prescribed Standard:													
	i)Industrial	80				80			360			120		
	II)Residential,Rural	60				60			140			60		

Source: TNPCB Year book , 2008-2009

**Table 2.5 Status Of Air Quality Of Important Cities /Towns Of Tamilnadu-Under National Air Quality Monitoring Programme (Namp)
Annual Average Concentration Of Air Pollutants,2009-2010**

Sl. NO	CITY & LOCATION	CATEGORY	Annual Average Concentration of Air Pollutants in µg/m³											
			SO₂			NOx			TSPM			RSPM		
			Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
1	CHENNAI													
a)	Kathivakkam	Industrial	19	8	12	31	11	19	340	87	181	184	35	78
b)	Manali	Industrial	22	8	13	27	12	20	375	50	174	223	32	83
c)	Thirvottiyur	Industrial	26	9	15	38	11	22	706	94	218	406	40	108
2	COIMBATORE													
a)	G.D Matric school	Mixed	18	4	5	56	10	23	540	39	121	273	23	60
b)	Pooniyarajapuram	Residential	16	4	5	50	10	23	236	33	98	153	11	51
C)	SIDCO	Industrial	29	4	7	60	10	27	955	98	231	216	51	100
3	THOOTHUKUDI													
a)	Raja Agencies	Industrial	38	4	15	31	5	12	670	52	254	360	20	135
b)	AVM Buildings	Mixed	45	4	15	32	5	13	297	24	97	146	12	47
C)	SIPCOT	Industrial	47	4	17	36	4	11	368	40	138	146	21	70
4	MADURAI													
a)	M/S Susee Cars & Trucks (p) Ltd.,	Industrial	15	7	11	34	18	25	129	47	81	70	16	36
b)	Awai Girls Higher Secondary School	Mixed	19	7	10	32	17	24	267	54	104	136	49	76
C)	Highways project Buildings	Residential	15	7	10	33	18	25	227	44	97	125	24	46
5	SALEM													
	Sowdeswari College Building	Mixed	14	6	9	41	16	24	267	56	133	167	32	85
	Prescribed Standard:													
	i)Industrial	80				80			360			120		
	II)Residential,Rural	60				60			140			60		

Source: TNPCB Year book , 2009-2010

Table 2.6 Status Of Air Quality Of Important Cities /Towns Of Tamilnadu-Under National Air Quality Monitoring Programme (Namp)
Annual Average Concentration Of Air Pollutants, 2010-2011

S. NO	CITY & LOCATION	CATEGORY	Annual Average Concentration of Air Pollutants in µg/m ³											
			SO2			NOX			TSPM			RSPM		
			Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
1	CHENNAI													
a)	Kathivakkam	Industrial	36	9	12	32	12	18	353	62	179	219	29	88
b)	Manali	Industrial	58	9	12	40	12	20	407	46	165	246	38	87
c)	Thirvottiyur	Industrial	17	8	12	28	12	20	585	77	167	292	30	66
2	COIMBATORE													
a)	G.D Matric school	Mixed	49	4	6	46	13	24	506	34	157	250	15	60
b)	Pooniyarajapuram	Residential	34	4	5	39	9	21	463	21	111	190	10	56
C)	SIDCO	Industrial	43	4	6	264	12	34	1403	39	273	1184	12	102
3	THOOTHUKUDI													
a)	Raja Agencies	Industrial	88	4	12	35	6	14	764	79	310	385	50	178
b)	AVM Buildings	Mixed	48	4	10	46	7	14	389	23	90	198	13	53
C)	SIPCOT	Industrial	36	4	12	28	7	12	589	38	156	347	17	88
4	MADURAI													
a)	M/S Susee Cars & Trucks (p) Ltd.,	Industrial	19	7	11	42	16	25	166	60	111	82	22	42
b)	Awai Girls Higher Secondary School	Mixed	15	7	8	34	15	25	207	25	107	88	25	45
C)	Highways project Buildings	Residential	17	5	11	33	12	24	222	52	101	101	23	47
5	SALEM													
	Sowdeswari College Building	Mixed	12	5	9	59	13	24	228	30	111	157	28	74
	Prescribed Standard:													
		SO2			NOX			TSPM			RSPM			
i)Industrial		80			80			360			120			
II)Residential, Rural & other areas		60			60			140			60			

Source: TNPCB Year book , 2010-2011

**Table 2.7 Status Of Air Quality Of Important Cities/Towns Of Tamilnadu – Under National Air Quality Monitoring Programme
(Namp) Annual Average Concentrations Of Air Pollutants, 2011 – 2012**

S.NO	City & Location	Category	Annual Average concentrations of Air Pollutants in µg/m ³								
			SO ₂			NO ₂			RSPM		
			Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
1	CHENNAI										
a)	Kathivakkam	Industrial	48	10	22	64	13	27	363	39	132
b)	Manali	Industrial	46	9	20	68	11	26	152	26	70
c)	Thirvottiyur	Industrial	42	8	20	61	12	27	351	22	88
2	COIMBATORE										
a)	G.D Matric school	Mixed	9	4	5	73	13	30	218	19	68
b)	Pooniyarajapuram	Residential	13	4	5	76	13	29	273	11	68
C)	SIDCO	Industrial	8	4	5	111	9	35	443	20	205
3	THOOTHUKUDI										
a)	Raja Agencies	Industrial	29	4	7	35	9	13	601	51	132
b)	AVM Buildings	Mixed	48	4	7	46	9	14	215	17	81
C)	SIPCOT	Industrial	23	4	9	34	9	15	437	26	112
4	MADURAI										
a)	M/S Susee Cars & Trucks (p) Ltd.,	Industrial	15	7	10	29	18	23	63	18	44
b)	Awai Girls Higher Secondary School	Mixed	22	5	11	43	16	24	137	26	46
C)	Highways project Buildings	Residential	17	6	10	27	16	24	89	28	47
5	SALEM										
a)	Sowdeswari College Building	Mixed	13	6	8	31	13	21	134	28	62
	Prescribed Standard:										
		SO2	NOX			TSPM			RSPM		
i)Industrial		80	80			360			120		
II)Residential, Rural &other areas		60	60			140			60		

Source: TNPCB Year book , 2011-2012

**Table 2.8 Chennai Ambient Air Quality Monitoring Programme Status Of Air Quality During
April 2004 To March 2005**

SL.NO	STATION	ANNUAL AVERAGE CONCENTRATION OF AIR POLLTANTS $\mu\text{g}/\text{m}^3$			
		SO ₂	NO _x	RSPM	TSPM
1	ANNA NAGAR	6	20	68	158
2	ADYAR	5	14	33	71
3	KILPAUK	7	36	97	308
4	THIYAGARAYANAGAR	8	30	77	197
5	VALLALAR NAGAR	8	33	87	255
	Prescribed standard	60	60	60	140

Source: TNPCB Year book , 2004-2005

**Table 2.9 Chennai Ambient Air Quality Monitoring Programme Status Of Air Quality During
April 2005 To March 2006**

SL.NO	STATION	ANNUAL AVERAGE CONCENTRATION OF AIR POLLTANTS $\mu\text{g}/\text{m}^3$			
		SO ₂	NO _x	RSPM	TSPM
1	ANNA NAGAR	6	26	75	183
2	ADAYAR	5	20	46	102
3	KILPAUK	8	39	92	267
4	THIYAGARAYA NAGAR	8	37	81	209
5	VALLALAR NAGAR	8	36	83	232
	PRESCRIBED STANDARDS	60	60	60	140

Source: TNPCB Year book , 2005-2006

**Table 2.10 Chennai Ambient Air Quality Monitoring Programme
Status Of Air Quality Monitoring During 2006-2007**

Sl.No.	Station	Average Concentrations of Air Pollutants, $\mu\text{g}/\text{m}^3$			
		SO ₂	NO _x	RSPM	TSPM
1	ANNA NAGAR	8	22	63	146
2	ADAYAR	7	17	41	90
3	KILPAUK	9	27	91	211
4	THIYAGARAYANAGAR	10	27	83	218
5	VALLALAR NAGAR	10	33	92	249
Prescribed Standard		60	60	60	140

Source: TNPCB Year book , 2006-2007

**Table 2.11 Chennai Ambient Air Quality Monitoring Programme Status Of Air Quality During
April 2008 To March 2009**

Sl.No	STATION	ANNUAL AVERAGE CONCENTRATION OF AIR POLLTANTS, $\mu\text{g}/\text{m}^3$			
		SO ₂	NO _x	RSPM	TSPM
1	ANNA NAGAR	10	25	121	262
2	ADYAR	7	12	50	97
3	KILPAUK	11	28	98	231
4	THIYAGARAYANAGAR	11	29	129	278
5	VALLALAR NAGAR	12	28	140	359
Prescribed standard		60	60	60	140

Source: TNPCB Year book , 2008-2009

**Table 2.12 Chennai Ambient Air Quality Monitoring Programme Status of Air Quality During
April 2009 To March 2010**

Sl.No	STATION	ANNUAL AVERAGE CONCENTRATION OF AIR POLLTANTS $\mu\text{g}/\text{m}^3$			
		SO ₂	NO _x	RSPM	TSPM
1	ANNA NAGAR	9	22	92	207
2	ADAYAR	8	16	40	78
3	KILPAUK	10	32	110	240
4	THIYAGARAYA NAGAR	12	30	143	285
5	VALLALAR NAGAR	12	35	136	315
PRESCRIBED STANDARDS		60	60	60	140

Source: TNPCB Year book , 2009-2010

**Table 2.13 Chennai Ambient Air Quality Monitoring Programme Status of Air Quality During
April 2010 To March 2011**

S.NO	STATION	ANNUAL AVERAGE CONCENTRATION OF AIR POLLTANTS $\mu\text{g}/\text{m}^3$		
		SO ₂	NO _x	RSPM
1	ANNA NAGAR	8	21	98
2	ADYAR	8	15	34
3	KILPAUK	10	28	91
4	THIYAGARAYANAGAR	11	30	119
5	VALLALAR NAGAR	11	29	135
Prescribed standard		60	60	60

Source: TNPCB Year book , 2010-2011

Table 2.14 Chennai Ambient Air Quality Monitoring Programme

STATION	ANNUAL AVERAGE CONCENTRATION OF AIR POLLUTANTS $\mu\text{g}/\text{m}^3$		
	SO ₂	NO ₂	RSPM
ANNA NAGAR	9	18	136
ADYAR	8	12	63
KILPAUK	10	20	135
THIYAGARAYANAGAR	11	21	145
VALLALAR NAGAR	11	21	168
Prescribed Standard	50	40	60

Source: TNPCB Year book , 2011-2012

**Table 2.15 Status Report Of Trichy Air Quality Under Trichy Ambient Air Quality
Monitoring Programme (Taaqm) During 2004-2005**

Sl.No	Station	Average Concentrations of Air Pollutants, micro gram /m ³			
		SO ₂	NO _x	RSPM	TSPM
1	Gandhi Market	15	19	90	208
2	Mainguard Gate	15	19	84	197
3	Bishop Heber College	11	15	53	72
4	Golden Rock	12	15	62	87
5	Central Bus Stand , Trichy	15	18	81	180
Prescribed Standard		60	60	60	140

Source: TNPCB Year book , 2004-2005

**Table 2.16 Status Report Of Trichy Air Quality Under Trichy Ambient Air Quality
Monitoring Programme (Taaqm) During 2005-2006**

SL.NO	STATION	AVERAGE CONCENTRATIONS OF AIR POLLUTANTS $\mu\text{g}/\text{m}^3$			
		SO ₂	NO _x	RSPM	TSPM
1	Gandhi Market	16	19	80	180
2	Mainguard Gate	16	20	83	185
3	Bishop Heber College	11	13	50	70
4	Golden Rock	12	15	58	81
5	Central Bus Stand , Trichy	15	19	71	153
Prescribed Standard		60	60	60	140

Source: TNPCB Year book , 2005-2006

Table 2.17 Status Report Of Trichy Air Quality Under Trichy Ambient Air Quality Monitoring Programme (Taaqm) During 2006 - 2007

Sl.No.	Station	Average Concentrations of Air Pollutants, $\mu\text{g}/\text{m}^3$			
		SO ₂	NO _x	RSPM	TSPM
1	Gandhi Market	17	23	73	223
2	Mainguard Gate	15	20	77	250
3	Bishop Heber College	11	17	48	119
4	Golden Rock	11	16	42	108
5	Central Bus Stand, Trichy	18	23	105	227
Prescribed Standard		60	60	60	140

Source: TNPCB Year book, 2006-2007

**Table 2.18 Status Report Of Trichy Air Quality Under Trichy Ambient Air Quality
Monitoring Programmr (Taaqm) During 2008-2009**

Sl.No	Station	Average Concentrations of Air Pollutants, $\mu\text{g}/\text{m}^3$			
		SO ₂	NO _X	RSPM	TSPM
1	Gandhi Market	20	25	95	251
2	Mainguard Gate	20	25	80	222
3	Bishop Heber College	10	14	36	73
4	Golden Rock	11	15	39	102
5	Central Bus Stand , Trichy	19	24	103	228
Prescribed Standard		60	60	60	140

Source: TNPCB Year book , 2008-2009

**Table 2.19 Status Report Of Trichy Air Quality Under Trichy Ambient Air Quality
Monitoring Programme (Taaqm) During 2009-2010**

SL.NO	STATION	AVERAGE CONCENTRATIONS OF AIR POLLUTANTS $\mu\text{g}/\text{m}^3$			
		SO ₂	NO _x	RSPM	TSPM
1	Gandhi Market	16	22	105	220
2	Mainguard Gate	15	22	96	226
3	Bishop Heber College	9	13	38	98
4	Golden Rock	9	14	37	99
5	Central Bus Stand , Trichy	17	24	137	256
Prescribed Standard		60	60	60	140

Source: TNPCB Year book, 2009-2010

**Table 2.20 Status Report Of Trichy Air Quality Under Trichy Ambient Air Quality
Monitoring Programme (Taaqm) During 2010-2011**

S.No	Station	Average Concentrations of Air Pollutants, $\mu\text{g}/\text{m}^3$			
		SO ₂	NO _x	RSPM	TSPM
1	Gandhi Market	14	21	100	223
2	Mainguard Gate	13	19	69	183
3	Bishop Heber College	9	13	36	92
4	Golden Rock	10	15	35	87
5	Central Bus Stand , Trichy	20	22	92	219
Prescribed Standard		60	60	60	140

Source: TNPCB Year book, 2010-2011

**Table 2.21 Status Report Of Trichy Air Quality Under Trichy Ambient Air Quality
Monitoring Programmr (Taaqm) During 2011 – 2012**

S.No	Station	Average Concentration of Air Pollutants, µg/m ³		
		SO ₂	NO ₂	RSPM
1	Gandhi Market	12	17	92
2	Mainguard Gate	11	17	68
3	Bishop Heber College	9	14	40
4	Golden Rock	10	15	42
5	Central Bus Stand, Trichy	13	19	113
Prescribed Standard		50	40	60

Source: TNPCB Year book , 2011-2012

Table 2.22 Status Of Vehicle Tested At Tnpcb Vem Stations During 2004-2005

Sl.No	STATION	NO. OF VEHICLES TESTED	VEHICLES WITHIN THE LIMIT	VEHICLES EXCEEDED THE LIMIT DURING FIRST TEST	VEHICLES COMPLIED EMISSION STANDARD AFTER RECTIFICATION	VEHICLES NOT COMPLIED EMISSION STANDARD	% OF VEHICLE EXCEEDED THE LIMIT DURING FIRST TEST
1	Chennai City	34553	28138	6475	4944	1531	19
2	Udhagamandalam	5247	4275	972	834	138	19
3	Dindigul	2303	2195	108	40	68	5
4	Palani	3783	3204	579	543	36	15
5	Chengalpattu	5454	3637	1817	1606	211	33
6	Katteri	2827	2141	686	610	76	24
Grand Total		54167	43590	10637	8577	2060	20

Source: TNPCB Year book , 2004-2005

Table 2.23 Status Of Vehicle Tested At Tnp cb Vem Stations During 2005-2006

SL.NO	STATION	NO. OF VEHICLES TESTED	VEHICLES WITHIN THE LIMIT	VEHICLES EXCEEDED THE LIMIT DURING FIRST TEST	VEHICLES COMPLIED EMISSION STANDARD AFTER RECTIFICATION	VEHICLES NOT COMPLIED EMISSION STANDARD	% OF VEHICLE EXCEEDED THE LIMIT DURING FIRST TEST
1	Chennai	32,200	29,892	2,308	1,626	682	7.17
2	VEM stations other than Chennai city	5,147	4,647	500	394	106	9.70
Grand Total		37,347	34,539	2,808	2,020	788	7.52

*The TNPCB VEM stations other than Chennai city denote the stations at Udagamandalam, Katteri, Dindigul, Palani & Chengalpattu. The above stations were closed with effect from 16.11.2005 and emission check is being carried out by authorized private vehicle emission testing centres in the above places.

Table 2.24 Status Of Vehicle Tested At Tnpcb Vem Station During 2006-2007

Sl.No	Station	No. of Vehicles tested	Vehicles within the limit	Vehicles exceeded the limit during the first test	Vehicles complied emission standard after rectification	Vehicles not complied emission standard	% of vehicle exceeded the limit during the first test
1	Chennai City	35,370	32,670	2,700	1,943	757	7.63

Table 2.25 Status Of Vehicle Tested At Tnpcb Vem Stations During 2008-2009

Si.No	Station	No. Of Vehicles Tested	Vehicles Within The Limit	Vehicles Exceeded The Limit During First Test	Vehicles Complied Emission Standard After Rectification	Vehicles Not Complied Emission Standard	% Of Vehicle Exceeded The Limit During First Test
1	Chennai City	42,206	40,835	4,760	3,389	1371	11.28

Table 2.26 Status Of Vehicle Tested At Tnpcb Vem Stations During 2009-2010

Si.No	Station	No. Of Vehicles Tested	Vehicles Within The Limit	Vehicles Exceeded The Limit During First Test	Vehicles Complied Emission Standard After Rectification	Vehicles Not Complied Emission Standard	% Of Vehicle Exceeded The Limit During First Test
1	Chennai	22,012	21,504	1,668	1,160	508	7.58%

Table 2.27 Status Of Vehicle Tested At Tnpcb Vem Station During 2010-2011

Sl.No	Station	No. of Vehicles tested	Vehicles within the limit	Vehicles exceeded the limit during the first test	Vehicles complied emission standard after rectification	Vehicles not complied emission standard	% of vehicle exceeded the limit during the first test
1	Chennai City	1,142	1,117	27	2	25	2.36 %

All data Sources are from TNPCB Year Books

Table 2.28 Ambient Air Quality Monitoring Results of Chennai between 2003 & 2012				
A. Location: Municipal Kalyanamandapam, Kathivakkam, Chennai				
Category -Industrial Area				
Year	Annual Average Concentration of Air pollutants, $\mu\text{g}/\text{m}^3$			
	TSPM	RSPM	NO _x	SO ₂
2003-2004	163	90	32	24
2004-2005	128	73	32	19
2005-2006	221	71	25	13
2006-2007	140	61	25	14
2008-2009	196	78	19	13
2009-2010	181	78	19	12
2010-2011	179	88	18	12
2011-2012	NA	132	27	22
Prescribed Standard				
Industrial	360	120	80	80
Residential, Rural & Other Areas (Mixed)	140	60	60	60
NAAQS-2009	NA	60	40	50

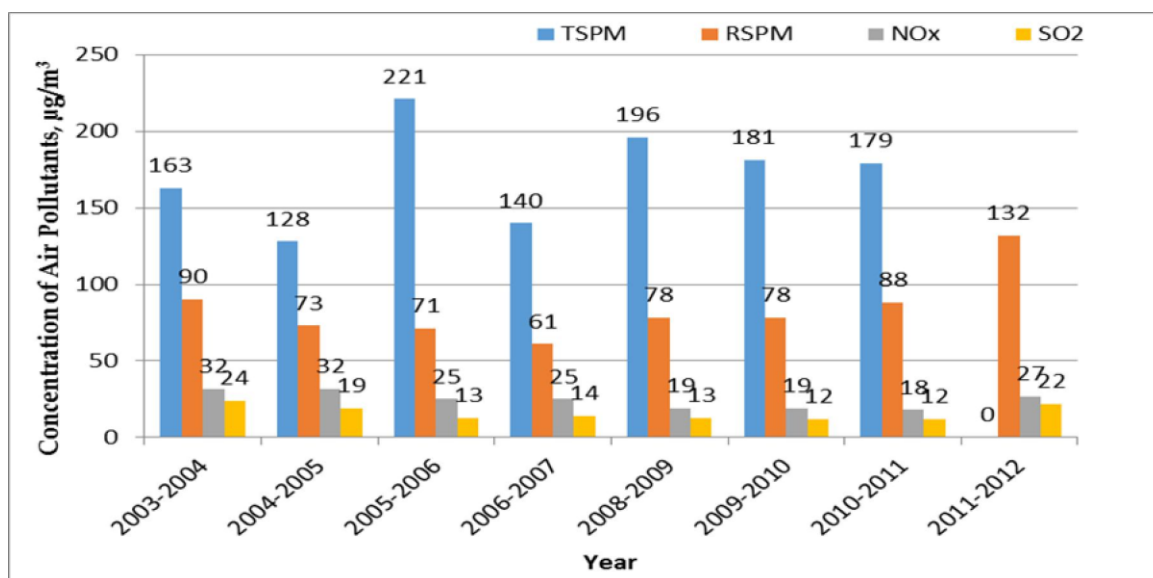


Figure. 2.1 Graph showing Ambient Air Quality in Kathivakkam Chennai between 2003-2012

Table 2.29 Ambient Air Quality Monitoring Results of Chennai between 2003 & 2012				
B. Govt. Hr. Sec. School, Manali, Chennai				
Category -Industrial Area				
Year	Annual Average Concentration of Air pollutants, $\mu\text{g}/\text{m}^3$			
	TSPM	RSPM	NO _x	SO ₂
2003-2004	214	109	34	22
2004-2005	181	95	34	20
2005-2006	236	79	27	14
2006-2007	151	81	25	14
2008-2009	177	86	21	14
2009-2010	174	83	20	13
2010-2011	165	87	20	12
2011-2012	NA	70	26	20
Prescribed Standard				
Industrial	360	120	80	80
Residential, Rural & Other Areas (Mixed)	140	60	60	60
NAAQS-2009	NA	60	40	50

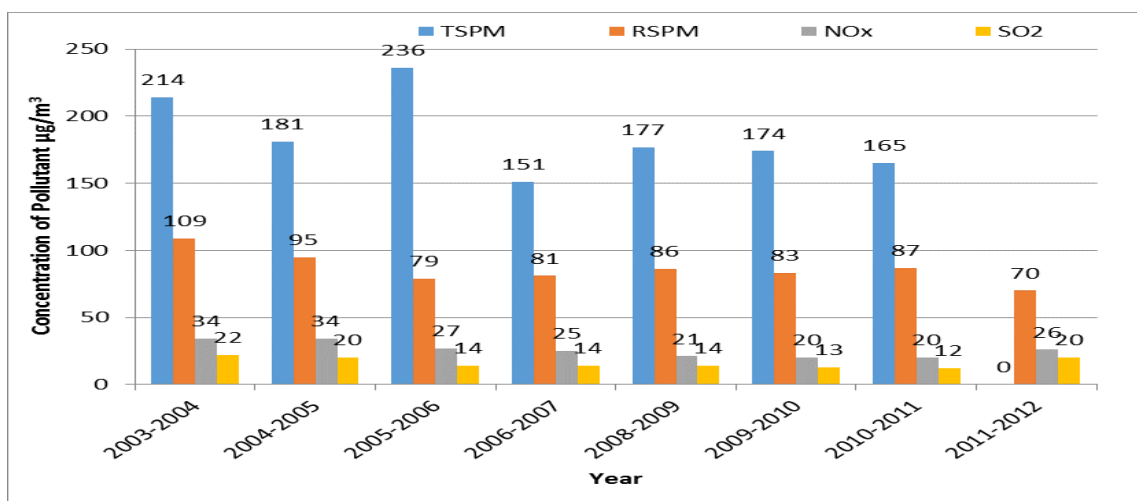


Figure. 2.2 Graph showing Ambient Air Quality in Manali Chennai between 2003-2012

Table 2.30 Ambient Air Quality Monitoring Results of Chennai between 2003 & 2012
C. Municipal Office , Thiruvottiyur, Chennai

Category - Mixed Area				
Year	Annual Average Concentration of Air pollutants, $\mu\text{g}/\text{m}^3$			
	TSPM	RSPM	NO _x	SO ₂
2003-2004	151	95	32	20
2004-2005	133	85	31	19
2005-2006	207	70	28	13
2006-2007	128	66	24	14
2008-2009	196	100	20	13
2009-2010	218	108	22	15
2010-2011	167	66	20	12
2011-2012	NA	88	27	20
Prescribed Standard				
Industrial	360	120	80	80
Residential, Rural & Other Areas (Mixed)	140	60	60	60
NAAQS-2009	NA	60	40	50

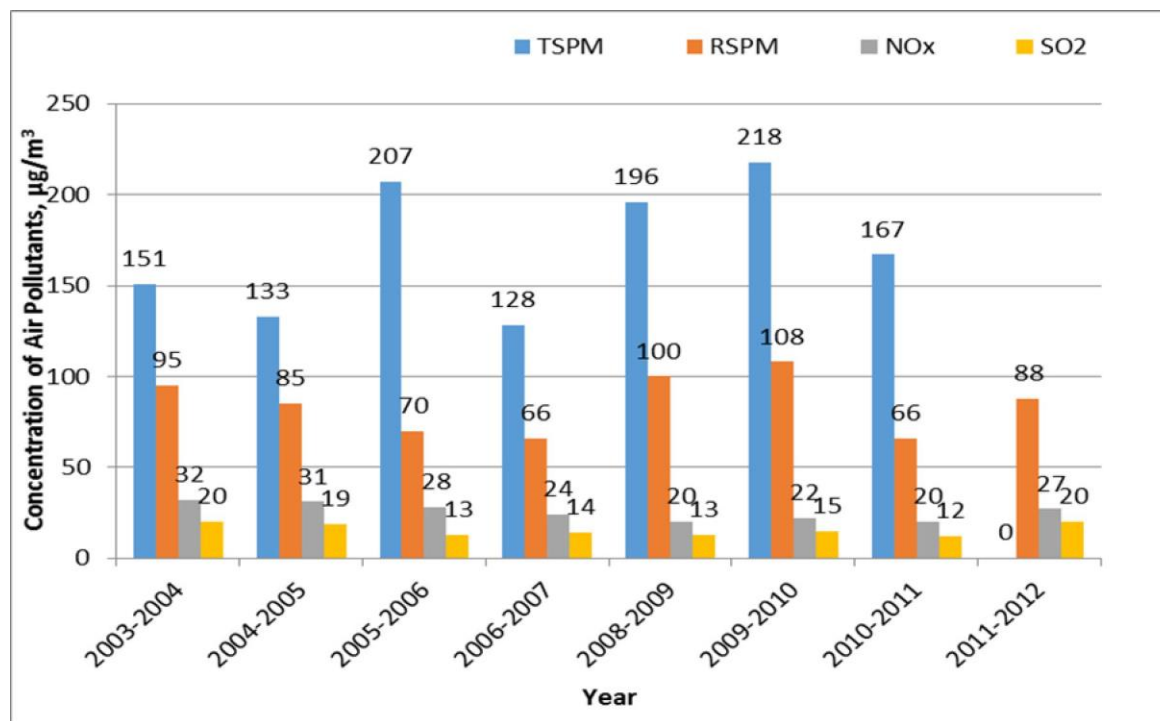


Figure. 2.3 Graph showing Ambient Air Quality in Thiruvottiyur Chennai between 2003-2012

Table 2.31 Ambient Air Quality Monitoring Results of Coimbatore between 2003&2012				
A. Location: Collectorate Office Building/GD Matric School, Coimbatore				
Category -Mixed Area				
Year	Annual Average Concentration of Air pollutants, $\mu\text{g}/\text{m}^3$			
	TSPM	RSPM	NO _x	SO ₂
2003-2004	108	43	51	10
2004-2005	134	53	39	7
2005-2006	90	39	43	8
2006-2007	88	44	32	10
2008-2009	107	59	30	5
2009-2010	121	60	23	5
2010-2011	157	60	24	6
2011-2012	NA	68	30	5
Prescribed Standard				
Industrial	360	120	80	80
Residential, Rural & Other Areas (Mixed)	140	60	60	60
NAAQS-2009	NA	60	40	50

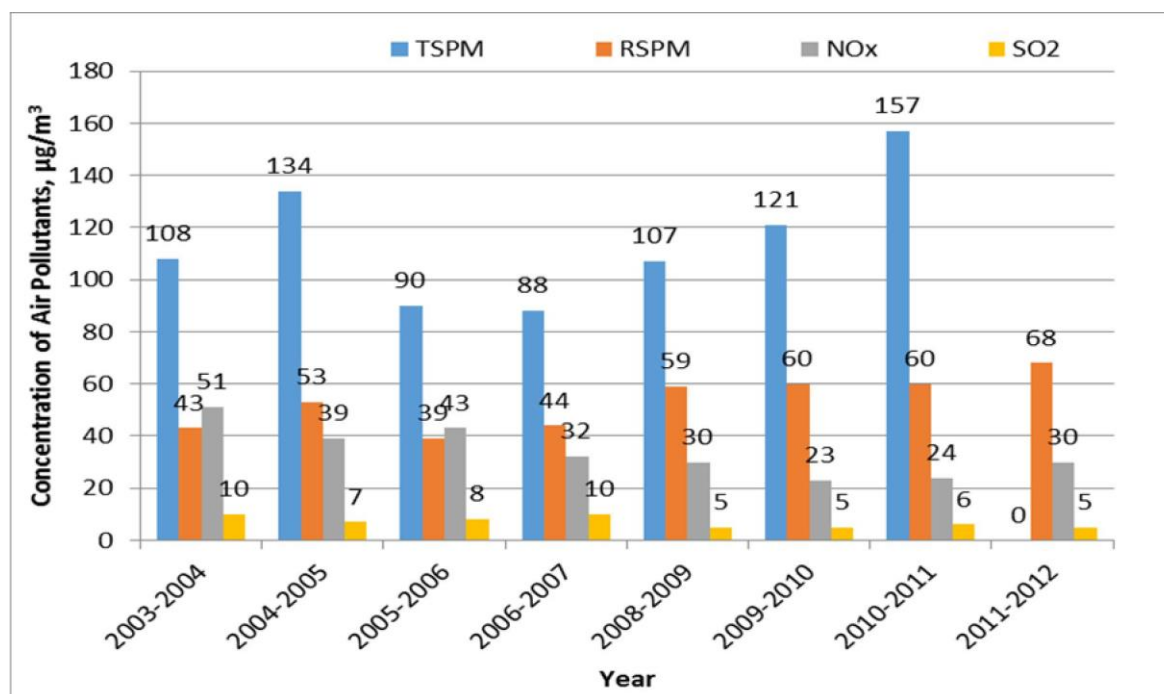


Figure. 2.4 Graph showing Ambient Air Quality in GD, School Coimbatore between 2003-2012

Table 2.32 Ambient Air Quality Monitoring Results of Coimbatore between 2003 & 2012				
B. Location: Ponniyarajapuram, Coimbatore				
Category -Residential Area				
Year	Annual Average Concentration of Air pollutants, $\mu\text{g}/\text{m}^3$			
	TSPM	RSPM	NO _x	SO ₂
2003-2004	111	46	46	10
2004-2005	113	51	41	7
2005-2006	86	44	38	7
2006-2007	87	44	32	9
2008-2009	90	50	31	5
2009-2010	98	51	23	5
2010-2011	111	56	21	5
2011-2012	NA	68	29	5
Prescribed Standard				
Industrial	360	120	80	80
Residential, Rural & Other Areas (Mixed)	140	60	60	60
NAAQS-2009	NA	60	40	50

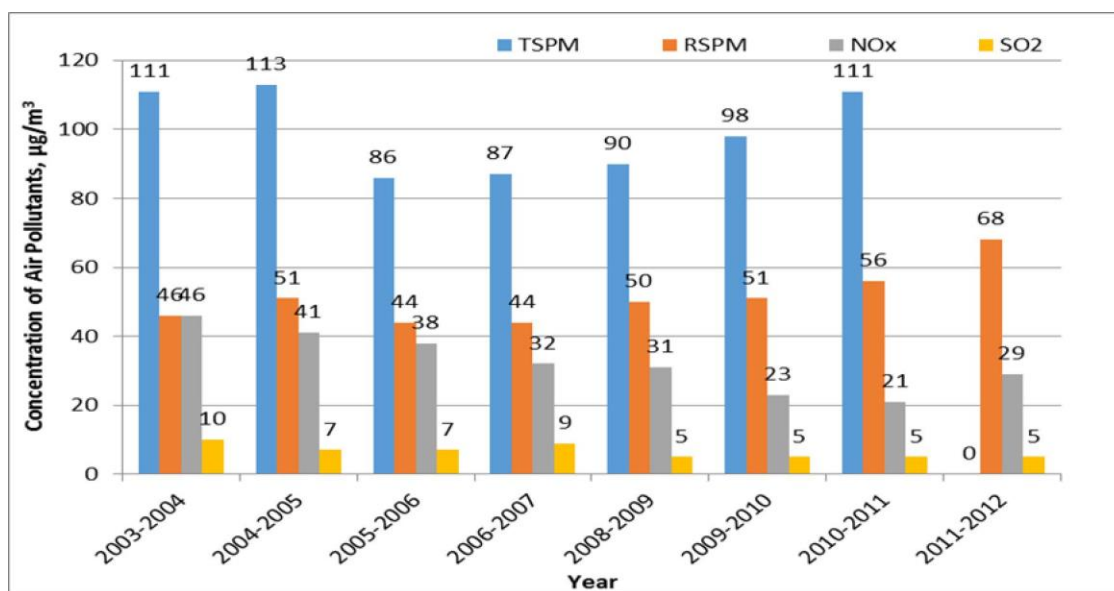


Figure. 2.5 Graph showing Ambient Air Quality in Ponniyarajapuram Coimbatore between 2003-2012

Table 2.33 Ambient Air Quality Monitoring Results of Coimbatore between 2003 & 2012				
C. Location: SIDCO, Coimbatore				
Category -Industrial Area				
Year	Annual Average Concentration of Air pollutants, $\mu\text{g}/\text{m}^3$			
	TSPM	RSPM	NO _x	SO ₂
2003-2004	151	62	56	13
2004-2005	192	84	48	9
2005-2006	161	73	47	10
2006-2007	230	102	40	11
2008-2009	221	116	37	6
2009-2010	231	100	27	7
2010-2011	273	102	34	6
2011-2012	NA	205	35	5
Prescribed Standard				
Industrial	360	120	80	80
Residential, Rural & Other Areas (Mixed)	140	60	60	60
NAAQS-2009	NA	60	40	50

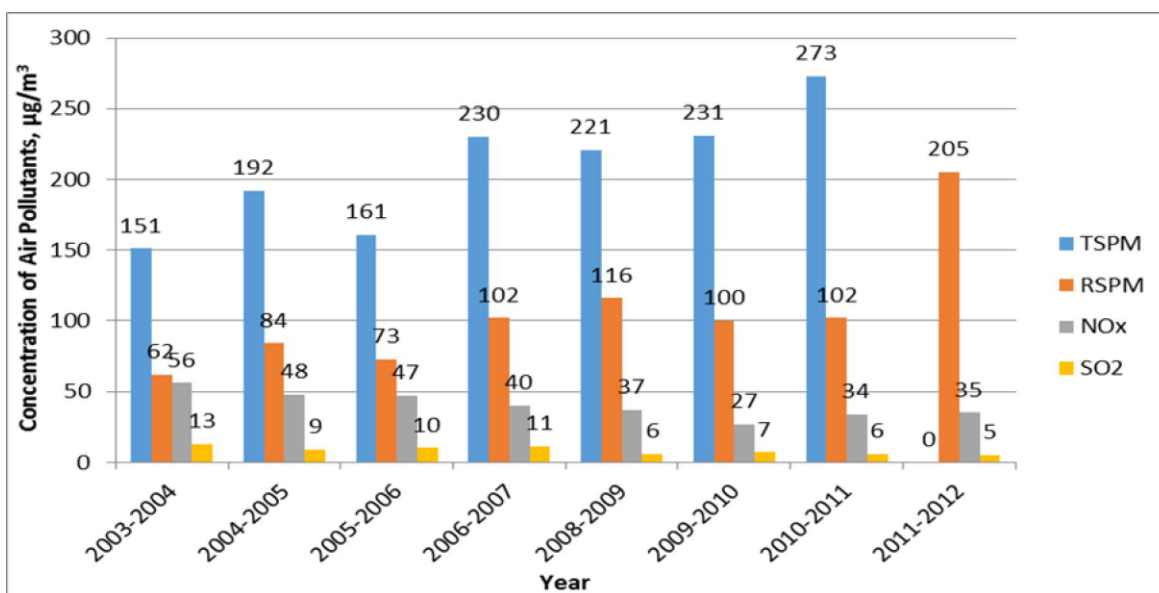


Figure. 2.6 Graph showing Ambient Air Quality in SIDCO Coimbatore between 2003-2012

Table 2.34 Ambient Air Quality Monitoring Results of Thoothukudi between 2003&2012				
A. Location: Raja Agencies, Thoothukudi				
Category -Industrial Area				
Year	Annual Average Concentration of Air pollutants, $\mu\text{g}/\text{m}^3$			
	TSPM	RSPM	NO _x	SO ₂
2003-2004	35	29	22	20
2004-2005	62	39	17	20
2005-2006	81	61	20	19
2006-2007	125	90	17	18
2008-2009	281	166	19	27
2009-2010	254	135	12	15
2010-2011	310	178	14	12
2011-2012	NA	132	13	7
Prescribed Standard				
Industrial	360	120	80	80
Residential, Rural & Other Areas (Mixed)	140	60	60	60
NAAQS-2009	NA	60	40	50

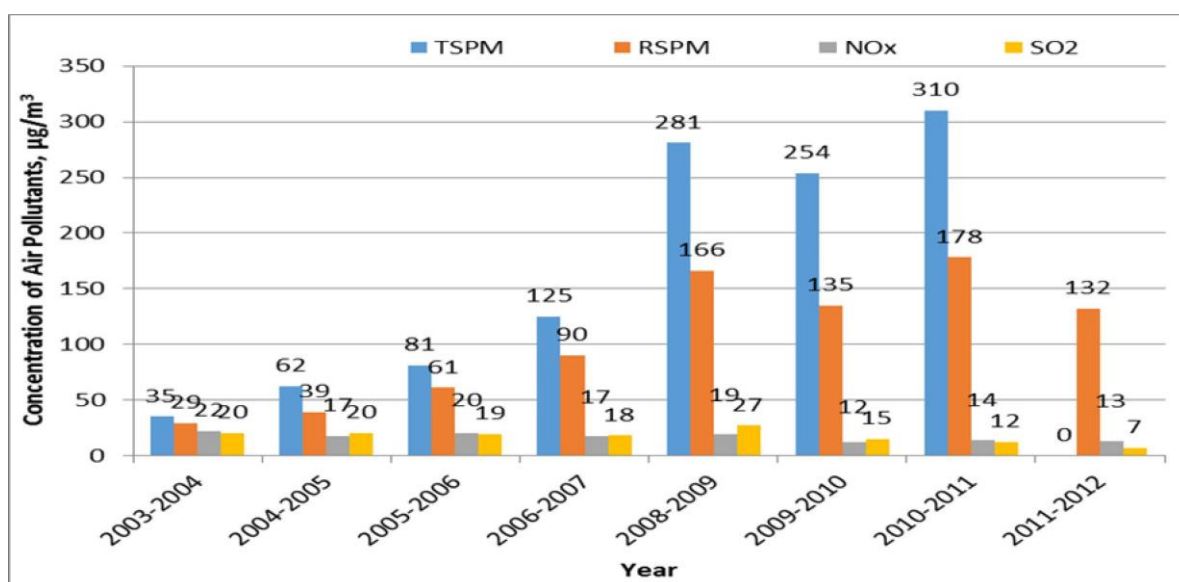


Figure. 2.7 Graph showing Ambient Air Quality in Thoothukudi between 2003-2012

Table 2.35 Ambient Air Quality Monitoring Results of Thoothukudi between 2003&2012				
B. Location: AVM Building, Thoothukudi				
Category -Mixed Area				
Year	Annual Average Concentration of Air pollutants, $\mu\text{g}/\text{m}^3$			
	TSPM	RSPM	NO _x	SO ₂
2003-2004	41	34	20	19
2004-2005	71	46	18	19
2005-2006	105	83	20	19
2006-2007	116	78	18	18
2008-2009	152	99	17	30
2009-2010	97	47	13	15
2010-2011	90	53	14	10
2011-2012	NA	81	14	7
Prescribed Standard				
Industrial	360	120	80	80
Residential, Rural & Other Areas (Mixed)	140	60	60	60
NAAQS-2009	NA	60	40	50

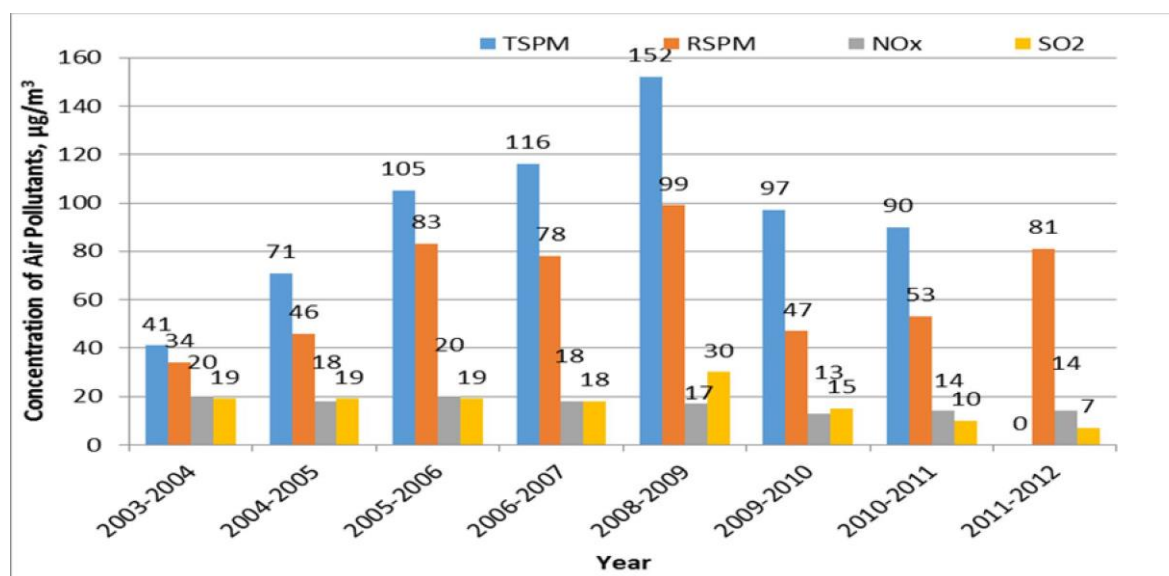


Figure. 2.8 Graph showing Ambient Air Quality in Thoothukudi between 2003-2012

Table 2.36 Ambient Air Quality Monitoring Results of Thoothukudi between 2003&2012				
C. Location: Fisheries College/ SIPCOT, Thuthookudi				
Category -Industrial Area				
Year	Annual Average Concentration of Air pollutants, $\mu\text{g}/\text{m}^3$			
	TSPM	RSPM	NO _x	SO ₂
2003-2004	38	30	19	20
2004-2005	60	38	18	19
2005-2006	66	54	22	19
2006-2007	90	63	17	17
2008-2009	130	86	19	30
2009-2010	138	70	11	17
2010-2011	156	88	12	12
2011-2012	NA	112	15	9
Prescribed Standard				
Industrial	360	120	80	80
Residential, Rural & Other Areas (Mixed)	140	60	60	60
NAAQS-2009	NA	60	40	50

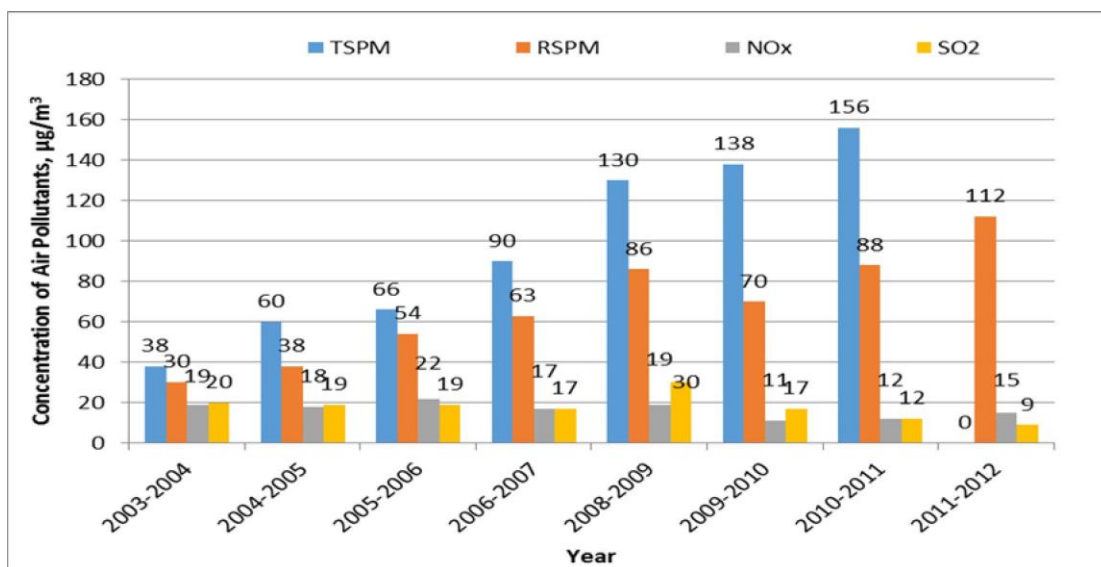


Figure. 2.9 Graph showing Ambient Air Quality in SIPCOT Thoothukudi between 2003-2012

Table 2.37 Ambient Air Quality Monitoring Results of Madurai between 2003&2012				
A. Location: Fennar Ltd, M/s. Susee cars & Trucks (p)Ltd., Madurai				
Category -Industrial Area				
Year	Annual Average Concentration of Air pollutants, $\mu\text{g}/\text{m}^3$			
	TSPM	RSPM	NO _x	SO ₂
2003-2004	163	72	29	22
2004-2005	136	52	28	18
2005-2006	117	37	29	17
2006-2007	94	65	26	12
2008-2009	91	45	24	11
2009-2010	81	36	25	11
2010-2011	111	42	25	11
2011-2012	NA	44	23	10
Prescribed Standard				
Industrial	360	120	80	80
Residential, Rural & Other Areas (Mixed)	140	60	60	60
NAAQS-2009	NA	60	40	50

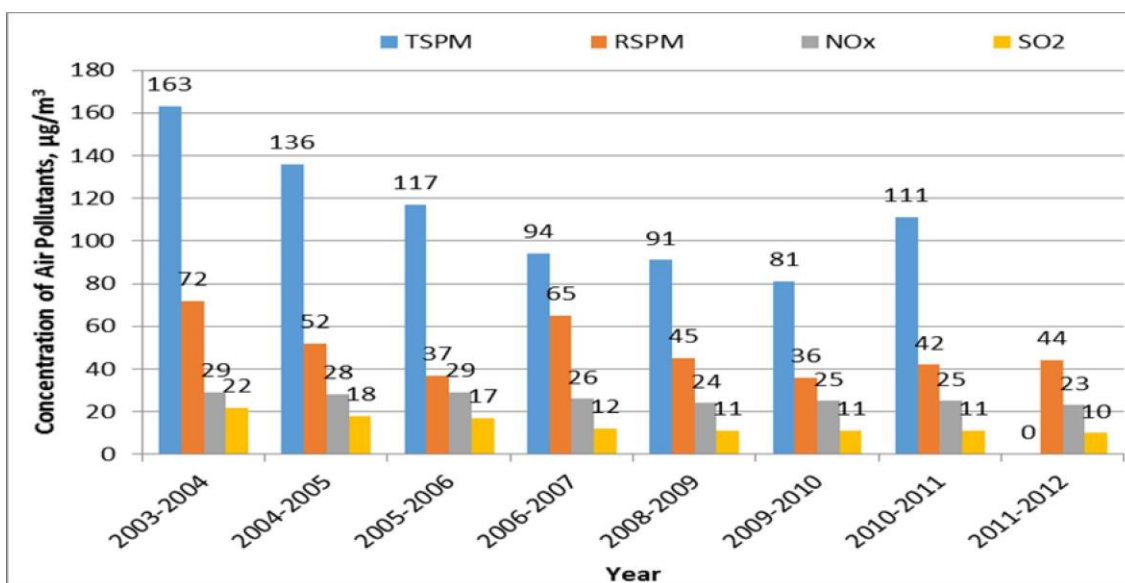


Figure. 2.10 Graph showing Ambient Air Quality in Madurai between 2003-2012

Table 2.38 Ambient Air Quality Monitoring Results of Madurai between 2003&2012				
B. Location: Kunnathur Chatram/Avvai Girls Hr.Sec.school Madurai				
Category -Mixed Area				
Year	Annual Average Concentration of Air pollutants, $\mu\text{g}/\text{m}^3$			
	TSPM	RSPM	NO _x	SO ₂
2003-2004	416	154	31	9
2004-2005	355	177	22	9
2005-2006	208	57	28	10
2006-2007	103	34	23	10
2008-2009	87	49	24	10
2009-2010	104	76	24	10
2010-2011	107	45	25	8
2011-2012	NA	46	24	11
Prescribed Standard				
Industrial	360	120	80	80
Residential, Rural & Other Areas (Mixed)	140	60	60	60
NAAQS-2009	NA	60	40	50

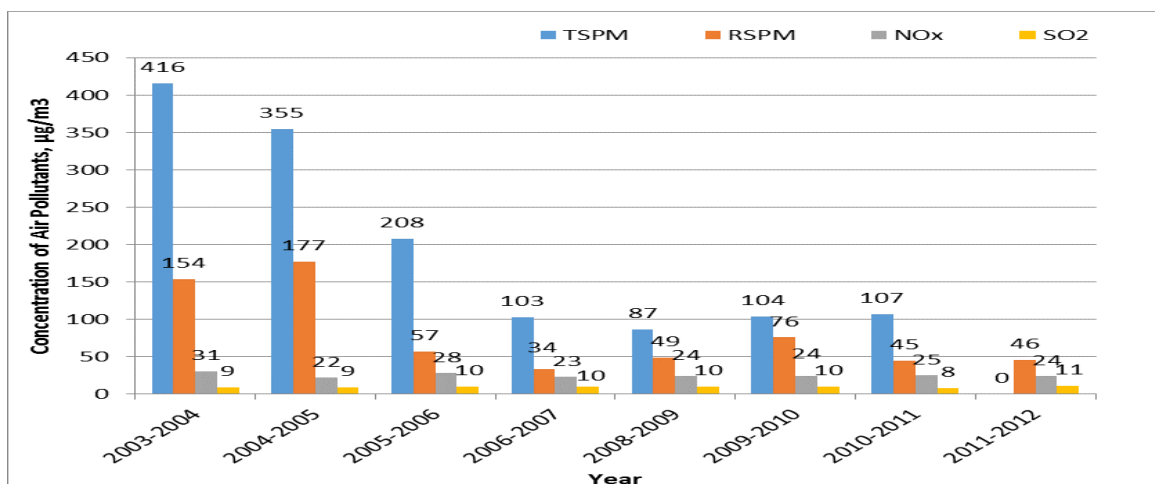


Figure. 2.11 Graph showing Ambient Air Quality in Kunnathur Chatram Madurai between 2003-2012

Table 2.39 Ambient Air Quality Monitoring Results of Madurai between 2003&2012				
C. Location: Highway Project Building, Madurai				
Category -Residential Area				
Year	Annual Average Concentration of Air pollutants, $\mu\text{g}/\text{m}^3$			
	TSPM	RSPM	NO _x	SO ₂
2003-2004	135	60	25	8
2004-2005	109	51	20	9
2005-2006	110	37	27	9
2006-2007	98	37	23	9
2008-2009	84	41	24	10
2009-2010	97	46	25	10
2010-2011	101	47	24	11
2011-2012	NA	47	24	10
Prescribed Standard				
Industrial	360	120	80	80
Residential, Rural & Other Areas (Mixed)	140	60	60	60
NAAQS-2009	NA	60	40	50

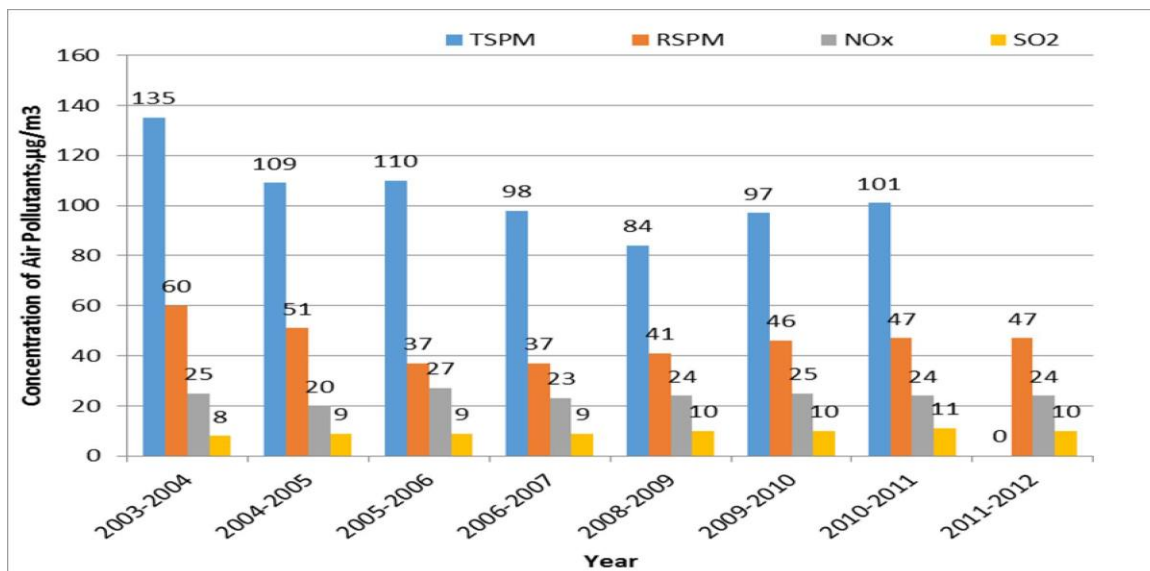


Figure. 2.12 Graph showing Ambient Air Quality in Highway Project Building -Madurai between 2003-2012

Table 2.40 Ambient Air Quality Monitoring Results of Salem between 2003&2012				
A. Location: Sowdeswari College Building , Salem				
Category -Mixed Area				
Year	Annual Average Concentration of Air pollutants, $\mu\text{g}/\text{m}^3$			
	TSPM	RSPM	NOx	SO ₂
2003-2004	66	28	37	8
2004-2005	71	38	34	7
2005-2006	69	42	33	7
2006-2007	69	42	33	7
2008-2009	118	79	25	9
2009-2010	133	85	24	9
2010-2011	111	74	24	9
2011-2012	NA	62	21	8
Prescribed Standard				
Industrial	360	120	80	80
Residential, Rural & Other Areas (Mixed)	140	60	60	60
NAAQS-2009	NA	60	40	50

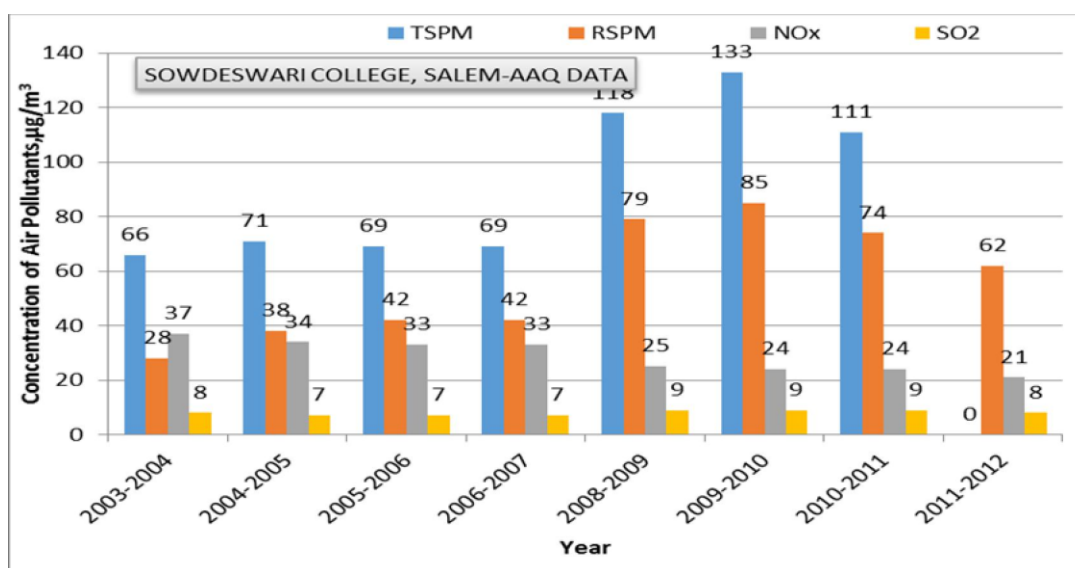


Figure. 2.13 Graph showing Ambient Air Quality in Salem between 2003-2012

From the above data it is clearly seen that levels of RSPM and TSPM are found to be high across all industrial and urban areas in Tamil Nadu.

2.3 Status of Number of Vehicles in Tamil Nadu

Table 2.41 Number of vehicles in Tamil Nadu - 2013
District wise Number of Commercial Vehicles As On 01.4.2013

Sl.No.	Name Of The District	Stage Carriages		Mini Buses	Autorick-Shaws	Ordi-Nary Taxi	Motor Cabs		Maxi Cabs		Omni Buses		Psv
		Public	Private				Sp	Aip	Sp	Aip	Sp	Aip	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Chennai	6546	6	0	70675	531	21560	7550	16023	3484	189	57	3474
2	Kancheepuram	659	177	112	3741	0	2189	148	4670	38	66	0	2950
3	Tiruvallore	182	108	62	5927	0	2872	832	2958	752	11	0	569
4	Vellore	599	615	98	14095	132	862	539	1337	126	0	2	478
5	Tiruvannamalai	271	331	157	2581	2	1309	372	661	65	0	5	66
6	Cuddalore	401	345	122	4011	8	2876	113	1802	10	0	0	54
7	Villupuram	755	303	172	8030	23	3428	124	1473	68	5	0	27
8	Salem	855	501	215	5955	5	2281	161	1894	16	88	9	162
9	Namakkal	266	518	203	821	0	1948	45	930	8	42	0	329
10	Dharmapuri	394	314	55	1767	0	557	63	434	18	1	0	18
11	Krishnagiri	494	143	48	3084	0	290	488	414	55	3	0	157
12	Trichy	769	465	204	9791	1895	4180	186	2288	83	63	9	178
13	Karur	116	167	117	1216	0	537	12	442	6	4	0	156
14	Perambalur	67	72	98	522	0	604	10	353	1	0	0	16
15	Ariyalur	125	31	34	209	0	520	4	323	0	0	0	11
16	Thanjavur	601	226	167	5677	12	2651	157	1484	131	52	21	22
17	Nagapattinam	170	162	189	4185	0	1983	22	1023	146	16	0	15
18	Tiruvarur	180	96	84	1525	0	1490	14	629	13	0	0	2
19	Pudukkottai	357	189	49	1483	61	1245	0	869	0	0	5	31
20	Erode	463	512	155	2780	0	3164	127	1366	15	4	4	341
21	Coimbatore	1203	448	161	10782	69	11629	155	3746	9	43	41	658
22	Udhagamandalam	423	0	118	2967	838	1781	462	710	37	0	2	54
23	Tiruppur	513	306	87	1733	15	1956	18	1285	5	17	0	779
24	Madurai	1184	240	274	13252	0	4117	142	3133	65	27	2	271
25	Dindigul	519	376	102	4848	32	2438	21	1457	16	18	0	181
26	Theni	258	103	109	5750	0	1193	65	1391	30	34	0	160
27	Virudhunagar	339	268	149	3345	0	1690	15	1413	8	11	0	1165
28	Sivagangai	285	170	58	2373	2	1647	4	784	0	5	0	52
29	Ramanathapuram	337	106	60	5134	8	1090	13	1578	2	0	0	14
30	Tuticorin	330	189	166	3904	68	2357	6	1517	1	44	6	307
31	Tirunelveli	556	292	267	10072	25	4556	13	3333	0	7	0	391
32	Kanniyakumari	684	78	233	6094	25	1887	0	1963	0	0	0	130
	State Total	22053	8060	4125	218329	3751	92887	11881	63683	5208	750	163	13218
	Chennai -City	6546	6	0	70675	531	21560	7550	16023	3484	189	57	3474

Source : Transport Department, Govt. of Tamil Nadu

Table 2.42 Number of vehicles in Tamil Nadu - 2003

DISTRICTWISE NUMBER OF COMMERCIAL VEHICLES AS ON 01.04.2003

SL. NO.	Name of the District	Stage Carriages		Mini Buses	Auto Rick- Saws	Ordi Nary Taxi	Motor Cabs		Maxi cabs Cabs		Omni Buses		Private Service Vehicle	Sch- Ool Bus	Ambu- Lance	Fire Figh- Ter	Light Commercial Vehicle	Lorri- Ies	Arti- Culated Vehicle	National Permit		Trac- Tors & Trai- Lers	Total Trans- Port Vehicles
		Pub- Lic	Pri- Vate				Sp	Aip	Sp	Aip	Sp	Aip								Lorri- Ies	Articulated Vehicle		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Chennai	3673	0	0	39782	222	5162	2400	3828	191	138	66	690	740	645	64	7156	16334	988	2939	649	660	86327
2	Kancheepuram	765	157	84	8145	41	1622	659	1272	32	5	3	232	387	85	30	2076	3912	73	329	7	1761	21677
3	Tiruvallore	80	108	59	2961	0	496	80	1154	47	0	0	36	118	35	4	935	4292	68	490	12	385	11360
4	Vellore	554	413	87	5943	27	230	78	585	14	3	4	176	60	43	20	269	5810	124	1767	14	1230	17451
5	Tiruvannamalai	176	280	150	1744	0	44	62	294	16	1	2	33	17	42	10	491	1979	98	385	0	344	6168
6	Cuddalore	336	291	115	3027	32	1787	37	1186	23	4	1	52	37	67	25	146	2816	488	614	3	1572	12659
7	Villupuram	586	293	156	1650	14	906	25	738	14	8	0	137	50	49	66	297	2903	334	638	2	1426	10292
8	Salem	470	416	166	3606	2	1252	41	834	40	19	16	109	213	68	33	4269	4622	298	2401	33	1523	20431
9	Namakkal	248	252	209	401	1	585	41	405	9	6	2	82	108	47	8	1836	5735	2479	6082	573	2042	21151
10	Dharmapuri	662	212	131	3169	0	213	39	312	10	1	0	120	275	58	19	1364	3438	94	573	50	870	11610
11	Trichy	507	362	192	4739	17	2570	28	1126	24	30	20	65	131	91	30	2775	4777	479	826	124	1353	20266
12	Karur	111	263	130	807	0	272	25	163	6	8	2	24	15	48	7	1211	2045	169	599	53	863	6821
13	Perambalur	170	97	147	363	0	441	5	300	8	3	0	34	49	17	1	119	920	17	161	10	1000	3862
14	Thanjavur	387	243	203	2900	6	1371	67	982	15	2	2	61	19	37	16	958	2499	117	102	0	1452	11439
15	Nagapattinam	195	88	150	1597	4	1795	66	774	25	5	0	24	42	21	10	281	1196	121	169	12	1466	8041
16	Tiruvarur	170	82	103	1165	0	1293	2	452	7	0	0	3	7	4	1	389	812	6	25	26	344	4891
17	Pudukkottai	309	159	49	1155	2	999	38	822	3	11	0	28	46	65	19	458	2362	100	128	2	545	7300
18	Erode	530	423	168	2642	7	1283	86	823	9	5	5	126	169	86	46	3280	7637	1252	1613	3	2376	22569
19	Coimbatore	1255	580	215	8407	41	2872	314	1672	84	15	8	518	785	207	93	7155	12663	1014	2071	7	2814	42790
20	Udhagamandalam	359	0	98	1837	88	564	82	393	36	2	1	45	85	88	12	428	653	160	236	0	427	5594
21	Madurai	817	196	238	6190	0	1448	115	1411	29	33	6	111	320	114	63	2253	3906	160	459	0	1523	19392
22	Dindigul	321	301	132	2459	24	1019	52	668	3	5	1	73	228	45	12	510	3184	107	384	0	1363	10891
23	Theni	242	73	90	961	0	257	56	665	14	8	2	94	87	44	10	303	1487	290	432	0	875	5990
24	Virudhunagar	348	179	134	1206	3	637	38	1032	11	4	2	195	205	107	23	1748	2277	106	482	0	874	9611
25	Sivagangai	258	130	59	1089	17	696	39	528	6	3	0	34	140	42	6	673	1301	430	34	0	498	5983
26	Ramanathapuram	295	65	46	2002	0	647	21	401	3	0	0	32	30	49	6	537	563	101	70	0	669	5537
27	Tuticorin	316	171	172	1835	66	1244	59	1146	17	3	0	204	103	104	28	1219	2774	95	329	290	764	10939
28	Tirunelveli	445	308	184	4341	179	2111	110	2778	43	7	4	89	262	156	39	3175	5076	193	205	11	2099	21815
29	Kanniyakumari	677	0	236	3596	121	1547	48	1266	65	0	0	53	195	92	34	1928	2171	77	196	6	928	13236
	State -total	16414	6345	3903	119719	914	35363	4713	28010	804	329	147	3480	4923	2556	735	48239	110144	10038	24739	1887	34046	457448
	Chennai city	3673	0	0	39782	222	5162	2400	3828	191	138	66	690	740	645	64	7156	16334	988	2939	649	660	86327

Source : Transport Department , Govt. of Tamil Nadu

Table 2.43 Number of Vehicles in the State during 2003 and 2013

Year	Name Of The District	Stage Carriages		Mini Buses	Autorick-Shaws	Ordinary Taxi	Motor Cabs		Maxi Cabs		Omni Buses		PSV
		Public	Private				SP	AIP	SP	AIP	SP	AIP	
2003	State - Total	16414	6345	3903	119719	914	35363	4713	28010	804	329	147	3480
2013		22053	8060	4125	218329	3751	92887	11881	63683	5208	750	163	13218

Source : Transport Department , Govt. of Tamil Nadu

Table 2.44 Number of Vehicles in the Chennai during 2003 and 2013

Year	Name Of The District	Stage Carriages		Mini Buses	Autorick-Shaws	Ordinary Taxi	Motor Cabs		Maxi Cabs		Omni Buses		PSV
		Public	Private				SP	AIP	SP	AIP	SP	AIP	
2003	State - Total	3673	0	0	39782	222	5162	2400	3828	191	138	66	690
2013		6546	6	0	70675	531	21560	7550	16023	3484	189	57	3474

Source: Transport Department, Govt. of Tamil Nadu

The number of Vehicles has a direct indication on the Air pollution in the State. Urban areas like Chennai City have high levels of air pollution especially levels of CO and So₂, due to the high number of vehicles. Further improper combustion of fuels and bad maintenance of vehicles add to the Pollution from vehicles. Frequent Checking is needed across the state to keep a check on the emissions from vehicles.

2.4 Action Taken to Prevent Air Pollution in Tamil Nadu

(a) Industrial Pollution

The salient features of actions taken to control industrial pollution are as follows:

- No new polluting units are permitted within the city.
- No new incinerators are permitted within the city, old incinerators being phased out.
- Common facilities are set up outside the city for incineration of Bio-medical Waste.
- The industries have been directed to develop a green belt of minimum 33% of the project area; Green belt is also being developed by industries on road sides as avenue plantations. Renewal of the consent is based on compliance with this condition.
- Periodic inspection of industrial units is to be fitted with online stack monitor connected to the pollution control board – CARE Air centre.

(b) Vehicular Pollution

The salient features of action taken to control vehicular pollution are as follows:

- Bharat Stage –II norms have been implemented for the registration of new passenger car from 1-7-2011.
- Emission norms for in-use vehicles in consultation with MoRTH & MoEF have been implemented in Chennai city for all vehicles from 1-1-1997.
- Catalytic Converter fitted passenger car have been registered since, 1997.
- Periodic inspection of in use vehicles in Chennai is conducted by the officials of transport Department and Police Department.
- Supply of Unleaded petrol from February 2000.
- In Chennai City Low sulphur diesel (0.05%) is supplied since 1-7-2001.
- Supply of Pre-mixed 2T oil since 1-4-2002
- Entry of heavy vehicles is restricted by the road in Chennai city during peak hours.
- Ring Road have been constructed to avoid the entry of intercity vehicles in the city.
- Mass transport system (metro Rail) from Beach to Velachery is completed.
- Fiscal Measures like structuring parking fees and road tolls has been implemented.

3. Conclusion

Data collected from various organizations and Departments of Government of Tamil Nadu, reveals that there is pollution in the environment in various districts of the State.

Population explosion, urbanization and Industrialization in the recent past has led to complex Environmental Pollution in Tamil Nadu. It was our belief that utilization of control equipment, establishment of Effluent treatment plants, Sewage Treatment Plants are enough to control emissions and for safe discharge of effluent into receptors like rivers, lakes, streams etc. But the real solution lies in avoiding the sources of pollution by adopting measures like resource recovery and cleaner technological processes for effective way of tackling the Environmental issues and problems. Process development to use less polluting raw materials is a long term preventive action. Recovery of Chromium from Tannery Effluent is a classic example of resource conservation.

Due to the compulsion on alternative energy sources, industries which produce hot waste gases have opted for the generation of power. This resulted in reducing the usage of coal and greenhouse gases.

Replacing hazardous substances with eco-friendly substances will not only reduce the pollution load, but also reduce the consumption of raw materials .

Environmental concerns due to generation of large quantity of municipal solid wastes, hazardous wastes, E-wastes, Bio-medical Wastes, Plastic Wastes from residential units, industries, institutions, Health care facilities, commercial establishments and service providers are posing Environmental pollution to a larger extent affecting land , water , air and the environment which leads to degradation of resources and loss of ecosystem depriving cleaner environment for future generation .

Sewage collection, treatment and solid waste management remains extensively unsolved in major cities and towns.

Transport is another sector that contributes to air pollution, especially in urban areas. A good action plan must be developed for traffic management in urban areas as the levels of pollution in the ambient air due to traffic is increasing at an alarming rate.

Many issues of environmental concern can be solved by making all stake holders to understand the problems in greater depth, so that it is possible to find appropriate solutions.

Industries, waste processors, communities, NGO's and all other stake holders must contribute their might to solve Environmental problems in addition to Government and regulatory Authorities.

Whether, it is pollution from Industry or local body or transport activity, it is the basic knowledge of the stake holders in the field of the latest legislations, technology, standards and all connected issues which will help for effective implementation of the Environment protection programmes.

List of Abbreviations	
Symbol	Meaning
ADD	Acute Diarrheal Diseases
Avg	Average
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
CFCs	Chlorofluorocarbon
CPCB	Central Pollution Control Board
Cs	Cases
DBU Class-C	Designated Best Use – Class C-Drinking Water source with conventional treatment followed by disinfection as per CPCB
DBU Class-B	Designated Best Use – Class B- Outdoor Bathing as per CPCB
D.O	Dissolved Oxygen
Ds	Deaths
E.Coli	Escherichia coli
ETP	Effluent Treatment Plant
FC	Fecal coliform
MNP	Most Probable Number
Max	Maximum
Min	Minimum
NAASQ	National Ambient Air Quality Standards
NOx	Oxides of Nitrogen
O3	Ozone
RSPM	Respirable Suspended Particular Matter
TH	Total Hardness as CaCO ₃
TSPM	Total Suspended Particulate Matter
TSS	Total Suspended Solids
TNPCB	Tamil Nadu Pollution Control Board
TWAD	Tamil Nadu Water Supply and Drainage Board
VOC	Volatile Organic Compounds

Data Sources	
Air Pollution	
1.	TNPCB
2.	National Air Quality Monitoring Programme
3.	Ambient Air Quality Monitoring Programme