MALE' DECLARATION ON CONTROL AND PREVENTION OF AIR POLLUTION AND ITS LIKELYTRANSBOUNDARY EFFECTS FOR SOUTH ASIA

COUNTRY PAPER - INDIA

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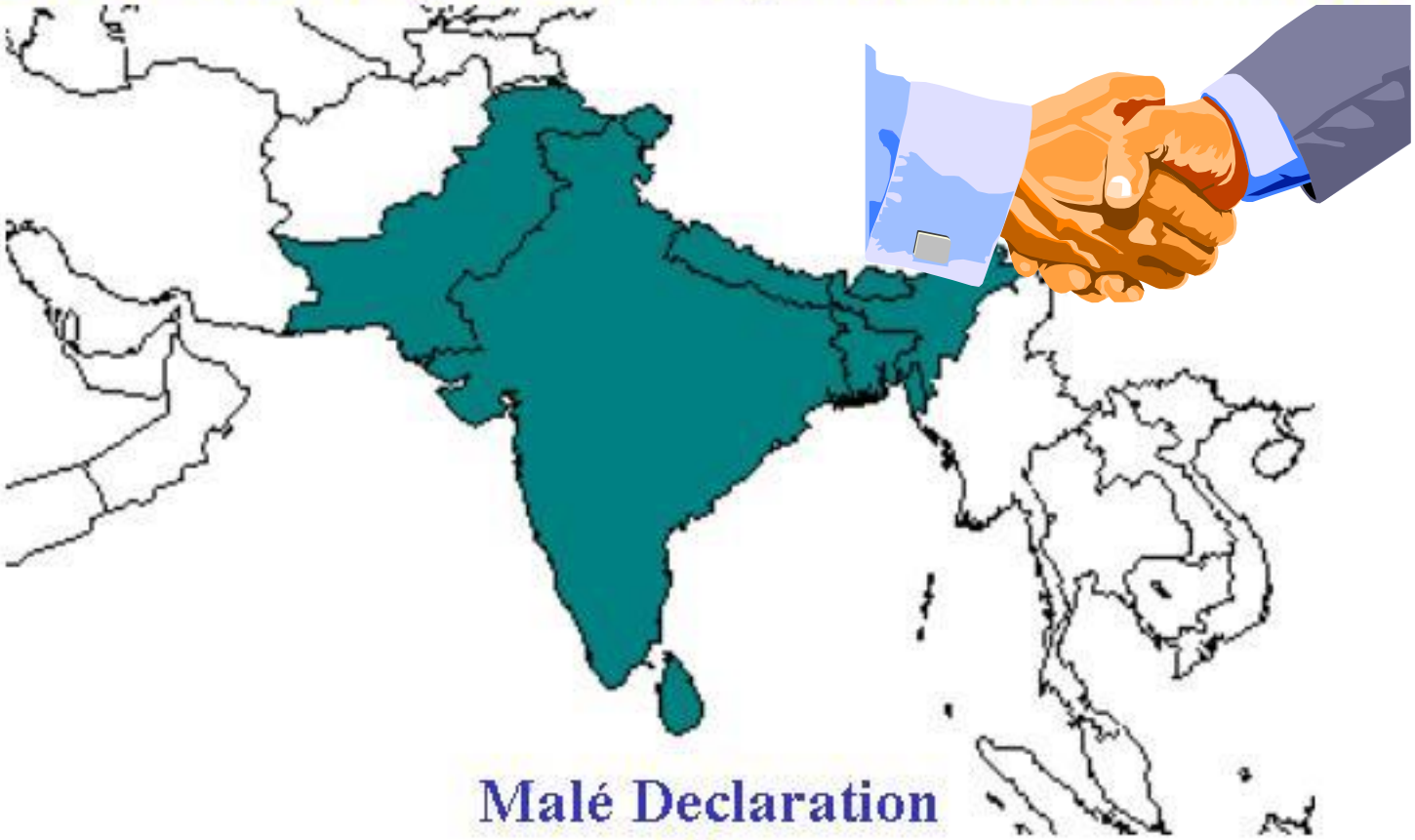
Malé: Sub-Regional Response in South Asia



Malé Declaration
On
Control and Prevention of Air Pollution and Its Likely Transboundary Effects
for
South Asia

MAJOR ENVIRONMENTAL ACTS IN INDIA

- The Water (Prevention & Control of Pollution) Act, 1974
- The Water (Prevention & Control of Pollution) Cess, Act, 1974 as amended in 1991.
- The Air (Prevention & Control of Pollution) Act, 1981
- The Environment (Protection) Act, 1986
- The Public Liability Insurance Act, 1991
- The National Environmental Tribunal Act, 1995
- The National Environment Appellate Authority Act, 1997

CENTRAL POLLUTION CONTROL BOARD

- APEX BODY IN INDIA FOR PREVENTION AND CONTROL OF ENVIRONMENTAL (AIR, WATER, NOISE, SOLID WASTE) POLLUTION.
- TECHNICAL AND SCIENTIFIC WING OF MOEF
- SET UP UNDER PARLIAMENT ACT (WATER ACT 1974, AIR ACT 1981)
- SUPREME COURT/HIGH COURT EXPECTATIONS
- RESPONSIBLE FOR SETTING ALL STANDARD AND POLICIES FOR CONTROL OF ENVIRONMENTAL POLLUTION BASED ON SCIENTIFIC STUDY.
- ENVIRONMENT PROTECTION ACT, 1986 (SECTON 5, DELEGATED BY MOEF)
- NEW RESPONSIBILITIES GIVEN UNDER VARIOUS RULES / ACTS
  - **NOISE POLLUTION CONTROL**
  - **BIOMEDICAL RULES**
  - **HAZARDOUS WASTE MANAGEMENT**
  - **MUNICIPAL SOLID WASTE MANAGEMENT**
  - **EIA - NOTIFICATION**
  - **FLY ASH MANAGEMENT**
  - **COAL BENEFICIATION**
  - **VEHICULAR POLLUTION CONTROL**

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MAJOR AIR POLLUTION ISSUES IN INDIA

1. Major Cities (Vehicular Air Pollution)

2. 24 – Critically polluted area (Industrial Air Pollution)

3. Indoor Air Pollution (Rural Area)

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AIR POLLUTION PROBLEM IN INDIA

I. MAJOR CITIES

(DELHI, KOLKATA, MUMBAI, CHENNAI, AHMEDABAD, BANGALORE, HYDERABAD, PUNE, KANPUR).-----VEHICLES, SMALL/MEDIUM SCALE INDUSTRIES

II. PROBLEM AREA

AREA		*TYPE OF POLLUTING INDUSTRIES*
SINGRAULI	-	POWER PLANTS, MINING, ALUMINIUM INDUSTRY.
KORBA	-	POWER PLANTS, ALUMINIUM INDUSTRY, MINING.
VAPI / ANKALESHWAR	-	CHEMICAL INDUSTRIES.
GREATER COCHIN	-	OIL REFINERIES, CHEMICAL, METALLURGICAL INDUSTRIES
VISAKHAPATNAM	-	OIL REFINERY, CHEMICAL, STEEL PLANTS.
HOWRAH	-	FOUNDRY, REROLLING MILLS, VEHICLES.
DURGAPUR	-	CHEMICAL INDUSTRIES, POWER PLANTS, STEEL PLANTS .

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AREAS		TYPE OF INDUSTRY
MANALI TAMIL NADU	-	OIL REFINERIES, CHEMICAL INDUSTRY,FERTILIZER INDUSTRY
CHEMBUR	-	REFINERIES, POWER PLANT, FERTILIZER INDUSTRY.
MANDI GOBINDGARH	-	SECONDARY STEEL INDUSTRY
DHANBAD	-	MINING, COKE OVEN.
PALI	-	COTTON TEXTILE, DYEING.
NAGAFGARH DRAIN BASIN	-	POWER PLANTS, VEHICLES.
ANGUL-TALCHER	-	MINING, ALUMINIUM PLANTS, THERMAL POWER PLANTS.

AREAS		TYPE OF INDUSTRY
BHADRAVATI KARNATAKA	-	IRON & STEEL, PAPER INDUSTRY
DIGBOI	-	OIL REFINERY
JODHPUR	-	COTTON TEXTILE, DYE
KALA-AMB	-	PAPER, ELECTROPLATING
NAGDA-RATLAM	-	VISCOSE RAYON, CAUSTIC, DYES DISTILLERY
NORTH ARCOT	-	TANNERIES
PARWANOO	-	FOOD PROCESSING UNIT ELECTROPLATING
PATANCHERU-BOLLARAM	-	ORGANIC CHEMICAL, PAINTS, PETROCHEMICAL INDUSTRY
TARAPUR	-	CHEMICAL INDUSTRY

PROBLEM AREAS IN INDIA

REASONS FOR AIR POLLUTION IN INDIA

- POOR QUALITY OF FUEL (COAL, DIESEL, PETROL, FUEL OIL)
- OLD PROCESS TECHNOLOGY (SPECIALLY IN S.S.I.)
- WRONG SITING OF INDUSTRIES
- NO POLLUTION PREVENTIVE STEP TAKEN (EARLY STAGE OF INDUSTRIALISATION)
- POOR VEHICLE DESIGN (2-STROKE)
- UNCONTROLLED GROWTH OF VEHICLE POPULATION IN ALL MAJOR CITIES / TOWNS.
- NO POLLUTION PREVENTION AND CONTROL SYSTEM IN SMALL/ MEDIUM SCALE INDUSTRY (S.M.S)
- POOR COMPLIANCE OF STANDARD IN S.M.S

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MAJOR ENVIRONMENTAL ISSUES IN INDIA

1. **Air Quality Problem in Major Cities (45) and Metro Cities (7) with respect to RSPM/PM_{10} and NO_x.**
2. **Toxic Pollutants (VOC,Benzene,PAH) level in Seven Cities generally exceeding the guidelines.**
3. **Industrial Air Pollution Control - Major Issues:**
   - **Thermal Power Plants (fly ash management, emission of SO_2/PM)**
   - **Iron & Steel Industry (coke oven plants emissions, waste utilization, BOD plant performance)**
   - **Aluminium Industry (pot room secondary emission)**

Contd..

- **Paper & Pulp Industry (Emission from Chemical Recovery Plant, Odour issues)**
- **Oil Refinery (SO_2 emission, VOC emission, Fugitive emission).**
- **Cu / Zn (SO_2 emission, Sludge disposal)**

5. **Pollution Control from Small Scale Industry (3 million).**

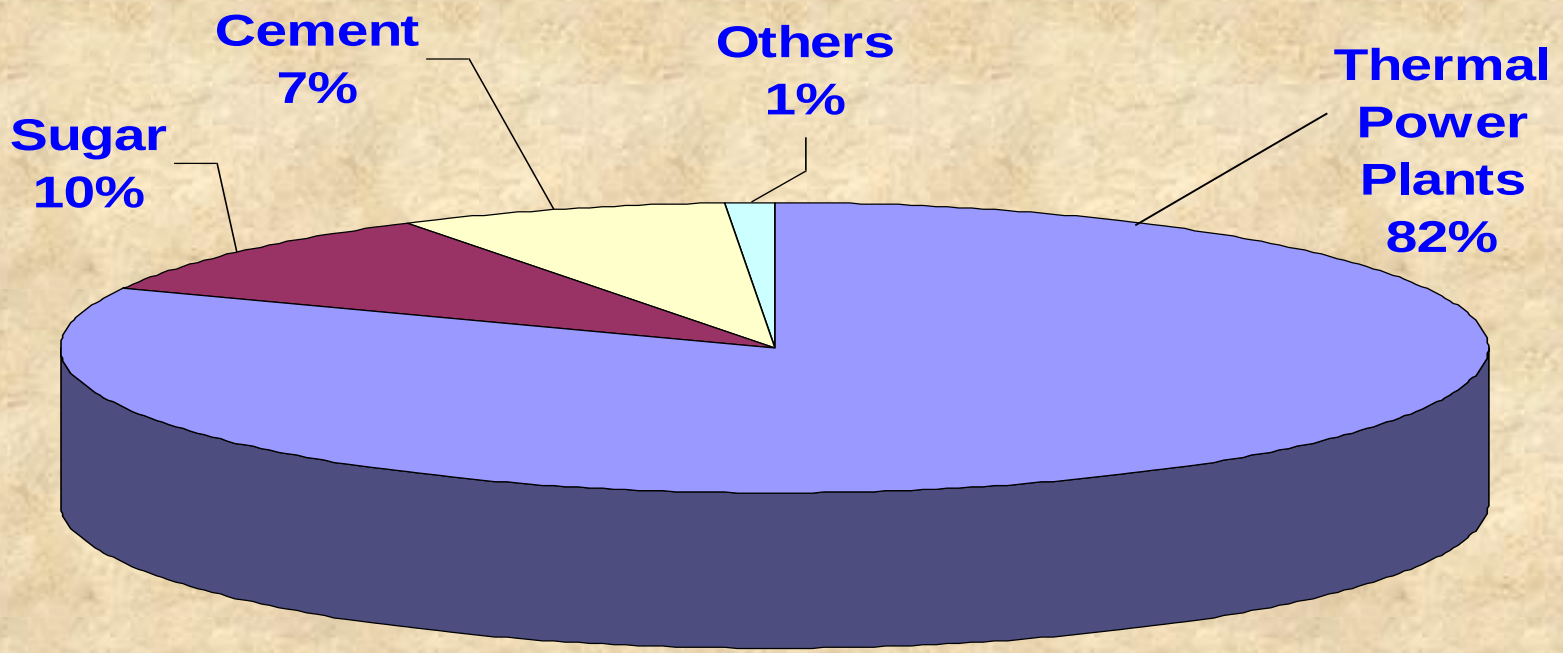
- **Stone Crusher**
- **Lime Kiln**
- **Foundries**
- **Electroplating**
- **Rerolling Mills**
- **Brick Kiln**

Contd..

6. Coal Quality (Clean Coal Technology, High Ash)
7. Fuel Quality (Benzene, Sulphur)
8. Pollution control from in-use Vehicles improvement of (I/M System)
9. Fly Ash Management (100 million tonne generation)

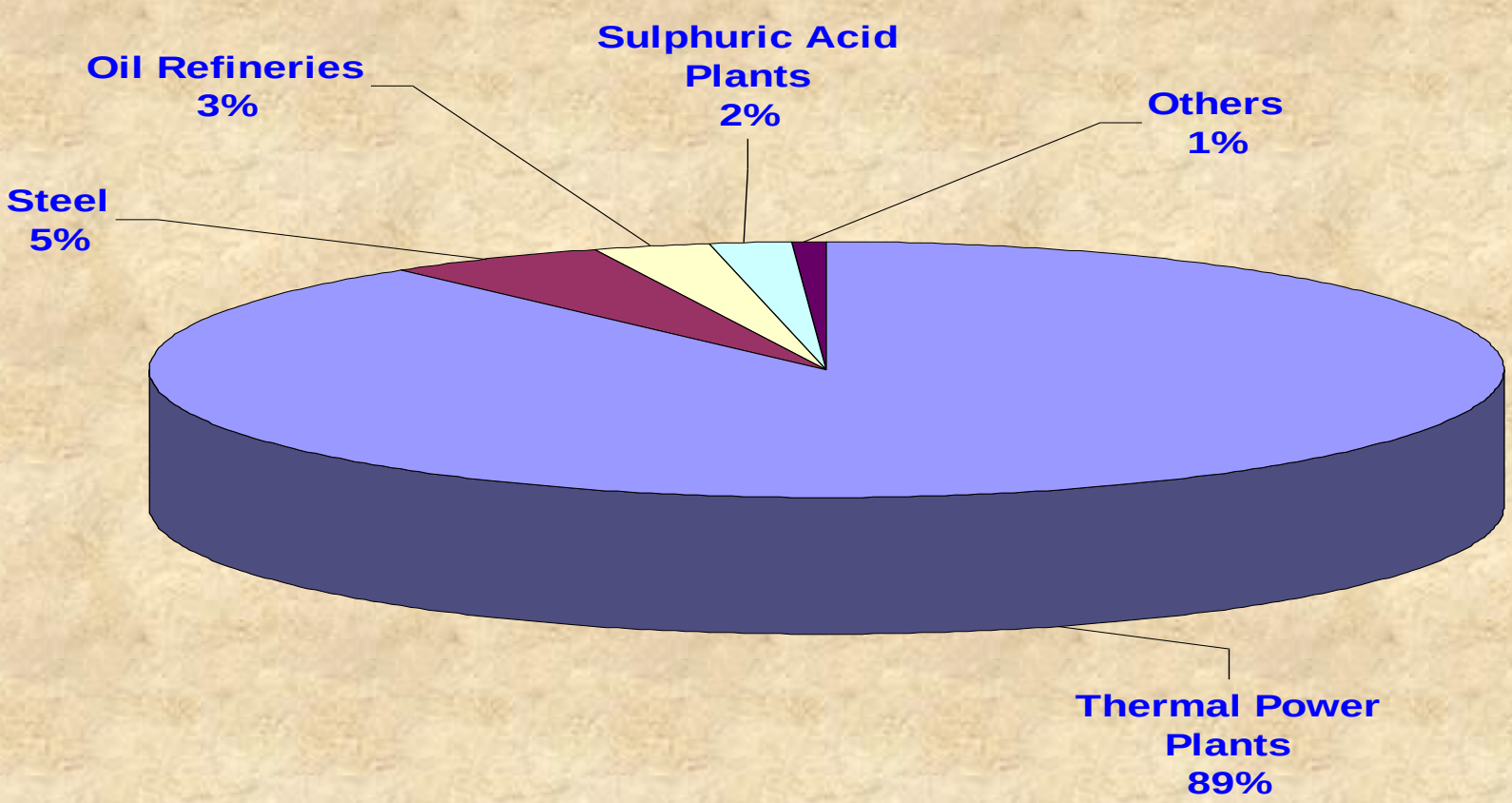
INVENTORY OF INDUSTRIAL EMISSIONS IN THE COUNTRY

EMISSION ESTIMATES



Share of Suspended Particulate Matter Load (tonnes/day) by Different Categories of Industries (With Control Device), Total Load = 5365 tonnes/day

Share of Sulphur Dioxide Load (tonnes/day) by Different Categories of Industries (Total Load = 3715 tonnes/day)



VEHICULAR POLLUTION PROBLEMS IN INDIA

- High vehicle density in Indian urban centers
- Older vehicles predominant in vehicle vintage
- Inadequate inspection & maintenance facilities
- Predominance of two stroke two wheelers
- Adulteration of fuel & fuel products
- Improper traffic management system & road conditions
- High levels of pollution at traffic intersections
- Absence of effective mass rapid transport system & intra-city railway networks
- High population exodus to the urban centers

INVENTORY OF VEHICULAR EMISSIONS IN THE COUNTRY

ESTIMATED AIR POLLUTION LOAD IN MAJOR CITIES

CITY	POLLUTION LOAD (TONNES/DAY)	NUMBER OF ON-ROAD VEHICLES (LAKHS)
Delhi	2686	34.25
Mumbai	885	8.4
Bangalore	971	12.4
Kolkata	449	6.6
Chennai	786	11.5
Ahmedabad	638	7.8
Hyderabad - Secunderabad	1123	10.99

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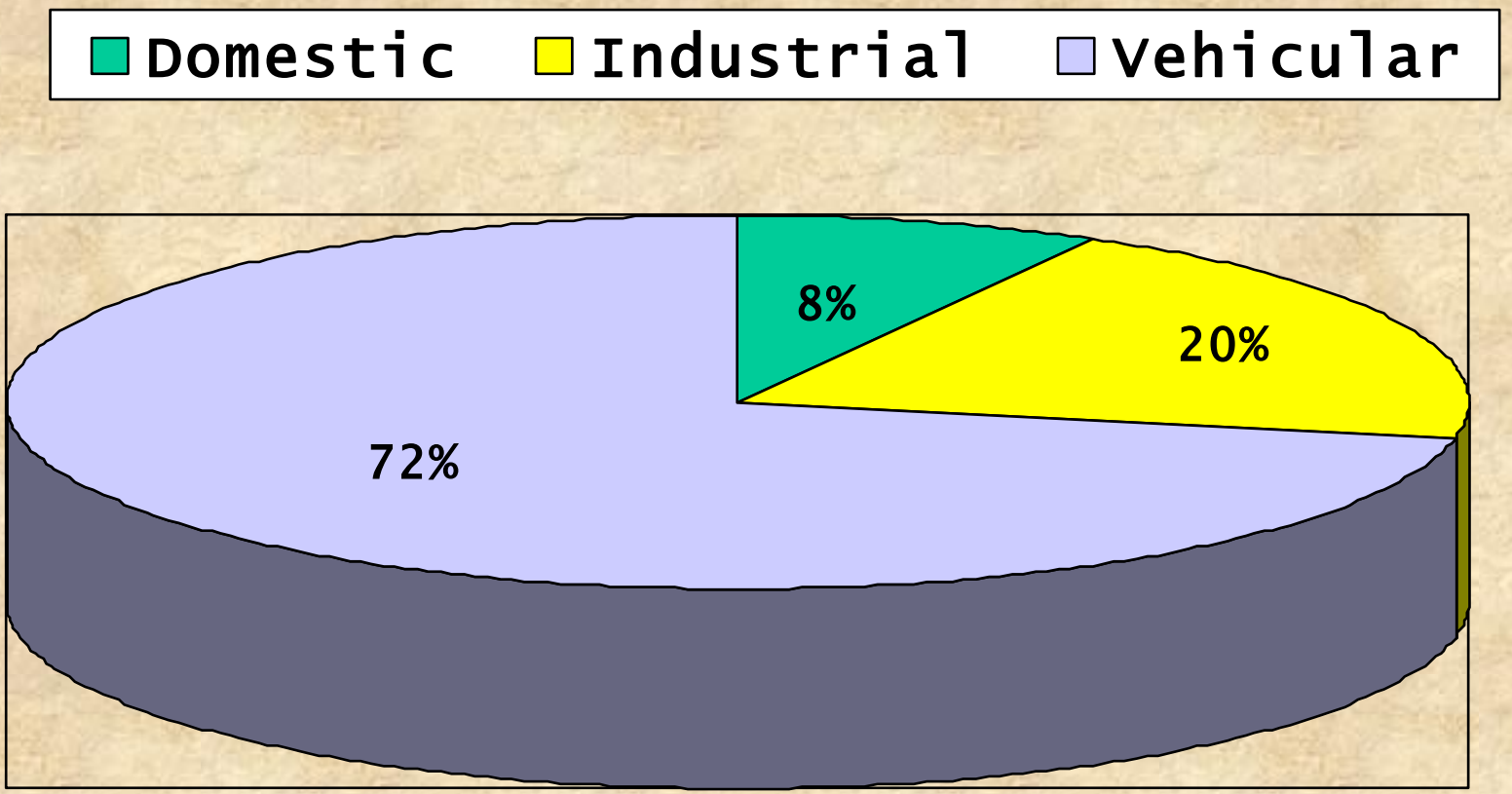
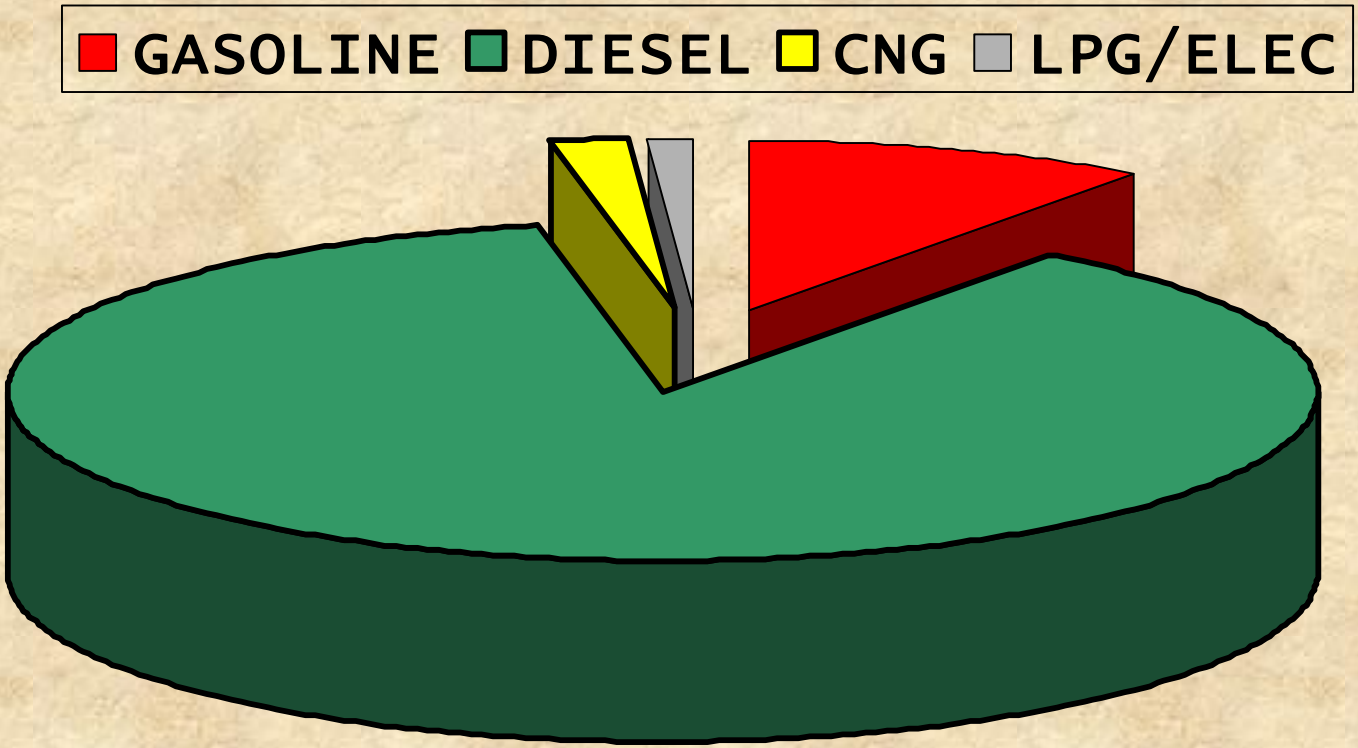
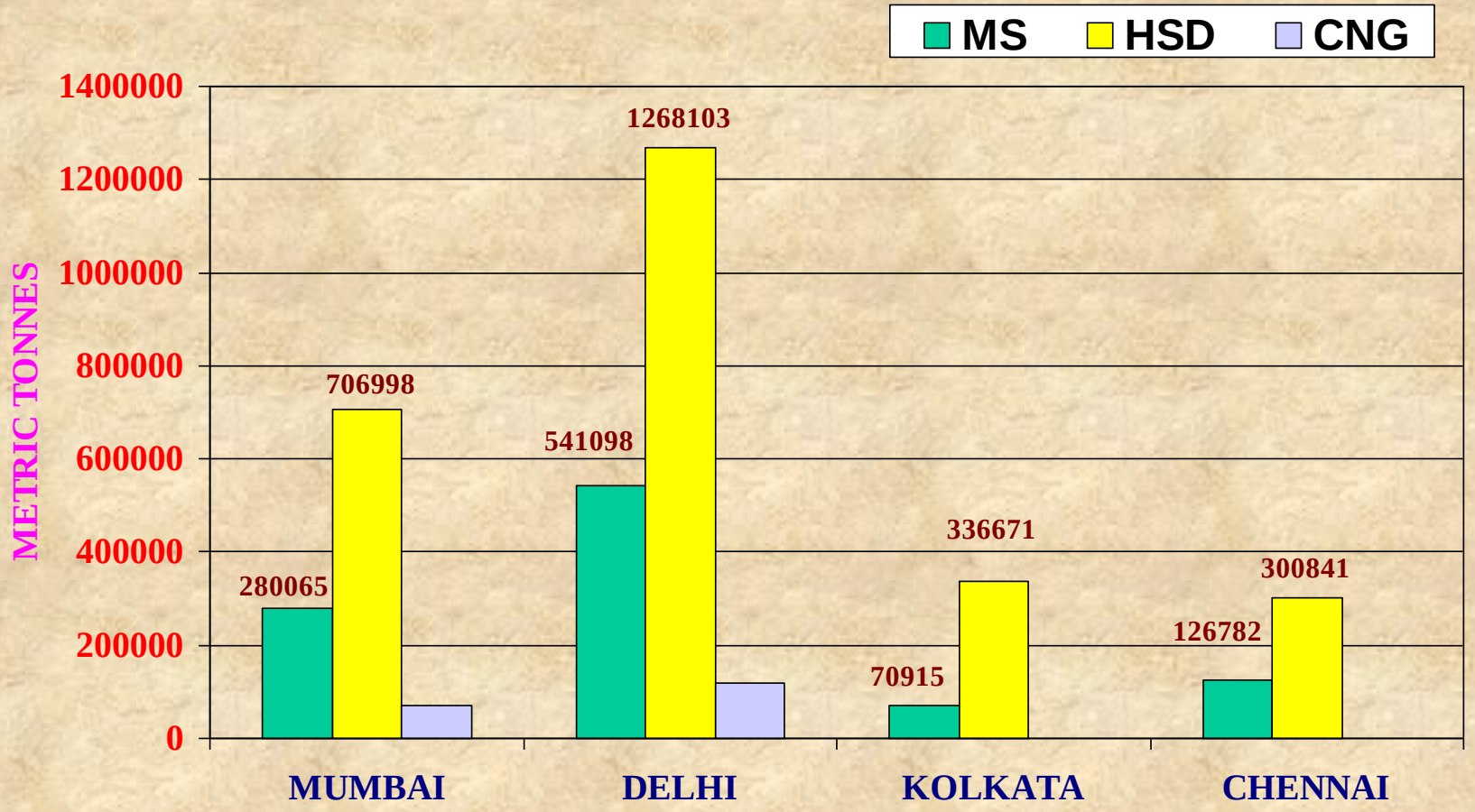
CONTRIBUTION OF VARIOUS SECTORS TO AMBIENT AIR QUALITY IN MAJOR CITIES



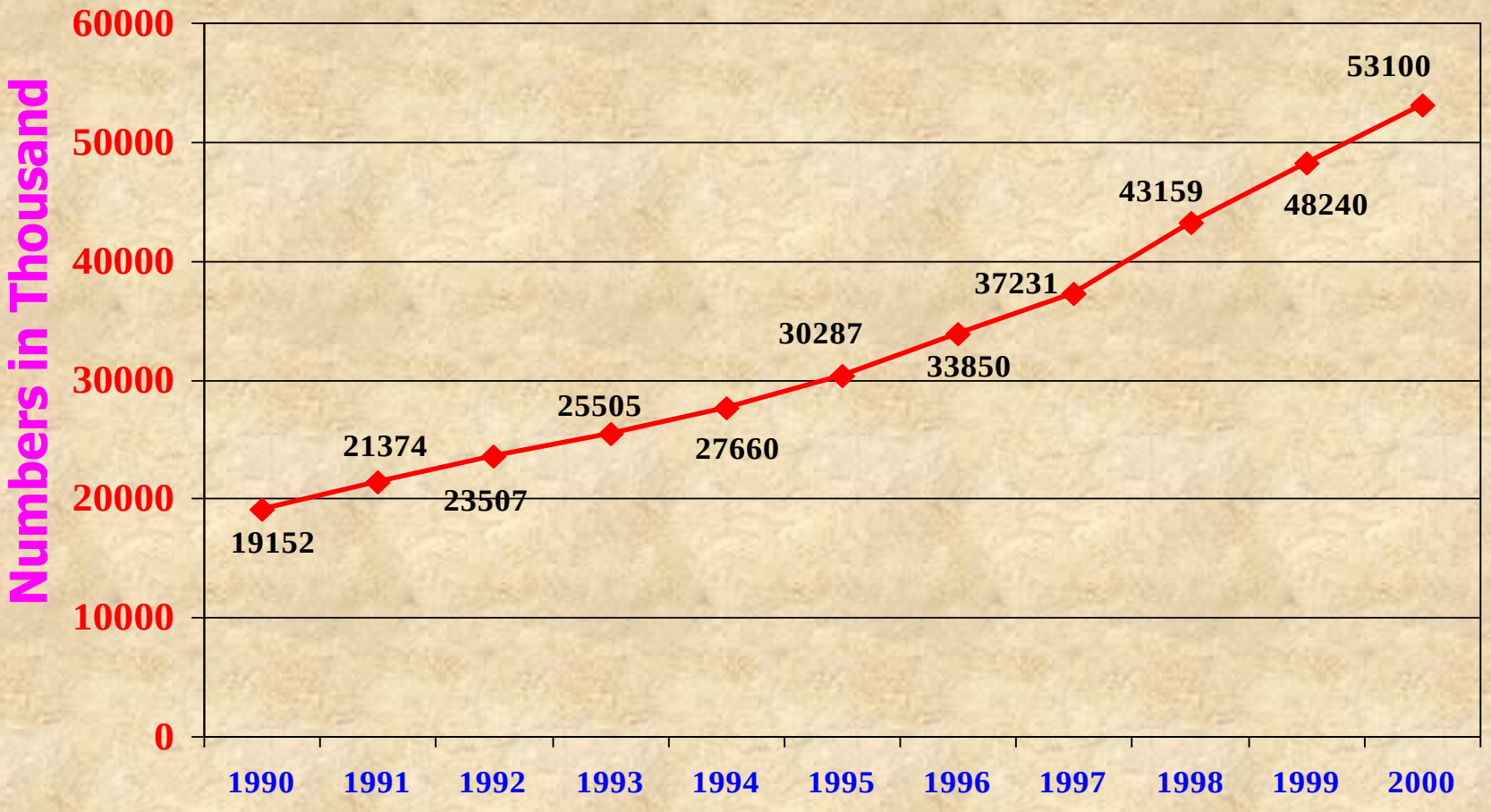
FUEL SHARE IN INDIA



FUEL CONSUMPTION IN METRO CITIES(1999-2000)



GROWTH OF MOTOR VEHICLES IN INDIA



AIR QUALITY MONITORING IN INDIA

NATIONAL AIR QUALITY MONITORING

- Started in 1984 - 7 Station (Manual Station)

- By 2000 - Increased to 295 Stations (Operated and Maintained by SPCB/CPCB/ Universities, etc. and funded by CPCB)

- Monitoring in Delhi

  - 2 Continuous AQMS (set up under GTZ assistance)
  - 1 Continuous AQMS (CPCB)
  - 2 Mobile Vans (with GTZ assistance)
  - 6 Manual AQMS

- Monitoring by Industry/Universities/ Other Institutes

  200 Stations (approx.)

Air Quality Monitoring

Parameters Monitored

Criteria Pollutants - SPM, SO_2, RSPM/PM_{10}, NOx, CO, Pb

Specific Pollutants- Poly aromatic Hydrocarbons
Benzene / Xylene / Toluene
Ground level ozone
(24 hourly, 8 hourly, 1 hourly)

CALIBRATION FOR ACCURACY OF DATA

CALIBRATION

- **Calibration of a system in its original meaning is to check up of any any scale, reading or value, digital or analog by comparison with an absolute standard.**
- **The calibration of any measuring system is very important to get meaningful results.**
- **The response of most of the analyser has a tendency to change somewhat with time (drift), the calibration must be updated (or the analyser response must be adjusted) periodically to maintain a high degree of accuracy.**

CALIBRATION STANDARD

- **PRIMARY STANDARD**

  Primary standard is certified to traceable to the NBS or SRM.

  Ex.: **Static Injection System, Soap bubble meters, volumetric burettes etc.**

- **TRANSFER STANDARD**

  A transfer standard is a device that is certified against a primary standard. These standards usually travel to the monitoring stations.

ZERO AND SPAN GAS

- ZERO GAS

  Zero gas is defined that the gas which does not contain any type of impurities or external material. The concentration of zero gas must be zero in respect of pollutant being calibrated.

- SPAN GAS.

  The span gas must be capable of providing an accurate, stable and reliable concentration of measured gas for at least five concentration , equally spaced between zero and full scale.

FREQUENCY OF CALIBRATION

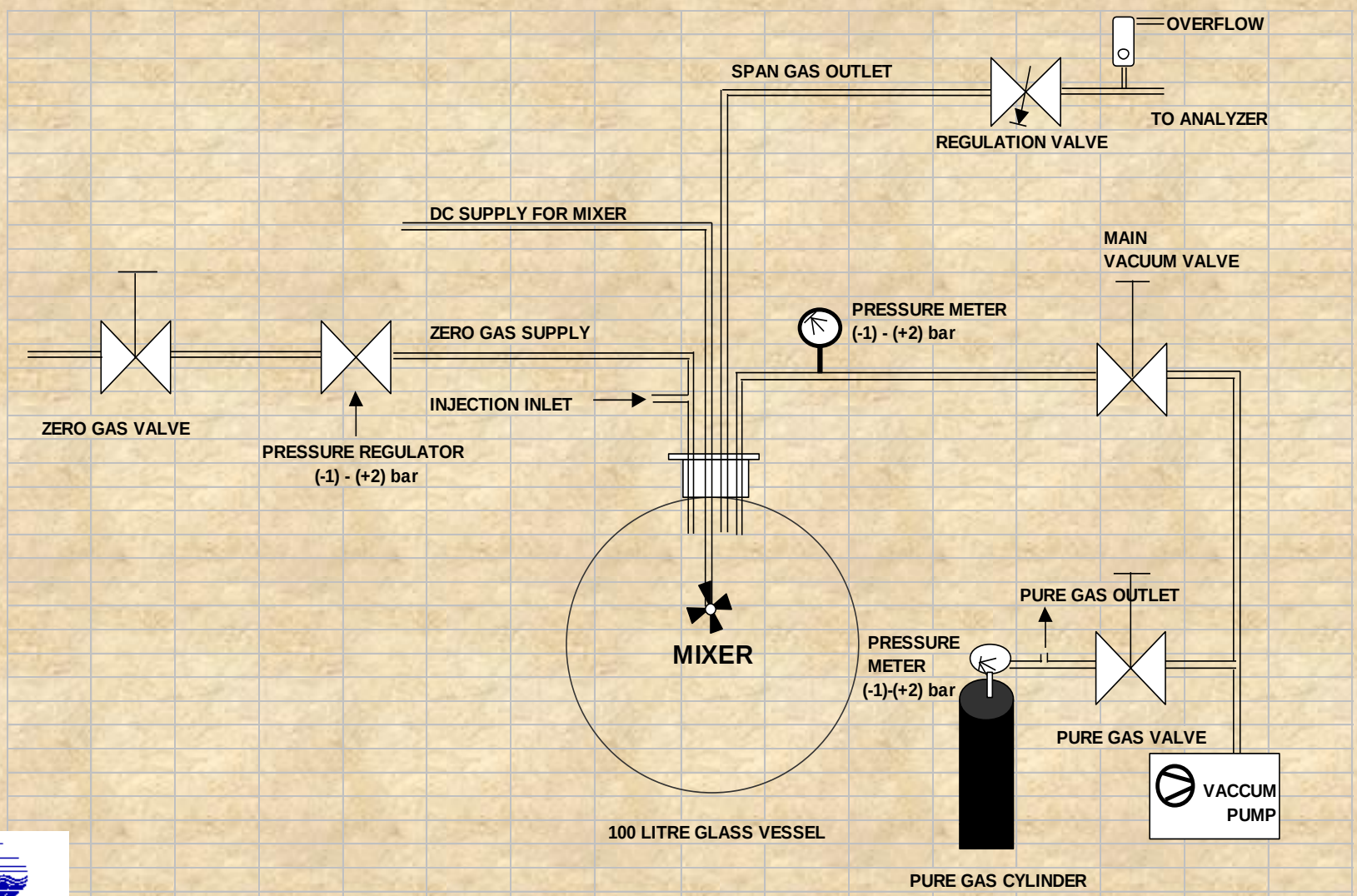
An analyser should be calibrated (or re calibrated):

a) **Upon initial installation;**
b) **Following physical relocation;**
c) **After any repairs or service that might affect its calibration;**
d) **Following an interruption in operation of more than a few days; and**
e) **Upon any identification of analyser malfunction.**

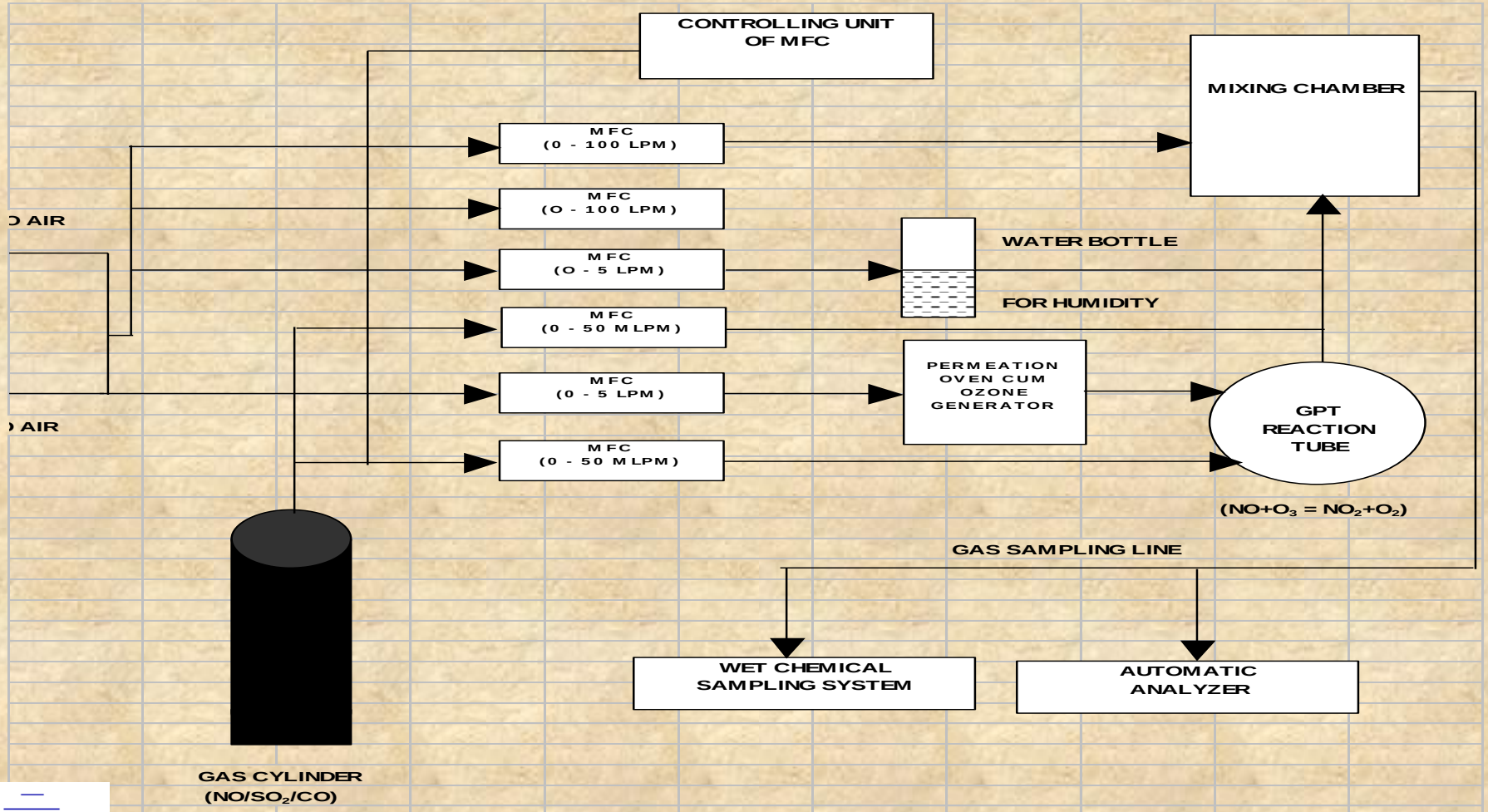
CALIBRATION OF AUTOMATIC ANALYSER

1) Static Injection System;
2) Dynamic Dilution System; and
3) Permeation System.

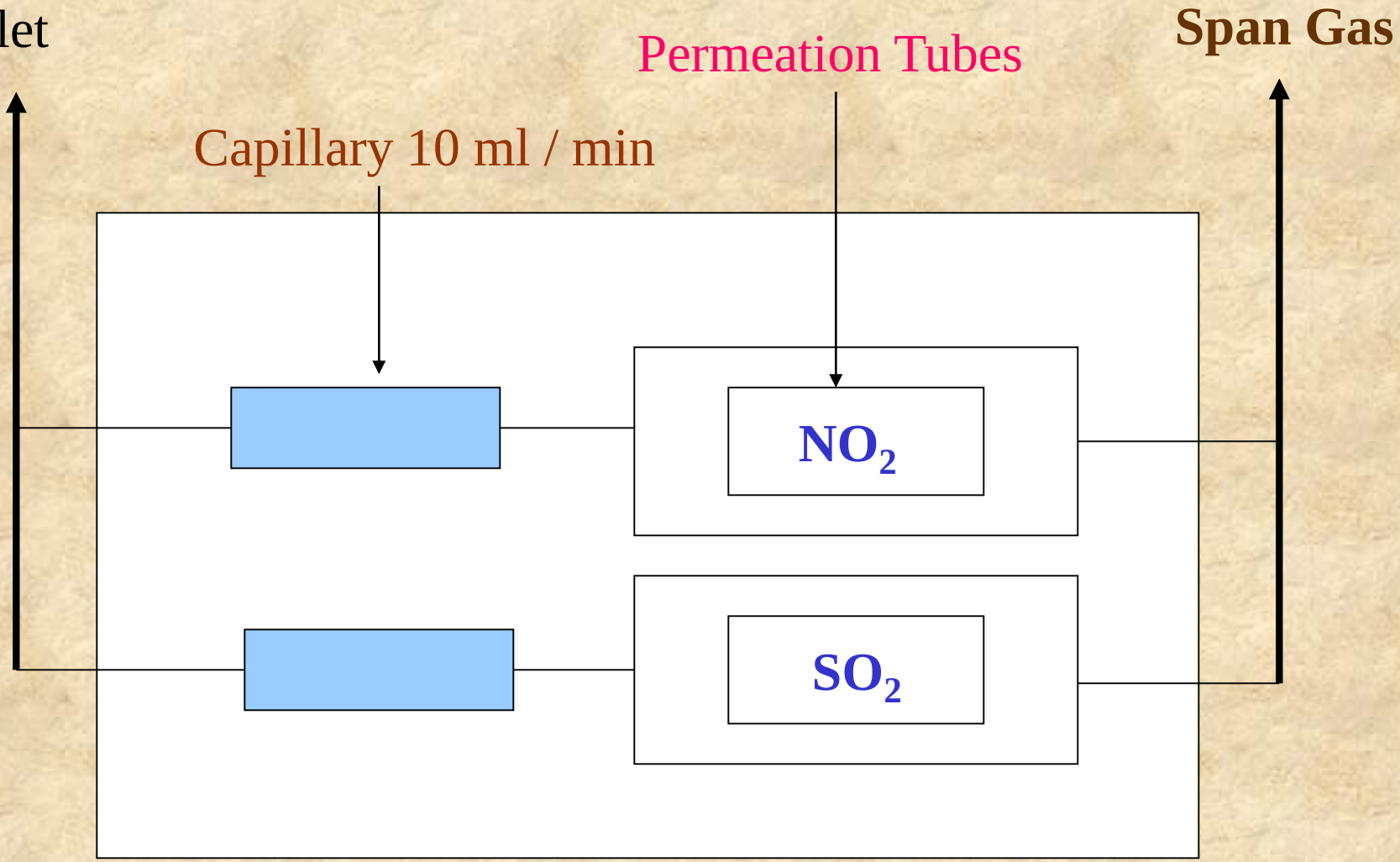
STATIC INJECTION SYSTEM



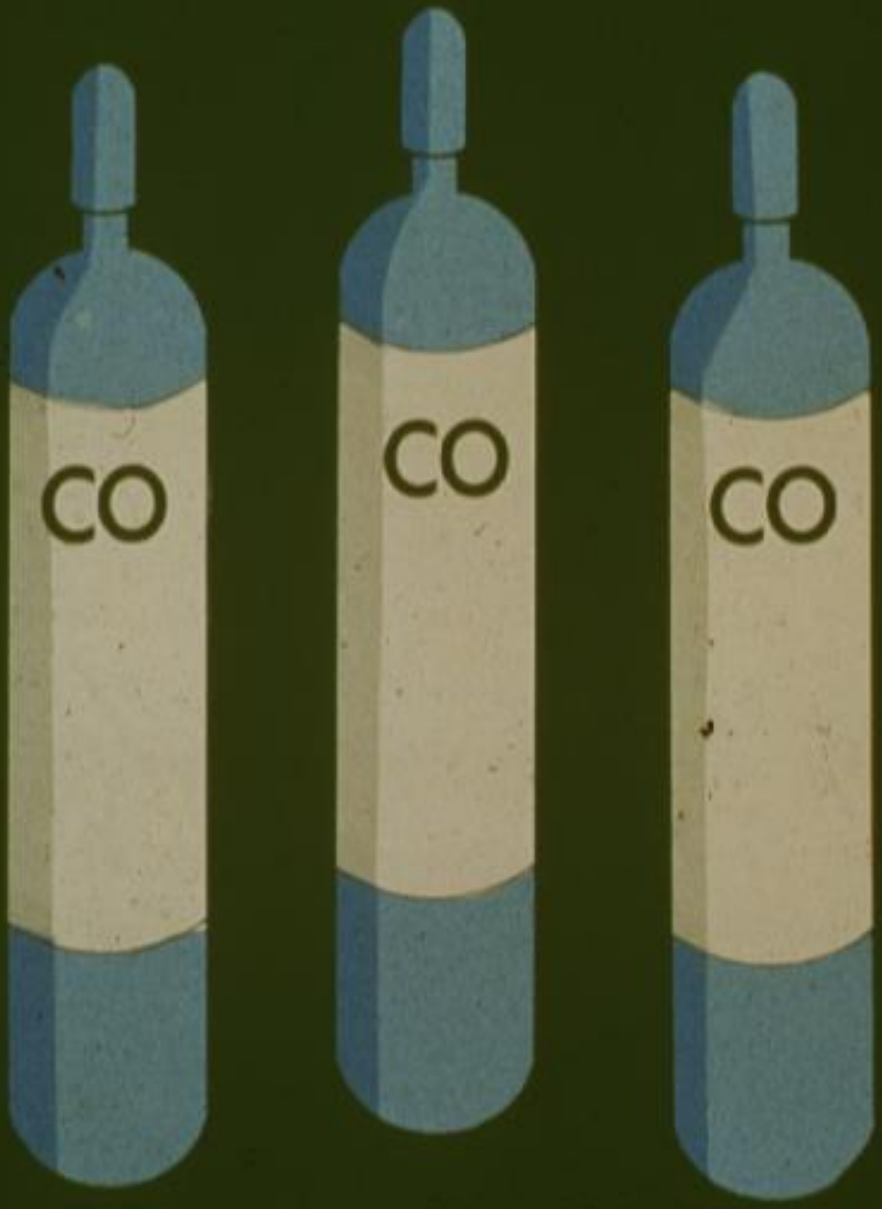
DYANAMIC DILUTION SYSTEM (RING TEST FACILITY)



Zero Gas



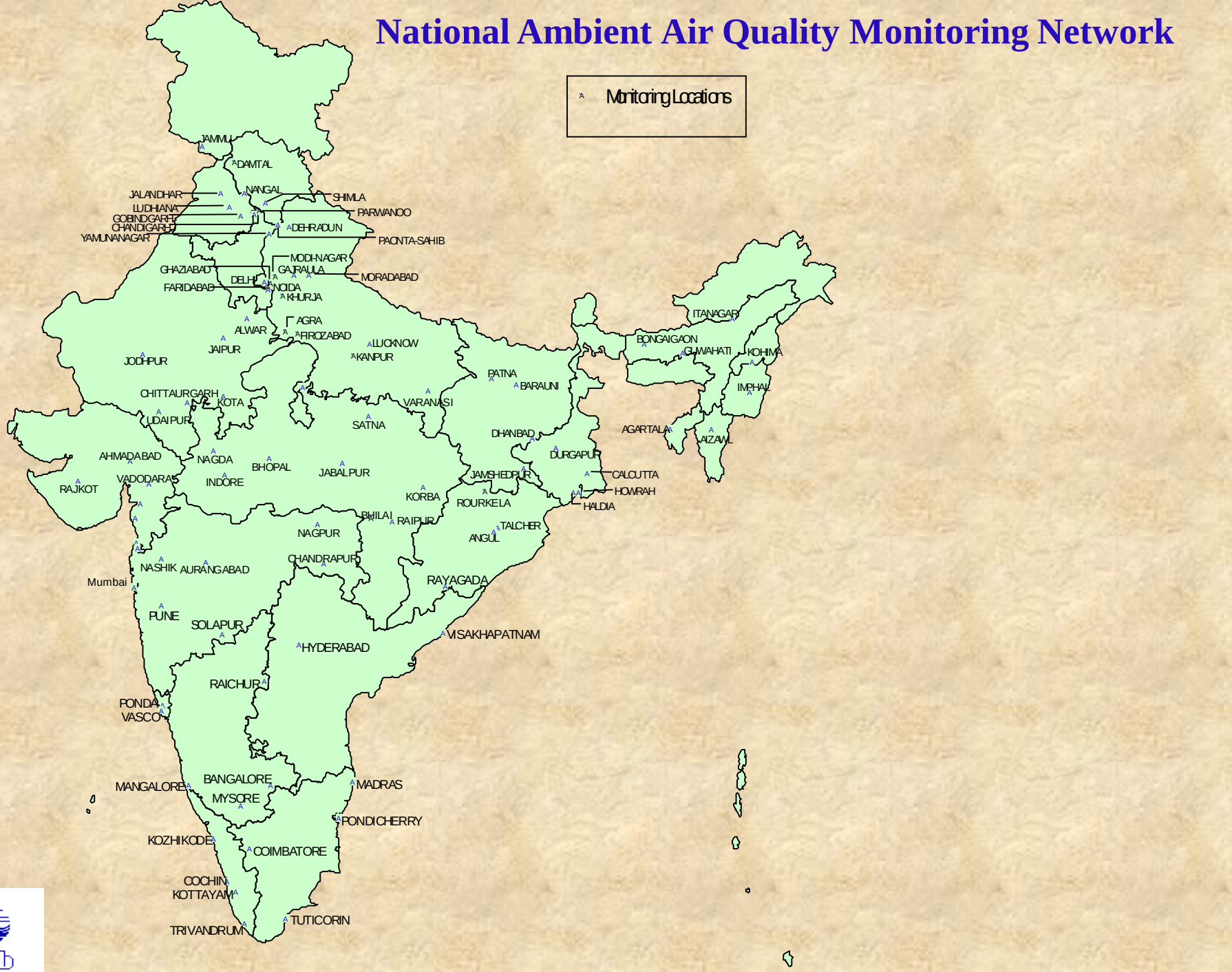
PERMEATION OVEN



CALIBRATION GASES

Calibration Procedure

National Ambient Air Quality Monitoring Network



NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

Pollutant	Time Weighted Average	Concentration in Ambient Air			Method of Measurement
		Industrial Area	Residential, Rural and other Areas	Sensitive Area	
Sulphur Dioxide (SO_2)	Annual Average*	80 µg/m^3	60 µg/m^3	15 µg/m^3	1. Improved West and Gaeke Method 2. Ultraviolet Fluorescence
	24 Hours Average**	120 µg/m^3	80 µg/m^3	30 µg/m^3	
Oxides of Nitrogen as NO_2	Annual Average*	80 µg/m^3	60 µg/m^3	15 µg/m^3	1. Jacob & Hochheiser modified (NaOH-$NaAsO_2$) Method 2. Gas Phase Chemiluminiscence
	24 Hours Average**	120 µg/m^3	80 µg/m^3	30 µg/m^3	
Suspended Particulate Matter (SPM)	Annual Average*	360 µg/m^3	140 µg/m^3	70 µg/m^3	High Volume Sampling (Average flow rate not less than 1.1m^3/minute)
	24 Hours Average**	500 µg/m^3	200 µg/m^3	100 µg/m^3	
Respirable Particulate Matter (Size less than 10µm) (RPM)	Annual Average*	120 µg/m^3	60 µg/m^3	50 µg/m^3	Respirable Particulate Matter Sampler
	24 Hours Average**	150 µg/m^3	100 µg/m^3	75 µg/m^3	
Lead (Pb)	Annual Average*	1.0 µg/m^3	0.75 µg/m^3	0.50 µg/m^3	AAS Method after sampling using EPM 2000 or equivalent filter paper
	24 Hour Average**	1.5 µg/m^3	1.0 µg/m^3	0.75 µg/m^3	
Carbon Monoxide (CO)	8 Hours Average**	5.0 mg/m^3	2.0 mg/m^3	1.0 mg/m^3	Non dispersive Infrared Spectroscopy
	1 Hour Average	10.0mg/m^3	4.0 mg/m^3	2.0 mg/m^3	
Ammonia (NH_3)	Annual Average*	0.1 mg/m^3			-
	24 Hour Average**	0.4 mg/m^3			

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

NOTE

1. National Ambient Air Quality Standard : The levels of air quality necessary with an adequate margin of safety, to protect the public health, vegetation and property.
2. Whenever and wherever two consecutive values exceed the limit specified above for the respective category, it would be considered adequate reason to institute regular/continuous monitoring and further investigations.
3. The State Government / State Board shall notify the sensitive and other areas in the respective states within a period of six months from the date of notification of National Ambient Air Quality Standards.

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Sensitive areas – sensitive area may include the following:

1) 10 kms all around the periphery of health resorts so notified by State Pollution Control Boards in consultation with department of public health of the concerned state.

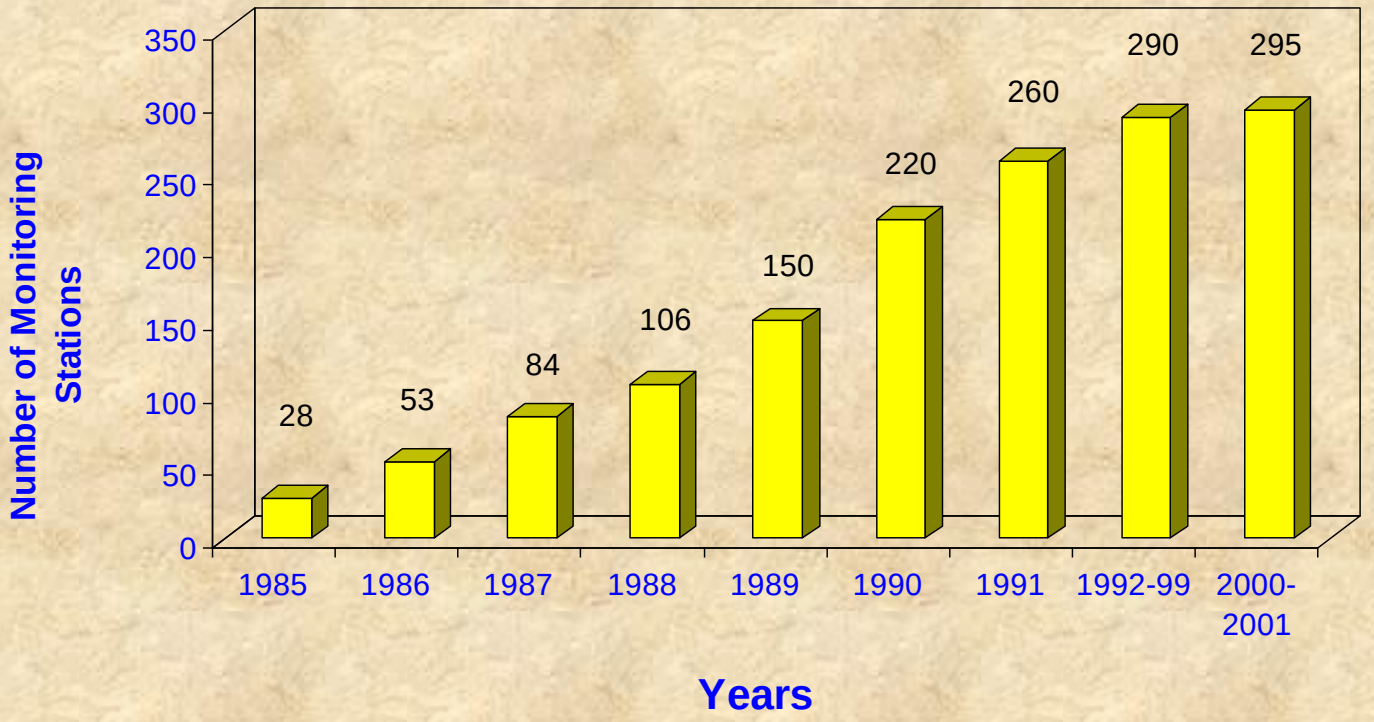
2) 10 kms all around the periphery of biosphere reserves, sanctities and national parks, so notified by Ministry of Environment and Forest or concerned states.

3) 5 kms all around the periphery of an archeological monument declared to be of national importance or otherwise so notified A.S.I. in consultation with State Pollution Control Boards.

4) Areas where some delicate or sensitive to air pollution crops/important to the agriculture/horticulture of that area are grown so notified by State Pollution Control Boards in consultation with department of agriculture/horticulture of concerned state.

5) 5 kms around the periphery of centers of tourism and/or pilgrim due to their religious, historical, scenic or other attractions, so notified by department of tourism of the concerned state with State Pollution Control Boards.

Growth of Ambient Air Quality Monitoring Stations under N.A.M.P.



NON-ATTAINMENT AREAS

$$\text{Exceedence Factor} = \frac{\text{Observed Annual Mean Concentration of a Criterion Pollutant}}{\text{Annual Standard for the Respective Pollutant and Area Class}}$$

The Four Air Quality Categories are:

- Critical Pollution (C): When EF is more than 1.5;
- High Pollution (H): When EF is between 1.0 - 1.5;
- Moderate Pollution (M): When EF is between 0.5 - 1.0;
- Low Pollution (L): When the EF is less than 0.5.

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AIR QUALITY CATEGORY IN SOME CITIES

Pollutants → / Area Class → / State / City ↓	SO_2		NO_2		SPM	
	I	R	I	R	I	R
• **Andhra Pradesh**						
Hyderabad	L	L	M	L	M	M
Visakhapatnam	L	L	L	L	L	M
• **Assam**						
Guwahati	-	L	-	M	-	H
• **Bihar**						
Dhanbad	L	L	L	L	M	C
Jharia	L	-	L	-	H	-
Jamshedpur	M	M	M	M	M	C
Patna	-	L	-	L	-	C
• **Delhi**						
Delhi	L	L	M	H	M	C

Contd..

Pollutants → / Area Class → / State / City ↓	SO_2		NO_2		SPM	
	I	R	I	R	I	R
• **Gujarat**						
Ahmedabad	L	L	L	M	-	-
• **Goa**						
Ponda	-	L	-	L	-	M
Vasco	L	-	L	-	L	-
• **Himachal Pradesh**						
Damtal	-	L	-	L	-	C
Parwanoo	L	L	L	L	M	C
Paonta Sahib	L	-	L	-	L	-
Shimla	-	L	-	L	-	L
• **Haryana**						
Yamuna Nagar	L	-	L	-	M	-

Contd..

Pollutants → / Area Class → / State / City ↓	SO_2		NO_2		SPM	
	I	R	I	R	I	R
• **Karnataka**						
Banglore	L	L	L	M	L	C
Mysore	L	-	L	-	L	-
• **Kerala**						
Cochin	M	L	L	M	L	-
Kottayam	L	-	L	-	L	-
Kozhikode	L	L	L	L	L	L
Palakkad	L	-	M	-	L	-
Thiruvanthapuram	L	L	L	L	L	L
• **Maharashtra**						
Mumbai	L	L	L	M	-	-
Chandrapur	L	L	M	M	L	H

Pollution Level	Annual Mean Concentration Range (µg / m^3)	
	RSPM Levels	
	Industrial (I)	Residential (R)
Low (L)	*0 – 60*	*0 – 30*
Moderate (M)	*60 – 120*	*30 – 60*
High (H)	*120 – 180*	*60 – 90*
Critical (C)	*>180*	*> 90*
Area Class → / State / City ↓	I	R
• **Andhra Pradesh**		
Hyderabad	M	H
Visakhapatnam	M	C
• Assam		
Guwahati	-	C
• **Delhi**		
Delhi	C	C
• **Gujarat**		
Ahmedabad	C	C

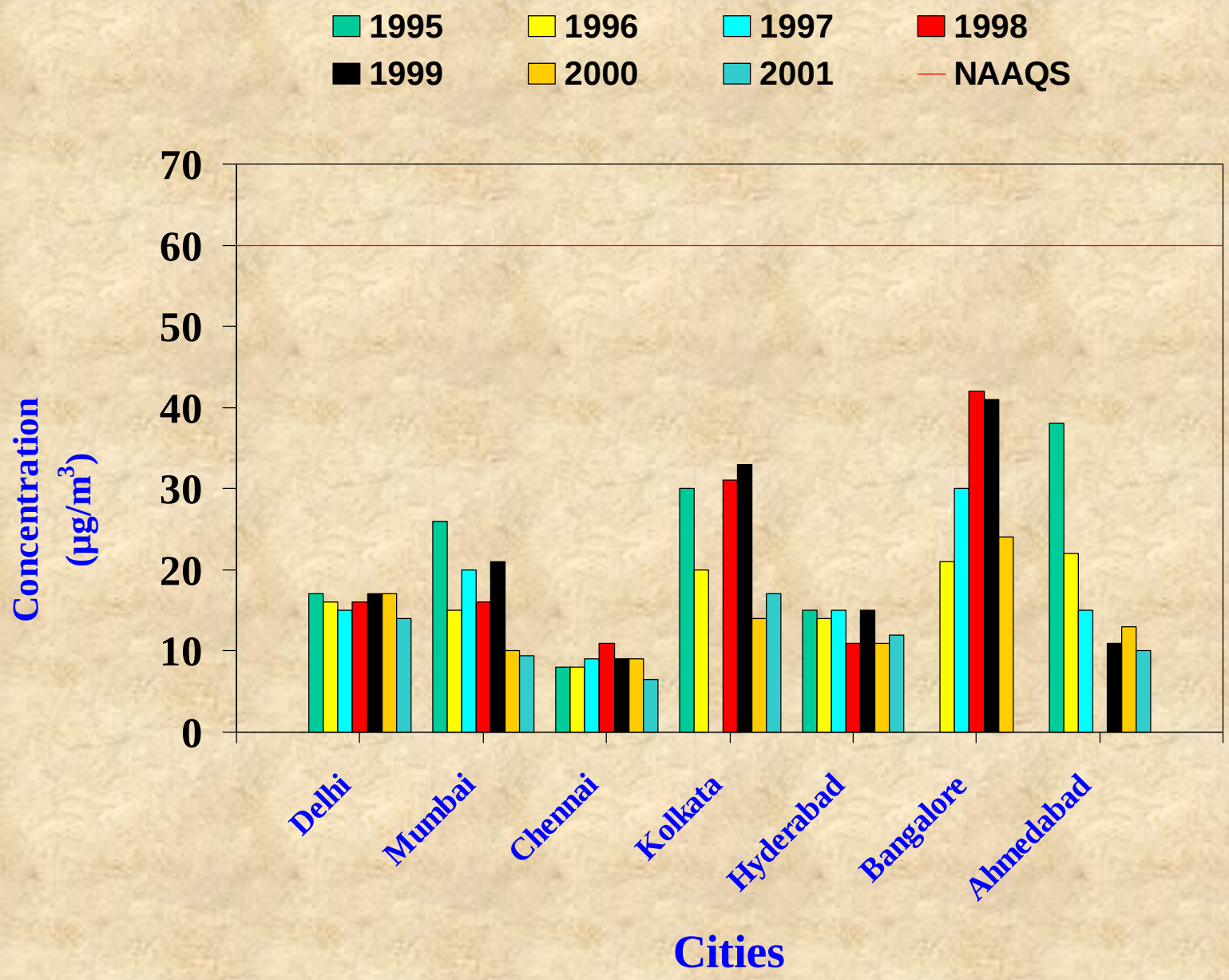
Pollution Level	Annual Mean Concentration Range (µg / m^3)	
	RSPM Levels	
	Industrial (I)	Residential (R)
Low (L)	*0 – 60*	*0 – 30*
Moderate (M)	*60 – 120*	*30 – 60*
High (H)	*120 – 180*	*60 – 90*
Critical (C)	*>180*	*> 90*
Area Class → State / City ↓	I	R
• **Himachal Pradesh**		
Parwanoo	-	H
• **Karnataka**		
Banglore	L	H
Mysore	M	-
• **Kerala**		
Kochi	H	C
Kottayam	L	H

Pollution Level	Annual Mean Concentration Range (µg / m^3)	
	RSPM Levels	
	Industrial (I)	Residential (R)
Low (L)	*0 – 60*	*0 – 30*
Moderate (M)	*60 – 120*	*30 – 60*
High (H)	*120 – 180*	*60 – 90*
Critical (C)	*>180*	*> 90*
Area Class → State / City ↓	I	R
Kozhikode	L	M
Thiruvanthapuram	C	C
Palakkad	L	-
• Madhya Pradesh		
Bhopal	C	C
Indore	C	C
Jabalpur	-	H
Nagda	M	C

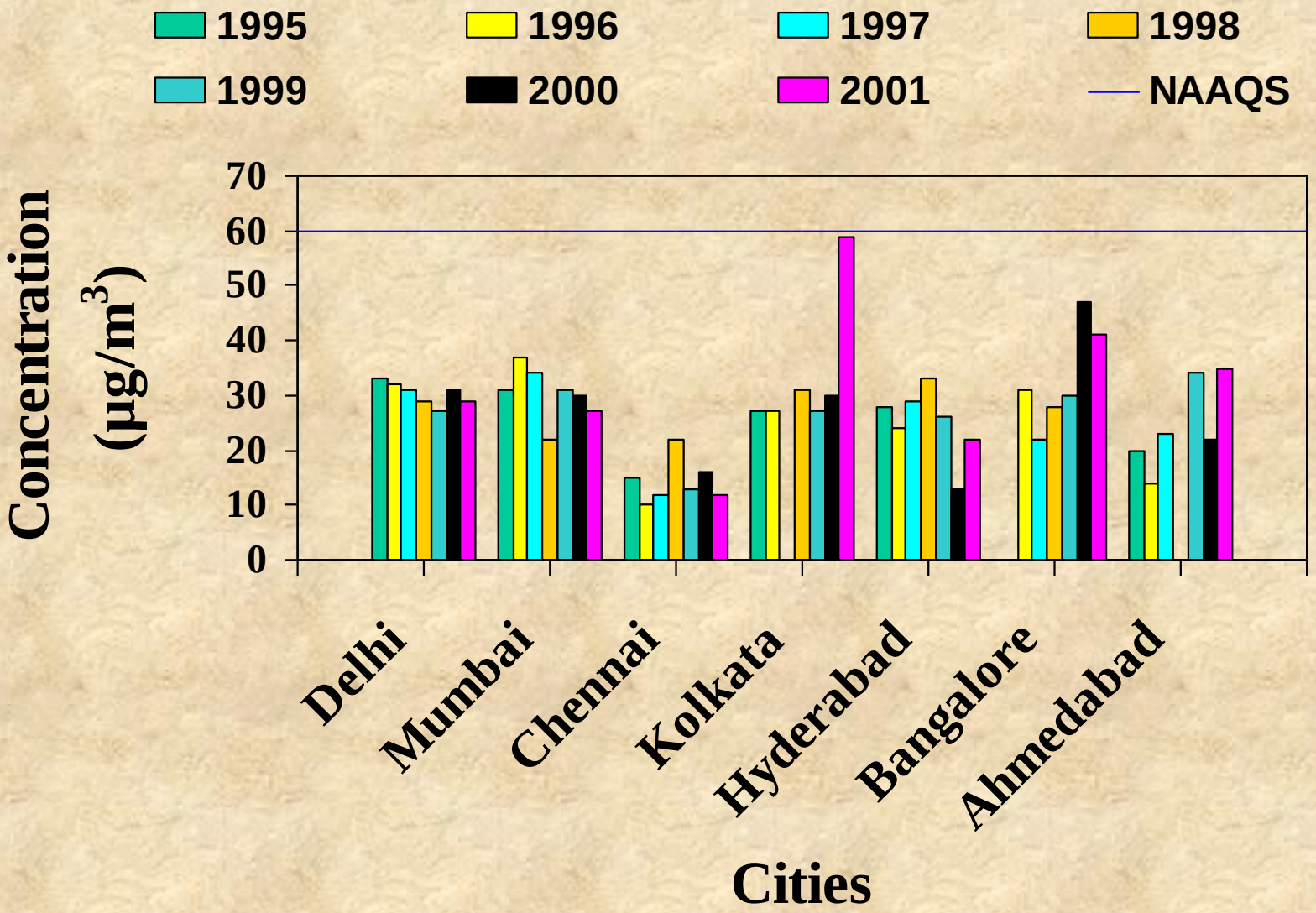
Pollution Level	Annual Mean Concentration Range (µg / m^3)	
	RSPM Levels	
	Industrial (I)	Residential (R)
Low (L)	*0 – 60*	*0 – 30*
Moderate (M)	*60 – 120*	*30 – 60*
High (H)	*120 – 180*	*60 – 90*
Critical (C)	*>180*	*> 90*
Area Class → State / City ↓	I	R
Satna	H	C
• Maharashtra		
Mumbai	M	H
Nagpur	M	C
Nashik	M	C
Pune	-	C
Solapur	C	C

TRENDS IN MEGA CITIES

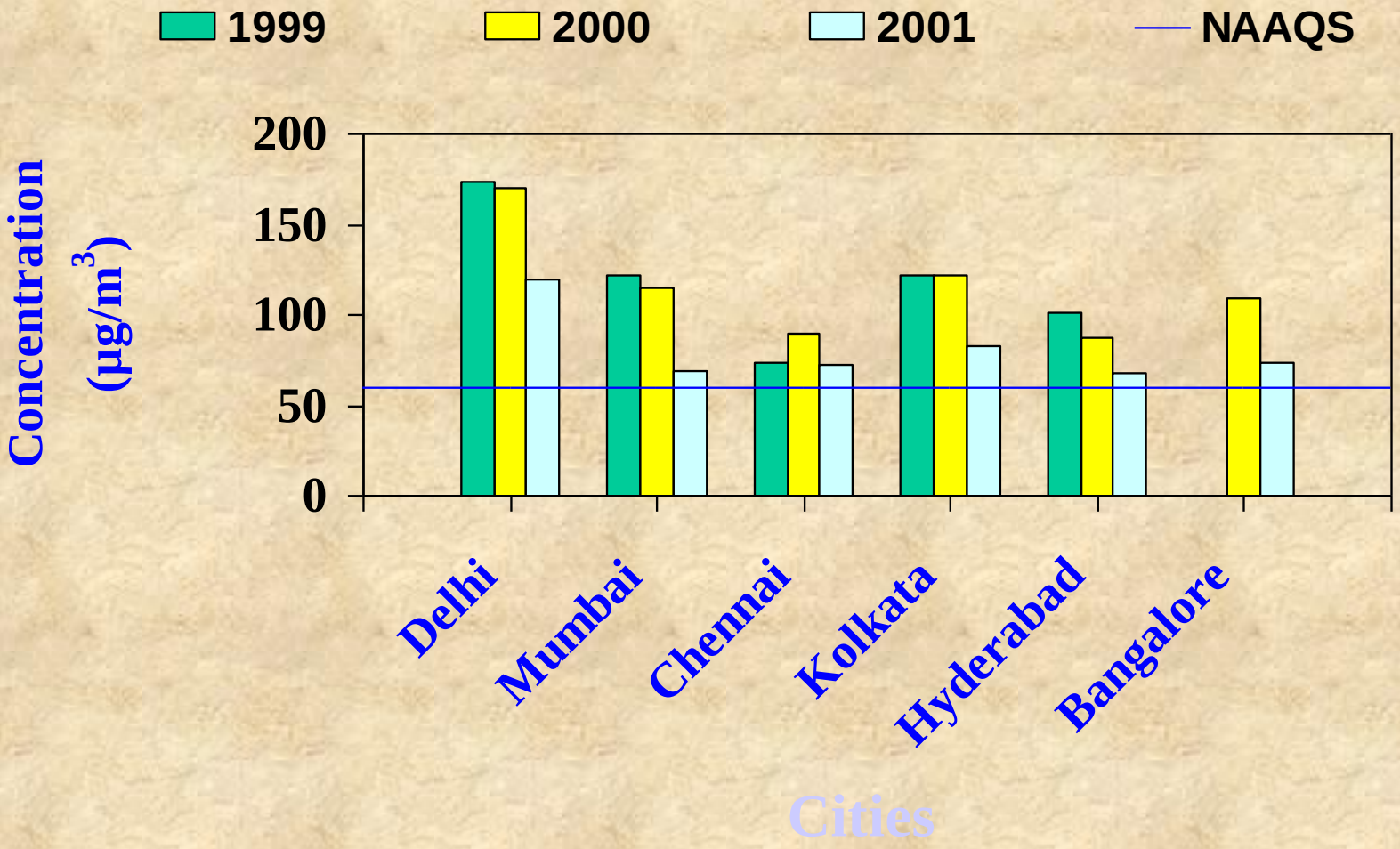
SO_2 (RESIDENTIAL AREAS)



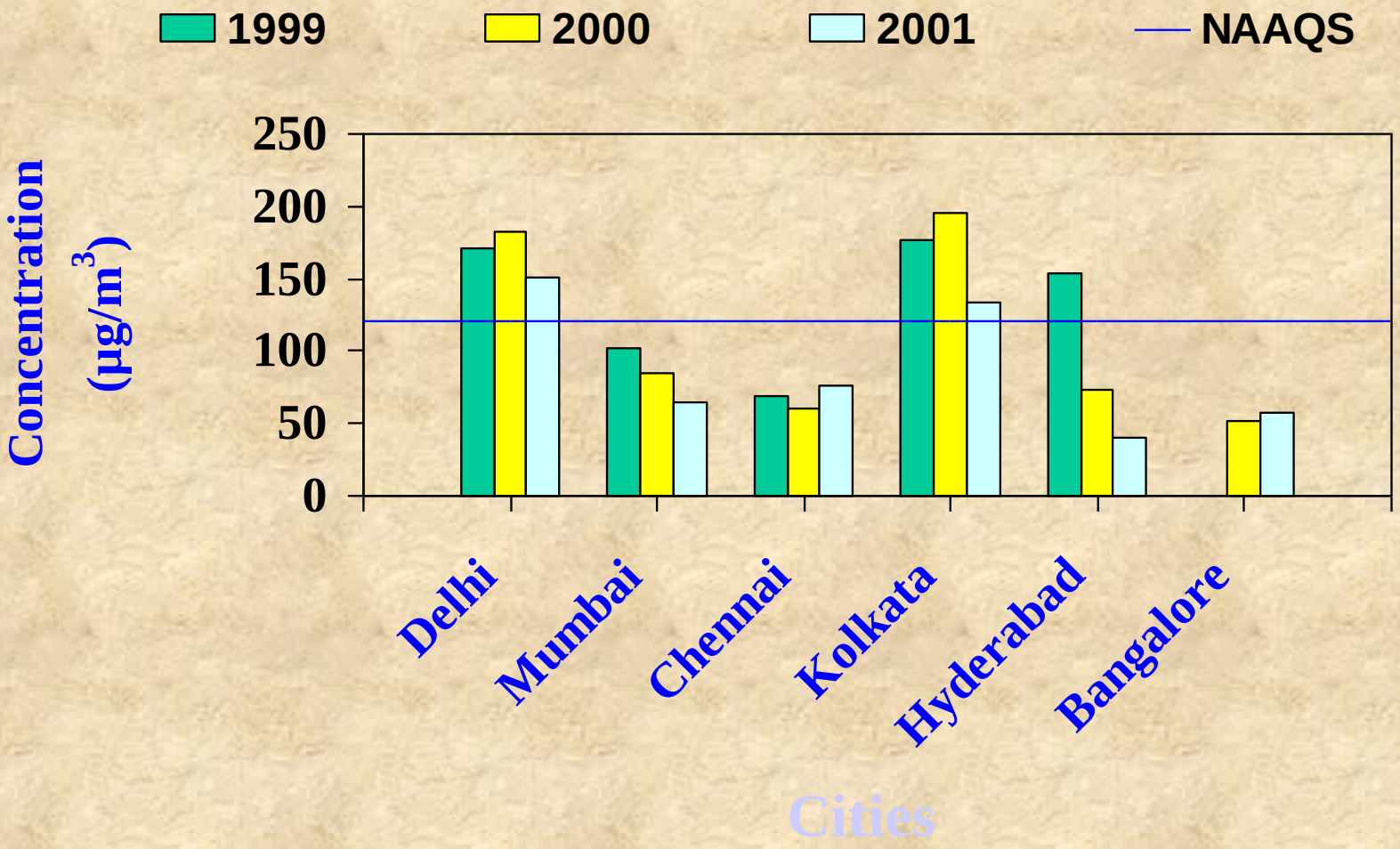
NO_2 (RESIDENTIAL AREAS)



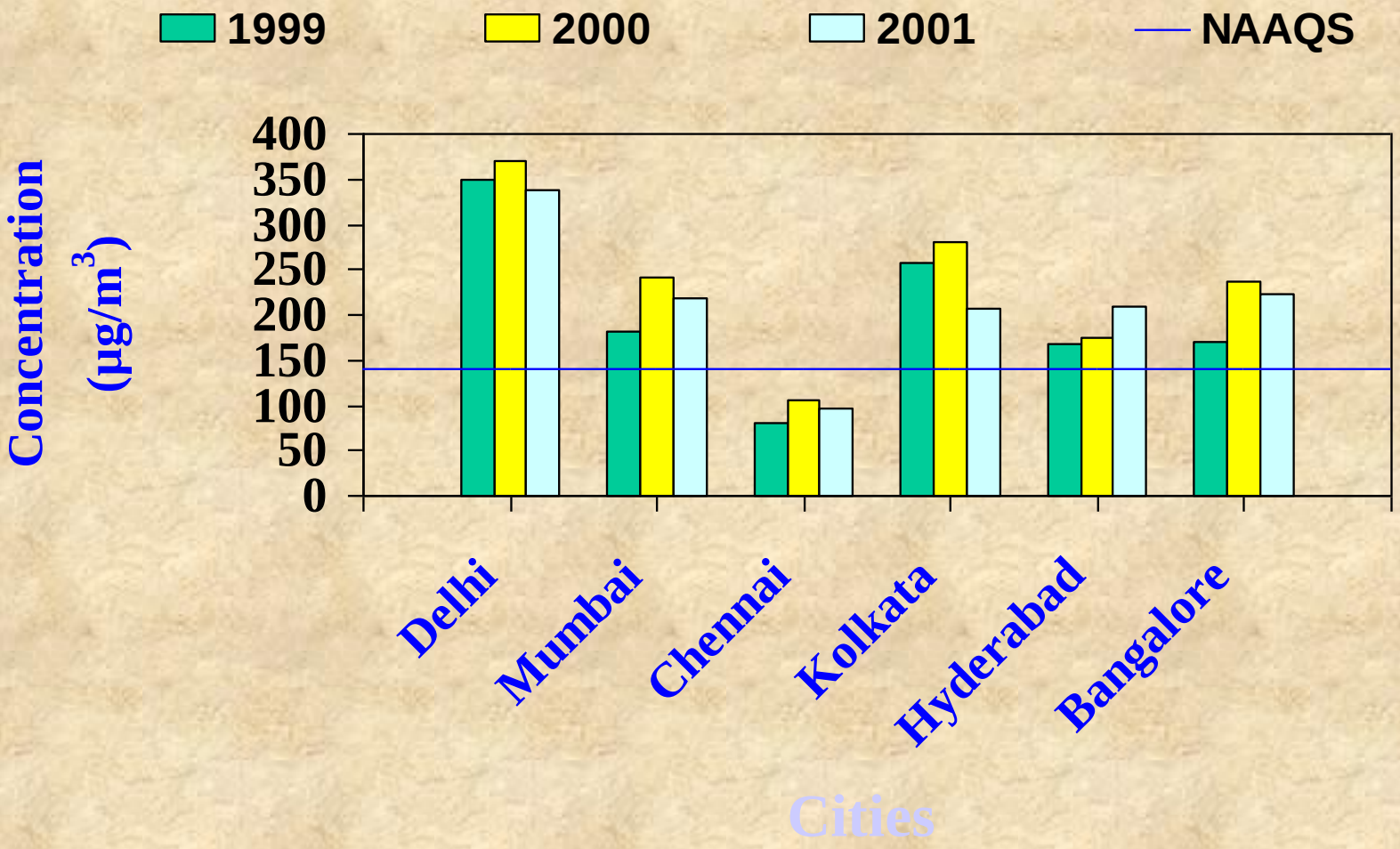
RSPM (RESIDENTIAL AREAS)

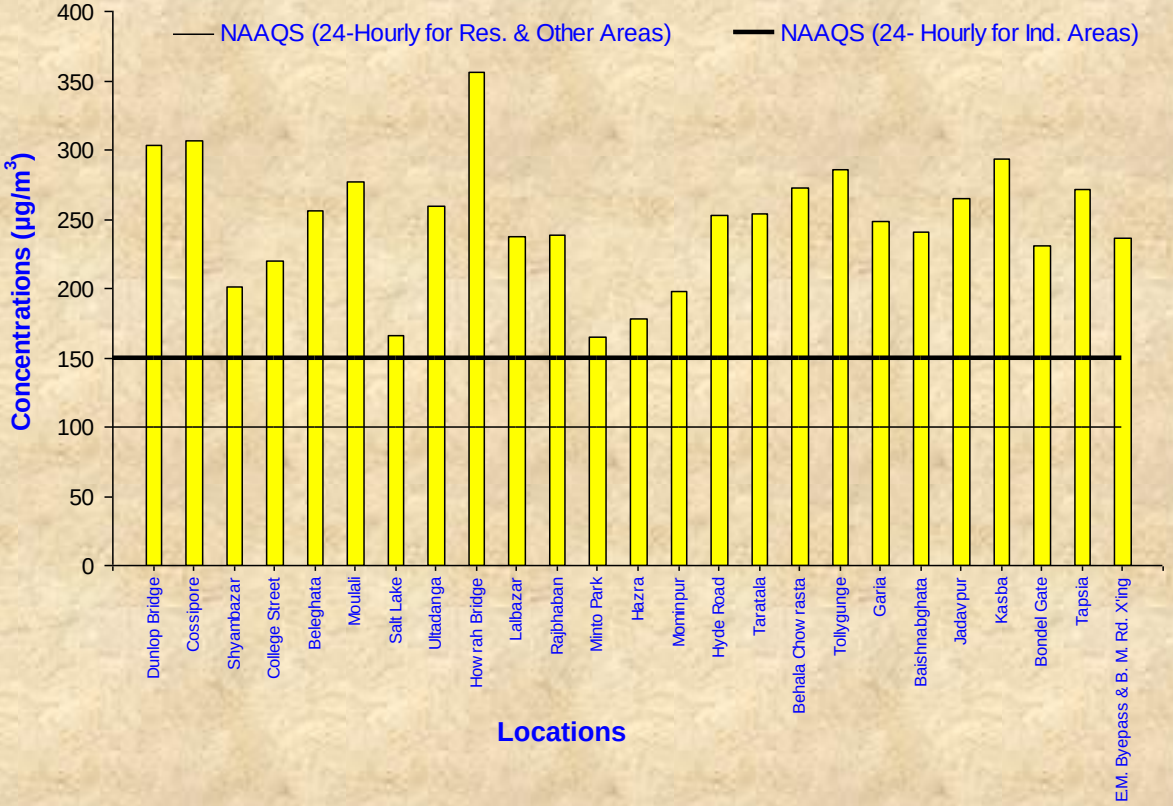


RSPM (INDUSTRIAL AREAS)



SPM (RESIDENTIAL AREAS)

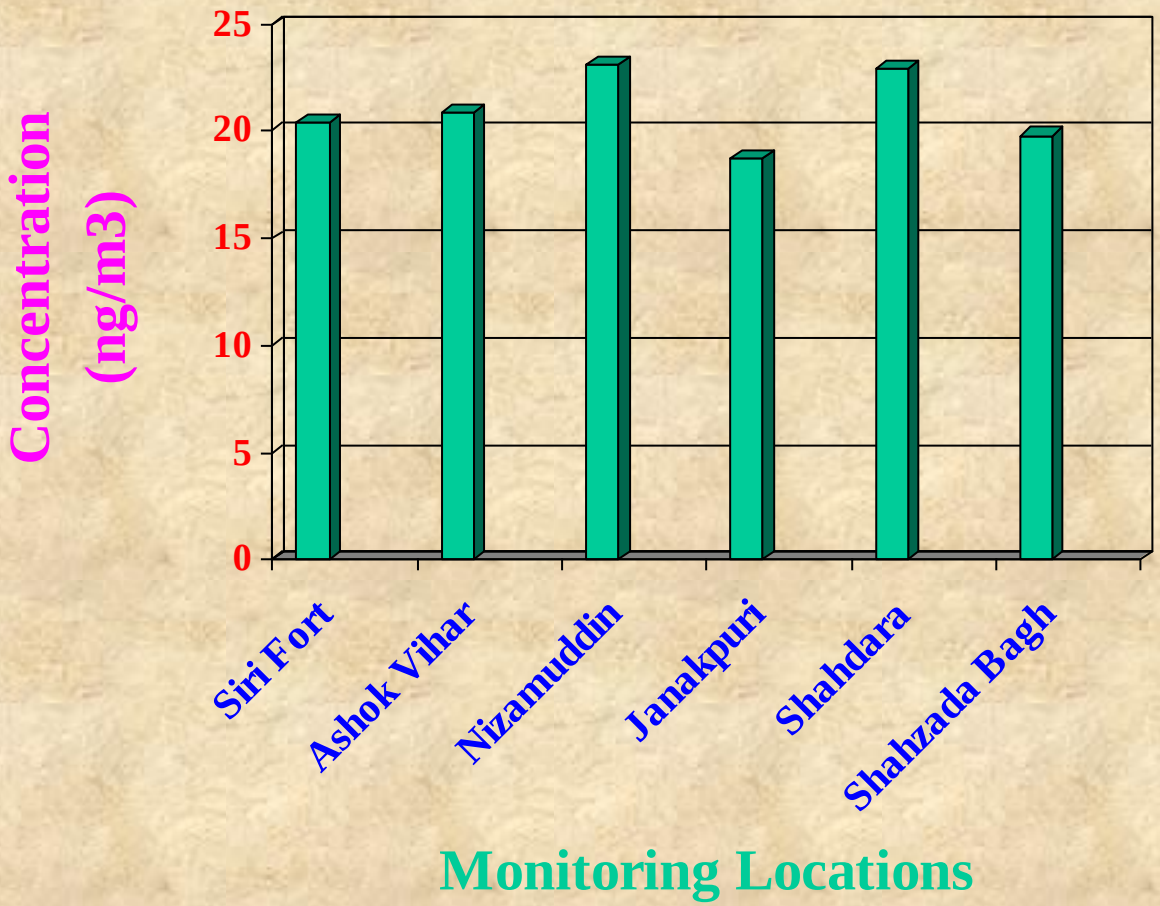




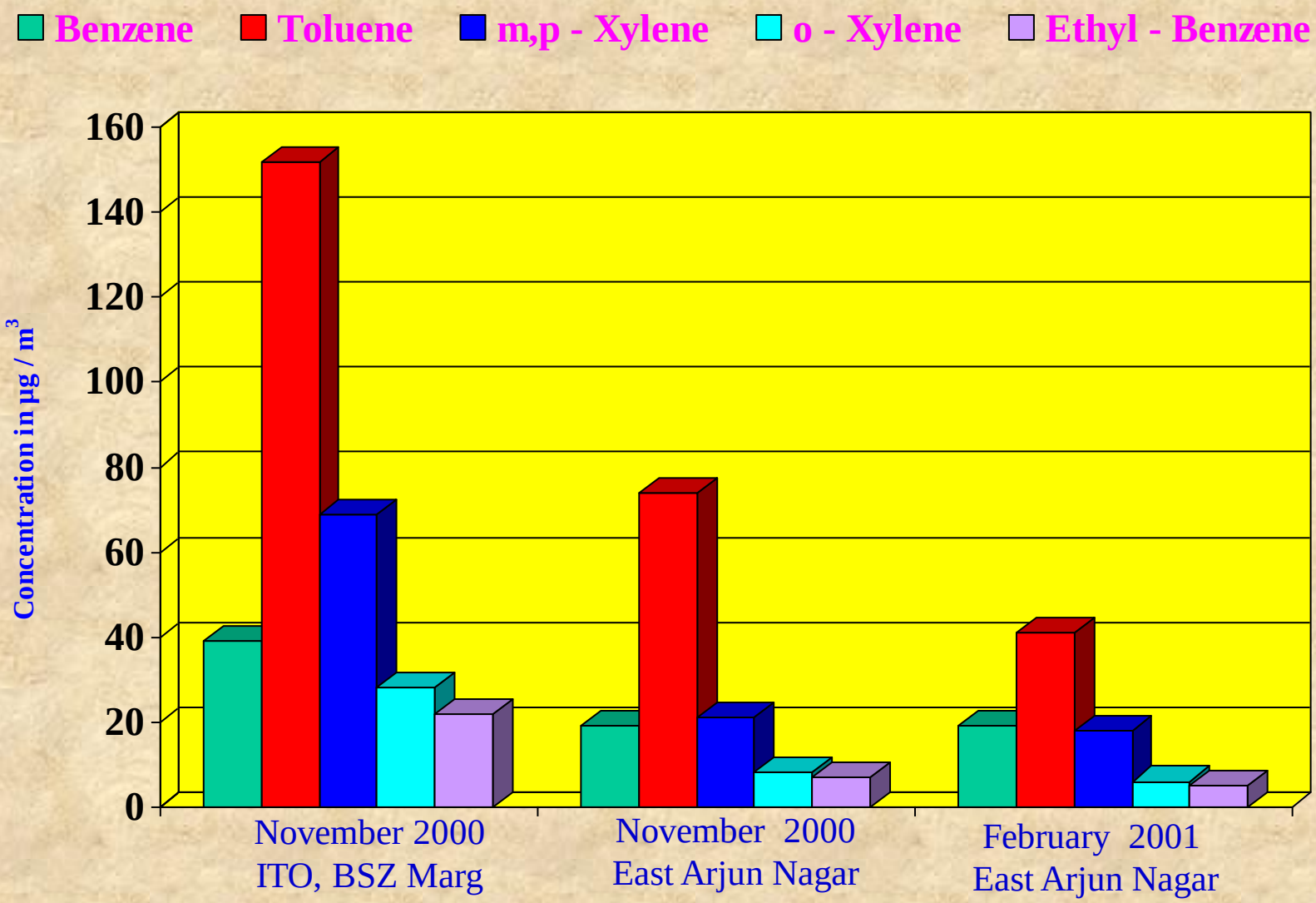
Monthly Average of RSPM at Various Locations in Kolkata During January 2001.

Source:- West Bengal Pollution Control Board, Department of Environment, Government of West Bengal, Website - http://www.wbpcb.gov.in/html/airqua.htm

TOTAL PAHS (NG/M^3) IN DELHI DURING 2000-2001

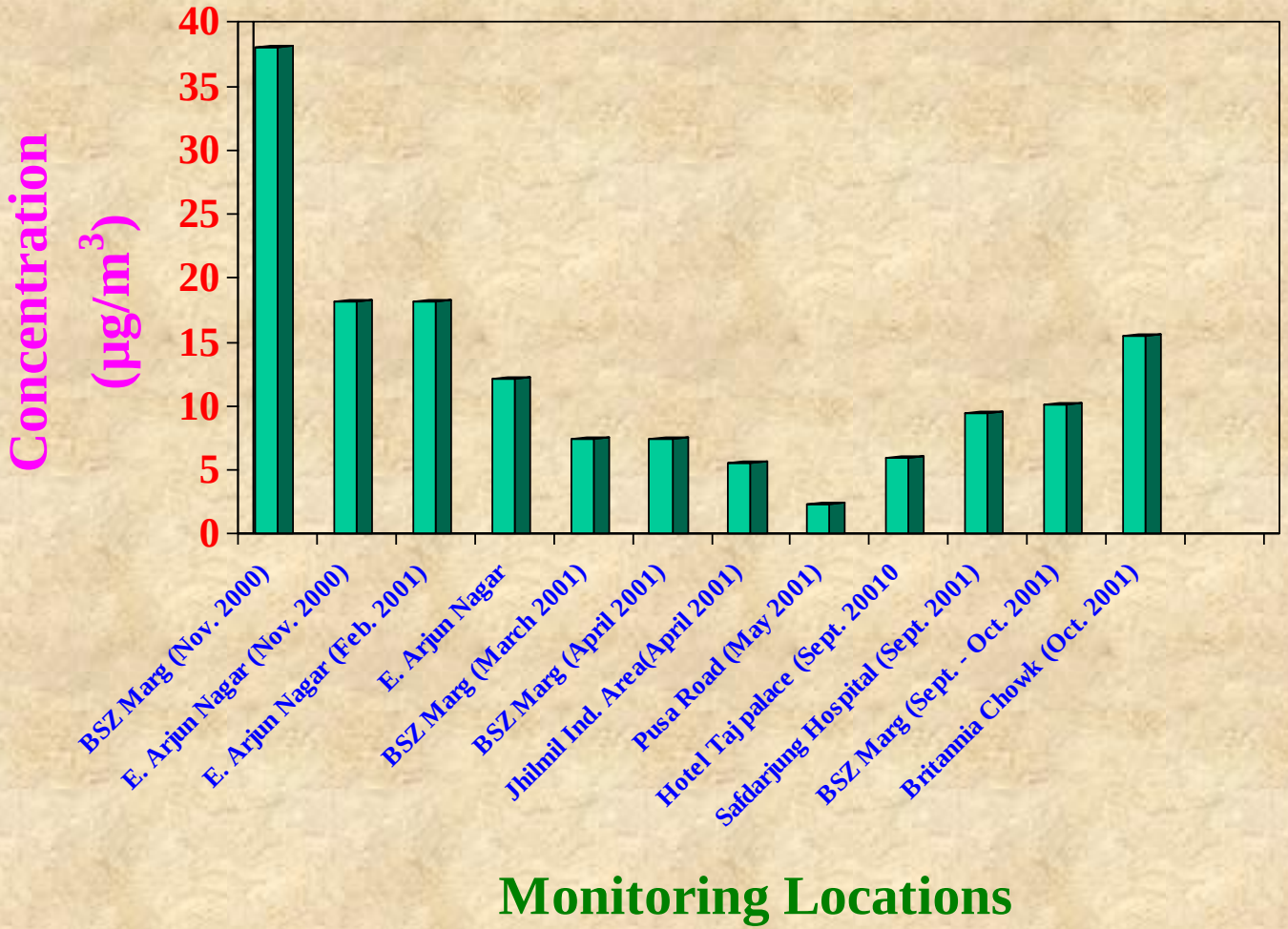


BTX Profile During Winter in Delhi

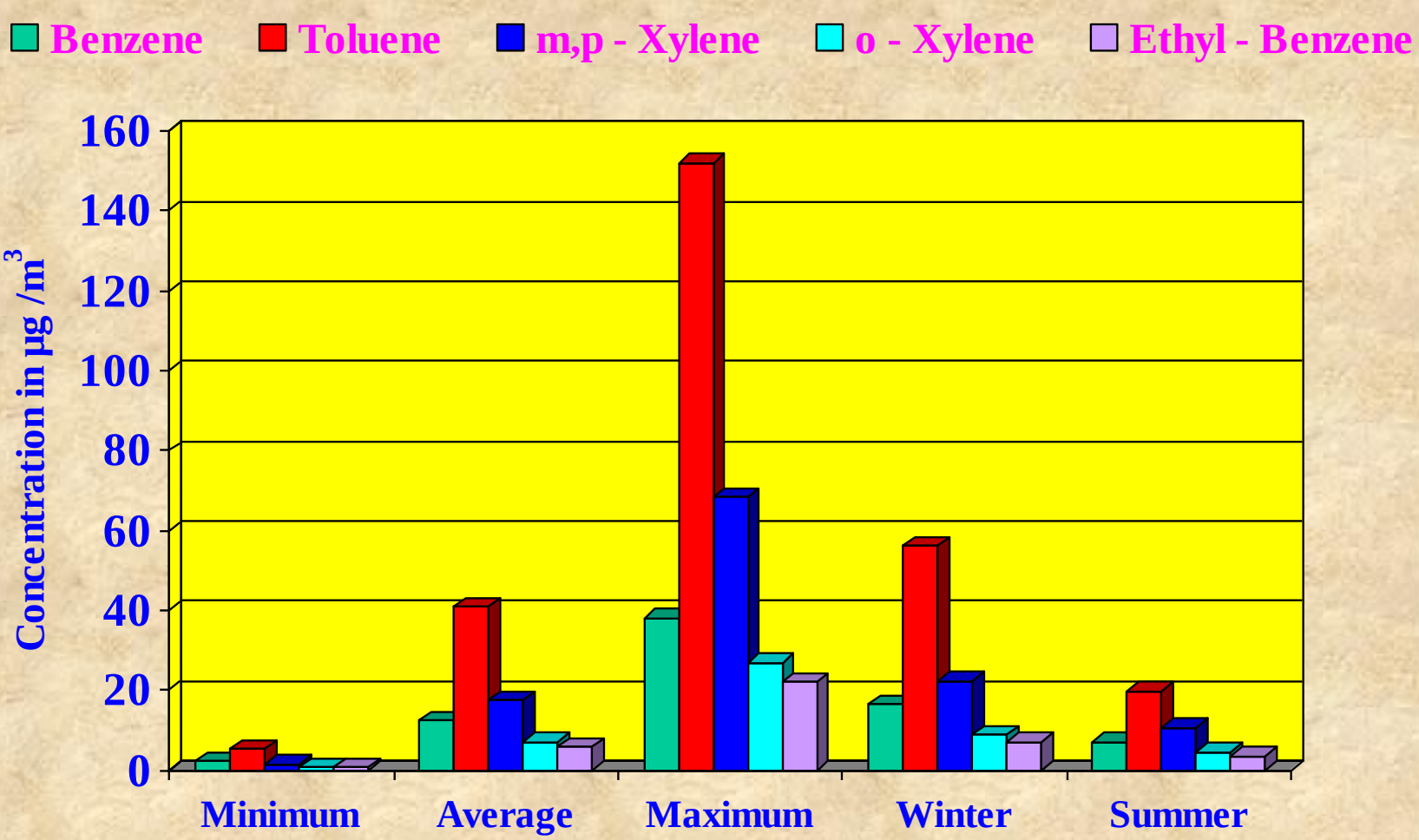


Source: CPCB Newsletter

BENZENE LEVELS IN DELHI



Average Benzene, Toluene levels observed in Delhi During the year 2000 to 2001



Source: CPCB Newsletter

CONCLUSION OF AIR QUALITY MONITORING (LAST TEN YEARS)

Critical Pollutants (exceeded the standard)

- **RSPM (PM_{10})**
- **Carbon Monoxide**
- **Benzene (Major Cities)**
- **Ozone (some places)**
- **Polyaromatic Hydrocarbon (Benzo – a- Pyrene)**
- **Oxides of Nitrogen (Some places)**

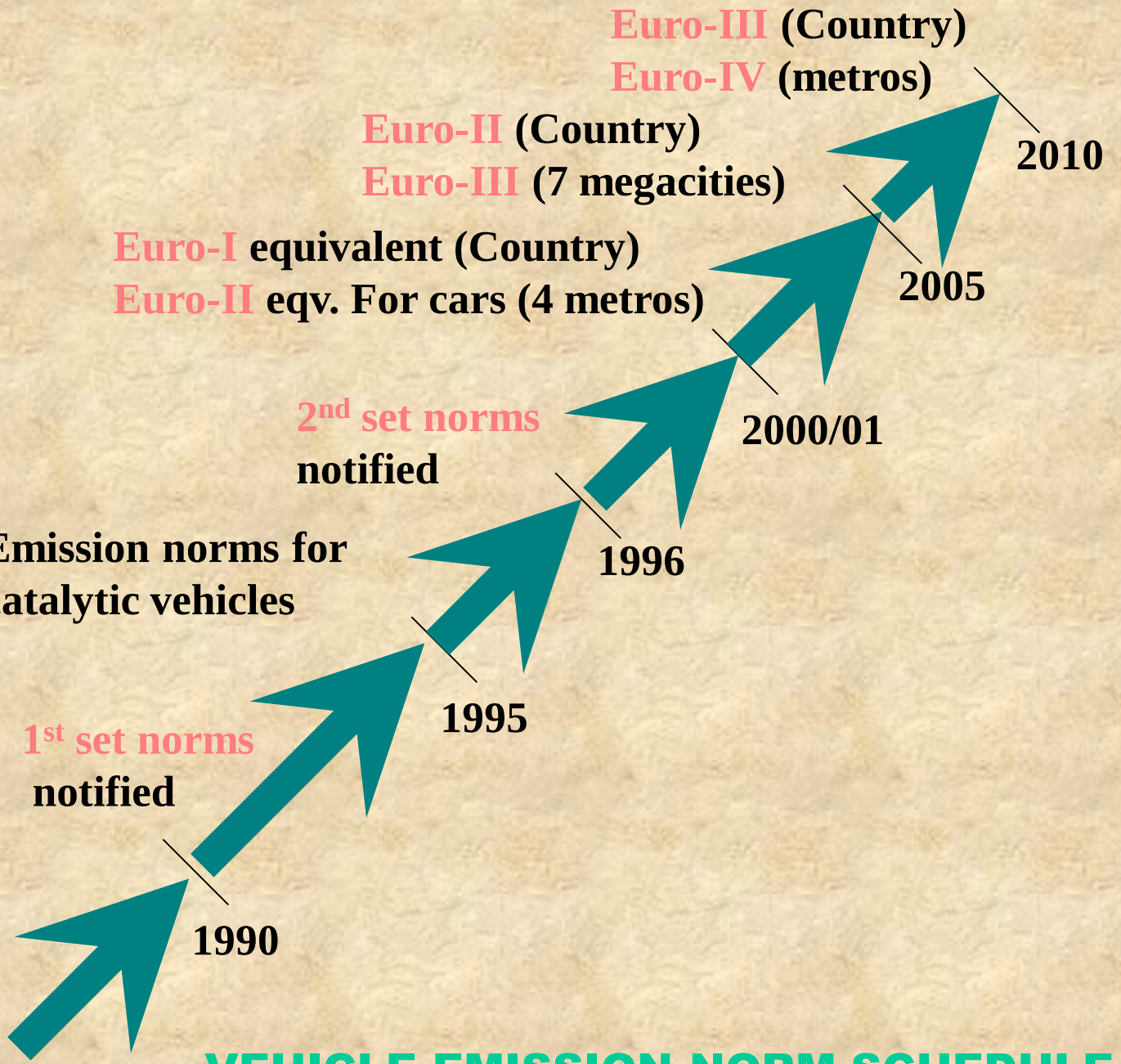
Within Limit

- **Sulphur Dioxide**
- **Lead**

STEP TAKEN SO FAR FOR CONTROLLING VEHICULAR POLLUTION

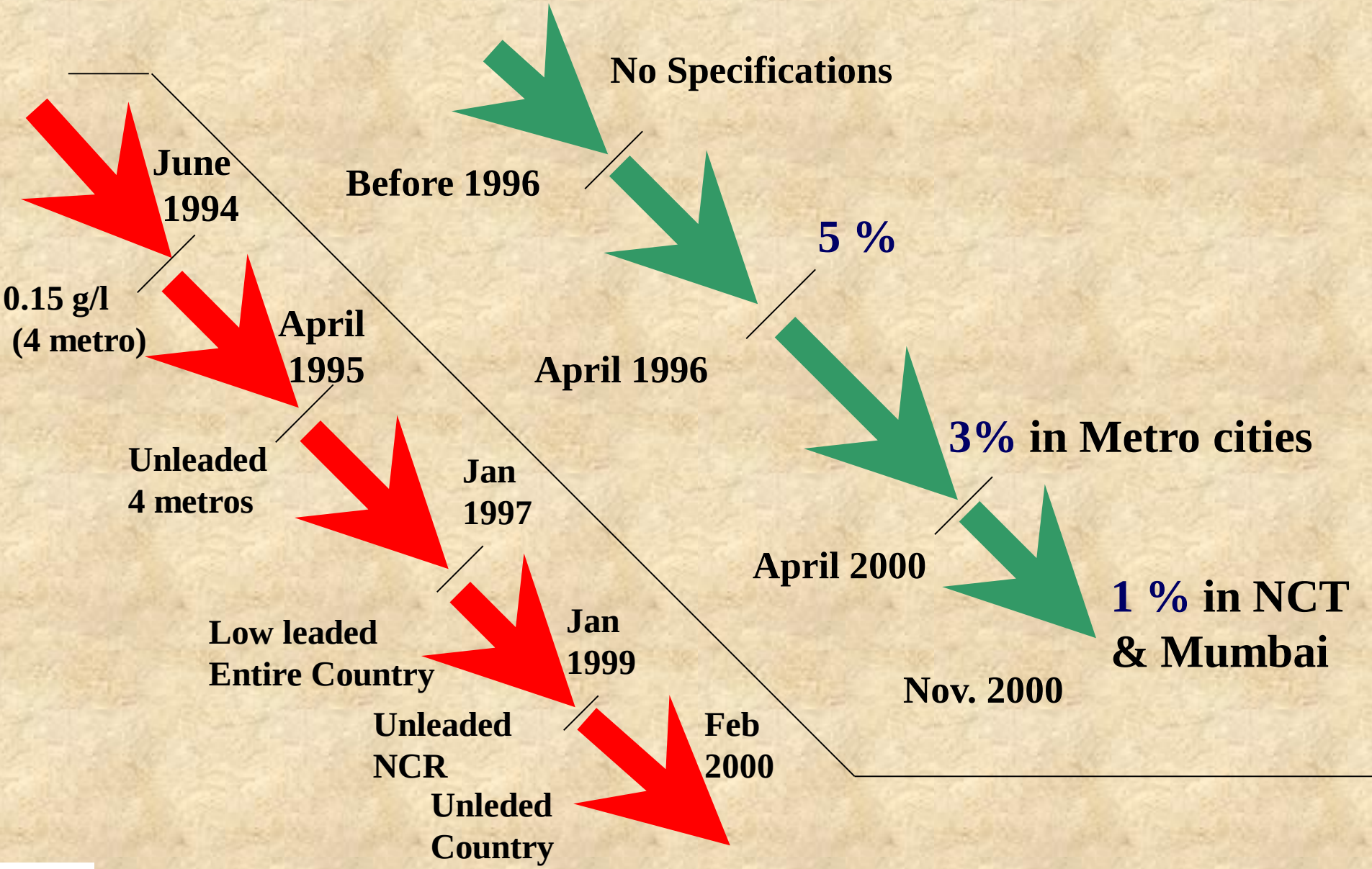
Vehicle Emission Standards

- **1991 Norms: First time introduced, very relaxed norms**
- **1996 Norms: Norms made slightly tighter**
- **1998 Norms: Passenger car with cat converter**
- **2000 Norms: India Stage 2000 (EURO – I)**
- **2005 Norms: Bharat Stage – II (EURO – II)**
- **2010 Norms: Bharat Stage – III (EURO – III)**



VEHICLE EMISSION NORM SCHEDULE IN INDIA

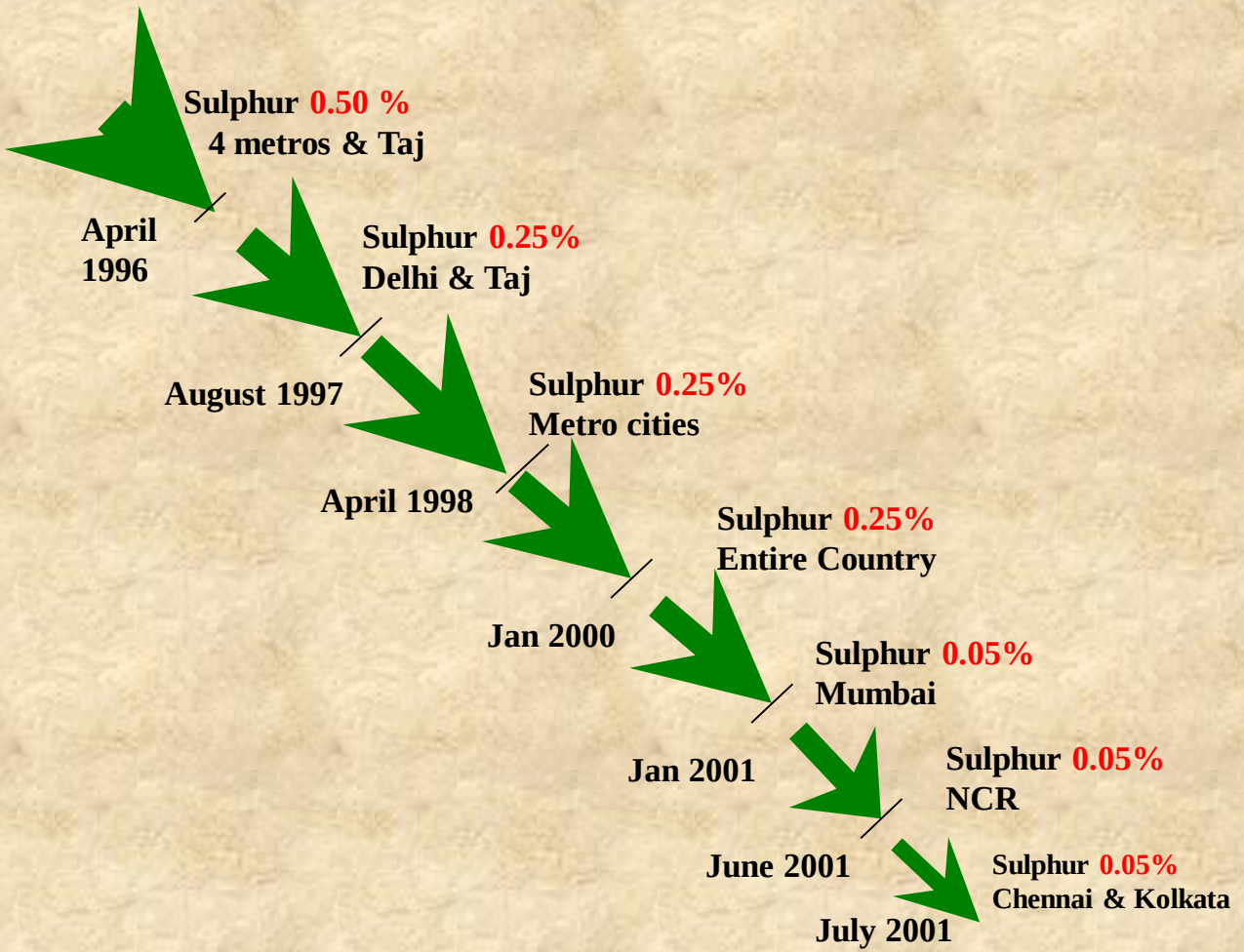
GASOLINE BENZENE REDUCTION PRORAMME IN INDIA



GASOLINE LEAD PHASE-OUT PROGRAMME IN INDIA

cpcb

DIESEL SULPHUR REDUCTION PROGRAMME IN INDIA



ALTERNATE FUEL

- **CNG – Norms notified more than 80,000 CNG vehicles in Delhi**
- **LPG – Norms notified, LPG kits approved**
- **Gasoline with 5% ethanol from 2003 in sugar producing states & UT to be extended to other states and Union Territories. 10% to be introduced by 2007**
- **Bio – diesel (5%) by 2005 & Bio – diesel (10%) by 2011**

STEP TAKEN TO CONTROL INDUSTRIAL AIR POLLUTION IN INDIA

- Enforcement of Standard in 17 categories of highly polluting industries.
- Use of Beneficiated Coal (34% Ash) in Power Plants.
- Pollution Prevention and Control Technology adoption in S.S.I. (stone crusher, brick kiln. etc.)
- Use of approved fuel in major cities.
- Adoption of clean process technology in major industries in India.
- Formulation and Implementation of Corporate Responsibility in Environmental Protection (CREP) Programme.

RESTRICTION ON GROSSLY POLLUTED VEHICLES

- 15 YEARS OLD COOMERCIAL VEHICLES PHASED OUT IN DELHI

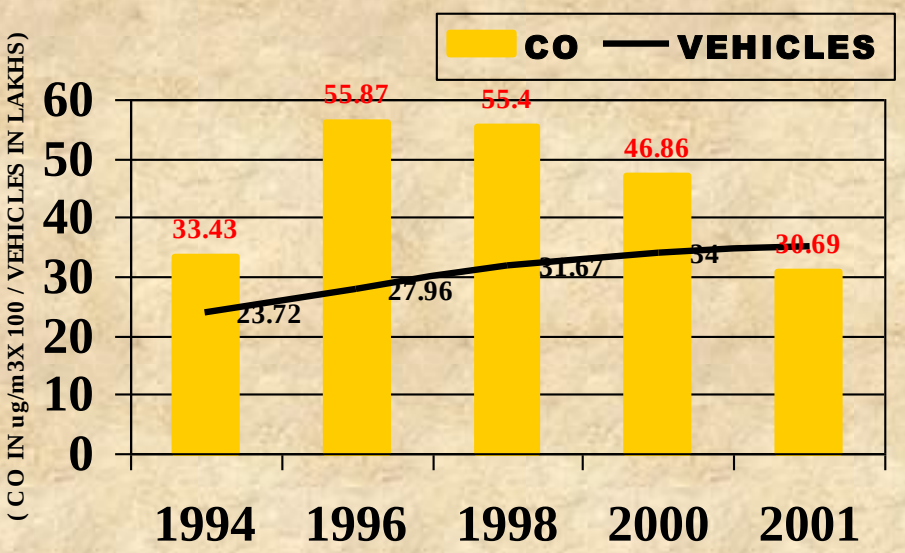
- CITY DIESEL BUSES PHASED OUT IN DELHI

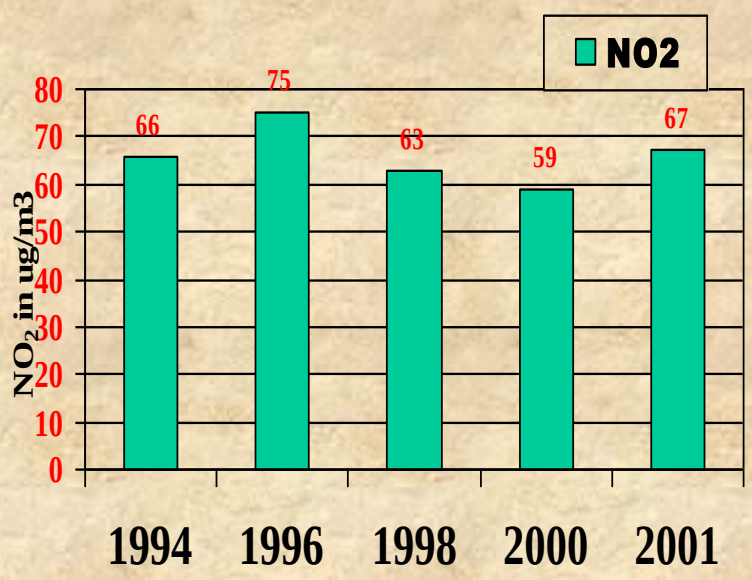
AGENCIES INVOLVED

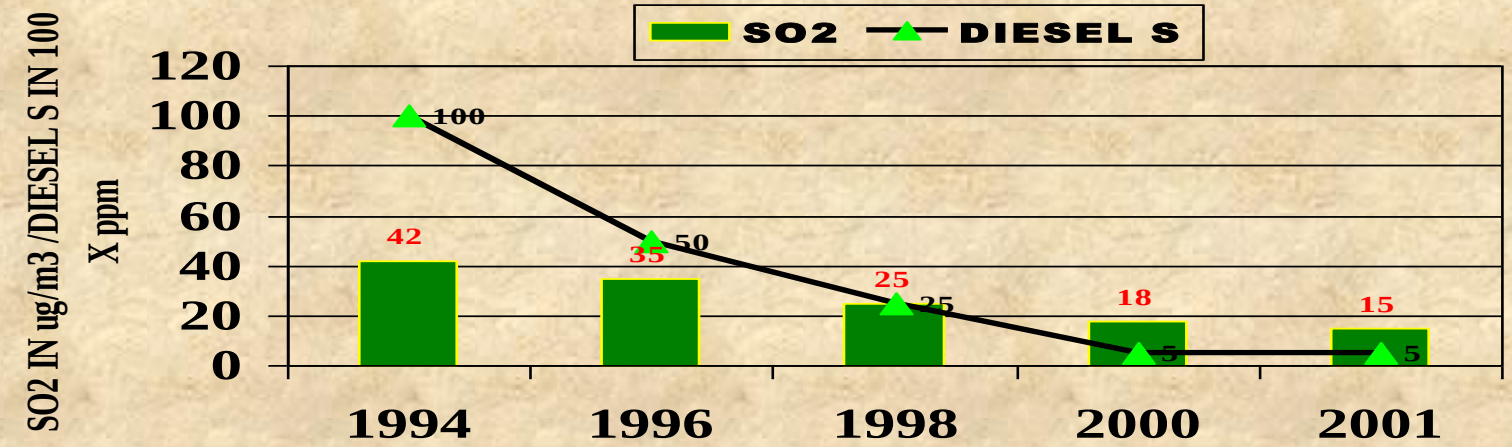
- Central Pollution Control Board
- Ministry of Environment & Forests
- Environmental Pollution Control Authority
- Ministry of Petroleum & Natural Gas
- Ministry of Road Transport & Highways
- Ministry of Industries

IMPACT OF STEPS TAKEN TO CONTROL AIR POLLUTION IN DELHI – NATIONAL CAPITAL OF INDIA

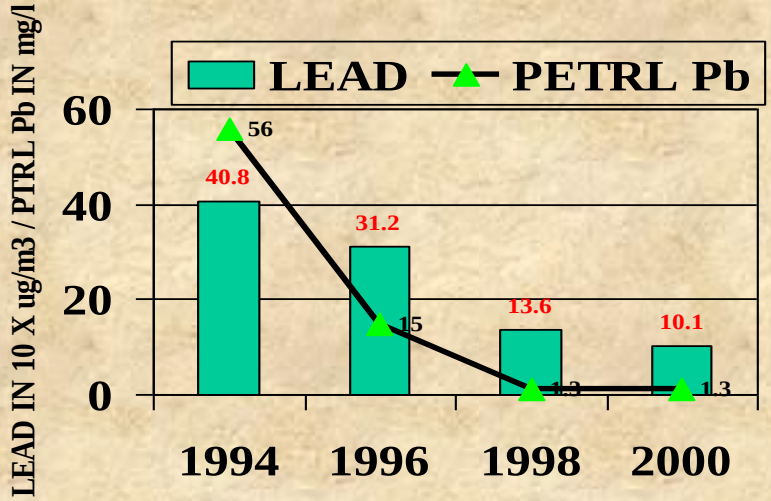
AMBIENT POLLUTANT LEVELS IN TRAFFIC INTERSECTION IN DELHI

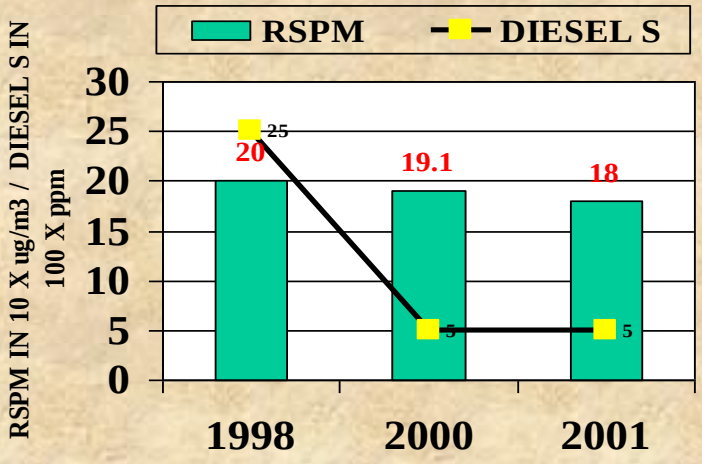




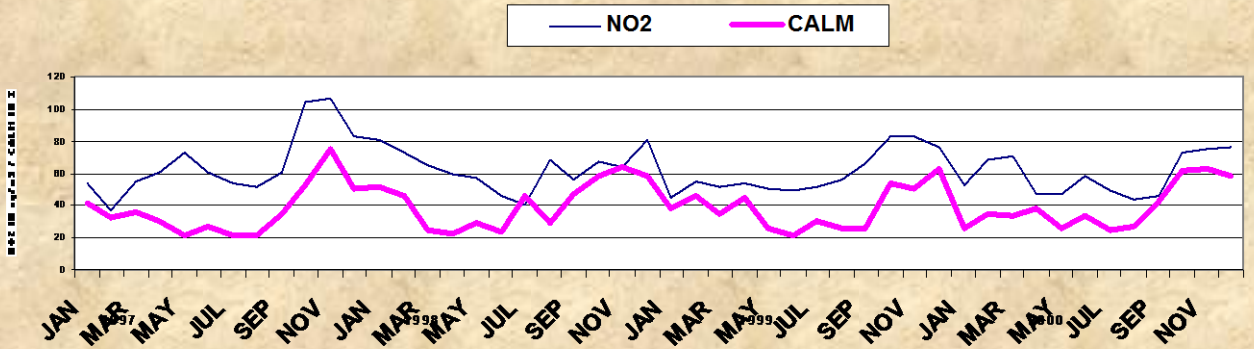


AMBIENT POLLUTANT LEVELS IN TRAFFIC INTERSECTION IN DELHI





CORRELATION OF AMBIENT NO2 LEVEL WITH CALM CONDITIONS OF WIND IN DELHI



PROGRESS MADE TO IMPLEMENT MALE' DECLARATION IN INDIA

PROPOSED MONITORING SITES - INDIA

BANGLADESH BORDER	:	- Port Canning (Sunder bans)
		- Dumki
BHUTAN BORDER	:	Bongaigaon
MALDIVES BORDER	:	Lakshadweep Islands
NEPAL BORDER	:	Narkatiaganj
PAKISTAN BORDER	:	- Tanot
		- Pathankot
SRILANKA BORDER	:	Thirunelveli
SOUTH EAST ASIA BORDER	:	Andaman Islands
NORTH EAST ASIA BORDER	:	Changele
ECOLOGICAL SITE	:	Molem

Proposed Monitoring Stations

Proposed site for first station

Climate of the region

- Tropical monsoon type climate
- Average annual rainfall 1750 – 1800 mm
- 80% rainfall between June and September
- Maximum and minimum temperature during summer 18 – 39°C

  during winter 13 -32°C
- Humidity between 60 and 88 %
- Dominant wind direction N to NE during winter and S to SW in summer

Sundarbans

Industrial Activities

- No large or medium industry located in Sundarbans
- Small scale manufacturing of cutlery and agricultural implements (Jayanagar and Mathurapur)
- Candle manufacturing, cock briquettes, small printing press, leather, wooden furniture, plastic, rubber electrical and other miscellaneous

Sources of Air pollution

- Use of Generator sets (Limited power supply)
- Burning of coal, briquettes, cow dung cake, wood, kerosene, dry leaf in household
- Water based transport by mechanised boats and launches

Port Canning

Industrial Activities

- Agriculture
- Fishing (mechanical boats and launches)
- Tourist movement in Sundarbans (mechanical boats and launches)

Sources of Air Pollution

- Burning of fire wood, coal, briquettes and kerosene
- Running of generator sets
- Plying of vehicles

Air Quality at Port Canning

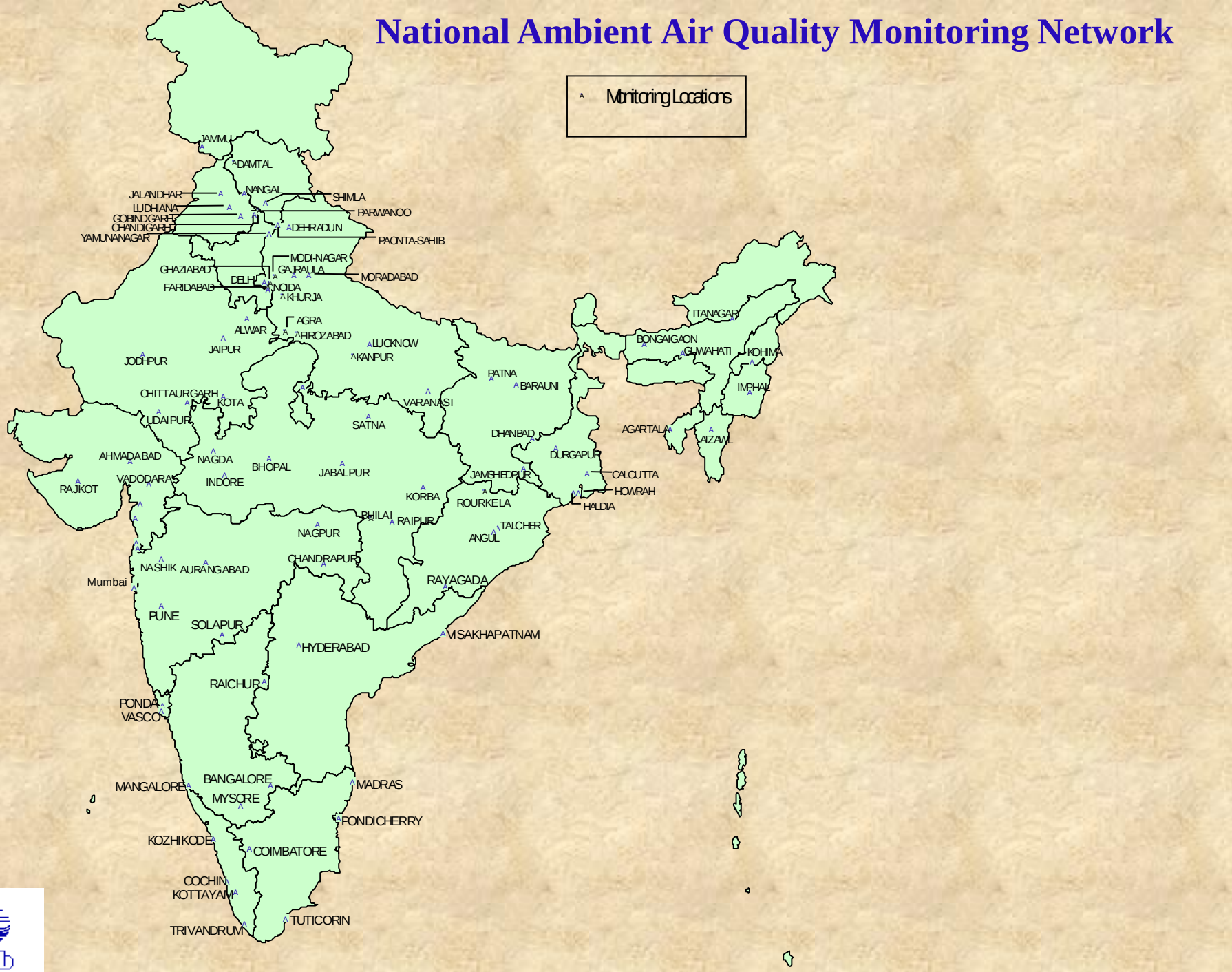
Parameters	Station I	Station II
RSPM	123	144
SPM	131	229
NO_2	14	24
SO_2	BDL	5

Unit : µg / m^3, 24 hrs. average values

Strengthening of the Network

- In addition to the proposed station at Sundarbans additional stations will be incorporated in the Male' Network by relocating of existing stations under the National monitoring programme or establishing new stations

National Ambient Air Quality Monitoring Network



FUTURE PLAN IN INDIA TO STRENGTHENING AIR QUALITY MONITORING

1. Increase number of air quality monitoring station from 295 to 1000 in phased manner.
2. Inclusion of Toxic and Hazardous air pollutants monitoring (Benzene, Poly Aromatic Hydrocarbon. Ozone, Metals etc.) in selected station in phased manner.
3. Strengthening monitoring of fine particulate matter (PM_{10} & $PM_{2.5}$).
4. Periodically calibration of air quality monitoring analysers.
5. Setting of Regional air quality monitoring calibration centres (Vadodara, Banglore, Kanpur and Kolkata)
6. Setting of few stations which will monitor background air quality.
7. Location of air quality monitoring station based on proper scientific study.

Condt..

8. Analytical Quality Control and Ring Test facilities for all air quality monitoring.
9. Certain specific pollutants to be monitor continuously in back ground and maximum impacts zones.
10. Proper ventilation coefficient and micro meteorological condition to be considered for locating new air quality station.
11. Periodic training to personnel who are doing air quality monitoring in SPCBs / other agencies.
12. Encouraging private participation in air quality monitoring.

ADVISORY COMMITTEE TO IMPLEMENT MALE' DECLARATION RECOMMENDATION IN INDIA

Advisory Committee

Nine member committee comprising members from

- Central Pollution Control Board
- State Pollution Control Boards
- Research Organizations
- NGOs
- Experts in the field of Air pollution

Terms of Reference of Advisory Committee

- To review the data, generated from the Air quality monitoring stations, established to monitor the transboundary air pollution before releasing it to UNEP or any other organisation.

- To identify the emission sources within the country which may contribute to transboundary movement of air pollutants.

- To prepare a list of major emission sources across the border which may affect the air quality within the country.

- To develop a model for assessing the movement of air pollutants from major emission sources within the country.

- To assess the need for strengthening / developing an Air quality monitoring network for assessing the transboundary movement of air pollutants from the neighbouring countries.

- To identify the parameters, necessary for monitoring the transboundary movement of air pollutants (in addition to the parameters, identified under Male' Declaration).

RECOMMENDATION OF CPCB ON CONTROL AND PREVENTION OF AIR POLLUTION AND ITS LIKELY TRANSBOUNDARY EFFECTS FOR SOUTH ASIA

1. Proper Inventory of air polluting sources (point, area and line source) to be made in this region using own country specific emission factors.
2. Prediction of air quality using appropriate and validated air quality models.
3. Location of air quality stations to see the impacts of transboundary air pollution should be selected based on proper scientific study.
4. Likely impacts of air pollution from neighbouring counties (not included in the network) to be studied also where coal and oil consumption for industrial and transportation purpose is very high.
5. Road map to be developed for improvement of fuel quality (both solid and liquid fuel) and to be implemented.

Condt..

6. Major thrust to be given to pollution prevention and control option for small scale air polluting industries in this region (brick kiln, lime kiln, rerolling mills, arc furnaces, foundries etc.).
7. Emission from Diesel Buses / Trucks and 2 stroke two and three wheelers to be controlled further and if required using clean fuel like CNG / LPG etc.
8. Proper source apportionment study to identified the sources of various pollutants like FPM, NO_X, SO_2 to be conducted in time bound manner.

THANK YOU