10th **Session of Intergovernmental Meeting and**
5th **Regional Stakeholders-cum-Regional Coordination Meeting**
Colombo, Sri Lanka
August 19 – 21, 2008

MALE` DECLARATION ON CONTROL AND PREVENTION OF AIR POLLUTION AND ITS TRANSBOUNDARY EFFECTS FOR SOUTH ASIA

Central Pollution Control Board
Parivesh Bhawan, East Arjun Nagar
Delhi – 110 032
INDIA
(http://www.cpcb.nic.in)

IMPLEMENTATION STATUS

(PROGRESS OF LAST THREE YEARS)

AIR QUALITY MONITORING

- **Location: Port Canning, Sunderban, South 24 Paraganas district, West Bengal; Bordering Bangladesh (23 km) on the Western bank of Matla river of Sunderban delta**
- **Commenced from: September 2004**
- **Air pollutants: SO_2, NO_2, RSPM**
- **Frequency: Eight hourly, Thrice a week**
- **Meteorological data: IMD Met Station within same campus**
- **Other parameters: Rain water, water quality of the adjacent water bodies such as ponds and rivers, quality of sediment and soil**
- **Frequency: Once in a year**

AIR QUALITY MONITORING STATION AT CANNING

Map Showing Air Quality Monitoring Station at Canning, Bordering Bangladesh

ADDITIONAL MONITORING STATIONS

- Four additional monitoring stations sanctioned
  - Dawki, Meghalaya bordering Bangladesh
  - Pathankot, Punjab bordering Pakistan
  - Lakshadweep islands bordering Maldives
  - Daranga, Baska District near Bhutan Border
- Funds released for procurement of equipment
- Expected to be operational by early 2009

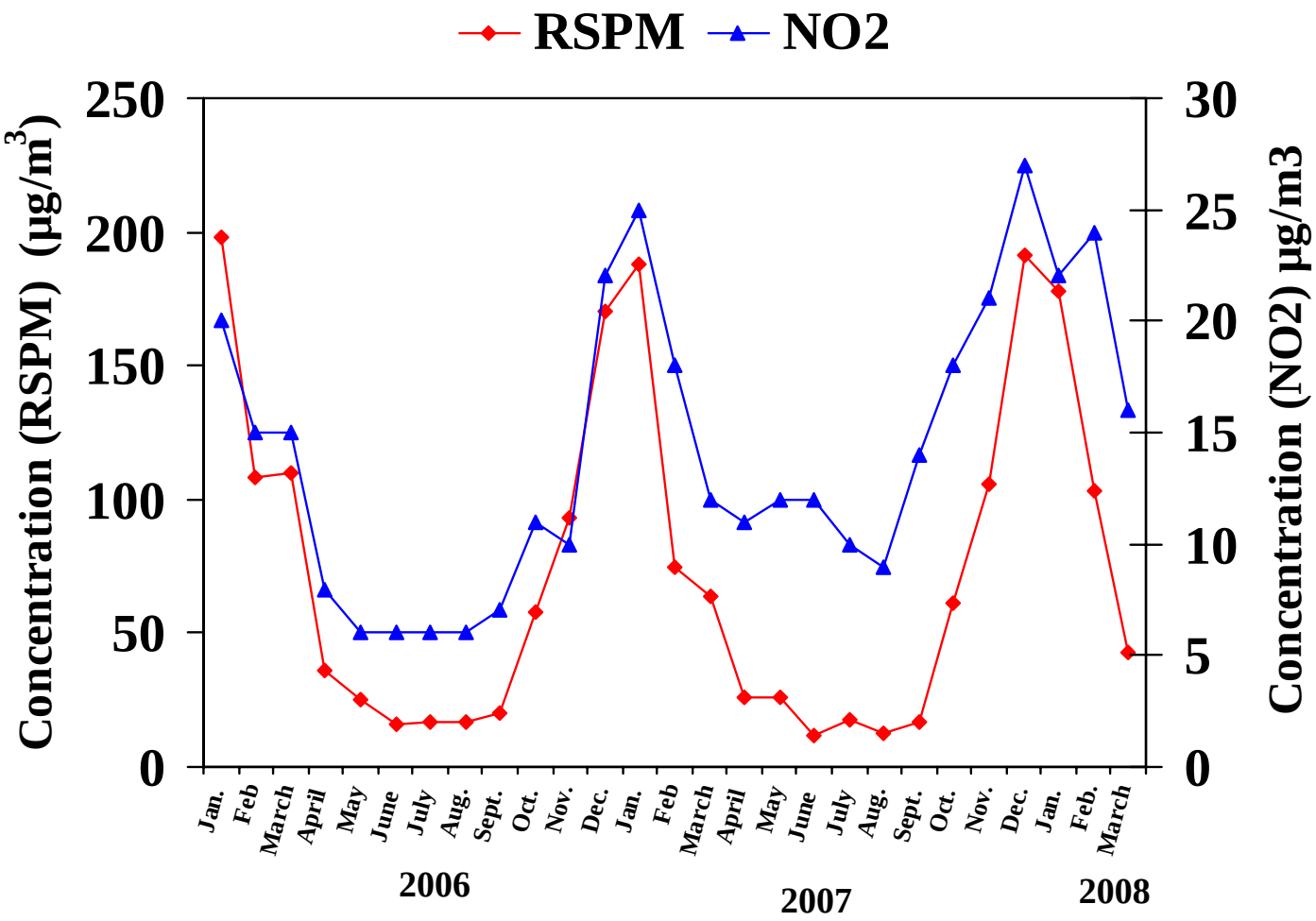
DATA REPORTING AND RESULTS

- Data on air quality, rain water quality, meteorology, etc. at Port Canning being forwarded to Male` Secretariat
- 24-hourly average concentrations of SO_2 and NO_2 much lower than ambient air quality standards
- RSPM concentrations exceed the prescribed standards, particularly during winter season
- RSPM and NO_2 values higher considering background location
- Passive sampling continued

PERCENT VIOLATION (24-HOURLY AVG. NAAQS)

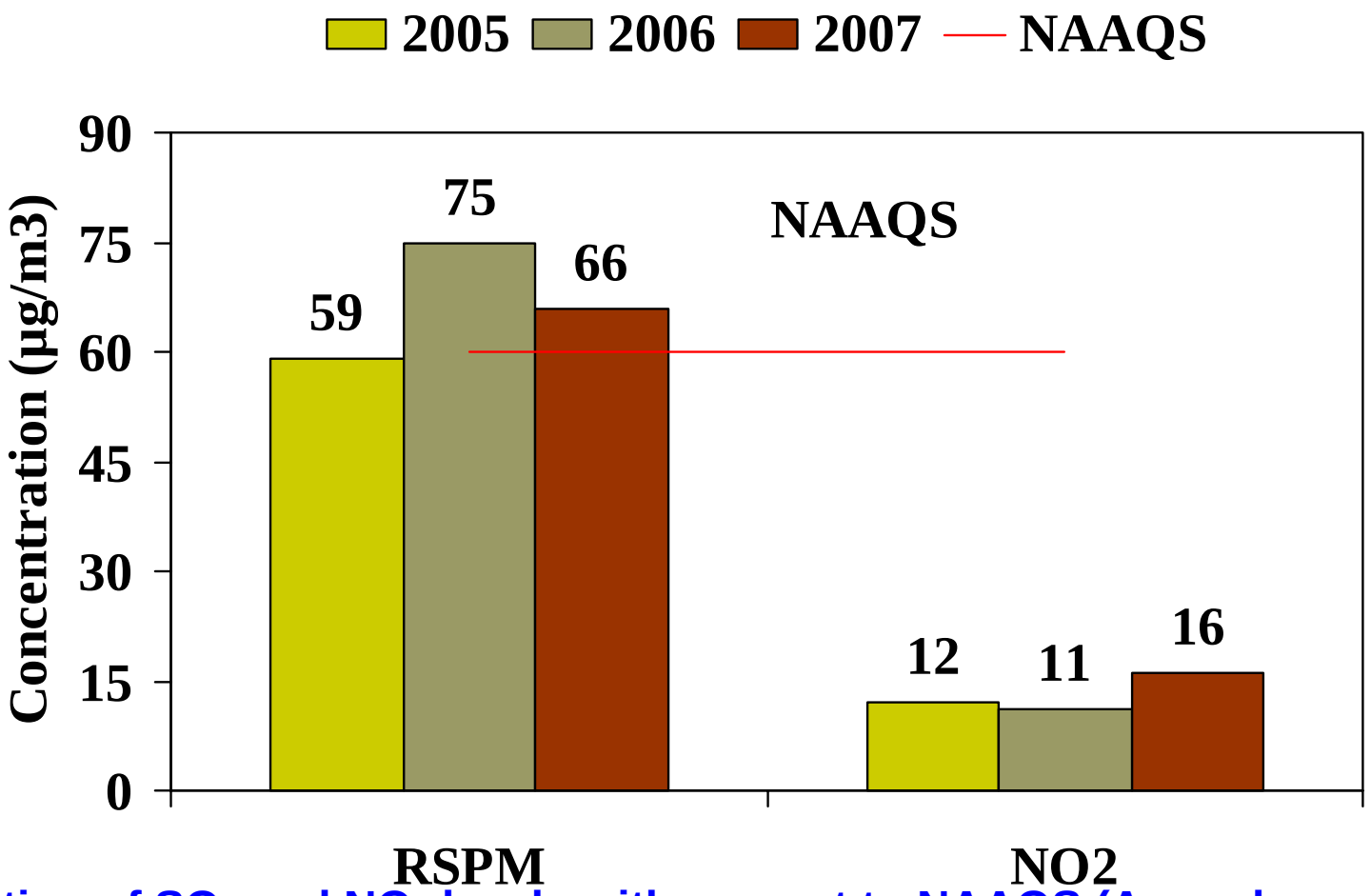
Parameter	2005	2006	2007	2008 (Jan – March)
RSPM	23	28	27	46
NO_2	0	0	0	0
SO_2	0	0	0	0

MONTHLY AVERAGE CONCENTRATIONS



Seasonal variations. Higher levels during winter

ANNUAL AVERAGE CONCENTRATIONS



No violation of SO_2 and NO_2 levels with respect to NAAQS (Annual as well as 24 hourly average)

FREQUENCY OF RSPM EXCEEDING NAAQS (APRIL 2007 – MARCH 2008

Months	No. of Obs.	No. of Violation of Std	% of Violation of Std
Apr-07	13	Nil	Nil
May-07	13	Nil	Nil
Jun-07	10	Nil	Nil
Jul-07	12	Nil	Nil
Aug-07	11	Nil	Nil
Sep-07	11	Nil	Nil
Oct-07	11	3	27.3
Nov-07	11	7	63.6
Dec-07	12	12	100.0
Jan-08	12	9	75.0
Feb-08	11	6	54.5
Mar-08	12	1	8.3

RESULTS OF ACTIVE AND PASSIVE SAMPLING

DATE		SO2 (µg/m3)			NO2(µg/m3)		
START	STOP	ACTIVE	PASSIVE	DIFFERENCE IN %	ACTIVE	PASSIVE	DIFFERENCE IN %
11/30/2004	12/21/2004	2	5.4	63	23.3	15.7	-48.4
11/30/2004	12/21/2004	2.5	5.6	55.4	23.3	16	-45.6
02/05/2005	02/27/2005	3.8	9.3	59.1	18.1	9.6	-88.5
03/10/2005	03/31/2005	1.7	2.5	32	10.5	4.4	-138.6
07/13/2005	08/02/2005	0.3	1	70	4	1.8	-122.2
8/02/2005	08/23/2005	0.8	2.3	65.2	6	2.8	-114.3
10/06/2005	10/26/2005	0.5	2.2	77.3	7.5	4.5	-66.7
11/03/2005	11/23/2005	1	4.5	77.8	12.9	11.3	-14.16
12/01/2005	12/21/2005	0.5	9.8	94.9	19.7	17.9	-10.1
02/07/2006	02/27/2006	1.7	9.1	81.3	14.1	9.6	-46.9
03/02/2006	03/22/2006	1.4	9.4	85.1	15.3	9.7	-57.7
04/04/2006	04/24/2006	0.3	3	90	6.8	4.2	-61.9

MONITORING OF RAINWATER, SOIL AND SURFACE RUNOFF

- **First rainwater pH values vary from 5.2 - 6.2**
- **Salt content varies from 4.0 to 63.0 µs/cm as reflected in the electrical conductivity of the water.**
- **Chloride being major constituent of the sea water salts, shows its presence in the atmosphere, which reflects from the concentration of chlorides ranging from BDL to 19.0 mg/l.**
- **Concentration of total nitrogen, available phosphorous, organic carbon, exchangeable calcium and magnesium in the soil indicated that the soil are fairly fertile.**

MONITORING OF RAINWATER, SOIL AND SURFACE RUNOFF

- **Quality of sediment was found quite suitable for a balanced ecosystem.**

- **Quality of surface run-off and pond water was found suitable for adequate organisms including fish, except a marginal increase in chloride, sodium and sulphate contents indicating influence of sea water.**

- **River water was found saline as reflected from the concentration of sodium, chloride, sulphate etc., indicating tidal influence.**

CHEMICAL CHARACTERISTICS OF RAINWATER (MAY – SEPTEMBER 2007)

Sampling Date	Sample Code	pH	Cond µs/cm	Na^+ mg/l	K^+ mg/l	TH mg/l	Ca_2^+ mg/l	Mg_2^+ mg/l	Cl^- mg/l	NO_3 mg/l	NH_4^+ mg/l	SO_4 mg/l
07.05.07	RW-1	5.0	11	0.58	BDL	BDL	0.75	0.22	0.95	0.94	0.6	0.75
07.05.07	RW-2	4.7	11	0.56	BDL	BDL	0.64	0.29	0.69	0.93	0.69	0.82
13.06.07	RW-1	6.1	42	1.60	BDL	10	3.80	0.37	2.00	5.20	1.3	2.96
03.07.07	RW-1	5.8	9	0.25	0.44	BDL	0.33	-	0.77	0.42	0.15	BDL
23.07.07	RW-1	5.9	14	1.88	1.78	-	3.87	1.06	2.30	1.91	1.05	1.17
24.09.07	RW-1	6.0	11	2.67	1.34	-	2.16	0.54	2.93	0.98	0.17	1.11

BDL= Below Detection Limit

IMPACT ASSESSMENT ACTIVITIES:
HEALTH IMPACT

- **Two Epidemiological Studies on adult and children in Delhi completed by Chittaranjan National Cancer Institute (CNCI), Kolkata, Ministry of Health & Family Welfare**

- **One Epidemiological Study on effects of air pollution carried out by CNCI, Kolkata in Kolkata**

- **Health Effect of Chronic Exposure to Smoke from Biomass Fuel burning in Rural Households: A Study in Northern and Eastern India under progress (CNCI), Kolkata**

- **Studies sponsored by CPCB**

IMPACT ASSESSMENT ACTIVITIES:
CROP IMPACT

- Study on impact of surface level ozone pollution on major crops like rice, wheat and maize, being carried out by IARI.
- Experiments are also being carried out to study the interactive effect of elevated ozone and carbon dioxide on the crop growth, productivity and soil fertility.
- Different exposure indices are being evaluated for ascertaining the damaging concentrations of surface level ozone and developing dose response relationships
- Studies on effect of air pollution on crops being carried out at BHU

IMPACT ASSESSMENT ACTIVITIES:
CORROSION IMPACT

- Being carried out at Tajmahal, Agra in collaboration with Corrosion & Metal Research Institute, Sweden
- Copper, Zinc, Painted Steel, Carbon Steel and Stone samples (total three sets of nine each) are being exposed
- Exposed samples being forwarded regularly (every two months with temperature & Humidity data) to Corrosion & Metal Research Institute, Sweden for analysis. Will be studied for corrosion on completion of first, second & fourth years (due in Nov. 07, Nov. 08 & Nov. 10 respectively)

IMPACT ASSESSMENT ACTIVITIES:
SOURCE APPORTIONMENT STUDIES

- **An integrated approach involving emission inventories, air quality measurements, dispersion & receptor modeling; initiated for six cities; focus on PM_{10} & $PM_{2.5}$; will address many air quality management issues**
- **Development of Emission Factors for vehicles based on measurements on in-use vehicles**
- **Development of Emission profiles for vehicular and non-vehicular sources**
- **Results expected soon**

EMISSION INVENTORY AND DISPERSION MODELLING

- **Work on development of Emission Inventory has been initiated in collaboration with IIT, Kanpur.**
- **Expected to be completed by December 2008.**
- **Reporting of information relevant for implementation under Male` Declaration**
- **Dispersion Modelling – Adequate Experience**

STAKEHOLDERS PARTICIPATION

- **Advisory Committee reconstituted – comprising members from Academia, Research Institutes and other stakeholders**
- **Committee would guide through implementation of activities & programmes under Male` Declaration**
- **Website of Male` Declaration linked to CPCB's website**

OTHER INITIATIVES

- NAMP Expanded to 342 stations covering 127 cities/towns – 04 stations under Male` Declaration
- Environmental Data Bank (EDB) established – Data for Port Canning available
- Additional Parameters – $PM_{2.5}$, BTX, PAH, O_3, CO, NH_3 (Selected locations), Characterization of PM_{10}
- Continuous monitoring being initiated in 16 cities and other non-attainment cities.
- Emission Standards: Revised standards notified for many industrial sectors – Oil refineries, Sulphuric Acid Plants, Pesticides, Common Hazardous Waste Incinerators, etc.
- NAAQS under revision – includes HAPs; draft finalized.

FUTURE PLANS

(ACTIVITIES FOR NEXT THREE YEARS)

PLANS FOR 2009 – 2011

- **Institutional Arrangements: NFP – MoEF; NIA – CPCB**
- **Air quality monitoring: continuing ongoing monitoring; establish more monitoring stations bordering other countries**
- **Impact Assessment: SA studies to be extended in other cities; integrate crop impact assessment studies and initiate more or strengthen ongoing studies; More epidemiological studies; Corrosion Study – to continue at Agra & take up at some other location with in-house expertise**
- **Emission Inventory: Refinement; Urban areas**
- **Capacity building: Conduct workshops/training programmes**
- **Regional Co-operation: Expertise & experience of the participating countries; initiating actions based on good examples**

Thanks

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