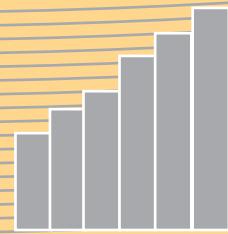


Apr-June 2015

Green Voice

Quarterly Newsletter



CMS ENVIS

Newsletter on
Environment & Media

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The main features of GREEN VOICE are:

RESEARCH PAPER scholarly written paper contains original research results or reviews existing results or show a totally new invention related with theme

COLUMN recurring piece or article in a newspaper, magazine or other publication accordance with the theme

IN BLACK AND WHITE some of the leading environmental news coverage in the print media for over a quarter

FACETS profile of a person who has contributed significantly to environment awareness through media tools

TALK OVER exclusive interviews with people actively engaged in environment advocacy such as filmmakers, journalists, photographers etc.

NGO VIGNETTES profile of an NGO or civil society organisation also in accordance with the theme

OPEN WINDOWS useful website links in accordance with the theme

ON AIR media update on programmes being aired by various channels

VIEWPOINT article by an expert on some contemporary issue

FEATURE focuses on particular people, places, and events, and it goes into great detail regarding concepts and ideas of specific issues

MEDIA ANALYSIS media trend analysis of environment news - quarterly

LATEST GREEN FILMS regular updates on fascinating films by Indian filmmakers on environment and wildlife

BOOKS latest books and publications on the theme of the newsletter

Environment calendar

January

- 4- Oil Conservation Week
- 15 – Oil Conservation Fortnight
- 30- National Cleanliness Day

February

- 2- World Wetlands Day
- 28- National Science Day

March

- 2-4 World Sustainable Day
- 21- World Forestry Day
- 22 - World Water Day
- 23 -World Meteorological Day

April

- 5- National Maritime Day
- 7- World Health Day
- 22- World Earth Day

May

- 11- International Migratory Day
- 22 - International Biodiversity Day
- 31 - World No Tobacco Day

June

- 5 - World Environment Day
- 8 - World Ocean Day
- 17 - World Day to Combat Desertification and Drought

July

- 11 – World Population Day
- 28- World Nature Conservation Day

August

- 6- Hiroshima Day
- 9 – Nagasaki Day
- 9 – International Day of the World Indigenous people

September

- 16- World Ozone Day
- 28 - Green Consumer Day

October

- 2-8 Wild Life Week
- 4 - World Animal welfare Day
- 5 - World Habitat Day
- 10 – International Day for Natural Reduction
- 16 – World Food Day

November

- 6- International Day for preventing the Exploitation of the Environment in War and Arm Conflict
- 10 – World science Day
- 21 – World Television Day

December

- 2– Bhopal Tragedy Day/ National Pollution Day
- 11- International Mountain Day
- 14 National Energy Conservation Day

Column

A new vehicle for clean air



Sunita Narain

Director General, Centre for Science and Environment, New Delhi

The best way to improve Delhi's toxic air is to massively augment public transportation systems.

Roll down the window of your bulletproof car, Mr Prime Minister. The security threat is not the gun, it is the air of Delhi." This was the headline of the public advertisement the Delhi-based Centre for Science and Environment (CSE) issued some 16 years ago. This was when Delhi's air was sick with black smoke, fuel and emission standards were virtually non-existent and motorisation was just beginning to take off. The agenda for action — also listed by the CSE in the public notice — was to advance the roadmap for fuel-emission standards, restrict diesel vehicles, and make the transition to a much cleaner fuel, compressed natural gas (CNG).

The rest is history. Amicus Curiae Harish Salve asked the Supreme Court to take firm action. It did. The city did leapfrog to CNG and the country also cleaned up its fuel and advanced emission standards for vehicles. The result was reduction in pollution; studies have recorded the impact in terms of benefits to health. More simply, we in Delhi could see stars. We even forgot that we had a problem called pollution.

But not anymore. Each year since 2007, pollution levels have risen to reach the dangerously toxic levels today. This winter, the level of PM 2.5 — tiny particles emitted from vehicles that can go deep into our lungs and enter the bloodstream — remained three to four times higher than the standard of safety. In December, the air was classified as "severely polluted" for over 65 per cent of the days. According to the government's own air quality index, this would mean pollution is so bad that it would cause "respiratory effects even on healthy people". It is unsafe to breathe. This is what we must realise.

So, what has happened to make Delhi, once again, wheeze, choke and die because of dirty

air? The fact is that in the past decade, since the introduction of CNG, some things have changed. One, there has been an explosion of personal vehicles — a near 100 per cent increase in registration in Delhi alone. So, even as each car has become cleaner because of tighter emission standards and better quality of fuel, their number has increased exponentially. The net result on pollution is the same.

Second, while in 2000, diesel cars were only 4 per cent of total sales, this had increased to 50 per cent by mid-2000. India-style socialism meant that cheaper diesel (there is still a price differential between petrol and diesel) continues to be used by the rich car owner. Each diesel car is legally allowed to emit four to seven times more than the petrol variant. Pollution is inevitable.

Three, the cities around Delhi have grown. By 2007, as many as 1.2 million vehicles entered or left Delhi everyday, in the direction of Gurgaon, Faridabad, Noida or Ghaziabad. And as we have done nothing to provide connectivity by bus or rail, the number of vehicle trips has but naturally increased, and so has its pollution. In all this, vehicles remain the major contributor to toxic air pollutants — whatever automobile companies say, it is not dust or leaf burning or even diesel from generator sets. These add to pollution. But not enough to cause the hell we breathe today.

There is one new pollution source — non-vehicle, which has made an entry post mid-2000. Punjab and Haryana directed farmers to delay paddy transplantation to save on groundwater usage in peak summer. But now there is no time for farmers to harvest paddy and grow wheat. They burn the straw. So, in October and November, just as winter inversion is settling in, this fire makes its way to the already polluted airshed of Delhi. We choke.

It is not as if governments don't know what to do. Deliberations on a comprehensive action plan for clean air, which listed what needed to be done in the short and long term, started in 2012. By the time it got completed, elections were held. Then the lieutenant governor set up another committee to prepare another action plan. After much confabulation, the same actions were listed. But no action was taken. Now we have new governments at the Centre and in the state. They are also busy asking for

action plans. It is time we stopped finding new excuses not to act. It is clear that taking action to control this runaway pollution will be tough. But each month we waste in revising the action plan, we lose more life-years in terms of bad health. The 2012 study of over 11,000 school students in the city found that every third child has impaired lung function. This is unacceptable and deadly.

What, then, is the way ahead? The fact is that Delhi managed to turn the page on pollution in 2001. Can it do so again? My colleagues and I believe it can be done. We have put together an agenda for action — the second-generation reform package, which lists 12 big steps that need to be taken.

The most immediate is to have an aggressive roadmap for clean fuel and vehicle technology in the country. But this is not acceptable to powerful vehicle manufacturers. So, even as oil companies have started to supply cleaner fuel across north India from April 1, car companies have succeeded in getting an extension for the supply of clean vehicles from the surface transport ministry. This, knowing full well that it would significantly bring down pollution from diesel trucks entering the city. Now, the same car companies are busy arguing that they should continue to have a licence to pollute. They want 8-10 years to move to the cleaner vehicle technology that Europe uses today. These companies need to understand that we have all run out of time and air to breathe.

Other steps are equally urgent, from monitoring air quality to smog alerts, so that we know when we are advised to take precautions because of bad air. But most critically — the game changer you can call it — is the need to massively augment our public transportation systems, the bus, metro, footpaths and cycle tracks, so that we can take a bus and then cross the road or just walk. We also need car restraints. Parking rates and fines for illegal parking need to be increased and then enforced. Today, we have a handful of cranes and a sprinkling of traffic police to stop illegal parking. This cannot go on.

Let us be clear, actions for cleaning our air are within our reach. But only if we accept that polluted air is a killer. This slow murder must be stopped.

<http://indianexpress.com/article/opinion/columns/a-new-vehicle-for-clean-air/>

ARTICLE

Scenario of Vehicular Emissions and its Effect on Human Health in Kolkata City

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Abstract:

Vehicular Pollution level in the city of Kolkata and its outskirts is alarming. West Bengal Pollution Control Board has indicated that the automobiles contribute significantly to particulate of the size of 1.1 micron and account for nearly 50 percent of the air pollution load in Kolkata. WBPCB has identified some of the reasons which are responsible for automobile pollution in the city which includes mainly high emission from two and three wheelers using of adulterer fuel, lacking in maintenance of vehicles, erratic traffic behavior and congestion at selected traffic intersection points, road encroachment by pavement dwellers, street hawkers and illegal car parking, improper traffic diversion, by Kolkata Traffic Police and inadequate traffic management emit huge amount of automobile pollutants in the city of Kolkata.

In Kolkata nearly 65 percent of the vehicles are diesel run. Diesel emissions are very toxic and it is carcinogenic in nature. Even Bharat Stage –IV compliant vehicles have higher toxicity than the petrol counterpart. Though petrol fuel emit high percentage of carbon monoxide and hydro –carbon and it is approximately 24 to 30 $\mu\text{g}/\text{m}^3$ per day (WBPCB, Annual Report 2012 –2013) compared to diesel fuel where the rate is nearly 18 to 21 $\mu\text{g}/\text{m}^3$ per day in the city. To assess the status of automobile pollution load, twenty traffic intersection points has been selected both from North, South, East, West and Central Kolkata in order to estimate the automobile pollution status. It has been noted that large and small buses are also the principle sources of NO_x, CO, HC, Pb, CO₂, SPM and RPM in the city. The average age of

the passenger cars within the city is about 10 years but over one quarter of the large diesel trucks are over 30 years. Therefore a large quantity of automobile exhaust not only effect the existing environment in the city of Kolkata but also results into heat island in all the traffic intersection points in comparison to other peripheral location in and around Kolkata. Further it has also been marked out that high rate of automobile emission may enhance the rate of temperature as well as relative humidity and in turn may reduce the amount of rainfall, thus unsaturated environmental condition has been noted in these selected traffic points. As an after math various respiratory diseases has cropped up like Bronchial Asthma, Chronic Bronchitis, Breathing problem, on the one hand and other diseases like Eye irritation, High pressure on the other found among the respondents in the city of Kolkata because of high rate of exhaust from the in-road running vehicles. Therefore an attempt has been made to justify the issue of vehicular pollution in Kolkata which has made residents at risk and to point out the traffic related air pollution in the city of Kolkata and its effect on environ along with comparison among the megacities of India followed by some critical appraisal and recommendations.

Key words: Automobiles, Traffic Intersection Points, Carcinogenic, Bronchial Asthma, Chronic Bronchitis, Breathing Problem.

Introduction:

Vehicular air pollution is a growing problem in Kolkata due to high growth rates of motorized transport. The rising level of air pollution can be attributed mainly to increasing vehicular population, which has been observed in an average decadal growth rate of almost more than 70 percent for two wheelers, 15 to 20 percent for four wheelers especially personalized cars and taxis, 8 to 13 percent for buses and 10 to 14 percent for three wheelers during 2001 to 2011. The West Bengal Pollution Control Board has pointed out that the main reasons behind the maximum vehicular emission are high average age of the vehicles, very low road surface area, road surface condition such as speed breakers, high density of population using the same roads, mixed vehicular mode along with the slow moving vehicles which are responsible for congested traffic condition in the city of Kolkata. From the Asian Development

Bank Report, it has been noted that the citizens of Kolkata breathe roughly 857 tonnes of air pollutants every day (ADB REPORT 2005). The pollution levels in Kolkata are not only increasing over the period but are critical at some traffic intersection point.

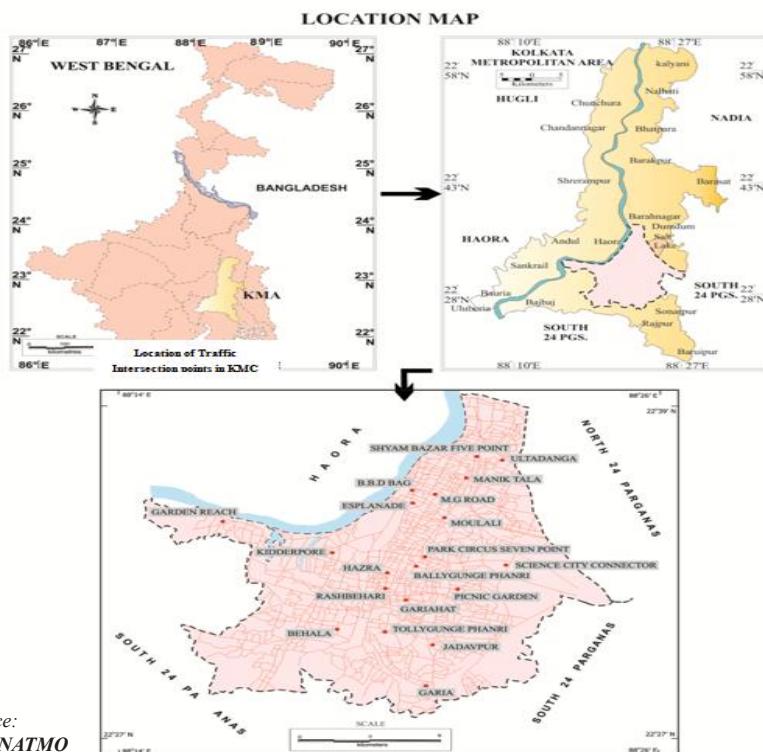
Area of Study:

The study area is the city of Kolkata under the jurisdiction of Kolkata Municipal Corporation (KMC). The district of Kolkata lies between 22°03'N to 22°07'N latitudes and 88°01'E to 88°23'E longitudes. The city comprises of an area of 187.33 sq. km. which is divided into 141 wards under 15 boroughs. According to the census of India (2011), the total population of Kolkata is 4,486,679 persons with a density of population of 24,718 persons per sq.km. It has shown a declining trend since 1991. But the vehicular population is on rise which shows an increase of 8 times from 1951 to 2011.

Objectives:

The study has been conducted with a view to fulfill the following objectives:

- To identify growth of different modes of urban transport and its importance and to mark out different sources of vehicular emission in the city of Kolkata.
- To measure the degree of different automobile pollutants at different traffic intersection points in North, South, East, West and Central Kolkata.
- To make a co-relation between concentration of automobile pollutants and climatic characteristics such as temperature, rainfall and relative humidity at different traffic points within the KMC boundary of Kolkata.
- To make a comparative analysis regarding pollution level and vehicular growth among ten metropolitan cities in India including Kolkata city.
- To examine the status of present scenario of fuel quality standard norms in the city of Kolkata.
- To evaluate the status of environmental pollution and health hazard related to vehicular air pollution in the city of Kolkata.
- To suggest how to minimize and reduce automobile pollution load by implementing various transport action strategy and legislative provision in the city of Kolkata.



Methodology:

All work of this academic tasks have been done in phases:

The first Phase: The first phase of the study was a preliminary attempt to gather various information and secondary data in registered vehicular population, like various sources of automobile pollution, diurnal variation of vehicular pollutants and seasonal variation of air pollution at different stations in the city of Kolkata. The information have been collected from the Transport Department, Government of West Bengal, various websites of CSTC, CTC and Kolkata Auto and Taxi Union, West Bengal Bus Syndicate Association, West Bengal Surface Transport Corporation, JNNURM, South Bengal State Transport Corporation and KMC offices of the 15 borough in the city.

Simultaneously, study on the existing literature available on the subject from libraries of West Bengal Pollution Control Board, and KolkataMetropolitan Development Authority. Secondary data have been collected from variousGovernment Reports and Manual in automobile air pollution and newspaper cuttings.

The intermediate phase: Collection of primary data has been made with the help of structured questionnaire. The primary survey

has been conducted on the basis of various perception from the traffic policemen, bus, auto and taxi driver and the people of Kolkata at different traffic junction points with the help of questionnaire survey. Relevant photographs have been taken during the field survey to illustrate the scenario more specifically.

The Final Phase: After the collection of primary and secondary data, computation, tabulation and analysis of the same have been done. In this phase data have been processed to prepare relevant maps and cartographic diagrams.

The interpretation of the prepared maps and diagrams has been done with necessary modifications ofthe previous works an d with critiques of the prevailing systems and other government policies.

Vehicular growth in Kolkata:

Kolkata city is connected with surrounding suburban areas by long and short distances bus services. These bus route services are mainly operated by public or Government sector (South Bengal State Transport Corporation, Calcutta Tramways Company, West Bengal surface Transport Corporation and Calcutta State Transport Corporation) and private sector (Bengal Bus Syndicate association, Calcutta

Bus Syndicate Association, Calcutta Mini BusAssociation and privately own Chartered Bus services). During the observation from 2008 to 2012, growth of two wheelers have been increasedmore than 3,00,000 followed by four wheeler (personalized car) which is more than 1,00,000 Three wheelers (more than 30,000) (Taxis (more than 40,000) and Buses (more than 10,000) have been observed in the city of Kolkata. According to 2011 census, vehicular population of Kolkata is near about 12.04 lakhs and total road space within the KMC area 7.0%. From this observation it has been marked that there is a negative co-relation between number of vehicle growth and limited road space, as a result there is trafficcongestion together with automobileemission in the city of Kolkata.

Concept of vehicular emission:

The fuel loss of vehicles may be due to emissions of refueling. The emissions may be evaporative or exhaust emission.The emission may be of different types as follows:

- **Exhaust Emission:**

Exhaust emission are those which are emitted through the exhaust pipe when the vehicle is running or is started. The exhaust emissions may be of two types:

Start up Emission: Emissions when the vehicle is started initially. Board on how long the vehicles had been turned off after use, they may be cold start and hot start. Cold Start refers to when the vehicle is started suddenly after a long gap of use, whereas, hot start refers to when the vehicle is started without the vehicle getting enough time to cool off after its previous use.

Running Emissions: Emissions during normal running of the vehicle, for example when the vehicle is in a hot stabilized mode.

- **Evaporative Emission:**

These include running losses and hot soak emissions produced from fuel evaporation when an engine is still hot at the end of a trip, and diurnal emissions (daily temperature variation).

- **Exhaust Pollutants:**

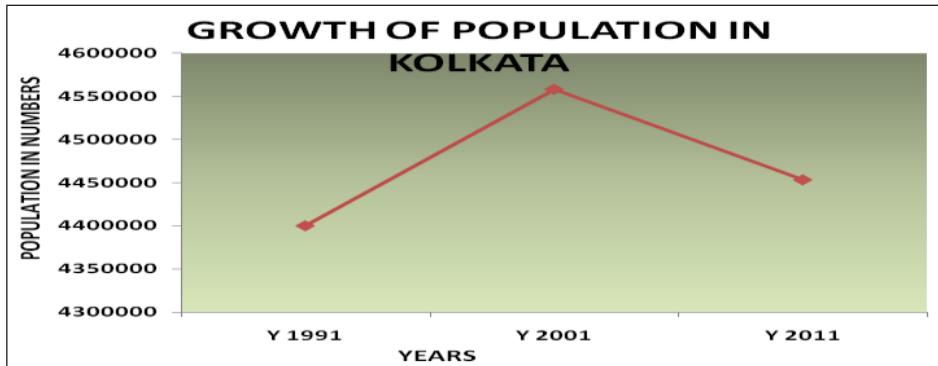
The pollutants which are emitted from the exhaust pipe of the automobiles; they are formed as a result of combustion of the fuel in the engine. These pollutants are harmful to the atmosphere and living things in particular in the city of Kolkata.

Table: I Major Automobile Pollutants in Kolkata

Pollutants	Description
Nitrogen Oxides (NO)	Road transport contributes to 49 percent of total NO emission in the city of Kolkata. NOx is a precursor of ozone formed in the troposphere.
Sulphur Dioxide (SO ₂)	Sulphur in diesel contributes to the exhaust particulate matter while in petrol it effects the performance of catalytic converters in engines.
Carbon Monoxide (CO) Volatile Organic Compounds (VOCs)	Road transport is the principle source of CO in the city of Kolkata. It includes wide range of hydrocarbon, oxygenates and halogen-containing species. Petrol vehicles emit more benzene in exhaust than diesel vehicles even when catalytic converters are used. The main source of 1,3 butadiene in the atmosphere is the combustion of petrol and diesel fuels.
Hydro Carbons (HC)	About 10 percent is emitted from automobile exhaust in the city of Kolkata.
Ozone (O ₃)	Ozone has a strong diurnal variation with concentration in peakin daytime hours Road traffic is a major contributor to its formation.
Lead (Pb)	The primary source of atmospheric lead in the city of Kolkata is leaded gasoline.
Particulate Matter (PM ₁₀)	Transport sectors in Kolkata again emit huge amount of particulate matter in the atmosphere.

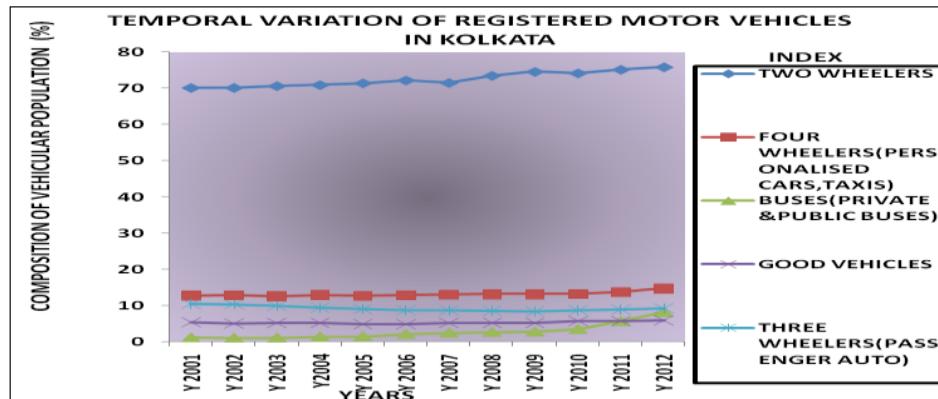
Source: Health Effect of Air Pollution: A Study on Kolkata by WBPCB

Figure 1: Growth of population in Kolkata



Data source: Census of India 2011

Figure 2: Growth of Vehicular Population in Kolkata



Data source: Transport Department, Government of West Bengal, 2014

Since Kolkata is a big city, growth of population have been increasing in Geometric Progression upto 2001 but then it has declined (fig:1) whereas vehicular growth (fig : 2) has shown a steady rise from 2001 to 2011. To maintain the status of the urban mind, most of the people depend on personalized vehicles especially two wheeler and four wheelers. From the recent observation, it has been focused that percentage growth of two wheelers are maximum in numbers followed by four wheelers, three wheeler and private and public buses. As a result these two wheeler and three wheeler emit huge proportion of automobile pollutants in the city of Kolkata due to ill maintained engine, using of adulterated oil and even aged and weight of the cars. From the statistical information provided by Transport Department, Government of West Bengal, it has been found that most of the old engine vehicles do not have catalytic converter which results in to exhausts of automobile emission in the environs of the city.

Major causes of air pollution from automobiles in the city of Kolkata:

There are several causes which are responsible for automobile pollution in the city of Kolkata. It includes mainly:

- High emission from two and three wheelers petrol driven vehicles.
- Using of poor quality fuel which include high sulphur, benzene and olefin.
- Adulteration of fuel especially using of Katatel (Kerosene and exhaust mobile) in the engine of three wheelers that is the autos in Kolkata.
- Lacking in maintenance of vehicles.
- Large number of heavy weight old engine petrol driven vehicles in use causes high emission.
- Erratic traffic behavior leading to congestion and emit huge proportion of automobile pollutants.
- Most of the busy traffic intersecting points in Kolkata have been encroached by pavement dwellers, street hawkers and illegal car-parking, as a result widening space of the road has reduced and thereby results to huge traffic congestion in the city of Kolkata.
- Improper construction of road divider in between two lane of the road make inadequate road space which prevent better mobility of traffic and even

unscientific construction of speed breaker reducing traffic speed in the city of Kolkata.

- Even improper management of traffic diversion by Kolkata traffic police and problem of traffic signalling system can create congestion which results into emission.
- Unscientific construction of flyover, size and weight of the car, inadequate traffic management emit huge amount of automobile pollutants in the city of Kolkata.

Concentration of Pollutants at Various Traffic Intersection Points in Kolkata:

During primary survey, 20 traffic intersection points has been selected to measure different degree/para metre of the different automobile pollutants to make an appropriate observation relevant to the study.

From the above observation (figure: 3), it can be pointed outthat, Park Circus Seven Point Crossing, Gariahat,Rashbehari and Hazra in South, Ballygunge and TollygungePhanri also in South, and M.G. Road, Shyambazar Five PointsCrossing in the North and Esplanade and B.B.D. Bag in the CentralKolkata recordedmaximum concentration of SPM, RPM, SO₂ and NO₂ concentration in comparison to other selected traffic intersection points in the city of Kolkata. As a result these traffic points consideredto be the site of heat islands in the city of Kolkata due to enhancing levelof pollutants and temperature and relative humidity.

Comparative analysis of Kolkata among other several metropolitan cities in India:

Central Pollution Control Board (CPCB) has published a recent empirical report, on

which it has examined that, Kolkatais ranking fourth in termof level of pollution after Delhi, Bangalore and Luck now. From the observation it has been identified that SO₂ has shown a decreasing trend of pollution level due to various interventions that have been taken place in recent years such as reduction of sulphur indiesel, and even use of cleaner fuel such as CNG in Delhi and Mumbai etc. Other measures include implementation of Bharat Stage –III emission norms for new vehicles andcommensuratefuel quality, There has been a change in domestic fuel used from LPG which may have contributed to reductionof SO₂ in ambient air levels.

Recently a decliningtrend in NO₂ has been observed in Ahmedabad, Faridabad, Kolkata, Mumbai and Pun.The reason for low levelof NO₂ may be because of various measures taken, such as banning of old vehicles, better traffic management etc. Even introduction of improved vehicular technology in the form of Bharat stage-III vehicles, banning of old vehicles in some cities, improved traffic management etc.

In regard to RSPM, a downward trend has been observed in the cities namely Ahmedabad, Hyderabad, Sholapur, Bangalore and Faridabad in comparison to Kolkata. Implementation of stricter vehicle emission norms and commensurate fuel quality, cleaner fuels, banning of diesel driven cars in same cities etc. are also the reasons.

Trend of SPM is fluctuating in many cities like Patna and Varanasi, in comparison to Kolkata. The reason for high SPM levels may be natural dust, suspension of dust from vehicles etc.

Effect of vehicular air pollution on human health in the city of Kolkata:

There are several type of diseases that have been observed due to maximum emission of vehicular pollution.

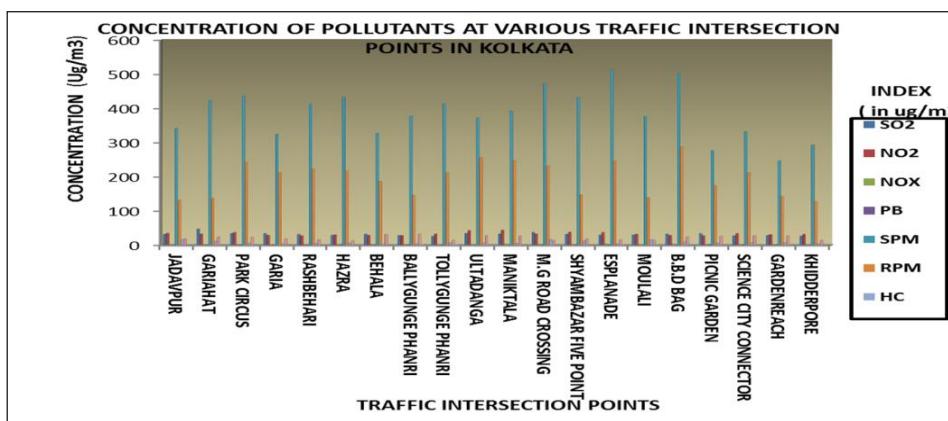
Chronic Bronchitis: A chronic inflammatory disease of the bronchus resulting in persistent production of cough and breathlessness due to maximum concentration of dust and SPM from exhaust emission of automobiles.

Table:2 Ward wise Distribution of Major Traffic Intersection Points In Kolkata.

Borough	Wards	Selected Wards	Traffic Intersection points	Zone	Description
I	1, 2, 3, 4, 5, 6, 7, 8, 9				
II	10, 11, 12, 15, 16, 17, 18, 19, 20	11	Shyambazar Five Points Crossing	I	North
III	13, 14, 29, 30, 31, 32, 33, 34, 35	13	Ultadanga	I	North
IV	21, 22, 23, 24, 25, 26, 27, 28, 38, 39	44, 50, 45, 27	M.G.Road Crossing, MoulaLi,B.B.D. Bag,Maniktala Esplanade	I& V	North & Central
VI	46, 47, 51, 52, 53, 54, 55, 60, 61, 62	46		V	Central
VII	56, 57, 58, 59, 63, 64, 65, 66, 67	64, 67, 66	Park Circus Seven Points Crossing, Picnic Garden, Science City Connector	V & III	Central & East
VIII	68, 69, 70, 72, 83, 84, 85, 86, 87, 88, 90	86, 84, 72, 69	Gariahat,Rashbehari,Hazra,Ballygunge Phanri	II	South
IX	71, 73, 74, 75, 76, 77, 78, 79, 80, 82	77	Khiderpore	IV	West
X	81, 89, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	100, 94	Garia, Tollygunge Phanri	II	South
XI	103, 104, 110, 111, 112, 113, 114	102	Jadavpur	II	South
XIII & XIV	115,116,117,118,119,120,121,122,123,124,125,126,127,128,129,130,131,132	116	Behala	IV	West
XV	133,134,135,136,137,138,139,140,141	137	Garden Reach	IV	West

Data Source: Computed by the Author, 2014

Figure: 3 Data Source: Primary Survey and Computed by the Author, 2014



Data Source: Primary Survey and Computed by the Author, 2014

Chronic Obstructive Pulmonary Disease (COPD):

COPD has been observed due to maximum inhale of SO₂ and RPM through the respiration system or process by the human being, this type of obstruction may occur.

Lung Cancer: Automobile pollution is another responsible factor for lung cancer in the city of Kolkata. It is the fact that age-adjusted rate of lung Cancer per 1,00,000 population is highest in Kolkata compared to other cities due to huge amount of vehicular emission (Cancer Registry, CNCI, 2009).

Bronchial Asthma: Epidemiologic evidence supports that exposure to high level of vehicular air pollutants is associated with increase in morbidity and mortality from Asthma results due to Ozone, SO₂, NOx and Respirable Particulate Matter from automobile sources.

Allergic Alveolitis: This may be due to exposition of SO₂, NO₂ and particulates matters from petrol driven engine vehicles and burning adulterated fuel.

Pulmonary Edema: High exposure to NO₂ and O₃ is known to cause structural changes in the lung resembling ageing and emphysema in the city of Kolkata.

During primary survey, it has been observed that, people of Kolkata are suffering from various type of health problems such as problem of blood circulation, low pressure, problem of breathing, cancer or leukaemia, reduction of fertility among the couples, enhancing high pressure, problem of eye

Table :3 Pollutants effect on human health

Carbon Monoxide	Affects the cardio vascular system, exacerbating cardiovascular diseases symptoms, particularly angina, affects nervous system impairing physical coordination, vision and judgment, creating nausea and headaches, reducing productivity and increasing personal discomfort.
Nitrogen Oxides	Increased susceptibility to inflections, pulmonary diseases, impairment of lung function and eye, nose and throat irritations.
Sulphur dioxide	Affect lung function adversely
SPM & RPM	Fine particulate matter may be toxic in itself or may carry toxic trace substance, and can alter the immune system. Fine particulates penetrate deep into the respiratory system, irritating lung tissue and causing long term disorders.
Lead	Impairs liver and kidney causes brain damage in children resulting in lower I.Q., hyperactivity and reduce ability to concentrate.
Benzene	Both toxic and carcinogenic excessive incidence of leukemia (blood cancer) in high exposesarea.

Source: Health Report, Department of Health, Govt. of West Bengal,2014

irritation, lung diseases and infections inthe stomach etc. From the primary data source, it hasalso beenexamined that most of the people of Kolkata are suffering from breathing problem, high pressure, eye irritation and even lung diseases as a chronic diseases in comparisonto other acute diseases in the city of Kolkata.

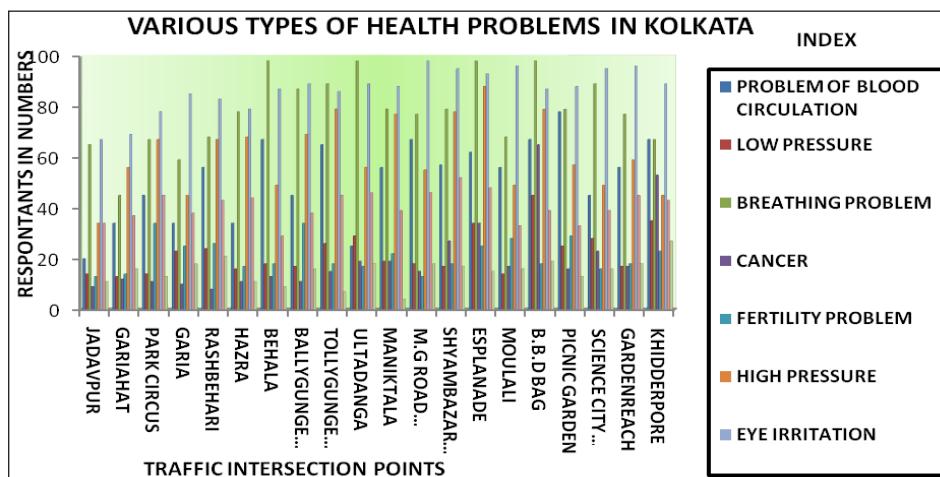
Policy & guidelines to reduce vehicular emission in the city of Kolkata:

In terms of implementation of Act U/S 20 of the air (prevention and Controlof Pollution) Act 1981, the following directionare issued to maintainthe emission levelwithinthejurisdiction of Kolkata Municipal Corporation.

- Transport vehicles of 15 years old and more should not be allowed to operate in the city of Kolkata.

- All registered auto-rickshaws (three wheelers) plying within Kolkata Municipal area need to be converted into LPG or CNG mode by 31st Mach 2009. In this concern motor vehicles department should regulate their registration on auto-rickshaw in Kolkata.
- Reduction of Sulphur content diesel and Benzene content petrol should be implemented as per the auto-fuel policy of Govt. of India to reduce the use of adulterated fuel.
- Registration of Auto-rickshaw having 2-storke engines should be stopped immediately by the motor vehicles department and all the four wheelers should be converted into Euro-III and IV emission norms.
- Automobile air quality should be monitored by WBPCB in a regular way at same selected nodal points within Kolkata to measure the parameters of automobile pollutants.
- Pollution under control certificate (PUC) should be issued after checking the engine scientifically by the issuing authority at different pumping station and selected model station.
- Motor vehicle act 1988, 1989, must be followed within the KMC area to reduce the emission and monitor the pollution scale of all the engines of the vehicles.

Figure: 4 Various Types of Health Problems in Kolkata



Data Source: Primary Survey and Computed by the Author, 2014

Findings and Conclusion:

During the observation following points have been notified:

- It is better to limit the number of personalized vehicles especially two wheelers and four wheeler because it emits more pollutants in the environ of Kolkata.
- Frequency of buses should be increased to cover the regular distance, otherwise increasing number of vehicles are not adequate in proportion to road space within the city of Kolkata.
- Poor quality of fuel must be banned whereas LPG and CNG must be encouraged to reduce automobile emission.
- Strict order and regulations should be maintained to ban the encroachment on the side of road and as it has been notified that catalytic converter engine reduce the emission, so motor vehicles department in collaboration with WBPCB must implement catalytic converter engines in all the newly launched vehicles under WBSTC, CSTC, CTC and JNNURM.
- Phasing out of 15 years of old or more engine vehicles from the city of Kolkata should be looked upon as it emits more and create traffic congestions.
- Optimization of traffic and improvement in traffic management must be followed to increase the speed of the vehicles which would reduce vehicular emission at end. Traffic management programme includes GPS navigation and traffic signaling system, green corridors, removal of encroachment of roads, regulation of digging roads etc.
- Improvement of vehicle technology is another systematic approach to reduce emission followed by restriction on manufacturing of two stroke engines, emission warranty and on board diagnostic system.

It can be summarized that if above noted points are taken into consideration for reduction programme, pollution specially vehicular emission may eliminate from Kolkata city in near future and will make the city clean and pollution free.

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Source:<http://www.ijhssi.org/papers/v4%285%29/Version-I/A04510109.pdf>

IN BLACK & WHITE

13 out of world's top 20 polluted cities in India, only three in China

Chetan Chauhan, Hindustan Times, 05 June 2015, New Delhi

India may be lagging behind China on several economic indicators but when it comes to environmental degradation, the country has definitely outsmarted its giant neighbour.

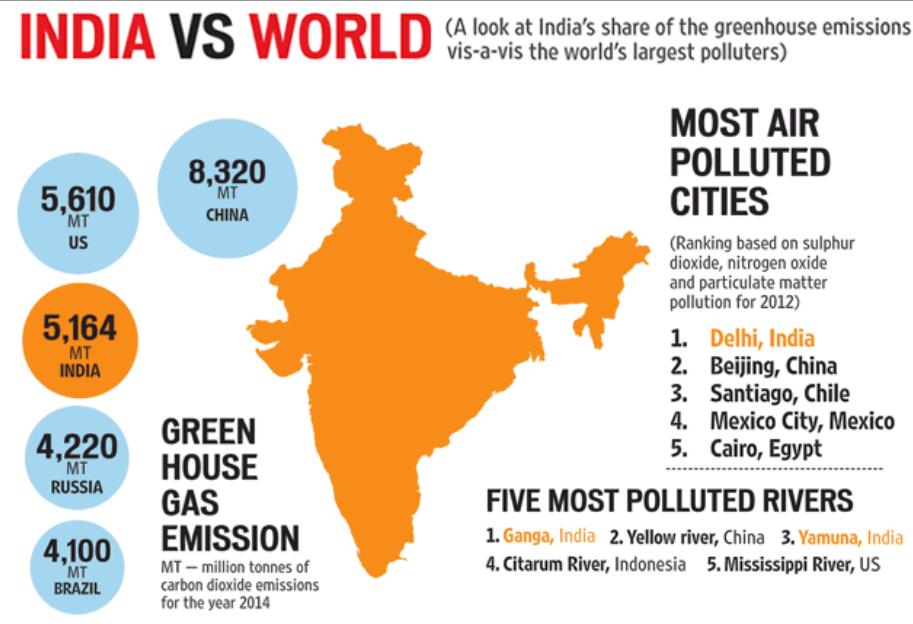
Of the world's top 20 polluted cities, 13 are in India compared to just three in China. Air pollution slashes life expectancy by 3.2 years for the 660 million Indians who live in cities, including Delhi. In China, the corresponding dip is marginally lower at three years.

The Ganga and Yamuna are ranked among the world's 10 most polluted rivers. China has just one. An evaluation in February ranked Vapi in Gujarat and Sukinda in Odisha among the 10 most environmentally-degraded zones in the world. China had no entries on the list.

The two nations have seen furious economic growth in the past decade fuelling a rapid rise in pollution. China leads the world in carbon emissions and India is in third position. But one important difference between the two emerging economies lies in China's ability to manage the impact of breakneck economic growth on its environment much better than India. The effect of China's success is most visible in its air and water, both of which have a direct bearing on public health.

Both countries were saddled with almost identical environmental concerns a decade ago, but China cleaned many of its polluted rivers and managed to check the spiralling urban air pollution through stringent rules.

The results are showing. "Beijing's air pollution has dipped 40% since 2000 as we have taken steps to phase out polluting vehicles and put checks on building heating systems," said Beijing municipal officer Li Kunsheng at an event in Delhi earlier this year.



In contrast, Delhi's air pollution has steadily climbed by 20% in the same period with successive governments reluctant to act. The story is the same in cities across the country. Coimbatore is the only exception as the air there was found to be fit for breathing.

The impact of rising toxins in the air is clearly visible on an average Indian's life, as proved by a Lancet study in 2012 that ranked air pollution as the sixth biggest killer with an annual estimated toll of 66 million.

A 2015 report by the Centre for Science and Environment, a Delhi-based NGO, says the decline in the country's overall environmental standards was because of river pollution, which is worse now than it was three decades ago, piling garbage in cities and increasingly toxic urban air.

"In India, environment degradation is a runaway problem impinging on public health and exacerbating poverty," says Sunita Narain, the NGO's director general. "We need to act and act fast ... otherwise the health cost would be enormous," she added.

A three-year analysis of the water quality in 290 rivers by the Central Pollution Control Board said about 66% of the stretches monitored had high organic pollution. It means 8,400 km of these rivers are badly polluted and not fit for supporting aquatic life. "Increasing flow of untreated waste water from cities into

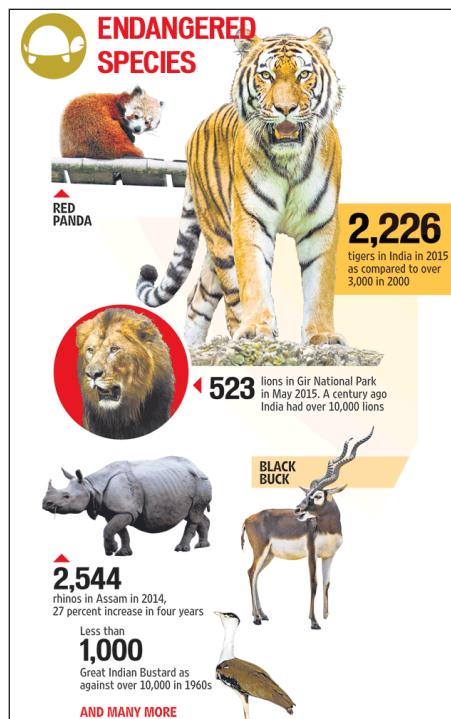
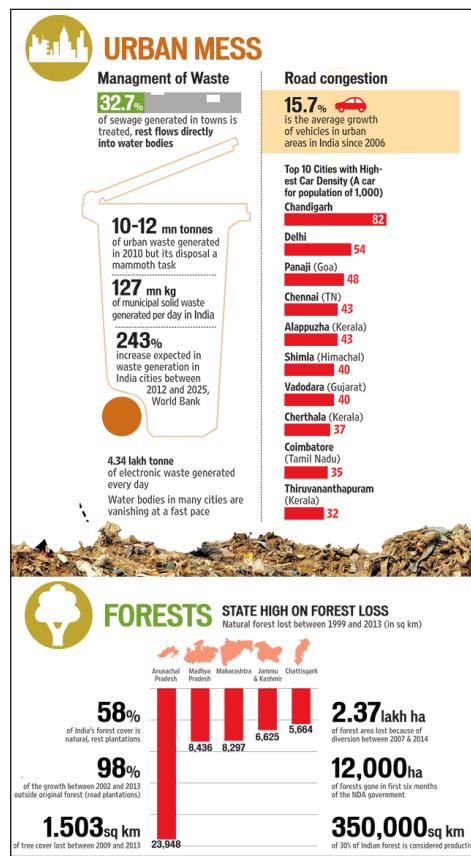
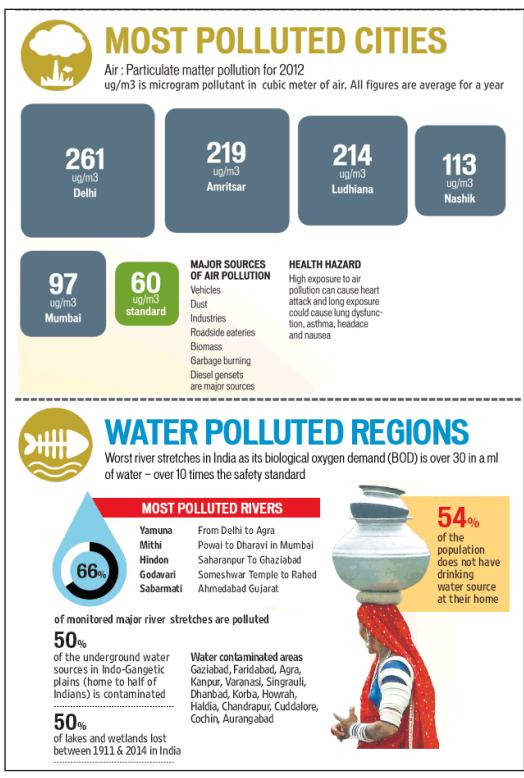
these rivers is the reason for our rivers getting polluted," says Shashi Shekhar, CPCB chairman and special secretary in the environment ministry.

But not all news is bad with innovative green initiatives sprouting all over the country. The bicycling clubs in Bengaluru act as one of the biggest networks of bikers in the country, a group of people have generated organic fertilizer from waste in Kolkata and Bungroo and a programme of the Gujarat Ecological Commission has turned wasteland into a good agri-production zone.

And then, there are a new band of young environment activists such as Ritwick Dutta who took authorities to court for violating environmental laws and protect people's right to a clean environment. As a result, the National Green Tribunal has compensated locals for pollution and one such case is in Tamil Nadu.

Union environment minister Prakash Javadekar is also hopeful of people's participation pushing governments to improve the environment, saying a policy of "development without destruction" is in place.

In the coming years, his ministry plans to introduce a new environmental regime that will focus on "self-regulation" and strengthen the "polluter-pay principle" with higher penalties for violation of environmental laws.



<http://www.hindustantimes.com/india/13-out-of-world-s-top-20-polluted-cities-in-india-only-three-in-china/story-myTrPZM8DHmQOhxB9cc5hI.html>

Seven years ago, everyone saw Delhi's air take a deadly U-turn but no one did a thing

Aniruddha Ghosal, Pritha Chatterjee,
The Indian Express, 31 March 2015

The way the graph moves tells the story of a public health disaster that has been allowed

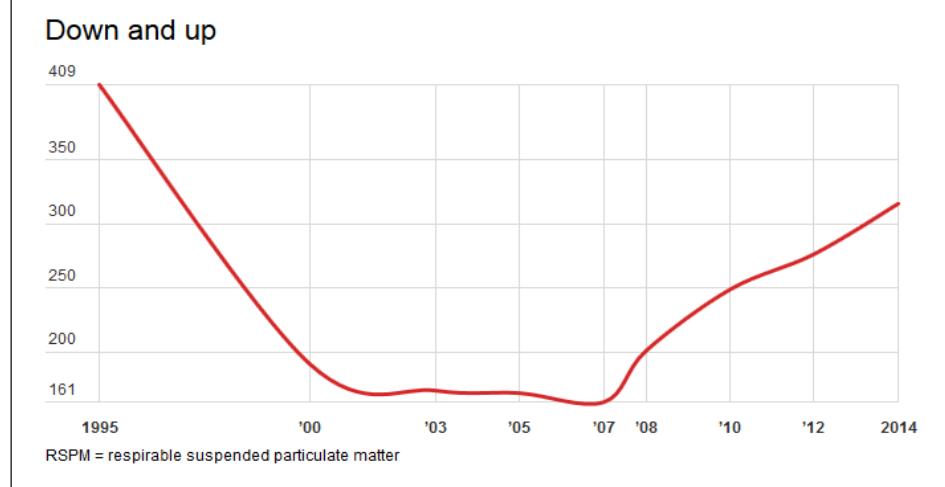
to happen: over the last 15 years, the fall and rise of the lethal, fine dust that clogs your lungs every day in the nation's capital.

After the historic Supreme Court judgement in 1998 forced all public transport vehicles, an estimated 100,000, to switch to cleaner

Compressed Natural Gas (CNG), the levels of respirable suspended particulate matter, or RSPM, in the city's air begin to dip year on year.

In 1995, suspended particulate matter in Delhi had hit a high of 409 µg/m³ (micrograms per cubic metre). In 2000, two years after the CNG verdict, scientists measured the tinier and virtually invisible RSPM for the first time and found the level at 191 µg/m³ — it fell to 161 µg/m³ in 2007.

Then, as sharply as a sudden gasp, from 2008 to be precise, the levels begin to rise and rise. And rise to the current 316 µg/m³, nearly 16 times what is considered healthy by the World Health Organisation (WHO), and nearly twice that of Beijing, the next most-polluted city in the world. So much so that even during the last monsoon in July-September — when nature ensures the lowest RSPM levels thanks to rain — the number was 171 µg/m³. It didn't have to be this way.



Source: Delhi Economic Survey

As an investigation by The Indian Express reveals beginning today, at least 15 authoritative studies, public and private, tracked the curve take this treacherous U-turn and rang alarm bells at regular intervals. But the Sheila Dikshit government in the state and the Manmohan Singh government at the Centre couldn't care less.

Result: the dramatic CNG gains — a 20% dip in RSPM levels in seven years — were steadily and sharply being frittered away. By a combination of government inaction and a set of factors linked to the manner in which the city and its suburbs were growing and how they were handling — mishandling, to be precise — construction, transport and fuel.

"You never get such an opportunity, very few cities of this size get to clean up so fast," said Justice Kuldip Singh who was, till his retirement in 1996, a member of various Supreme Court benches that heard a number of pleas on environmental issues, including the one on air pollution in Delhi.

"And then you waste all that. Today, your air has actually become like poison. Either it was ignorance or neglect or both," he added.

Said Advocate M C Mehta, the petitioner in the CNG case: "Once we were showcased

and celebrated as a success and then we completely failed to hold on to the good days." That the good days were ending wasn't lost on anyone. Consider these:

First Alarm Bell from the Lab, 2007

Dr Pramila Goyal, from IIT Delhi's Centre for Atmospheric Studies, rang the first alarm in 2007, a year before the line spiked. As the principal investigator of a study sponsored by the Delhi government, she predicted that "emissions of air pollutants" by diesel-fuelled vehicles may exceed norms soon.

"I don't know what happened after I submitted my findings. The Delhi Government had approached me after I finished my study and asked me to send it to Sheila Dikshit, who was the chief minister at the time. I refused because that's not my job," Goyal said.

Two More in 2009 & 2012, on Transport

Apart from a number of other studies that warned about the rising danger, two of the loudest alarm bells were sounded by the NCR Planning Board — in 2009 and 2012.

In 2009, the board — an inter-Ministerial group under the Union Urban Development Ministry with representatives from Delhi, Haryana and Uttar Pradesh — warned that the "latest trends indicate increase in PM levels,

particularly in PM2.5, which have reached alarming proportions".

Levels for PM2.5 in Delhi exceeded the standard by six times, the board said. RSPM includes PM10 and below — particulate matter lesser than 10 micron (a micron is one-millionth of a metre) in diameter.

Three years later, the board's transport plan monitored the air quality at 82 stations in Delhi, and warned that "the prescribed standard limits were... being violated at all the monitoring stations. These levels are expected to rise further beyond critical limits".

One person who was on the board was Nainilayaseelan, who was member secretary and chairperson of Delhi Pollution Control Committee from 2006-2008. "Had the government of Delhi and member states of NCR taken decisions to leapfrog into second generation reforms we would have perhaps ensured that the graph of air quality had a different curve — the pollutants would have continued dipping and new pollutants would not have surfaced in the air," she said.

Who was Watching, What do they have to Say?

The Central Pollution Control Board (CPCB) and the Delhi Pollution Control Committee

DEATH BY BREATH AN EXPRESS INVESTIGATION- PART ONE

Seven years ago, everyone saw Delhi's air take a deadly U-turn but no one did a thing

As many as 15 authoritative studies red-flagged how landmark gains from CNG were being frittered away



(CNG), the levels of respirable suspended particulate matter, or RSPM, in the city's air began to dip year on year.

In 1995, suspended particulate matter in Delhi had hit a high of $409 \mu\text{g}/\text{m}^3$ (micrograms per cubic metre). In 2000, two years after the CNG verdict, scientists measured the finer and virtually invisible RSPM for the first time and found the level at $191 \mu\text{g}/\text{m}^3$ — it fell to $161 \mu\text{g}/\text{m}^3$ in 2007.

Then, as sharply as a suddenly gap, from 2008 to be precise, the levels begin to rise

and rise.

And rise to the current $316 \mu\text{g}/\text{m}^3$, nearly 16 times what is considered healthy by the World Health Organisation (WHO), and nearly twice that of Beijing, the next most polluted city in the world.

So much so that even during the last monsoon in July-September — when nature arrives the lowest RSPM levels thanks to rain — the number was $173 \mu\text{g}/\text{m}^3$.

It didn't have to be this way. An investigation by The Indian Express reveals beginning today, at least 15 authoritative studies, public and private, tracked the curve take this treacherous U-turn and rang alarm bells at regular intervals.

CONTINUED ON PAGE 2

2014
316*

TODAY:
FROM HOSPITALS
ACROSS CITY,
DOCTORS RING
ALARM BELLS

2012
276.6

2010
249

2008
201

2009
Govt belatedly reports of scams related to CGW

2013
Cong govt loses, AAP edges BJP with Cong support

2014
AAP resigns, wins election

2015
Govt rocked by party infighting

'HOW DID THIS HAPPEN?'



ALL GOOD WORK
PASTED, SAYS GREEN
WITH
SINGH

biglink.it
THE STUDIES WE
BASED UPON PAGE 6

LEARN MORE

* Data as of August 2014 by the Central Pollution Control Board

(DPCC) are directly responsible for ensuring clean air in Delhi.

When contacted, current CPCB member secretary A B Akolkar said that the figures need to be placed in context. "From 2007-2015, you'll see that overall air pollution has decreased, but the annual PM2.5 and PM10 averages are increasing. This needs to be understood in the context of increase in vehicles. The problem is that while emission norms were made more stringent and pollution levels dipped, the increase in vehicles skewed the matter."

So what was the CPCB doing all this while?

"I am not in a position to comment... the current authorities can comment, whatever was done is documented in files, and available with the current post-bearers," said J S Kamyotra who was the member secretary of the Central Pollution Control Board (CPCB) from 2008 to 2012.

Kamyotra was originally appointed by the then Congress-led UPA government to head the central body for a three-year term but was granted five extensions, of three months each. He is now a scientist in charge of the CPCB's Pollution Control Planning division.

Dr B Sengupta, who headed the CPCB from 1998-2008 said, "In Delhi, the pollutant levels increased for three reasons — increase in diesel vehicles, mobile towers which had diesel generating sets, and small scale industries. The findings were published by us every year, both the rise in pollutants and the reasons. We have also submitted them to MoEF at regular intervals," Dr Sengupta said.

"I am not authorised to speak on this matter," said Sanjiv Kumar, Delhi's Environment Secretary and chairman of DPCC.

There were alarm bells initially, admitted JK Dadoo, Delhi's Environment Secretary from 2007-2009. "The IIT Delhi study suggested urgent need for monitoring, so we began monitoring air quality from 42 locations in Delhi. We would send DPCC team members to various locations, where the air quality was poor. Today, there are six permanent monitoring stations," he said.

The CPCB, meanwhile, has been without a full-time chairman since Prof S P Gautam

completed his tenure in 2012, thanks to a lengthy recruitment process that was further stalled after one of the candidates challenged the move in court.

Environment Secretary, Ministry of Environment and Forests, Ashok Lavasa, said that the ministry was "in the process" of selecting a fulltime chairman and that the appointment would "happen soon".

THE WASTED YEARS: WHAT WAS UNDONE, WHAT WASN'T DONE

According to Dr GufranBeig, project director, System of Air Quality Weather Forecasting and Research (SAFAR), Ministry of Earth Sciences, "From all available data, it is clear that Delhi made big gains in those immediate years after introduction of CNG, particulate matter levels went down exponentially. Then they started rising again because of the presence of more diesel vehicles, lack of curbs on the number of trucks entering Delhi, and the unruly construction the region has seen."

Official documents accessed by The Indian Express show that there were some attempts to get back on track.

For instance, the minutes of a review meeting on air quality before the 2010 Commonwealth Games, which was attended by senior officials and experts, listed some remedial steps including the closure of industries on a "negative list".

An official who attended that meeting, but did not wish to be identified, admitted that nothing much happened after that.

The Delhi government, meanwhile, proposed a slew of steps to get a grip on a crisis that was fast spinning out of control, including a cess on the sale of diesel, a congestion tax, making its main markets congestion-free zones, and regulating access to cars on specific days. Of these, only the 25 paise per litre cess on diesel has been implemented.

Some of the environment experts that The Indian Express spoke to were clear that "there were no steps" taken to take the "CNG reforms" forward. CNG burns cleaner than petrol or diesel because of its lower carbon content and produces 95% fewer emissions than petroleum products.

"When I travelled for international conferences immediately after the CNG days, scientists would say Delhi's air has visibly improved. They said that when you land in a flight you could see the skyline of the city — at night you can see the stars. One would hear this and feel proud," said Dr J N Pande, who had led an AIIMS study in 1997-98 linking outdoor air pollution to hospital visits for respiratory and cardiovascular events.

Dr Pande's study was cited by Supreme Court in its CNG judgment of 1998. "Those gains have been lost and it is very disheartening to people who were so closely involved in the first phase of pollution reforms," Dr Pande added.

Another key figure in that judgment was BhureLal, who headed a expert panel to advise the three-member bench. "Things have gone horribly wrong since then. An increase in the consumption of diesel combined with the city's inability to keep out trucks not destined to Delhi has resulted in this situation," he said.

Another study that the Supreme Court cited in 1998 was conducted by Dr Maureen Cropper, a former World Bank economist, who joined hands with New Delhi Municipal Council (NDMC), to find a link in 1997 between mortality rates and air pollution levels.

"There are definite parallels in the pollution story in what we saw in India in the 1990s and the US in the 1960s. Court orders and directives preceded state action, which had many advantages, many decisions could be implemented more effectively because the judiciary took the first step, we saw that in air quality in Delhi," Dr Cropper said.

Last month, the Supreme Court-appointed Environmental Protection Control Authority (EPCA), responding to a petition from M C Mehta, whose earlier plea led to the CNG judgement 17 years ago, told the apex court: "In view of the significant increase in toxic air pollution and loss of air quality gains from the CNG programme and other first generation action directed by the Honorable Supreme Court, key directives are sought... to accelerate second generation reforms to protect public health in Delhi and the NCR."

<http://indianexpress.com/article/india/india-others/seven-years-ago-everyone-saw-delhis-air-take-a-deadly-u-turn-but-no-one-did-a-thing/>

Choking India gets air quality index

Vishwa Mohan, The Times of India, 07 April 2015

NEW DELHI: With Prime Minister Narendra Modi launching a national Air Quality Index (AQI), India on Monday joined a global league of nations which includes US, France, China and Mexico that have implemented such an alert system. The system will give details of air quality and information on its likely health implications for city dwellers.

India's AQI will initially be available to people in 10 cities for now -- Delhi, Faridabad, Agra,

Kanpur, Lucknow, Varanasi, Ahmedabad, Bangalore, Chennai and Hyderabad. It will help people in these cities take precautions on days when the air quality is particularly poor.

Other cities including Mumbai, Kolkata and Chandigarh will come under the national indexing network in a couple of months when their pollution control boards are ready with the new and updated round-the-clock monitoring stations.

A similar facility will be made available to the remaining metropolitan cities and state capitals in another one to two years.

The central agencies have taken into account eight pollutants: PM2.5, PM10, nitrogen oxides, sulphur dioxide, ozone, carbon monoxide, ammonia and lead while calculating and releasing the AQI. The index, using continuous 24-hour average data, will be made available daily from various monitoring stations in those cities.

The Central Pollution Control Board (CPCB) has developed the index in consultation with IIT, Kanpur and other expert groups comprising medical professionals and scientists.

The move, which will not only enhance public awareness but also create a competitive environment among cities to take steps for air pollution mitigation, was welcomed by environmentalists and think-tanks. They however, said the government should also implement pollution emergency measures to bring down peak pollution levels in the same manner as is being done in other countries.

"For the first time, the government has taken the initiative to inform people about daily air quality with simple descriptions that people can understand. It is cautioning them about possible health consequences. This can help build public awareness as well as public support for hard decisions needed to get cleaner air," said Anumita Roychowdhury, executive director of Delhi-based research and policy group Centre for Science and Environment (CSE).

Under the AQI, hosted on CPCB's website, air pollution levels have been classified in six bands with simple descriptions to help people understand it. Each band has cut points of concentration with a colour code to visually express the level of severity that people can comprehend easily. Air quality is classified 'good' if the pollution levels are at least 50% below regulatory standards.

As far as health indicators are concerned, good air quality days mean minimal health impacts. But on 'moderately polluted' days, it may cause breathing discomfort in those suffering from lung or heart diseases. On severely polluted days, pollution may cause respiratory effects even in healthy people and serious health impact in people with lung disease.

Appreciating the move, Greenpeace India said, "We welcome the launch of the national AQI but given the scale of air pollution and the impact it has on the public in Delhi and many other cities across the country, we had

NATIONAL AIR QUALITY INDEX LAUNCHED

10 cities where people can get information on actual air quality and its health implications:
Delhi, Agra, Kanpur, Lucknow, Varanasi, Faridabad, Ahmedabad, Chennai, Bangalore and Hyderabad



► Most of the monitoring stations in these 10 cities started displaying the index from Monday (April 6)

► Index can be accessed from websites of Union environment ministry or respective state pollution control boards

► AQI scheme reflects 'one colour one code' for different types of air quality (good, satisfactory, moderate, poor, very poor and severe)

► 46 other million-plus cities and 20 state capitals will have similar air quality index in next one to two years

► Each of these cities will have 6-7 monitoring stations with AQI display boards

AQI SCHEME

AQI	Colour code	Likely health implications
1-50	Good	Minimal impact
51-100	Satisfactory	Minor breathing discomfort to sensitive people
101-200	Moderate	Breathing discomfort to people with lungs, asthma & heart disease
201-300	Poor	Breathing discomfort to most people on prolonged exposure
301-400	Very Poor	Respiratory illness of prolonged exposure
401-500	Severe	Effects healthy people & serious impact to those with existing diseases

source: <http://timesofindia.indiatimes.com/photo/46830773.cms>

expected the government to address the issue with more rigor and responsibility....Air Quality Index needs to be matched with actionable plans on how to bring the pollution levels down, at the very least with a health advisory".

Citing Beijing's example, the group said the purpose of an AQI in China's capital was not merely to say how poor the quality of air was, but to ensure immediate action to minimize the health impact on the public.

<http://timesofindia.indiatimes.com/home/environment/pollution/Choking-India-gets-air-quality-index/articleshow/46830411.cms>

Cooking fires poisoning the air we breathe, says govt. study

SubhabrataGuha, The Times of India, 07 April 2015

Every year, 1 million people — among them at least 100,000 children - die prematurely in India because of the simple act of cooking, the Institute of Health Metrics and Evaluation's latest study says. Ambient air pollution kills 627,426, road accidents 273,835 and complications from inadequate sanitation cause 111,624 deaths.

Cooking with polluting fuel constitutes a significant health and environmental hazard, indoor air pollution affecting more Indians than residents of any country. A major, though under-reported, source of this is cooking on open fires and traditional chullhas. Fumes from household cooking fires trigger up to 30% of fine-particulate ambient pollution, a government study shows.

According to the Global Alliance for Clean Cook stoves, a public-private partnership hosted by the UN Foundation, 3 billion people the world over rely on biomass as primary sources of cooking and heating. Indians are worst hit, for more than 70% of the population lives in its vast rural stretches.

More than 4 million premature deaths happen around the world because of air pollution, roughly 25% of these in India, the Global Burden of Disease study, 2012. says.

Indoor pollution can trigger pulmonary and respiratory disorders in women and children under five, including pneumonia, cancer, and chronic obstructive pulmonary disease. Other hazards include adverse pregnancy outcomes (low birth weight), cardiovascular diseases and cataracts, not to mention burns.

Every day, 780 million Indians use traditional chulhas to cook. Millions of girls and women live in energy scarcity without access to clean cooking fuels. Women spend long hours gathering wood, twigs, and cow dung. Travelling distances in search of fuel puts rural women at safety risks.

Cooking emissions are a leading source of harmful black carbon, according to a study by Dr VeerabhadranRamanathan of the University of California at San Diego, and can hit agricultural production.

Research shows adoption of cleaner, efficient cooking methods and fuels help reduce negative impacts to health and environment. So why don't these stoves and fuels reach homes? That's because people simply aren't aware.

"India has the capacity and innovation to be a global leader in developing clean cook stoves and fuels — at the government level and in the private sector," said RadhaMuthiah, CEO of the Global Alliance for Clean Cook stoves.

To address the issue, the global community met at the Cook Stoves Future Summit in New York last November to discuss scaling up cleaner cooking solutions. Delegates outlined solutions to build momentum around research, standards, manufacturing, distribution and finance, including in India.

Politicians and policy-makers are fostering programmes to improve lives of Indians. But with government attention and support from private and non-profit sectors, one public health initiative shows promise in helping Indian families: A clean cooking movement.

Such a movement should include not only efforts to develop and distribute stoves that burn local biomass cleanly, but also efforts to expand clean fuel use. Solutions exist and the government should include Clean Air as part of Swachh Bharat Abhiyan.

(The writer was in New York as a UN foundation fellow)

<http://timesofindia.indiatimes.com/india/Cooking-fires-poisoning-the-air-we-breathe-says-govt-study/articleshow/46830746.cms>

'Air we breathe smells of acid'

Gitanjali Das, Mumbai Mirror, 18 May 2015

Residents of two congested streets in Masjid are inhaling noxious fumes from make shift chimneys on terraces.

The fumes come from gold dust purifying units, set up on top floors of some buildings. A 12-year-old girl contracted TB, while others suffer from bronchitis, asthma, high blood pressure and breathing ailments that usually stem from excessive smoking or chewing tobacco.

The Maharashtra Pollution Control Board (MPCB) said that the issue was raised six months ago, and when they took it up with BMC they were told the units come under cottage industries. The BMC ward office, in turn, said their licence inspectors will have to check the sites before they comment.

The roughly 40 units, in buildings on Samuel Street and Kazi Sayed Street, recover gold by melting residual dust collected from Zaveri Bazaar jewellery shops. Some of the units were established around 40 years ago, but their numbers have risen drastically.

According to Mohammed Irfan, who is in the jewellery business and lives in FurqanManzil on Kazi Sayed Street, the dust is dipped in nitric acid and hydrochloric acid to separate the gold, which is what emits the dangerous fumes. Another Zaveri Bazaar jeweller told Mirror, "These units are important for jewellers as they help recover gold which would otherwise have been lost in the dust."

Like Slow Death

The fumes are telling on the health of residents. Ayesha Attarwala, 34, moved into FurqanManzil six years ago and within few months her daughter Mizba, 6, contracted TB. "Two chimneys point directly to my window, spouting white fumes every 15 minutes. I too now have asthma," Ayesha said. Her neighbour ShehnazSayyed, a school principal, said, "The air we breathe smells of acid. We made the labourers turn the chimneys the other way, but the wind still carries the fumes into our homes."

Another resident of eight years, Abdul Gaffar, can barely utter a sentence without coughing. "Doctors ask if I chain smoke or chew tobacco, but I've never touched these substances," he said.

In Anand Nivas on Samuel Street, Daneshwar Momaya, 55, who underwent a bypass, said life there is hell."We cannot breathe in our homes. It's like I am dying a slow death," he said.

Showing skin peeling off her hands, his wife Anjali said, "We've lived here for decades but this never happened before the units increased in number."

Dr Iqbal Pathan was forced to move in 2012 after his wife contracted bronchitis. He said, "The fumes can also lead to asthma and fluid accumulation in the lungs. This weakens the immune system and can result in TB."

Passing the Buck

Confirming that the issue was raised six months ago, Amar Durgule, subregional officer, MPCB, said that when they took it up with BMC, they were told the units come under cottage industries. "Only BMC gives permissions for cottage industries," Durgule said. "We recommended that if the units are health hazards, they should either be shifted or fitted with a proper duct system and scrubbers [air-purifier]. The problem is that the buildings are so old that scrubbers cannot be installed in them. Around 10 people work in a cramped room. The labour department should also carry out health check-ups of the labourers."

Mirror learnt that each unit is 150 sqft and has seven labourers seated around a furnace. Most units are badly lit, but each room has a CCTV camera. On knocking, a labourer opened just a square slot on the door, and refused to reveal the name of his boss.

MushtaqAntulay, ex-chairman, MPCB, said, "Units that use such harsh chemicals cannot be set up in residential areas. Two prior permissions are needed from MPCB - consent to establish the unit and consent to function."

Narendra Sankhe, head of the B ward licence department, added, "In case of industrial units, the owner has to seek permissions from BMC and the fire brigade too, besides MPCB."

AjazRawoot, president, FurqanManzil Residents Association, said they wrote to MPCB as well as environment secretary SitaramKunte, besides approaching corporatorJavedJuneja. Juneja said: "We took up the issue earlier, but were told they were cottage industries, I will take up the matter again." Kunte said: "As far as I know, there was a committee set up to study shifting the units."

When Mirror contacted Dr P Anbalagan, member secretary, MPCB, he said: "We will

check the units and if we find any hazardous material, we will take action." Local licence department head Sankhe, in turn, said, "Our inspectors will investigate the matter. Only then can we comment."

<http://www.mumbaimirror.com/mumbai/others/Air-we-breathe-smells-of-acid/articleshow/47323368.cms>

Reality check: An expert's take on Delhi's air

Hemul Goel, India Today, 04 June2015, New Delhi

Everything you wanted to know about the condition of Delhi's air, the telltale symptoms of exposure and the practicality of air purifiers in the city.

After multiple reports about the horror that is Delhi air, especially a harrowing account by Gardiner Harris, a New York Times journalist, doubts about the 'air' we breathe are on the rise. With toxic gases, dust and microscopic particles, the capital city's air seems to be the poison of every Delhiite's choice and making. According to a World Health Organisation report released in 2014, Delhi's air is the worst in the world, the increasing amount of people suffering from respiratory diseases being proof enough.

Pollution, say experts, has two types of effects: Long- and short-term. While short-term effects are easily accounted for, irreversible damage is posed by the long-term effects of exposure to polluted air.

According to Prof.RandeepGuleria, Head of Department of Pulmonary Medicine and Sleep Disorder at AIIMS, "When it comes to short-term risks, those with respiratory diseases tend to do poorly in Delhi as levels of high pollution aggravate their problems. Many of my patients shift base in the winter because smog worsens their condition. While heart patients may not realize it, air pollution also aggravates their condition."

In terms of long-term effects, those living in the city from a young age are actually putting their health at great risk. On a day with high levels of air pollution, kids are more prone to the ill-effects of the city's air, visible in the development of symptoms like coughing, wheezing, stuffy nose, reddening of the eyes and worsening of the underlying respiratory condition. Besides disturbing the respiratory function of the body, air pollution is being cited

as an important risk factor when it comes to heart attacks and heart diseases. "After a person is born, his lungs continue to grow. Lungs that develop in a city like Delhi have a low lung capacity. Even without any other risk factors, these children end up with chronic bronchitis and terrible coughing and wheezing problems because of just having resided in Delhi. Data proves that constant exposure to pollution causes inflammation in the lungs which then spills into the blood, eventually leading to Atherosclerosis. There is a high probability of such people eventually developing heart diseases," added Dr.Guleria.

Health concerns have also pushed sales of air purifiers in the region. An air purifier is a device that aims to reduce or eliminate toxic contaminants from the air in a particular space. However, is the device really able to justify all its lofty claims? Not really, it seems. "The data on air purifiers isn't strong. While air purifiers do nothing for outdoor pollution, the application of the device is limited indoors, unless you have a room which is so tightly sealed, that it can block access to outdoor air," says Dr. Guleria.

<http://indiatoday.intoday.in/story/expert-on-delhi-air-pollution-symptoms-lung-function-air-purifiers/1/442124.html>

Pollution Board's breathtaking tips to clean the air we breathe

NiranjanKaggere, Bangalore Mirror Bureau, 09 June 2015

The recommendations, which were submitted to CM Siddaramaiah on June 5, have baffled the bureaucracy, with many IAS officers describing these as 'mostly bizarre'

Tackling air pollution in Bengaluru and the state could be tougher than expected. Some of the recommendations made by none other than the Karnataka State Pollution Control Board (KSPCB) itself is a mixed bag ranging from the bizarre to the impossible to the mumbo-jumbo kind. Some are just party poopers. Those at the helm are putting the blame — or credit — at the doorsteps of the 'public' whose views it elicited, but to forward it in the form of recommendations to the state government in all earnestness begs logic.

KSPCB was asked to recommend a 'State Action Plan on Climate Change'. Solutions mooted include shutting of pubs by 10 pm daily and conducting the vedic ritual of agnihotrahoma!

KSPCB's recommendations on 'State Action Plan on Climate Change' is a must-read for all the wrong and weird reasons: Solutions mooted include shutting of pubs by 10 pm daily and conducting the vedic ritual of agnihotrahoma!

The recommendations, which were submitted to chief minister Siddaramaiah on June 5, have baffled the bureaucracy with many IAS officers describing these as "mostly bizarre" and "highly absurd". In fact, KSPCB had, in January this year, initiated a study based on interactive meetings various green activists and other stakeholders in order to prepare an exhaustive report on the list of recommendations that would be included into the state action plan on climate change.

A senior IAS officer, who tipped off Bangalore Mirror about the contents of report, said: "This was supposed to be a serious report from the pollution control agency but it seems to have turned into a comedy of sorts, at least with regards to recommendations pertaining to checking air quality."

The KSPCB study, while maintaining that air pollution was a major source of respiratory ailments and was rendering cities unfit for healthy living, has mooted 53 solutions for containing air pollution; of these six caught our attention:

1. Banning all cars that give mileage less than 20 km/ litre of petrol/diesel.
2. Closing pubs and bars by 10 pm and imposing green tax on alcoholic beverages.
3. Rationing of sale of fuel to 100 litres per month per car.
4. Forcing public servants to switch off lights and ACs during daytime.
5. Sprinkling treated water on roads to reduce heat.
6. 'Agnihotra day' should be considered as a public function periodically all over the state to cleanse the air.

In fact, the remaining recommendations too are not path-breaking either. Some of them are: controlling stone crushers to reduce dust, strictly implementing emission standards, having dedicated cycle paths, using GPS-based vehicle tracking in government vehicles to curb misuse and reduce pollution, monitoring biomass waste burning and incineration units and providing local grid connections to outdoor broadcasting vans of television channels instead of diesel generators.

When Bangalore Mirror took up the issue with KSPCB, weirder was its justification: KSPCB chairman Vaman Acharya said, "While we admit that some of the recommendations are odd, we want to make it clear that these suggestions came from the public during consultative meetings." KSPCB maintained that over 2,000 people had attended the meetings held across 21 cities and towns in the state in the last few months. Interestingly, KSPCB has given an explanation for each of these unusual recommendations (see below).

Why weren't the recommendations from the public scrutinised before forwarding them to the government? The author of the KSPCB study report, Shankar Sharma, said: "We were only asked to listen to people by holding public consultation meetings and compile their recommendations. It is up to the government to decide on that and we have conveyed to the government what people had to say." He added: "One may consider it as trivial. But in the long run it has a huge impact on the society."

But KSPCB failed to see the practicality of the suggestions made by the public. An officer in the chief minister's office said: "They want cars giving less than 20 kmpl to be banned. Going by the recommendation, almost all cars will have to be stopped from plying. Moreover, Bengaluru's stop-and-start traffic will never guarantee over 20 kmpl."

Another odd recommendation pertains to closing pubs and bars by 10 pm on the ground that it can save power. However, Sharma stated: "People were so angry that in one of the consultations, they shot back saying only a small chunk of the population frequents pubs and bars but are draining the resources in a big way. Why should a major part of population suffer just for an action of a small group? Rather than wasting power for lighting and air-conditioning, it can be conserved and used for others. As mentioned, we did not get into any discussion with the public and conveying what they had to say to the government," Sharma clarified.

On the recommendation of green tax on alcoholic beverages, Sharma explained, "Government keep saying that it lacks funds to set up pollution monitoring centres in cities. People drew our attention towards levying of green tax. They think that only rich and wealthier class of society splurge on alcoholic beverages and charging them extra would not make much

of a difference as the same money would be used to improve quality of life of others."

But the suggestion that stands out in this age and times is that of observing Agnihotra day as a public function. Sharma maintained: "A senior academician in Dharwad argued that this vedic ritual had several cleansing effects on air and surrounding ambience and he presented lot of scientific data on the issue and quoted proven examples. Hence the recommendation was included."

However, Vaman Acharya said he was not enthused by the idea of a vedic ritual. He said: "On several occasions, people have come to me saying we could cleanse the air through homa and havan. In fact I have rebuked them. We only test and measure carbon-dioxide and suspended particulate matter in the air (SPM). If you measure air at a place where a homa is conducted, naturally both will be high. We are a scientific body and should not recommend such ideas. We at the board do not stand by what people have expressed but only communicated what people are saying."

<http://www.bangaloremirror.com/bangalore/cover-story/Pollution-Boards-breathtaking-tips-to-clean-the-air-we-breathe/articleshow/47591063.cms>

Cleaner air could save 1.4 million lives in India, China

The Hindu, 17 June 2015

At the present rate, deaths per capita from air pollution would increase 20 to 30 per cent during the next 15 years in the two countries.

Improving air quality could prevent up to 1.4 million premature deaths per year in polluted countries such as China and India, a new study has found.

The study also warned that with no changes in air pollution, deaths per capita from air pollution would increase 20 to 30 per cent during the next 15 years in India and China. If also accounting for population growth, the increase in deaths would be even greater if those countries experience no change in air pollution, researchers said.

WHO guidelines

The researchers found that meeting the World Health Organisation's (WHO) particulate air quality guidelines could prevent 2.1 million deaths per year related to outdoor air pollution worldwide.

Joshua S. Apte of the Cockrell School of Engineering at The University of Texas Austin and his team looked at outdoor air pollution from particulate matter (PM) smaller than 2.5 microns.

Those particles can enter deep into the lungs. Breathing PM is associated with increased risk of heart attack, stroke and other cardiovascular disease; respiratory illnesses such as emphysema; and cancer.

"We wanted to determine how much cleaner different parts of the world would need to be in order to substantially reduce death from particulate matter," said Apte, lead author of the study published in the journal Environmental Science & Technology.

The study used the Institute of Health Metrics and Evaluation's Global Burden of Disease 2010 database, estimates of PM concentrations derived from ground-based measurements, satellite observations and air pollution models, and WHO's air quality guidelines.

Worldwide, most people live in areas with PM concentrations far above WHO's air quality guideline of 10 microgrammes per cubic metre, with some parts of India and China experiencing levels that exceed 100.

The study demonstrated major potential to reduce mortality from PM in the world's most polluted regions.

One of the study's unexpected findings was that cleaning air in less polluted parts of the world, including in North America and Western Europe, can have as much health benefit as similar measures taken in the most polluted areas.

The study determined that meeting WHO's air quality guidelines could prevent up to 1.4 million premature deaths per year in polluted areas such as China and India.

Meeting WHO guidelines in clean regions could reduce premature deaths from outdoor pollution by more than half a million deaths per year.

Another important finding is that because of ageing populations, health risks in many countries will increase even if pollution levels are constant.

<http://www.thehindu.com/sci-tech/energy-and-environment/cleaner-air-could-save-14-million-lives-in-india-china/article7326215.ece>

Talkover



Death by breath: 'You have to understand there are various lobbies,' says Sheila Dikshit

(Former CM Sheila Dikshit looks back at the way the capital, having once become a model for fighting air pollution, went downhill from there) People whose petitions brought about key environmental rulings look back at the way the capital, having once become a model for fighting air pollution, went downhill from there

Sheila Dikshit was chief minister of Delhi's Congress government from 1998-2013 — 15 years during which several measures were charted out to contain air pollution. But except for CNG for public transport following a Supreme Court verdict, and a cess on diesel, nothing much happened on the ground.

Excerpts from the Interview:

Environment experts say your government failed to act upon its promise of cleaning Delhi's polluted air.

This is misleading. To say that the people in the previous government did nothing is wrong. It's a way of shirking responsibility or inability to tackle what has now become a huge problem.

Why was your government unable to control vehicular population over the previous decade?

We couldn't stop people from buying cars. We tried to get fewer of them on the roads—not stop sale, but look at reducing the number on the road. For instance, we tried to popularise carpooling. But the ideas weren't popular. You have to understand that there are various lobbies. If auto manufacturers have buyers, for them it looks unfair that we are stopping their growth. On the other hand, the air quality has become worse. Unless there's a collective decision and the lobbies come together for the good of the people, nothing can be done. I find it a little disappointing. We have been through it, innumerable meetings with the lobbies. Because we, the people of Delhi, were the most disturbed by it.

Your government announced a number of schemes after the implementation of CNG and the plan to provide Delhi with a "green cover". But these were not enforced as well as they could have been.

What went wrong?

We had different ideas, such as assigning odd and even numbers to cars, to restrict the numbers on the roads. But the government traffic department and the police come under the central government. More importantly, the traffic department has to have the will to do it. The crisscrossing of traffic among Haryana, UP, Rajasthan and Delhi made it difficult. Once you have the will to do it, it's possible.

The Supreme Court issued an order in 2005 on creating peripheral routes to divert truck traffic not meant for Delhi.

Why has that not happened?

A lack of coordination between states remained the prime cause. We had met then transport minister Kamal Nath on the issue. But the states didn't want to contribute to the construction of the expressway, since it didn't affect them. The problem was that we needed goods to come in, since we don't manufacture anything. The states surrounding Delhi needed to come together. Haryana did try to do it, but land acquisition was a huge problem... and even though we needed the expressway the most, we also had the least land to give.

Your government did succeed in one area — a diesel cess of Rs 0.25 per litre. What happened to the other measures tried?

People in the government feared that putting a surcharge on diesel could hit revenue, since it's a porous border. Especially, petrol pump owners near the border came to us and said we'll ruin them. But eventually we found that the impact wasn't as great as feared.

When we tried to make Connaught Place a no-congestion zone in 2008, the trader community said customers would stop coming. They said they wouldn't walk that much. Similar problems were faced in Khan Market, when we proposed the creation of a separate parking zone for customers. In both cases, people refused to see the importance and we had to relent.

Interview taken by- Aniruddha Ghosal (The Indian Express, 03 April 2015)

<http://indianexpress.com/article/india/india-others/death-by-breath-you-have-to-understand-there-are-various-lobbies-says-sheila-dikshit/>

FACT



R Rajamani

HYDERABAD: Well-known environmentalist and former bureaucrat, R Rajamani, passed away in Hyderabad on Thursday, after a brief illness. He was 78.

Best remembered for his uprightness, passion and humility, the 1959 batch IAS officer from Andhra Pradesh cadre, served as the collector of both Adilabad and Medak during his tenure. He also held the principal secretary post in the finance and forest departments of erstwhile AP.

Apart from his home ground, the distinguished officer worked in various departments at the Centre during the term of three Prime Ministers - Morarji Desai, Charan Singh and Indira Gandhi. He then went on to serve in the cabinet secretariat under Rajiv Gandhi. Rajamani eventually retired from office as secretary, forest and environment, Government of India.

As an expert on environmental issues, his association with the field, however, did not end there. Post the completion of his tenure, Rajamani took on the role of an advisor to the United Nations Environment Programme and also played a critical part in protecting the city's environment and rich heritage.

In fact, post a PIL filed before the Supreme Court pertaining to 'destruction' of the Hussainsagar, the SC appointed a three-member committee (was called the Rajamani Committee), with him at the helm of affairs, which

eventually went on to save the iconic water body from falling prey to widespread encroachment.

"There was a high court order of 2000 that had laid down certain restrictions on construction activity around the lake. However, that was flouted by certain parties. When this three-member committee submitted its first report in 2005, the SC directed the authorities to honour the HC order," shared environmental engineer, SagarDhara, who was part of this body along with R C Reddy and Rajamani. "While his level of involvement with his work was unimaginable, what struck me most about him was how humane he was. Also, despite being a former bureaucrat, he never shied away from raising his voice each time he thought that the government was doing something wrong. He was a great friend and mentor," Dhara said. For 'green' campaigner M Mandal too, Rajamani's death has meant losing an advisor who environmental activists from the city flocked to, each time there was a crisis. "Until a few years ago, he also chaired the Heritage Conservation Committee and went all out to preserve Hyderabad's ancient structures. He will be missed," Mandal said.

Members of Forum for a Better Hyderabad (FBH) also expressed their condolences through a release issued on Thursday. "His knowledge, experience and wisdom concerning issues of nature and environmental protection and preservation had been of immense value during his association with FBH during the last one and half decades," the release stated. The funeral will be held in the city on Friday.

<http://timesofindia.indiatimes.com/city/hyderabad/Environment-expert-Rajamani-passes-away/articleshow/47823275.cms>



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NGO Vignettes

Clean Air Council

<http://www.cleanair.org/>

The Delaware Valley Citizens' Council for Clean Air (now known as Clean Air Council) was formed in 1967 through the efforts of 11 local, county-based Pennsylvania, New Jersey, and Delaware Tuberculosis and Health Associations (later to be known as Lung Associations). Each of the Associations recognized that while air pollution was a threat to health, it was a problem that demanded a region-wide solution. From its inception, the Council was intended to represent the interests of the Associations at a regional level. All of the Associations committed a portion of their Christmas Seals proceeds to fund the new organization.

The Council gained widespread notoriety during the 1980s when it fought toe-to-toe with Pennsylvania for refusing to implement vehicle emissions inspections. By the end of 1982, the Council had successfully obtained a court contempt judgment against Pennsylvania, which stood to lose \$495 million in federal highway funding, as a result. Ultimately, Pennsylvania gave in. Along with its success in the courts, the Council increased its name recognition by organizing its first 5K Run for Clean Air in Philadelphia, in which 200 runners participated. Programmatically, the Council established an indoor air information resource center in response to public demand for information. It helped Philadelphia pass both the Worker and Community Right to Know and mandatory curbside recycling laws.

The screenshot shows the Clean Air Council's website. At the top, there's a navigation bar with links for Outdoor Air, Energy, Transportation, Waste & Recycling, Indoor Air Pollution, Enviro. Health, Global Warming, News, Get Involved, and Resources. Below the navigation is a large banner for the "10th ANNUAL GREENFEST PHILLY" event on Sunday, September 13. The banner features a chimney emitting CO₂ and a woman blowing dandelion seeds. To the right of the banner is a "Donate Now" button and a "Take Action NOW" section with a list of five items. At the bottom of the page, there are news headlines: "Council Updates", "News", and "Council Comment on Governor's Pipeline".

Initially the Council was a two-person operation with an annual budget of about \$22,000 just trying to promote its name to the public. It worked with the City of Philadelphia to organize the first regional "Cleaner Air Week" and it distributed reporting forms for community members to fill out if they had complaints about air pollution. Its first major advocacy action included successfully getting Southeastern Pennsylvania, Southern New Jersey, and Northern Delaware to be designated as one "air pollution control region," which is still true today.

By the mid-1970s the Council had made a name for itself as the result of two major achievements: 1) winning a lawsuit against Pennsylvania for failing to implement a vehicle emissions inspection program and 2) establishing and distributing a regional air quality index report. While its programmatic focus expanded from air pollution to include solid waste, transportation, and energy, the Council's budget and staff size only showed a modest increase.

Throughout the 1990s and into the present day, the Council has flourished. In 1991 the Council amicably broke off formal affiliation with its founders, the Lung Associations, and truly became an independent entity. It legally changed its name to the present day "Clean Air Council." Notable accomplishments included forming Community Energy, Inc., which was responsible for bringing the first wind farm to Pennsylvania; establishing the Philadelphia Port Environmental Task Force; and starting an active community outreach team, which has significantly grown the Council's membership base. The Council also expanded its work to address global climate change, tobacco smoke pollution, and children's environmental health. Today the Council boasts more than 8,000 members, a \$1.1 million annual budget and 20 staff members.

Opinion



The polluted air we breathe

SarathGuttikunda, The Hindu, 20 March 2015

Technical solutions alone will not be sufficient to control air pollution in Indian cities; we need a change in the institutional setup

In 2006, Al Gore broke down the complicated issue of climate change in "An Inconvenient Truth" to make it understandable to the public. In a similar manner, a month back, "Under the Dome" — a documentary on air pollution in China — highlighted the known linkages between pollutants and human health. Even though the documentary is in Chinese, the message is global. It is especially relevant for Indian cities where air pollution is going from bad to worse, and where there is a lack of understanding of where this pollution is coming from and what we must do to about it.

According to the World Health Organization, 25-30 cities in the top 100 most polluted cities in the world are from India. The Global Burden of Disease assessments for 2010 estimated that 6,27,000 premature deaths in India can be attributed to outdoor air pollution. Of the pollution-related risks, a substantial increase was observed in the cases of ischemic heart disease (which can lead to heart attacks), cerebro-vascular disease (which can lead to strokes), chronic obstructive pulmonary diseases, lower respiratory infections, and cancers (in trachea, lungs, and bronchitis). These estimates do not include acute impacts such as asthma attacks, eye irritations and other respiratory ailments. We still do not know and have not quantified the long-term health impacts of air pollution on vulnerable populations such as children and the elderly. The pollutant with the most impact on health is Particulate Matter. Particulate Matter with an aerodynamic diameter of less than 2.5 micron-meter is especially harmful as they are small enough to settle inside our lungs and cause long-term health problems. Other pollutants are Sulfur dioxide, Nitrogen oxides, Carbon monoxide, and ozone.

According to the 2011 census, by 2030, with a majority of the population classified as urban, the expected growth and demand in industrial, transportation, and domestic sectors will consequently result in an increase in problems of air pollution, which will spread from the big cities to secondary and tertiary cities. In the early 2000s, Delhi mandated a policy to convert auto-rickshaws, taxis and buses from diesel to Compressed Natural Gas. The benefits from this switch lasted for 3-4 years, but as the number of vehicles kept increasing, pollution levels from the transport sector were once again high. Such a large-scale conversion or any such intervention to target air pollution was not attempted again in any other city.

Inadequate urban planning

Air pollution is a complicated issue and is most often a symptom of inadequate urban planning. Lack of power supply leads to the use of diesel generator sets; lack of buses to support the public transport demand leads to higher use of personal vehicles; lack of infrastructure to promote walking and cycling leads to more motorised transport; lack of road maintenance and traffic management by allowing on-road parking leads to congestion; lack of a sufficient waste management system leads to garbage being left behind and often burnt in residential areas; and lack of paved or covered roads leads to re-suspension of dust when vehicles are passing by. The fact that air pollution is an externality from multiple sectors means that it needs to be addressed by multiple ministries that are willing to coordinate with one another. Technical solutions alone, like introducing CNG or changing standards for vehicles



and industries, will not be sufficient to control air pollution in Indian cities. We need a change in the institutional setup in ways that will allow department and ministries to work together.

As citizens, it is our right to know the quality of air that we breathe, the severity of pollution in the air, and where this pollution is coming from. There are multiple sources and there is little that one can do as an individual that would make an impact on reducing emissions. Only when the government takes the lead to address this seriously, by mandating policies in the context of wider social and economic development, will we have any real change towards improving the quality of air. This will not be easy as it is a complicated issue, but we need to start somewhere. Getting a sense of how bad the air is through regular monitoring, and allowing citizens to demand action, is the first step. And we must take that step.

(Sarah Guttikunda is the Director of an independent research group, UrbanEmissions. Info and an Adjunct Associate Professor at the Indian Institute of Technology Bombay.)
<http://www.thehindu.com/op-ed/the-polluted-air-we-breathe/article7016163.ece>

Open window

Clean Air World

The National Association of Clean Air Agencies. Contains world-wide listings of air-pollution agency contacts and information and news on a wide range of environmental topics related to all aspects of air pollution.

The screenshot shows the homepage of Clean Air World. At the top, there's a navigation bar with links to 'HOME', 'WORLDWIDE AGENCY CONTACTS', 'AIR POLLUTION TOPICS', 'LEARN ABOUT AIR POLLUTION', and 'NACAA'. Below the navigation is a banner with four small images: a landscape, autumn leaves, a dead tree, and a close-up of an owl. The main content area has a heading 'Welcome to Clean Air World' and a sub-section 'Find Your Worldwide Agency Contact' featuring a world map. On the right, there's a sidebar with a search bar, a 'Clean Air News' section, and a 'Did You Know?' box containing statistics about energy consumption.

www.cleanairworld.org

Center for Clean Air Policy's

This mission is to significantly advance cost-effective and pragmatic air quality and climate policy through analysis, dialogue and education to reach a broad range of policymakers and stakeholders worldwide.

The screenshot shows the homepage of CCAP (Center for Clean Air Policy). The header includes links for 'MAILING LIST', 'CONTACT', 'CAREERS', and 'SUPPORT CCAP'. Below the header is a search bar. The main content features a large image of several international flags and the text 'Momentum Uptick as Paris Green Summit Approaches'. A sub-section below discusses the need for INDC conversion, mentioning Laurence Blandford and Hannah Pitt.

www.ccap.org

Clean Air Trust

This organisation is working to achieve a strong and effective Clean Air Act . Info and news about the Clean Air Act.

The screenshot shows the homepage of Clean Air Trust. It features a navigation menu with links like 'Home Page', 'Clean Air Villain', 'Alternative Fuels: E85 Ethanol Based Fuel', 'E85 Sources', 'E85 & E85 Differences', 'E85 vs. E100 E85', 'E85 Properties', 'E85 Information', 'E85 in the US', 'Ethanol Comparison', 'Handling E85', 'Impact of E85 on Health', 'Conservation and Emissions', 'Home Heating Emissions', 'Household Appliance Emissions', 'Water Emissions', 'Hot Water Emissions', 'Oil & Diesel Travel Emissions', 'Local Travel Emissions', 'Emissions Reductions', 'Water Conservation', 'Water Conservation Conservation', 'Base Information', and 'Emissions'. The main content area has sections titled 'Making our Vehicles Cleaner' and 'Changing Our Climate'.

www.cleanairtrust.org

Clean Air Watch

This is non profit watchdog group that seeks to protect the public interest. Monitors clean-air and climate policy and seeks to present a public-interest perspective grounded in fact and analysis. News.

The screenshot shows the homepage of Clean Air Watch. It features a navigation bar with links to 'Home', 'Donate', 'About Us', 'Blog', 'In the News', and 'Resources'. The main content area has a section titled 'Latest from the Clean Air Blog' with an article about Apple's Clean Power Pledge. There's also a 'Tweets' section and a sidebar with a 'AIR NOW' app advertisement.

www.cleanairwatch.org

Coalition for Clean Air

Coalition for Clean Air is committed to restoring clean, healthy air to all of California and strengthening the environmental movement by promoting broad-based community involvement, advocating responsible public policy and providing technical expertise.

The screenshot shows the homepage of the Coalition for Clean Air. It features a navigation bar with links to 'LEARN MORE', 'OUR GOALS', 'EVENTS', 'JOIN US', 'CONTACT US', and 'DONATE NOW'. The main content area has a large image of a double-decker bus and the text 'Over 40 Years of Excellence' and 'CALIFORNIA'S ONLY statewide nonprofit dedicated exclusively to advocating for healthy air.'

www.coalitionforcleanair.org

Northeast States Center for a Clean Air Future (NESCAF)

This is a non-profit sister organization of NESCAUM, works to create effective solutions to critical clean air issues that harmonize environmental, public health, economic, and other societal goals through cutting-edge scientific research, policy analysis, and outreach.

The screenshot shows the homepage of NESCAF. It features a navigation bar with links to 'ABOUT US', 'INITIATIVES', 'ACTIVITIES', and 'ACKNOWLEDGMENTS'. The main content area has a large image of a moonset over Boston and the text 'Northeast States Center for a Clean Air Future (NESCAF) works to create effective solutions to critical clean air issues that harmonize environmental, public health, economic, and other societal goals through cutting-edge scientific research, policy analysis, and outreach.' A sidebar on the right contains information about NESCAF's history and its relationship to NESCAUM.

<http://www.nescaf.org/>

List of Orgnaisation website deals with Air Pollution

Friends of the Earth

Friends of the Earth is a non-profit advocacy organization dedicated to protecting the planet from environmental degradation.

Clean Air Council

A member supported, non-profit environmental organization dedicated to protecting Pennsylvanians' right to clean air.

Environmental Defense

Environmental Defense is a not-for-profit environmental advocacy group with four main goals: (1)Stabilizing the Earth's climate, (2) Safeguarding the world's oceans, (3) Protecting human health, and (4) Defending and restoring bio diversity.

Scorecard

Scorecard combines data from over 200 different state and federal databases to profile local environmental problems and the health effects of toxic chemicals.

Pollution.com

The latest nuclear power and pollution news.

EPA: Office of Wetlands, Oceans and Watershedsx

OWOW provides tons of information to raise public awareness and encourage involvement in water quality issues.

Clean Up Australia

A very successful Australian organization that works to cleanup environmental pollution and to teach citizens how to lead greener lives.

Worldwatch Institute

Worldwatch is dedicated to fostering the evolution of a society in which human needs are met in ways that do not threaten the health of the natural environment.

Greening Industry

New ideas in pollution prevention.

EPA: Acid Rain Program

The goal of the Acid Rain Program is to significantly reduce electric utilities emissions of sulfur dioxide and nitrogen oxides, the pollutants responsible for acid deposition.

EPA: Water Management Division

Includes fact sheets, tips, definitions of key terms, state-by-state quality reports and more.

Greenpeace: Ozone Crisis

Details Greenpeace's "Protect the Ozone Layer" campaign and up-to-date news and resources.

Toxics Release Inventory

EPA's guide to toxic chemicals that are being used, manufactured, treated, transported and released into the environment.

National Oceanic and Atmospheric Administration

NOAA guides our use and protection of ocean and coastal resources and conducts research to improve our understanding and stewardship of the environment which sustains us all.

Union of Concerned Scientists

The Union of Concerned Scientists works to ensure that all people have clean air and energy, as well as safe and sufficient food.

Enviro\$en\$e

Single repository for pollution prevention, compliance assurance, and enforcement information and data bases.

Save Our Seas

The mission of SOS is to preserve, protect and restore the world's oceans for the future of all life forms on the planet.

The Nature Conservancy

The Nature Conservancy purchases and protects millions of acres of threatened natural habitats.

Capitol Reports/ Environmental News Link

Provides environmental news and research aids on a number of issues, from pollution to climate change.

Nelson Institute of Environmental Medicine

One of the nation's oldest and foremost centers for research into the health effects of environmental pollution.

Climate Institute

The Climate Institute works to protect the balance between climate and life on earth by facilitating the dialogue among scientists, policy makers, business executives and citizens.

Clean Water Action

A national citizens' organization working for clean, safe and affordable water and the prevention of health-threatening pollution.

The Southwest Network for Zero Waste

This web site will provide you with tools and resources to help you identify money saving options to reduce pollution.

Environmental News Network

ENN covers breaking environmental news, including pollution issues.

EPA: Office of Transportation and Air Quality

Protecting public health and the environment by controlling air pollution from motor vehicles, fuels, and nonroad equipment, and by encouraging travel choices that minimize emissions.

Environmental Working Group

A leading content provider for public interest groups and concerned citizens who are campaigning to protect the environment.

GREEN: Global Rivers Environmental Education Network

An innovative, action-oriented approach to education, based on an interdisciplinary watershed education model.

NIPR--New Ideas in Pollution Regulation

A site for researchers, government officials, and citizens interested in understanding and improving control of industrial pollution, especially in developing countries.

Living on Earth

This weekly NPR radio program covers a variety of environmental issues, including pollution, sustainable development and transportation challenges.

Environmental Bureau of Investigation (EBI)

Dedicated to the protection of public resources through the application and enforcement of environmental laws.

Noise Pollution Clearinghouse

Efforts include building a library of resources and tools concerning noise pollution, establishing links to other groups that have similar collections, establishing networks among local noise activists, assisting communities and activists who are working to reduce noise pollution, and monitoring and advocating for stronger noise controls.

Natural Resources Defense Council

NRDC uses law, science, and the support of more than 400,000 members nationwide to protect the planet's wildlife and wild places and to ensure a safe and healthy environment for all living things.

Pacific Rivers Council

A nonprofit organization passionately committed to protecting our streams and the species that inhabit them.

Sierra Club

A leading environmental organization with chapters in all 50 states and Canada.

World Wildlife Fund

Information on the WWF's global campaign to reduce the use of toxic chemicals.

U.S. Water News Online

Find the latest news concerning water and water issues, including water supply, water quality, conservation and more.

Burning Issues

Facts, news and the latest research on air pollution.

Earth 911

Green shopping tips and ideas on how to reduce water pollution and air pollution, as well as energy conservation and real-time beach water quality information, are all available through Earth 911.

Center for Sustainable Systems

Seeks to facilitate sustainability through education on pollution prevention.

Earthshots: Satellite Images of Environmental Change

Earthshots is an ebook of before-and-after Landsat images showing recent environmental events of the last 27 years.

DOE Pollution Prevention Information Clearinghouse

A centralized source of US Department of Energy Pollution Prevention information that assists with valuable P2 resources outside of the DOE.

Exxon Valdez Oil Spill Trustee council

Updated pictures, publications, policies, news, and more regarding the restoration of the Exxon Valdez spill.

Keep America Beautiful

Non-profit organization that educates individuals about litter prevention and ways to reduce, reuse, recycle and properly manage waste materials.

The National Atmospheric Deposition Program/National Trends Network

Collects data on the chemistry of precipitation for monitoring of geographical and temporal long-term trends.

IPEN-The International POPs Elimination Network

The mission of IPEN is to work for the global elimination of persistent organic pollutants, on an expedited yet socially equitable basis.

20/20 Vision

Advocates for pollution reduction, sustainable development, and other environmental issues.

American Rivers

The American Rivers' mission is to protect and restore America's river systems and to foster a river stewardship ethic.

Clean Air Society of Australia and New Zealand

Provides a forum for discussion of environmental issues and to facilitate contacts between environmental practitioners.

Earth Force

Earth Force helps youth discover and implement lasting solutions to environmental problems in their communities.

CEEI: America's Threatened Streams

An index of comprehensive studies on water quality-limited streams.

Office of Air and Radiation

Deals with issues that affect the quality of our air and protection from exposure to harmful radiation.

The International Ozone Association

The IOA serves as a central gathering and disseminating information point on a variety of ozone issues.

SETAC

Develops and applies multidisciplinary approaches to solving environmental problems.

Marine Conservation Biology Institute

Tackles numerous marine conservation issues head on, including the effect of pollution on marine life.

National Response Center

The NRC is the sole federal point of contact for reporting oil and chemical spills.

Oregon Environmental Council

OEC's mission is to restore and protect Oregon's clean water and air, now and for future generations.

UTK - The Energy, Environment and Resources Center (EERC)

The Energy, Environment, and Resources Center (EERC) at the University of Tennessee-Knoxville finds real-world solutions to problems related to the environment, energy, economic development, and technology.

Pollution Prevention Regional Information Center

The P2RIC provides access to pollution prevention information from and about EPA Region 7.

Pollution Prevention

Pollution prevention programs and information from the EPA.

Canadian Centre for Pollution Prevention

Pollution prevention resource from Canada.

Australian Water Association

IAWQ is a professional membership association dedicated to the advancement of the science and practice of water pollution control and water quality management worldwide.

Water Environment Federation

A not-for-profit technical and educational organization whose goal is to preserve and enhance the global water environment.

Clean Car Campaign

Help reduce air pollution and global warming by letting automakers and policymakers know that consumers want clean cars.

Air Cycle Corporation

Air Cycle Corporation offers recycling services and transportation throughout all of North America to assist facilities in properly disposing lamps, ballasts, batteries, and computer hardware.

ATSDR

The ATSDR's mission is to prevent exposure and adverse human health effects and diminished quality of life associated with exposure to hazardous substances present in the environment.

International Water Law Project

Provides information and links on international water law and policy and related water pollution and conservation topics.

Fostering Sustainable Behavior

Offers information on effective strategies for engaging people in the behavior changes required to reduce waste, increase water and energy efficiency, and alter transportation patterns.

Air & Waste Management Association

The A&WMA is a nonprofit, nonpartisan professional organization that provides training, information, and networking opportunities to 12,000 environmental professionals in 65 countries.

Skepticism: Clean Air

Challenges EPA clean air regulations.

Pollution Equipment News

Online source for product news and information on hazardous waste, water, air and wastewater.

The Great Lakes Information Network

GLIN offers a wealth of data and information about the Great Lakes region's environment and economy, tourism, education and more.

Canadian Pollution Prevention Information Clearinghouse (CPPIC)

An online database and comprehensive resource that provides Canadians with the information they need to put pollution prevention into practice.

Green Car

The clean car campaign.

One World News Service: Pollution

Provides news regarding pollution issues.

PEER

The Public Employees for Environmental Responsibility (PEER) group provides uniquely valuable services to government employees charged with safeguarding the nation's natural resources.

PPRC

The Pacific Northwest Pollution Prevention Resource Center is a leading resource for promoting a cleaner environment through pollution prevention.

Chem-Tox.com

Researching the effects of chemicals and pesticides on health.

National Environmental Technology Institute

NETI focuses on the design and modification of processes and materials "upstream" to minimize pollution prior to ultimate treatment and disposal.

Bureau of Reclamation

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Water Partners International

Works to ensure safe drinking water for developing countries.

Water Online

The most convenient source of technical, operational, product, management and regulatory information available for the water industry.

Water Recycling

Explore an ecological waste water recycling system in Chatham County, North Carolina.

The Carbon Dioxide Information Analysis Center

CDIAC's scope includes potentially anything and everything that would be of value to users concerned with the greenhouse effect and global climate change.

Health and Energy

News and information on pollution, energy efficiency, renewable energy, global warming and more.

No Butts About It Litter Campaign

No Butts About It is a campaign to help rid the earth of cigarette butt litter.

Basel Action Network

An international network of activists seeking to put an end to the export and dumping of hazardous wastes from rich industrialized countries to poorer, less-industrialized countries.

Zero Emissions Research and Initiatives (ZERI)

"ZERI seeks to create a new paradigm of sustainable industry by targeting zero gaseous, liquid and solid emissions, and by making zero emissions a world-wide industry standard."

Coalition for Alternative Transportation

Supports better travel options to reduce the amount of pollutants.

EMPACT

The Environmental Monitoring for Public Access and Community Tracking program.

Nonpoint Source Pollution Homepage

Clearinghouse for information related to Nonpoint source (NPS) pollution, which occurs when rain or snowmelt wash pollutants into waterways, wetlands and underground water.

GASP: Group Against Smog and Pollution

GASP has been working to prevent air pollution on local, state, and national levels since its creation in 1969.

Flush Gordon's Dirty Water Page

Information on water pollution and how to prevent it.

Ocean Pollution

Basic information about the problem of ocean pollution and how it affects human health and resources.

Tracking and Analysis Framework

The TAF is an integrated modeling framework developed to assess, inform, and guide U.S. regulatory policies on emissions of precursors to acid rain.

Pollution Engineering

Provides broad, balanced coverage of technical news and features to meet the information needs of environmental professionals with multiple pollution control responsibilities: air, water, solid and hazardous waste.

National Pollution Prevention Roundtable

The largest membership organization in the United States devoted solely to pollution prevention.

RCO On-Line

Promoting environmental sustainability through waste minimization and resource conservation.

Healthy Communities Environmental Mapping

Empowers local communities to build smarter and healthier neighborhoods.

Cleaner Production in China

The site is designed to provide information in English on Cleaner Production, on China's Cleaner Production policy and legislation, and on existing and planned activities to implement Cleaner Production in China.

Hazardous, Toxic and Radioactive Waste Center of Expertise

Brought to you by the U.S. Army Corps of Engineers.

Source: <http://www.world.org/weo/pollution>

MEDIA ANALYSIS

Environment being an extremely sensitive aspect, its adequate coverage becomes all the more mandatory. It is almost the backbone of our survival and consistent maintenance on earth. Electronic media needs to lend the required space and structure to the environment that it rightly holds. Its only then that a mature and palpable interaction will be made possible.

Undoubtedly society and electronic media are congenially intertwined. They have very symbiotic relationship and have extraneous influence on each other. However the need is to accommodate environment effectively so that the validity of its essence is comprehended and widespread understanding is generated.

CMS ENVIS Centre has been collating and analysing the prominent news channels coverage on environment and wildlife issues in the month of April - June 2015.

Methodology

Over the years CMS Media Lab has acted as a source for the CMS ENVIS Centre because it has undertaken significant experimentation to develop a robust and rigorous methodology as given below. The content analysis broadly covers qualitative and quantitative aspects.

Prime time band: The prime time programming is the industry benchmark in News television for all significant events and issues that are prominently covered on a particular day.

Six mainstream news channels: AajTak, DD News, ABP News, Zee News, CNN-IBN and NDTV 24X7.

Recording: The recordings were then previewed and the news stories listed under various classifications and categories to generate quantitative data.

Logging: The news content on the above mentioned channels were listed and documented in the log sheets.

Coding: The stories were classified and separately coded (e.g. politics, business, sports, environmental news etc.).

Environment related stories: The theme specific stories were separately reviewed and analysed.

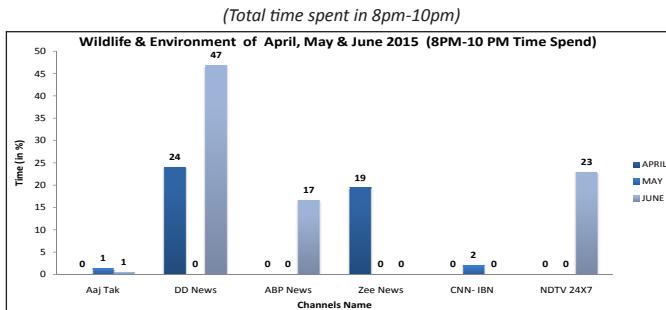
Time frame: The timeline taken for this particular study was April - June 2015.

Table 1: Coverage of Environment and wildlife Stories by News Channels from April-June 2015

Environment & Wildlife (Total time spent in minutes)						
April to June 2015	Aaj Tak	DD News	ABP News	Zee News	CNN-IBN	NDTV 24X7
APRIL	0	24	0	19	0	0
MAY	1	0	0	0	2	0
JUNE	1	47	17	0	0	23

Source: CMS Media Lab

Fig 1: Coverage of Environment and wildlife Stories by News Channels (In minutes)



Source: CMS Media Lab

In the month of April, DD News topped the chart for coverage on Environment & Wildlife by giving maximum time (24 minutes), followed by Zee News (19 minutes), CNN-IBN, ABP News, AajTak, NDTV 24X7 had not cover even a single minute.

The month of May recorded drastically low coverage by all of the major news channels, led by CNN-IBN (2 minutes), AajTak (1 minute), Zee News, DD News, ABP News and NDTV 24X7 did not spare any time for environment & wildlife coverage during this month.

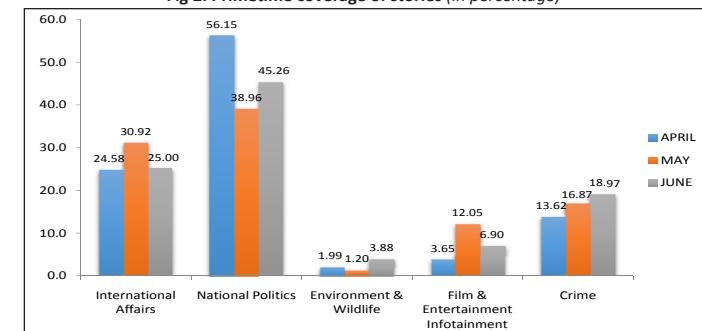
In June, the total time spent on covering environment & wildlife stories was only 88 minutes. While DD News and NDTV 24X7 fared better than the rest with 47 and 23 minutes of coverage respectively, ABP News trailed behind with 17 Minutes of coverage and AajTak was extremely poor with 1 minute. CNN-IBN and Zee News did not air any story pertaining to environment and wildlife during this period.

Table 2: Primetime coverage of stories (In minutes and percentage)

Issues	APRIL		MAY		JUNE	
	No. of Stories	%	No. of Stories	%	No. of Stories	%
International Affairs	74	24.58	77	30.92	58	25.00
National Politics	169	56.15	97	38.96	105	45.26
Environment & Wildlife	6	1.99	3	1.20	9	3.88
Film & Entertainment	11	3.65	30	12.05	16	6.90
Crime	41	13.62	42	16.87	44	18.97
Total	301	100.00	249	100.00	232	100.00

Source: CMS Media Lab

Fig 2: Primetime coverage of stories (in percentage)

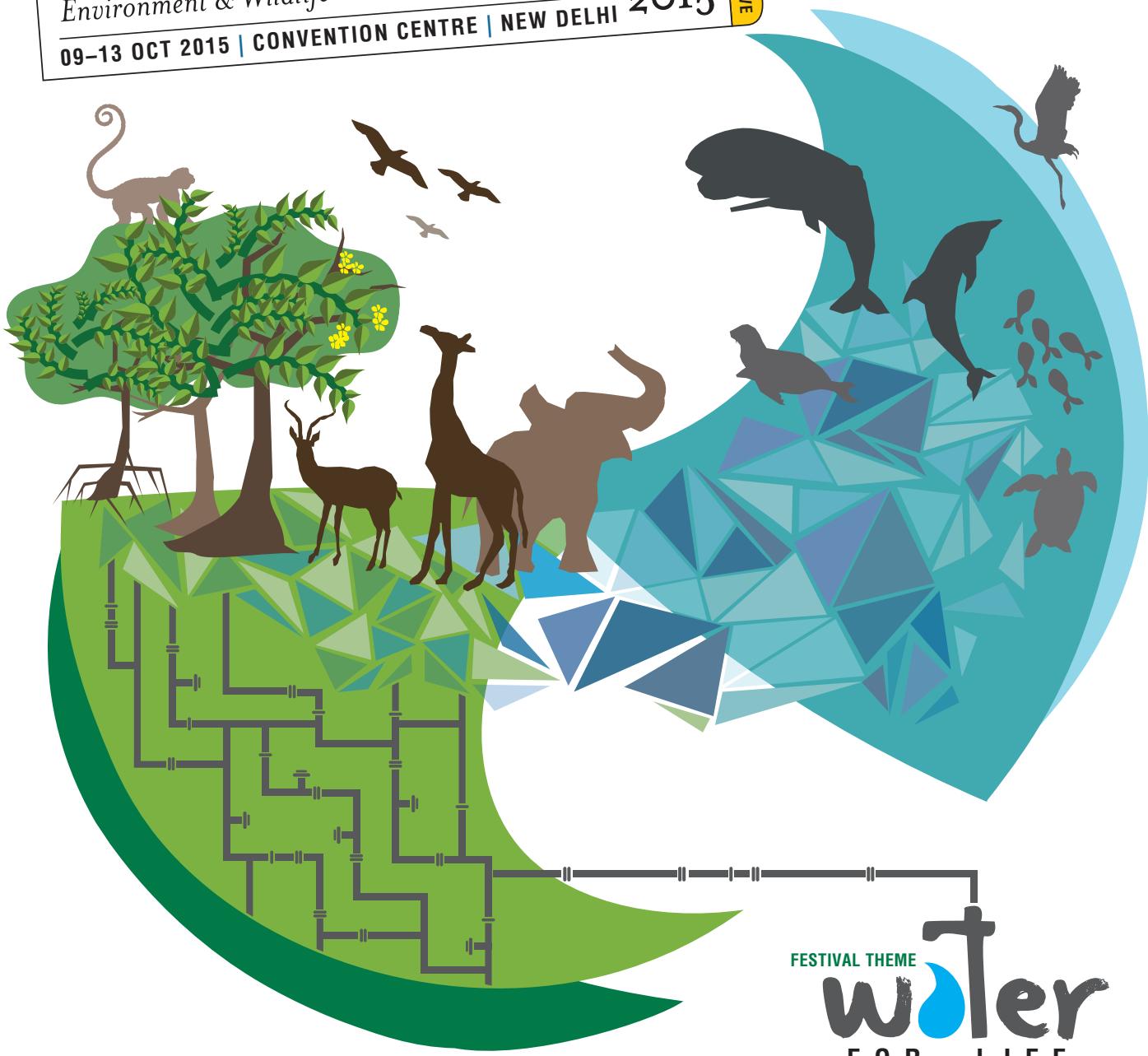


Source: CMS Media Lab

The month wise analysis of primetime coverage of stories reveals that National Politics dominated the news channels in all the three months taking the 56%, 39% & 45% of the total primetime in months of April, May and June respectively. In April, National Politics stories held the first position with (56%) of the total primetime coverage, followed by International Affairs (25%), Crime (14%), Film & Entertainment (4%) and Environment & Wildlife (2%). While May and June saw a repeat of trends as in the month of April.



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CMS Environment

Promoting Responsibility

Established in 1991, CMS has carved out a niche for itself as a research based think tank committed to rigorous and objective analysis to support improved policymaking.

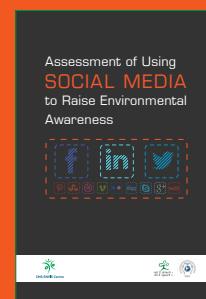
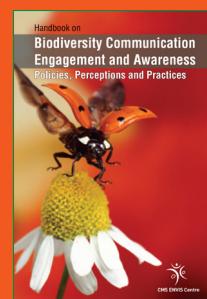
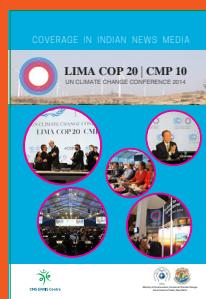
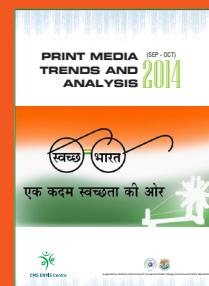
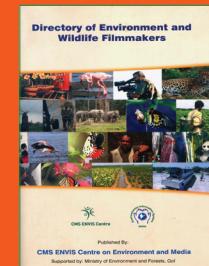
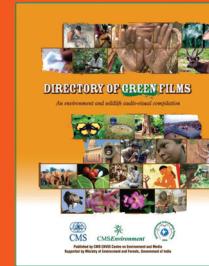
CMS Environment, the team behind all the environmental endeavours of CMS, has been involved multifariously in policy research and programme evaluation aimed at creating sustainable solutions for environment protection. CMS Environment Team has also been consistently undertaken capacity building and enhancing initiatives with range of stakeholders to orient on contemporary environment issues like climate change, sustainable transport, conservation, etc.

CMS ENVIS CENTRE

Established in 2000, **CMS ENVIS** is a premiere centre designated by Ministry of Environment, Forests & Climate Change (MoEF&CC), Government of India to facilitate information dissemination and further the cause of environment awareness and sensitisation. A separate space in its campus has been allocated to house documentary films, spots/ public service messages, info-mercials, quiz programmes, jingles etc. on environmental and wildlife issues. www.cmsenvis.nic

Green Films Resource Centre

Established in 2007, the Audio Visual Resource Centre (AVRC) is a state-of-the-art archive of documentaries, films and audio spots on environment and development issues.



For more information:

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