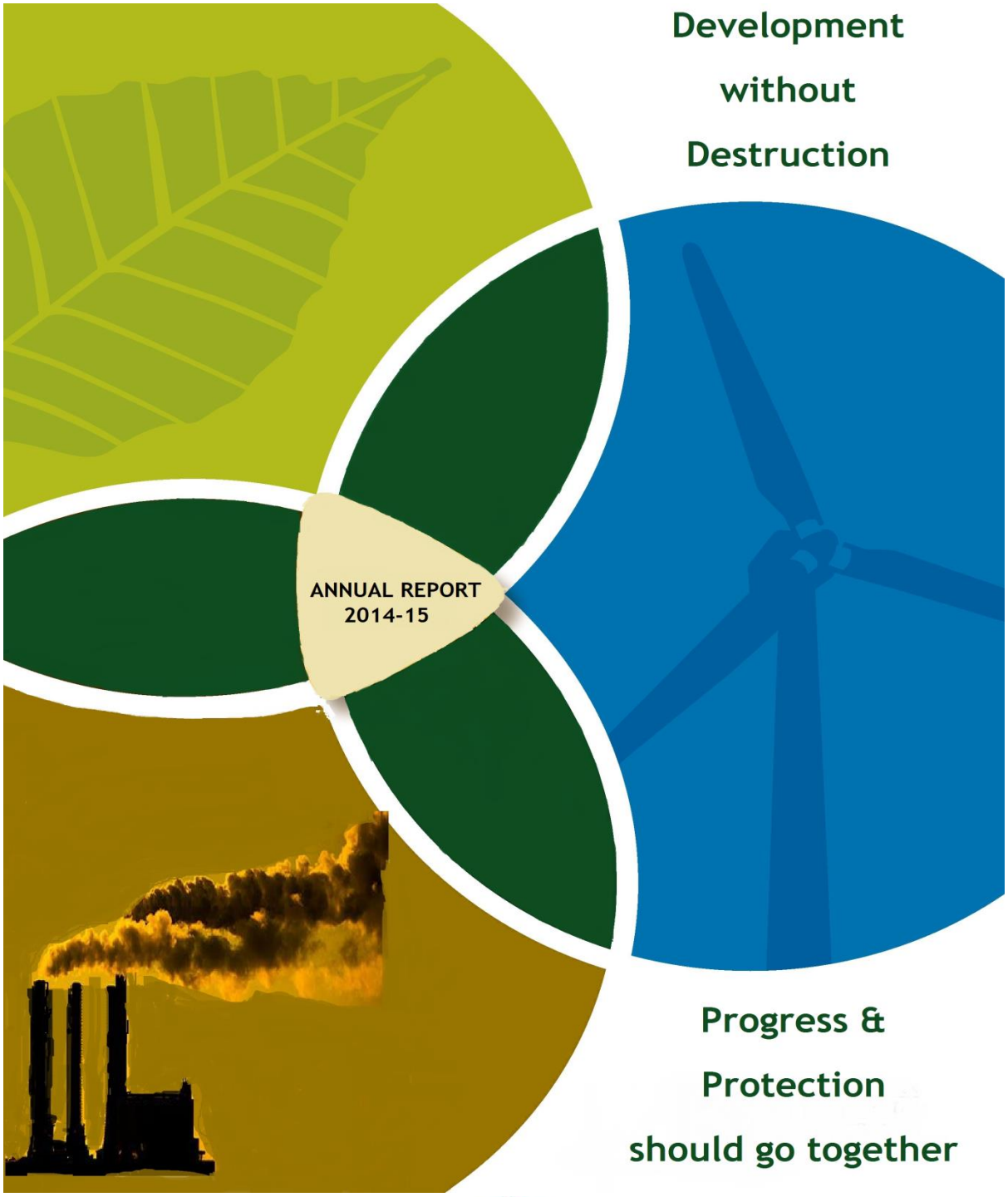


CENTRAL POLLUTION CONTROL BOARD
Zonal Office (South)
Nisarga Bhavan, Thimmaiah Road
Shivanagar, Bengaluru - 560 079

1.0 Introduction

CPCB is playing multi-faced role in Pollution abatement & Control as R&D, Advisory and Legal/ Statutory organisation. The South Zonal Office, Bengaluru was established in October 1988 to cover the entire Southern Jurisdiction. During the FY 2014-15, Andhra Pradesh was split into two states and the jurisdiction of South Zonal office was increased from five to six states namely Karnataka, Tamil Nadu, Kerala, Andhra Pradesh, Telangana & Goa & two Union Territories Pondicherry and Lakshadweep covering total area of 639474 Sq. km & vast coastal stretch of 3025 km. The jurisdiction of south zonal office is depicted in Figure 1.

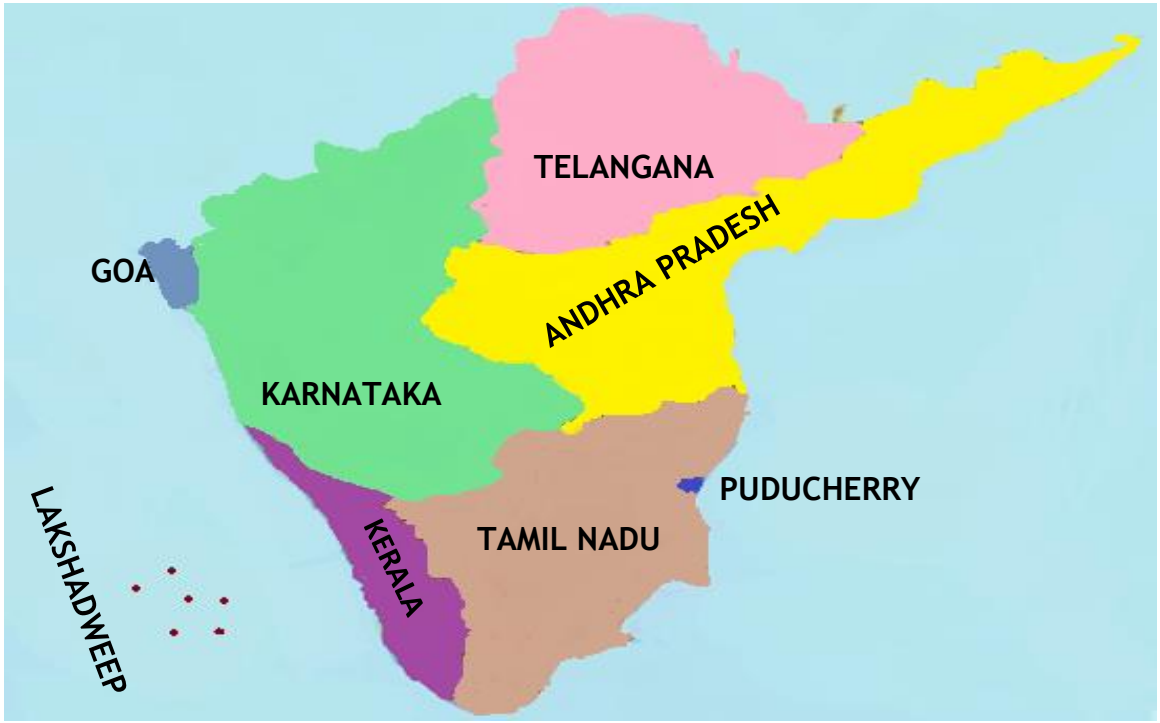


Figure 1: Jurisdiction of CPCB South Zonal Office, Bengaluru

More than two and half decades have elapsed since establishment of this office operating in entire Southern zone. The activities of CPCB have increased multifold and operating from Bengaluru to cover the entire jurisdiction on technical aspects is really a challenging one. The staff strength of the office is around 30 including Scientific, technical and supporting administrative staff. But, due to vast jurisdiction, there is huge work load on office; the industrial sectors/ activities and other details like CETP's, STP's etc. are given in Table 1. Apart from this, the officials/ staff require to travel long distances from Bengaluru to perform the activity resulting in more financial aspects and man hour requirement.

Table 1: State-wise distribution of Industries and Common Treatment Facilities

State/ Facilities	Andhra Pradesh	Karnataka	Kerala	Goa	Tamil Nadu	Telangana	Puducherry	Lakshadweep
Industry	159	141	50	11	243	313	9	Nil
CETP	2	8	7	Nil	44	2	Nil	Nil
TSDF	1	1	1	Nil	1	1	Nil	Nil
H.W. Recyclers	*	123	10	2	19	*	115	Nil
STP	16	14	8	97	40	10	2	Nil
CBMTF	5	23	1	Nil	11	7	1	Nil
MSW disposal facilities/landfills	16	134	54	14	142	*	1	9
E-Waste Recyclers	*	24	Nil	Nil	19	*	3	Nil
NAMP stations	24	24	29	16	28	21	03	*
NWMP stations	34	64	126	49	55	106	22	*

* Information to be updated

Apart from co-ordination with all concerned State Pollution Control Boards as well as other organizations engaged in Pollution Control Activities, other major activities carried out under the following Project Heads for implementation of Annual action Plan:

- I Pollution Assessment (Survey and Monitoring)
- II Scientific & Technical Activities and R & D
- III(b) Industrial Pollution Control (Standards, Technologies and Enforcement)
- IV(a) Training programmes
- IV(b) PR, Mass Awareness Programmes& Hindi
- IV(C) Library
- V Information (Database) Management
- VI Waste Management and Urban Pollution Control (plastic waste, Hazardous Waste, Municipal Solid Waste, Bio-Medical Waste, E-Waste & Vehicular Pollution)

A total amount of Rs. 373.50 lakhs was earmarked to this office in the financial year 2014-15 to carry out the above activities out of which Rs. 304.23 lakhs was sanctioned and utilised. The major achievements of this office are presented in this report.

2.0 Project Head –I. Pollution Assessment (Survey and Monitoring)

Scheme 1 & 2; Surveillance of NAMP and NWMP stations including review meeting

Air and Water Quality Monitoring helps in evaluating the nature and extent of pollution control required and effectiveness of pollution control measures already in existence. It also helps in assessing the air/water quality trends and prioritizing pollution control efforts and for dissemination of information & other related matters. To understand the prevalent air and water quality, the SPCB's/PCC's assess the air & water quality through NAMP and NWMP programmes funded and guided by CPCB.

Further, ZO, CPCB carries out surveillance of NAMP and NWMP stations with an objective to ensure and verify the accuracy/quality of monitoring data of NAMP and NWMP received from SPCBs. In Southern zone there are 145 NAMP stations and 456 NWMP stations and during FY 2014-15 this office has randomly inspected 33 NAMP and 24 NWMP stations. The observations and shortcomings have been discussed on site with SPCB officials and the technical and scientific guidance has been provided for further improvement in quality of monitoring and reporting.

Scheme 3: Monitoring of inter-state river water quality including all microbial parameters in Southern Zone

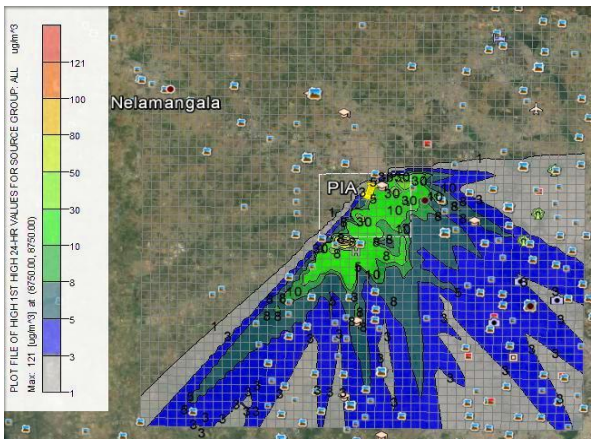
The water quality of the rivers is regularly monitored at interstate boundaries since 2005. In Southern zone, during FY 2014-15 river water quality was monitored quarterly in River Thenpennai at Mugulur Bridge and once in a year at three locations namely River Cauvery at Satyamangala Bridge, River Tungabhadra at Hochcheli and River Krishna at Devdurga. All river monitoring points were meeting the standards but Thenpennai River at Mugulur Bridge is not meeting w.r.t BOD. The necessary action plans to prevent and control pollution have been recommended to concerned SPCBs.

Scheme 4; Air Pollution Modelling

The objective of the scheme aimed to predict the present air quality at Bengaluru city and to develop air quality modelling for future. In the first phase, the impact of stack emissions and DG sets emissions on ambient air quality in Peenya Industrial area, Bengaluru was studied since it is the largest and oldest industrial area in Bengaluru. AERMOD 8.6 dispersion model was used to predict the maximum ground level concentration of pollutants in order to assess the cumulative impact of emission to the surrounding environment.

The study was confined for two seasons, winter and summer. The 24 hourly ground level concentrations have been predicted for PM, SO_2 & NO_x to assess the impact on receptors. The results revealed that PM concentration is exceeding the NAAQS during both the seasons at the receptor locations. The impact of pollution with respect to PM is very significant and the exceedance factor is above 1.5 times which indicates the critical air pollution. The SO_2 and NO_x concentration are well with in the NAAQS.

The CAAQM station of CPCB at Peenya was considered as reference point and the model run results confirms that CAAQM station is very close to the predicted high polluting locations. Hence the suitability and continuance of the station is highly relevant.



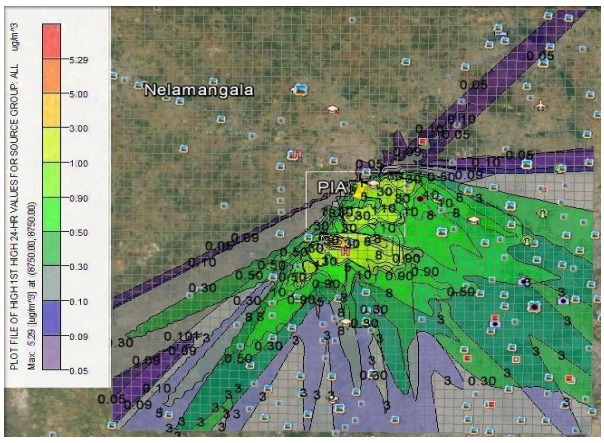


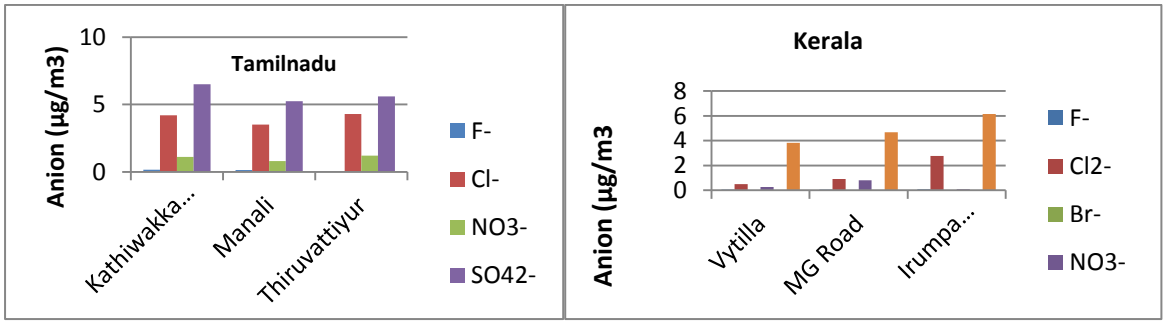
Figure 2: Contour plot of PM for summer season Figure 3: Contour plot of SO_2 for summer season

Scheme 5: Study of Total PAH in ambient air in the zone

Based on the NAMP data, few cities in Southern zone were identified as non-attainment cities w.r.t Particulate Matter. Hence ambient particulate matter was analysed for the chemical composition with respect to PAH, anions and cations to identify the sources of pollution so as to control pollution at source.

The study was carried out in Tamil Nadu, Kerala, Telangana, Karnataka, Goa and Pondicherry. Samples were extracted from PM_{10} filter papers, concentrated for PAH and then analysed using Gas Chromatograph equipped with Flame Ionisation Detector. Out of the 16 PAHs, only five PAHs such as Benzo (b) Fluranthene, Benzo (a) Pyrene, Dibenzo (a, h) pyrene, indenopyrene, Benzo (ghi) pyrene were identified. The findings of the study reflect:

- Among the analysed anions, Cl- and SO_4^{2-} were found to be in higher concentration compared to NO_3-, and F- ions at all 6 states. Phosphate and Bromide were not detected during the study.
- The trend of ionic contribution in decreasing order at all 4 states is $SO_4^{2-} > Cl^- > NO_3^- > F^-$
- Among cations only sodium and calcium were detected during April and May 2014



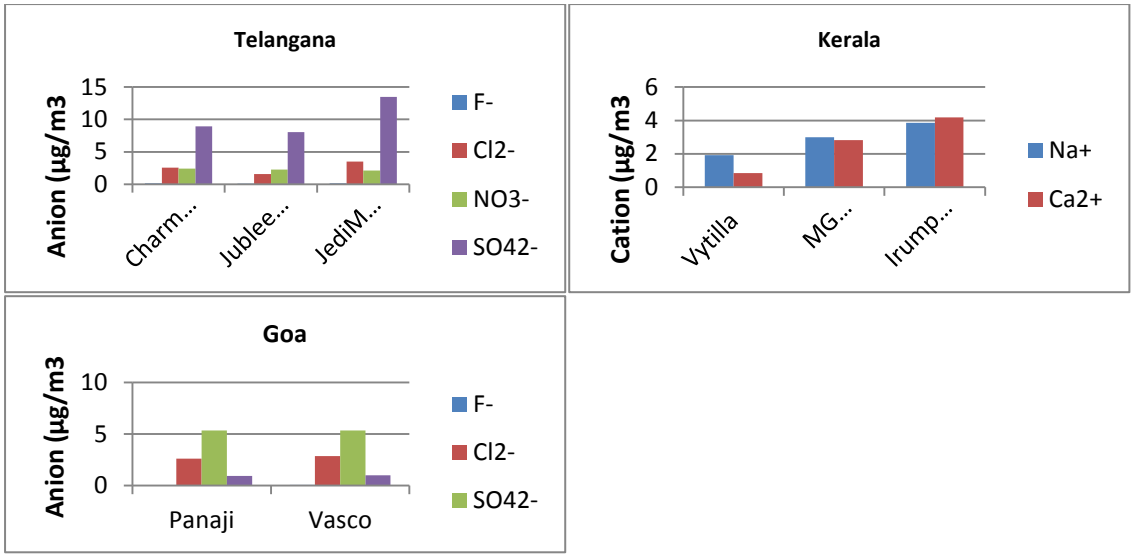


Figure 4: Average concentration (Jan-Aug. 2014) of anion and cation in µg/m^3 in four states.

3.0 Project Head – II. Scientific& Technical Activities and R & D

Scheme 6; Operation and Maintenance of Networking of Continuous Ambient Air Quality Monitoring (CAAQM) stations at Bengaluru and Chennai.

CPCB in line with National Environmental Policy 2006 is strengthening air and water quality monitoring network in the Country. The objective of the study is to provide information on key environmental resources and parameters including the ambient air quality on a GIS platform which will be accessible to all stake holders including Government, Institutions and Public. This in turn will enhance the enforcement of environmental compliance.

To strengthen continuous ambient air quality monitoring network in the country, 16 CAAQMS and its network were established under private participation project. Out of which, this office is supervising six Continuous Ambient Air Quality Monitoring Stations (CAAQMS) three each at Bengaluru namely 1. BTM Layout, 2. BWSSB, Marathalli and 3. Peenya and Chennai 1. Alandur, 2. IITM, Adayar and 3. Manali. The locations are selected based on residential area, commercial area and industrial area. The monitoring stations are equipped with various analysers as to measure about fifteen pollutants and seven meteorological parameters. These monitoring stations are equipped with multipoint calibrators by which each analyser can be calibrated as and when required on schedule basis.

The processed data reveals that the average data capture rate in Bengaluru is 79.9% and in Chennai the percentage of data capture rate is 63.5% during the year 2013. The data generated by these monitoring stations are linked with local and central networking stations apart from disseminating online data through digital display board to public at each monitoring site. The disseminated data will help the general public in understanding the pollution levels at any point of time. In addition the decision takers can take appropriate actions based severity of pollution levels in different areas.

Scheme 7; Operation & Maintenance, AMCs of instruments/ equipment and development of the laboratory

The project aims to equip the laboratory to meet the demands of the statutory requirements of monitoring & analysis works. CPCB, South Zonal Laboratory, Bengaluru is well equipped with sophisticated instruments like AAS, ICP, Bomb Calorimeter, TCLP analyser, UV spectrophotometer, Mercury analyser, Gas Chromatograph (GC) etc. AMC and regular calibration practices are being adopted to ensure round clock operation of laboratory and generation of quality data. The laboratory provided all necessary support in monitoring and analysis of air, water and soil samples.

Laboratory has participated in two International Proficiency Test programme for air, water & microbiology parameters and achieved good score. Procurement of new laboratory equipment's is in progress for augmentation of laboratory facilities. The well preparedness of the laboratory will help in taking up more monitoring and analysis works, optimum usage of the existing facilities and speedy submission of accurate results with high level of confidence.

The officials from this office along with officials from MoEFCC visit various laboratories in the zone for recognition as Environmental laboratories under E (P) Act, 1986.

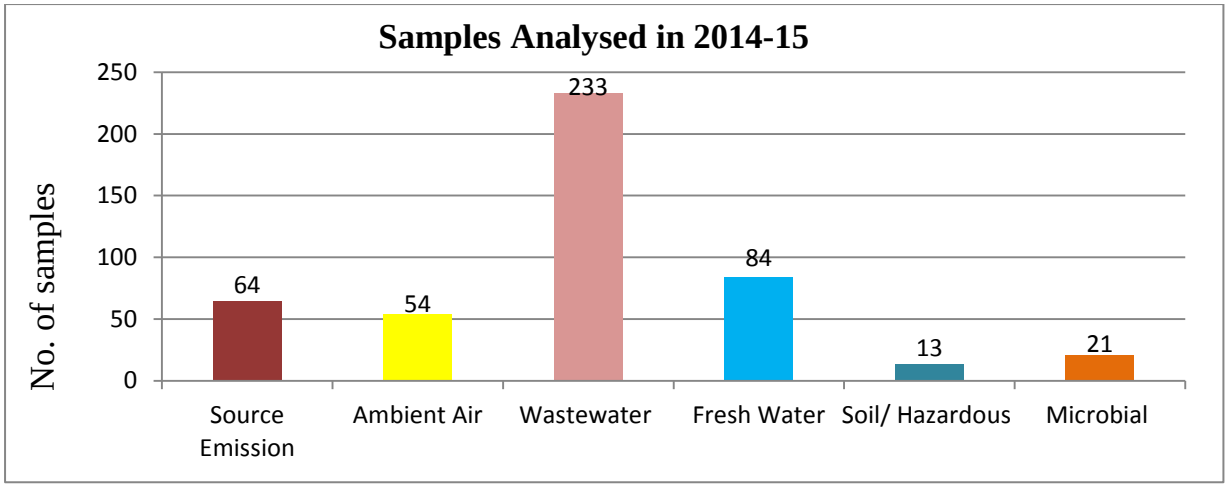


Figure 5: Number of samples analysed in 2014-15

Scheme 9; Accreditation/ Recognition for South Zone Office Laboratory under NABL and E (P) Act.

The objective of the scheme aimed for accreditation/recognition of south zonal laboratory under NABL and E (P) Act. Series of lectures and practical demonstrations were organized to all the staff on ambient air, source emission, water/wastewater and hazardous waste samples collection, its preservation and analysis for various parameters as a part of NABL requirements.

This office has engaged M/s QUENOHS, Bengaluru for the implementation of ISO 9001:2008 & IS OHSAS 18001:2007 to the laboratory by following proper administrative procedure. Training Programmes on "Laboratory Quality Management", "Internal Audit as per ISO/IEC 17025: 2005", "ISO 9001:2008 & OHSAS (IS 18001:2007)", "First Aid" etc. were regularly organized at this office. Three day internal auditor course for QMS & OHSMS was conducted to all the scientific & technical staff of CPCB SZO during December 29-31, 2014. In compliance to NABL Accreditation following progress has made:

i. The list of items has been sorted for calibration under NABL.
ii. Detailed SOP for instruments and test methods are prepared. Quality manual has prepared and finalized in consultation with H.O.
iii. Mock drill on Fire accident was conducted
iv. HIRA-Hazard Identification & Risk Assessment is prepared
v. IMS (Integrated Management System) draft is prepared
vi. All records and files numbered accordingly.

vii. GAP analysis is followed sequentially

viii. Non-Compliance in GAP analysis is being addressed one after the other.

ix. Internal Audit is completed and all "Non-conformities" raised are addressed

Presently the office has filed application with BIS for further consideration of certifications.

Scheme 10; Statistical Analysis and Interpretation of Continuous Ambient Air Quality (CAAQM) data at Bengaluru and Chennai

Continuous Ambient Air Quality (CAAQM) data at Bengaluru and Chennai were Statistical Analysed using various components like correlation study, regression analysis and other statistical tools. The wind rose & pollution rose were plotted using the software "PAVANAAREKH" to analyse the dominant wind direction and dispersion of pollutants around the stations.

Daily and monthly (seasonal) behaviours and trends in data were studied from 2011. The study helps to establish whether, and the extent to which, concentrations of air pollutants have changed over the time period in relation to industrial and community development.

Scheme 11; Development of methodology for assessment of CO_2 absorption through Green Belt emission from industrial process and its Carbon budgeting in selected industrial sector (partially outsourced).

As per the conditions for Environmental Clearance by MoEFCC, the industries are bound to develop green belt in 30% of the total project area to sequester Carbon dioxide so as to mitigate the air pollution. The main objective of the scheme is to prepare guidelines for developing green belt in industries based on Carbon budgeting.

Phase-I of the study is carried out in Cement industries across Karnataka, surveyed and collected plant samples around the industry by making plots of 30mX30m with in the radius of 100 m from the industry premises. Trees and shrubs present in the plots were recorded in addition to the height and girth of the plants. The photosynthetic ability of selected plants present in the green belt of industrial area and Comparative account of carbon stock and the

photosynthesis ability with plants present in the industrial area with those present in relatively low pollution areas were assessed.

During the study it was observed that the dust accumulation and the pollution level seriously affect the photosynthesis ability of plant species and there was dust accumulation on the leaf surface upto 1.5 Km distance from the Industry.

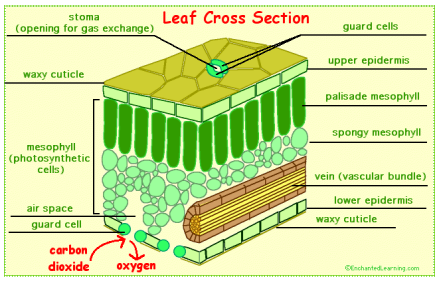


Figure 6: Structure of leaf

4.0 Project Head – III (b).Industrial Pollution Control (Standards, Technologies and Enforcement)

Scheme 13; Building Maintenance

Entered into MoU for extending Comprehensive Annual Maintenance Contract for one more year with M/s Power One Microsystem Pvt., Ltd., for UPS system, M/s Intek Security System Pvt., Ltd for Fire alarm system and M/s LG Electronics India Pvt., Ltd., for AC units and Ventilation System. Rectified the break down occurred in timely and executed the preventive maintenance of UPS, Fire alarm system and AC units & ventilation system periodically to ensure hassle free operation.

Scheme 15; Assessment of Environmental Compliance of Electroplating Units in Bengaluru

Electroplating is a technique of deposition of a fine layer of one metal on another through electrolytic process during which effluent containing toxic materials and heavy metals, air emissions and solid wastes are discharged into the environment. The electroplating units in Bengaluru is situated in different industrial areas namely Peenya, Rajajinagar, Yeswanthpur the western part of the town & at Koramangala in the south east, at Anekal, Bommasandra,

Attibele, Hosur mostly in the southern part of the town. This study was taken up, to assess the status of pollution control measures taken by the electroplating industries in Bengaluru.

In the first phase of the study, 18 electroplating industries were inspected and five ground water samples were also collected in order to assess the quality of ground water at Peenya Industrial Area. The Interim report of the same was prepared and submitted to H.O. In the second phase of the study, 10 electroplating industries were inspected at Veersandra and Bommasandra Industrial Area along with KSPCB officials during 2014 -2015.

The first and second phase of the study in Peenya industrial estate, Veersandra and Bommasandra Industrial Area revealed that majority of the units are tiny & small scale units involved in job work without maintaining records of raw material used, production, water consumption. The unscientific storage & management of effluent, poor housekeeping, inadequate pollution control measures and unskilled manpower are leading to pollution threats affecting the environment and ground water in the vicinity. The suggestions for betterment of the situation includes relocation of industries in designated industrial estates, to initiate to keep track on production details as well as the job work details to whom they are providing service to make accountability, to make mandatory to obtain consents for both parties i.e. for electroplating industries as well as the units providing job work, proper management of effluent, utilization of trained manpower, adoption of cleaner technology and installation of dedicated CETP meant to treat the electroplating industries effluent . This will help to minimise the pollution load from electroplating units and to stop ground water pollution further in the Peenya industrial area.

16: Assessment of Pollution from Textile Dyeing units located in Tirupur, Tamil Nadu and measures taken to achieve ZLD

In Tirupur around 729 textile dyeing units are under operation and these units generate around 96.1 MLD of wastewater which after treatment in CETP/ individual ETP is discharged into river. But the units failed to meet the discharge standards of TDS and chlorides and significantly affected the river water quality. Hence, in 2006, the High Court directed the dyeing units to install Zero Liquid Discharge plant.

During Phase-I of the study, 6 CETPs and 3 Individual ETPs were monitored to verify the pollution control measures adopted in of textile dyeing units to achieve ZLD. In second phase of study 3 CETPs & 3 IETPs and ground/surface water samples were collected along the Noyyal River to assess the quality of ground/surface water. The study revealed that individual ETPs and CETPs in Tirupur have implemented ZLD by installing Physico-chemical, biological and tertiary treatments viz combination of Nano filtration, ultrafiltration and Reverse osmosis to recover water and brine solution. The water so recovered through RO is recycled in the process and thereby fresh water consumption is reduced by 75-85%. For Ro Reject management CETPs IETPs installed combination of MVR and MEE and recovering salt in terms of Pure salt (60 -75 %) and impure salt (20-40 %). None of the CETPs or IETPs is practising 100% salt recovery through advanced concentration techniques, still 5-10 % of concentrated mother liquor being sent to solar evaporation ponds. The pure salt recovered is being utilised in their process, however impure salt is being stored in storage shed and facing disposal problem. The Lime sludge generated from chemical treatment is sent to cement industries for co-processing. The CETPs/IETPs handling combined sludge from chemical and biological system are facing sludge disposal problem.

17: Study of Solvent Recovery systems installed in Pharmaceutical and Pesticide Manufacturing units in South Zone

Organic solvents are used in Pesticide and pharmaceutical industries as reaction media and for separation & purification of synthesis products. As per Charter on Corporate Responsibility for Environmental Protection (CREP), the efficiency of solvent recovery should be at least 90%. This study is taken up to know the actual status of recovery, reconditioning and reuse of solvent in the Pharmaceutical and Pesticide industry.

The work is divided into two phases; first phase was carried out in pesticide sector while second phase in Pharmaceutical. The operational status of pesticide industries in Southern zone was obtained from concerned SPCB's and through questionnaire survey followed with in depth study. The study mainly focused to obtain/ assess the solvent recovery with respect to their types, boiling point, and operational temperature etc., and also the condensers (primary, secondary, tertiary and common vent condensers) are in place.

In the first phase of study, the identified pesticide industries were inspected based on questionnaire survey and VOC monitoring was also carried out. The Interim report of the same was prepared and submitted to H.O. In the second phase of the study, the pharmaceutical industries were identified based on questionnaire survey and inspected two industries to study the solvent recovery system.

The findings of the study indicates that, the pesticide industries generally use solvents like Ethylene Di chloride (EDC), Hexane, Dimethyl Carbonate, Toluene, Iso propyl Alcohol etc., Both ground level (Horizontal & Vertical) and Underground or mounded storage tanks with breather valve cum flame arrester are provided. Based on the mass balance approach, the estimated solvent recovery and loss from the system varies between 81.7 to 96.66 % and the loss varied between 3.34 to 18.3 %. It also confirmed the presence of VOC's in the ambient air; the reported compounds are Carbon Tetra Chloride, Ethyl Benzene, Toluene, Bromo Benzene etc.

Figure 7: Low Volume VOC sampler

Figure 8: A case of total VOC in the ambient

Figure 9: Solvent Vapour Recovery System

18: Study of Mercury emission from Non Ferrous industries in South Zone

Mercury and its compounds are highly toxic which causes significant ailments. Mercury occurs naturally in coal and its content in Indian coal ranges between 0.01 ppm to 1.1 ppm. Assuming the average mercury content in Indian coal to be 0.25 ppm, huge quantity of unintentional mercury is released into the environment. The coal consumption in thermal power plants alone is estimated to release around 59.29 tons per annum of mercury.

Phase-I of the study was carried out in Thermal Power Plants and phase-II was carried out in lead and zinc smelters. The study is taken to explore the quantity of mercury emitted into air and soil environment by monitoring, analysis & applying certain mathematical models to design appropriate treatment technology.

19: Verification of compliance of pollution control standards by industries in southern zone, Environmental Surveillance Squad, Status of Comprehensive Environmental Pollution Index, follow up of court directions, NGT follow ups, Inspection for National Awards

Under ESS activities, highly polluting units falling under 17 categories are selected through computerized random generation system for surprise inspection/ monitoring to check the compliance of consent conditions, standards, CREP, etc. Based on the inspection reports, letters/directions are issued depending on severity of violations either under Section 18(1) (b) of the Water (Prevention and Control of Pollution) Act, 1974 or under Section (5) of the Environment (Protection) Act, 1986.

During the financial year 2014-15, the ESS inspections were shelved and again resumed from the month of November, 2014. Hence, 14 no. of industries were inspected and details are given in below table. Apart from these, many industries were inspected under ESS follow up for compliance verification. All the reports are submitted to H.O within the 15 days from the date of inspection.

Table 2: Status of ESS inspection during 2014-15

State	Number of visits	Number of units inspected	No action require/unit found closed	General Letter from H.O.	Directions u/s 18(1)(b) of the Water and Air Act	Directions u/s 5 of E(P)A
Andhra Pradesh	1	4	0	4	0	0
Goa	0	0	0	0	0	0
Karnataka	1	3	0	2	1	0
Kerala	0	0	0	0	0	0
Pondicherry	0	0	0	0	0	0
Tamil Nadu	2	7	1	6	0	0
Telangana	0	0	0	0	0	0
Total	**4**	**14**	**1**	**12**	**1**	**0**

Status of Legal Cases

The Zonal Office (South), Bengaluru is dealing with the legal issues pertaining to Southern Region in National Green Tribunal (SZ) Chennai & Goa and National Green Tribunal (WZ) Pune and other cases in Hon'ble High Courts & District Courts of the respective states.

Totally 34 legal cases are ongoing and 11 cases has been disposed. One case at Hon'ble Court of III Additional Chief Metropolitan Magistrate at Gajuwaka, Vizag was filed by CPCB against M/s Hinduja National Power Corporation Ltd for violation of CRZ under Section 15 of E (P) Act, 1986 as per direction of MoEFCC and Competent Authority for which DDR no. is obtained and statement is yet to be recorded.

Table 3: Court wise details of no. of cases handled

	No. of cases on going	**No. of cases disposed**
NGT, Chennai	14	06
NGT, Pune	01	Nil
High Court of Madras	06	01
High Court of Kerala	07	03
Court of III Additional Chief Metropolitan Magistrate at Gajuwaka, Vizag	01	Nil
High Court of Andhra Pradesh	01	01
High Court of Karnataka	03	Nil
Court of Chief Judicial Magistrate at Puducherry	01	Nil
Total	**34**	**11**

Status of Comprehensive Environmental Pollution Index

- Nine areas in Southern Zone are identified as Critically Polluted Area (CPA) namely Patancheru Bollaram and Vishakhapatnam in Andhra Pradesh, Bhadravathi and Mangalore in Karnataka, Greater Kochi in Kerala, Coimbatore, Cuddalore, Manali and Vellore in Tamil Nadu.
- The remedial action plans were implemented successfully by respective state boards as a result moratorium is lifted in seven areas namely Vishakhapatnam, Bhadravathi, Mangalore, Greater Kochi, Coimbatore, Cuddalore and Manali.
- Officials from this office regularly participate in "CEPI Action Plan Review Meeting" and give valuable inputs. Official from this attended "Technical Review meeting of CPAs/SPAs" conducted at MoEFCC, Delhi during 22nd January 2015.
- Monitoring of Dioxin and Furan was carried out at Coimbatore and Manali area under CEPI
- Regular follow-ups being made with state boards for implementation of action plan at CPAs.

Inspection of industries for National Awards

- National Awards for Clean Technology are given each year by MoEFCC, one in each of the following identified 18 categories of highly polluting industries which make a significant and measurable contribution towards development or use of clean technologies, products or practices that prevent pollution and find innovative solutions to environmental problems: The National Awards for Prevention of Pollution are bestowed to 23 industries (18 large scale and 5 small scale industries) one each for the above mentioned categories of industries.
- The Rajiv Gandhi Environment Award for Clean Technology is given to one of the best among these industries particularly from the angle of adoption of clean technology, identified by the selection Committee while reviewing the nominations for the National Awards for Prevention of Pollution.
- The nominated industries are inspected by this office and report submitted to H.O for further review and action.
- During the financial year, M/s ITC Ltd., Paper Boards & Specialty paper Division, Bhadrachalam, Sarapaka, Khammam District, Telangana M/s Ramco Cements Limited, Salem Cement Grinding Unit, Singhipuram(Po), Valapadi Taluk, Salem

District-636115, Tamil Nadu and M/s Ramco Cements Limited, Alathiyur Works, Sendurai, Ariyalur (Dist.), Tamil Nadu, were identified and inspected for National Award.

Study of Noise & Air Pollution during Deepawali Festival

- Bursting of crackers during Deepawali festival is a major source of deterioration of Ambient Air Quality. To study the impact of bursting of fire crackers, ambient air quality & noise level were monitored on normal and deepawali day at three locations namely Rajajinagar, R T Nagar and Rajarajeshwarinagar in Bengaluru.

- During Normal Day (20.10.2014) and Deepavali Day (23.10.2014), the climate was very cloudy and rainy. The monitoring results of Normal Day and Deepavali day were meeting the ambient air quality standards of SO_2, NO_2 and PM_{10} at all selected manual locations. Due to rain the pollution level is reduced in general.

- Ambient noise level was also monitored and it was observed that the Noise Level exceeded the Noise standard of 55dB (A) at all three locations, with percentage of increase in compare to the standard is 32.9% at R.T. Nagar, 60.5% at Manjunath Nagar and 24.7% at Raja Rajeshwari Nagar due to bursting of crackers.

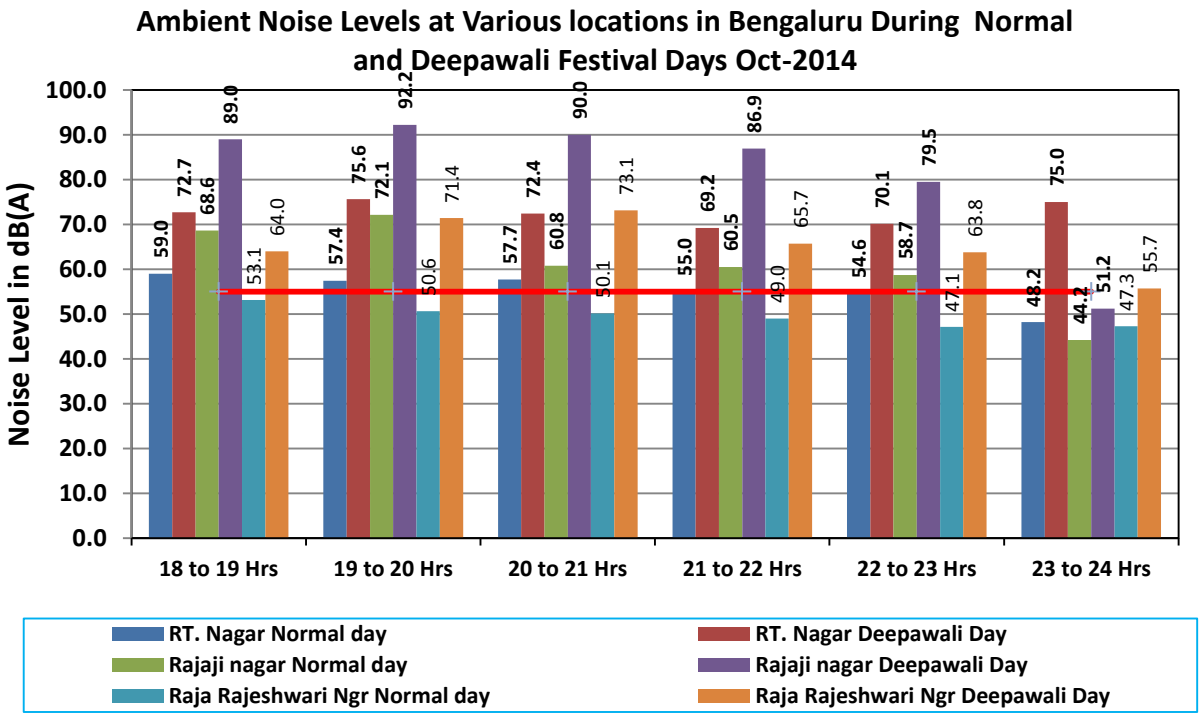


Figure 10: Ambient noise levels in Bengaluru during Diwali 2014

Public complaints, RTI matter and Parliament related matter

This office receives many VIP complaints/ representations in hard copy form, email and as well as through telephone calls. Public complaints are redressed in a time bound manner and follow them regularly till their final disposal.

The Zonal Office, Bengaluru investigates the complaint depending upon the seriousness of the grievance but all the representations received at this office are attended. Many grievances received by this office are forwarded to concern SPCB's/ PCC's who are dealing with the issues with a request to redress the complaint in a time bound manner with a request to furnish the Action Taken Report to this office.

During the financial year, this office investigated three pubic complaints and report submitted to H.O. All the matter related to Parliament and VIP references are attended as and when received by this office. During the financial year this office has received and processed six RTI matter.

5.0 Project Head – IV (a) Training programmes

Scheme 20; Imparting various training programme to staff sponsored by Headquarters and other organizations and evaluation of effectiveness of training imparted to officials of SPCB/PCCs.

S.N	Course	Schedule	Candidate Name with Designation
1	Real-time Data Collection from Continuous Monitoring Systems	August 6, 2014	Sh.R.Rajkumar, Sc-C
2	development of Technology for sewage generation, collection, treatment and disposal	September 22-26, 2014	Shri K Karunagaran and Shri I A Kadar
3	"Monitoring and analysis of Non-Point Source of Pollution (NPS) – Agriculture in a Riverine System " organized by National Institute of Hydrology, Roorkee	October 13 -15, 2014.	Smt H D Varalaxmi, Shri Radheshyam Balaji and Shri Karthikeyan

4	"Air Quality Modelling and Source Apportionment Study" organized by TERI, New Delhi	November 26-28, 2014	Smt. Anjana Kumari V, Sc.C
5	"Advanced instrumentation AAS, GC & ICPs" at IIT, Roorkee	December 8-10, 2014.	Shri Deepesh, SSA and Shri I A Kadar, Sr.Technician
6	" Coastal Water Quality Monitoring & Management- Monitoring of physical, biological/microbial & biomarker/toxicity in coastal ambient water"	December 8-12, 2014.	Dr. B S Anupama, SSA
7	"OSHAS 18001" at National Institute of Occupational Health, Ahmedabad	December 16-18, 2014	Shri Thirumurthy, Sc D
8	Impact of air quality on human health at PGIMER,Chandigarh	December 22-24, 2014	Shri S. Iqbal (Tech.Supr.)
9	Pollution control and waste management in sugar and distillery units at Vasavadatha sugar Institute ,Pune	January 5-9, 2015	Shri A.Gnanavelu(SSA)
10	"Clean Technologies and waste minimization for prevention of industrial pollution" at IIT, Guwahati		Shri RajKumar R Sc. 'C' and Shri S Jeyapaul, Sc.C'
11	Treatment and removal of TDS and other pollutants to promote ZLD in pulp and paper mills at CPPRI,Saharanpur	February 9-13, 2015	Shri R.Rajkumar Sc.C'
12	Environmental registration ,interpretation and enforcement at National law school of India, University Bengaluru	February 11-13, 2015	Shri S.Suresh (ZO) & Smt Sowmya Sc.C'

Apart from the above training programmes various training programmes on different areas were also organized at CPCB, Zonal Office Bengaluru such as RO techniques and its application, training on utilization of AERMOD software, Statistical analysis and its application etc. based on the project areas.

Training of Students

This office facilitates capacity building among user community in all fields of pollution mitigation & its applications. As a part of outreach policy, it provides bright external students at post graduate levels from different universities across country for carrying out dissertation work / summer training. This office carried out research work in various environmental disciplines by engaging a good number of students along with their dissertation studies.

6.0 Project Head – IV (b) PR, Mass Awareness Programmes & Hindi

Scheme 21; Organizing mass awareness Programme in High School, Colleges and Public places, Organising of Environmental Awareness , Printing of pamphlets, booklets and conducting Hindi Diwas

CPCB, Zonal Office, Bengaluru celebrated World Environment Day on theme "Raise your voice, Not the Sea Level" during 5th June, 2014. Technical presentation on theme and video on climate change were also arranged during the occasion. Message was conveyed to adopt the best management practices to reduce the negative impact on the globe. Zonal Office, Bengaluru initiated an awareness campaign to promote the awareness among the public on various environmental issues by conducting mass awareness programme at Schools and public etc. During the financial year series of awareness programme were conducted.

Zonal office, Bengaluru conducted Mass awareness programme at Angel High School, Bengaluru to promote the awareness on need of celebration of Eco-Diwali during 17th October, 2014 involving more than 300 students. An elocution competition was conducted among the student community and the winners were awarded environmental books. It was also stressed about the importance of "***Swachh Bharat Mission"*** to the teachers and to the students to upkeep the premises neat and hygienic.

Zonal office, Bengaluru has worked in close co-ordination with KSPCB, Tumkur and organized three awareness programmes. A one day workshop was conducted for the Rice mills owners and its association members on 12th November, 2014. All rice mill owners were

made to realize the impacts of the Pollution problems associated with Rice Mills. Officials from this office delivered lecture on "mitigation of pollution" in rice mills. After the awareness programme, remarkable progress has been made and more than 90% of rice mills in Tumkur have installed air pollution control devices.

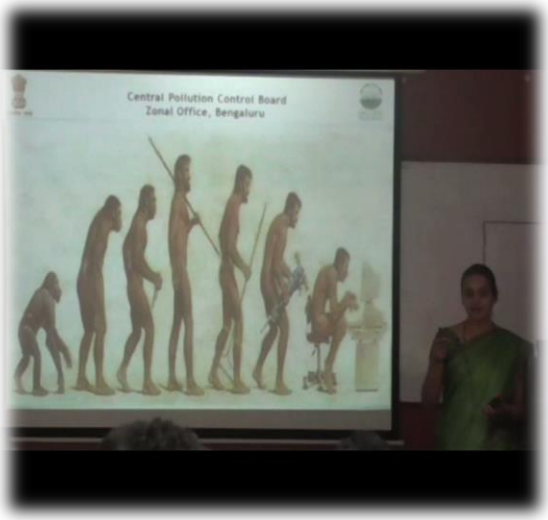
Smt. Mahima T, Sc-C delivered the presentation on "Lake Conservation & Restoration" at M/s Jain High School, Tumkur on December 8, 2014 wherein more than 500 school children attended.

Zonal office, Bengaluru has actively participated in the mass awareness programme which was organized for industries at Tumkur on December 26, 2014 and delivered the presentation on "Air Pollution Control Measures", wherein more than 40 SSI's attended.

Power point presentation on "Environmental Issues of Bengaluru" was delivered at Centre for Infrastructure, Sustainable Transportation and Urban Planning (CiSTUP), IISc Bengaluru during February 27-28, 2015.

To promote the use of Rajbhasha Hindi, Hindi Diwas was celebrated at CPCB Zonal Office, Bengaluru during October 1, 2014. During the occasion Hindi noting and drafting, debate and Kavitha recitation competitions were conducted. Hindi quarterly progress report has been prepared and submitted to department of official language, Bengaluru and Town official language implementation Committee, Bengaluru.

In compliance with Head Office Memorandum No C-22011/Misc. /06-Admn. (P)/2331 dated September 30, 2014 "Swachhata Shapath" (Pledge) was administered to all officials on 2nd October, 2014 at 11.00 AM in Central Pollution Control Board, South Zonal Office, Bengaluru



7.0 Project Head –IV (c) Library

Scheme 22; Development of library, procurement of Books including scientific, technical, administrative , accounts , Hindi etc., News Papers, Magazines, Journals, Swamy Rules Books etc.,

This office has subscribed for 10 newspapers covering all regional languages of South-India and two weekly magazines for the benefit of the staff. The staff's keeps a track on the environmental issues published in both print & mass media and appropriate action is initiated as and when required. This office subscribed for four environmental journals and procured IS and other scientific & technical books. The journals and magazines are widely circulated among the staff to make them aware of the current environmental issues. Installation of e-granthalaya software is under pipeline.

8.0 Project Head –V Information (Data base) Management

Scheme 23; Digitization of documents of South Zone Office, Bengaluru

Digitization, Operation & Maintenance of computers, networking etc. are taken care under the scheme with an objective to meet the demands of the increasing office work and to explore the possibilities of the existing LAN for improving the overall performance of the office by centralized data storage, usage of common application software and uninterrupted internet connectivity.

During the financial year, one new computer was procured under digitization along with the scanner so that all the records are being scanned and stored in the computer to maintain the data backup.

This office is successfully utilizing networking and sharing in all the systems during the financial year and working on the concept of *"Save Paper and Conserve Energy".* Presently, drafting and communications such as letters, reports, circulars, office orders etc. are being done through networking. In order to maintain centralized data storage, this office has successfully implemented centralized back up system through the existing server. The backup of important files & records from each individual system is done automatically on daily basis through server.

Scheme 24; Operation and Maintenance of computer systems and its peripherals, Local Area Networking (LAN), procurement of computers, software other items and AMC for computers, payment to BSNL for providing internet facilities etc.

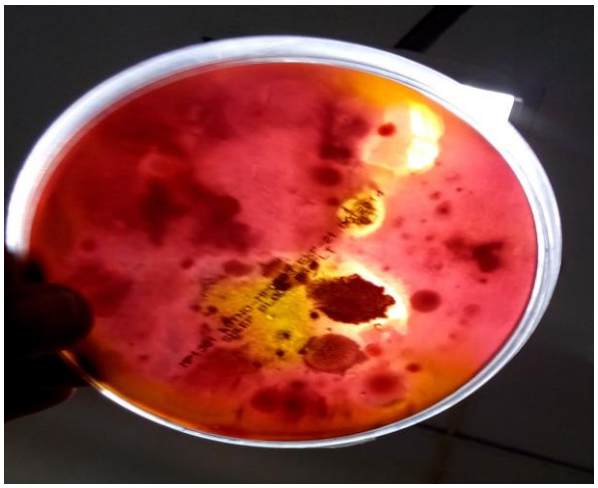
This office is having Annual Maintenance Contract with M/s Avishkaar Techno Solutions Pvt. Ltd, Bengaluru and M/s Printer Copier Systems, Bengaluru for smooth operation & maintenance of the existing 32 computer systems, 4 laptops and 32 printers, and 2 scanners. The optimal usage of computers, printers and scanners were achieved by timely procurement of Cartridges, drums & blades and other accessories as applicable. The provision of computers to individuals has made self-sufficient by allowing them to do tasks independently in a speedy manner. One day training was provided to all officials to familiarise with working of windows 8 operating system. This office is connected to NIC centralized server of

capacity 750 GB. This office is having Local Area Networking (LAN) of 2-MBPS and three Wi-Fi access points facilitated by BSNL.

9.0 Project Head – VI Waste Management and Urban Pollution Control (plastic waste, Hazardous Waste, Municipal Solid Waste, Bio-Medical Waste, E-Waste & Vehicular Pollution

Scheme 25; Monitoring of Municipal Solid Waste (MSW) management facilities, assessment of air borne microbial emissions from MSW and characterization of compost quality in South Zone

Monitoring of seven MSW management facilities covering all southern states has been carried out for verification of compliance of MSW Rules in south Zone. Assessment of airborne microbial emissions was carried out at five MSW facilities and it was found that due to unscientific handling and dumping of waste more carcinogenic microbes are found at the vicinity of the dumping site. PCR analysis for each microbial community is in progress. Report on "Status of MSW management in Southern states" has been prepared and submitted to H.O.



Scheme 26; Monitoring of Sewage Treatment Plants (STPs), sewage drains, assessment of sewage characteristics in terms of pathogenic microbial load and parasitic helminthic load.

STPs located at Hassan, Mangalore, Udupi, Mandya, Mysore and Kollegala districts of Karnataka state were inspected. Report on "Updated information of Status of STPs in South Zone" has been prepared and submitted to H.O. From the above study it was found that Total Coliforms was in the range of 3000- 200000 CFU/ml, Fecal Coliform was in the range of

400- 23000 CFU/ml and Fecal Enterococci was in the range of 0- 15000 CFU/ml in the outlet of STP sample.

Table 4: Microbial count (indicator organisms) in the outlet sample of STP's

S.N	Location	Total Coliforms CFU/100 ml	Fecal Coliforms CFU/100 ml	Fecal Enterococci CFU/100 ml
1	Chikkegowdanadoddi,Mandya	182000	22800	14400
2	Gutthalu, Mandya	19600	6600	700
3	Maddur	16400	8400	8100
4	Srirangapatna	26800	4100	200
5	Rayankere, Mysore	3200	400	0
6	Vidyaranyapuram, Mysore	27600	17200	600
7	Kesare, Mysore	48000	11600	1200

Scheme 27-29; Monitoring of Common Effluent Treatment Plants, Treatment, Storage and Disposal Facilities, Common Bio-Medical Waste Treatment Facilities in the zone

Performance evaluation study of four MSW sites, two STPs, seven CETPs, seven CBMWTF's and three TSDF has been carried out during the financial year. The reports of the same has been prepared and submitted to H.O.

10 Accounts & Administration

Accounts

A total amount of Rs. 373.50 lakhs was earmarked to this office in the financial year 2014-15 out of which Rs. 304,23,387 (Three hundred and Four Lakhs Twenty Three Thousand Three Eighty Seven) was sanctioned and utilised. The total plan expenditure was Rs. 303, 25,916/- and non-plan was Rs. 97,471/-. The plan and non-plan monthly expenditure incurred during the FY and project wise expenditure is depicted in below graphs. 85% of the total plan expenditure is incurred under the Project III b-Enforcement.

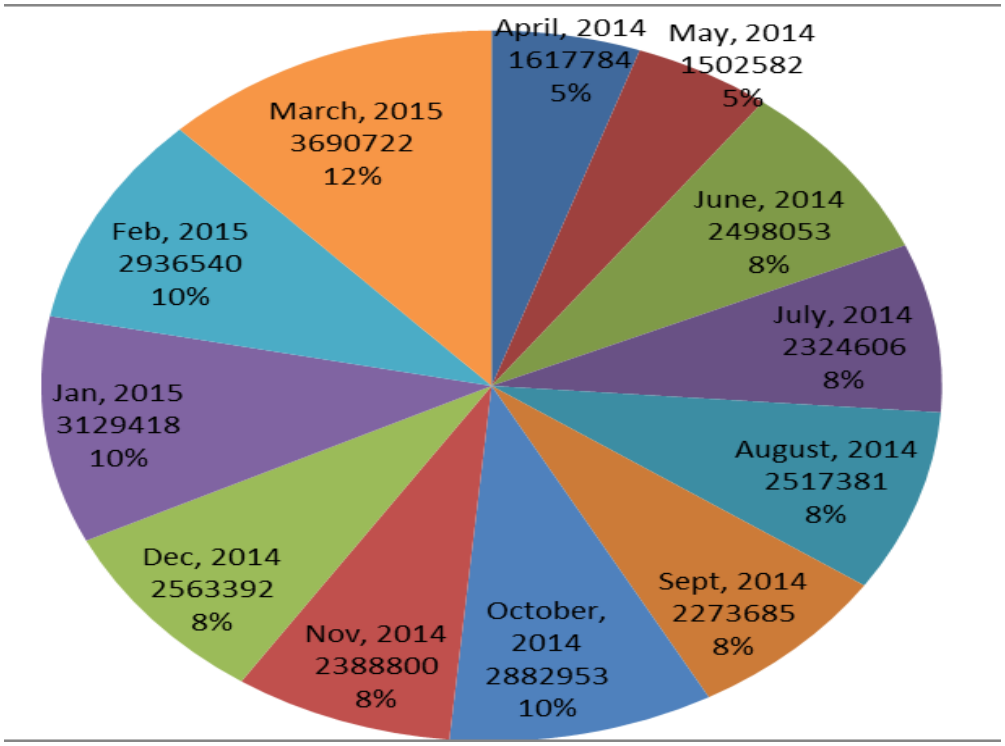


Figure 11: Break-up of Monthly expenditure

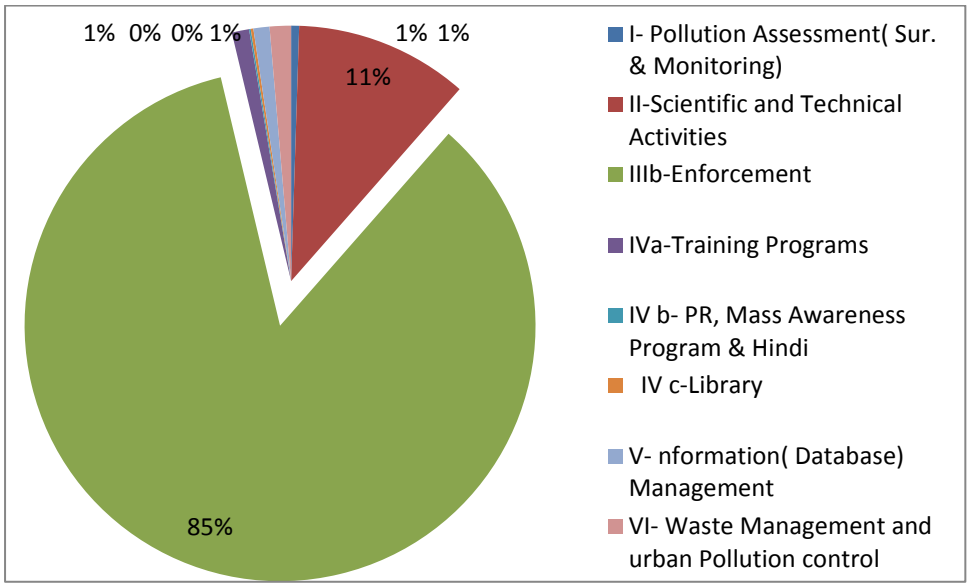


Figure 12: Break-up of project-wise expenditure

Administration

During the FY this office has despatched 1899 letters through ordinary post, speed post and courier service and has received 1941 letters. The expenditure incurred by this office for despatch is Rs, 25,333/- (Twenty Five Thousand Three Hundred and thirty three only).

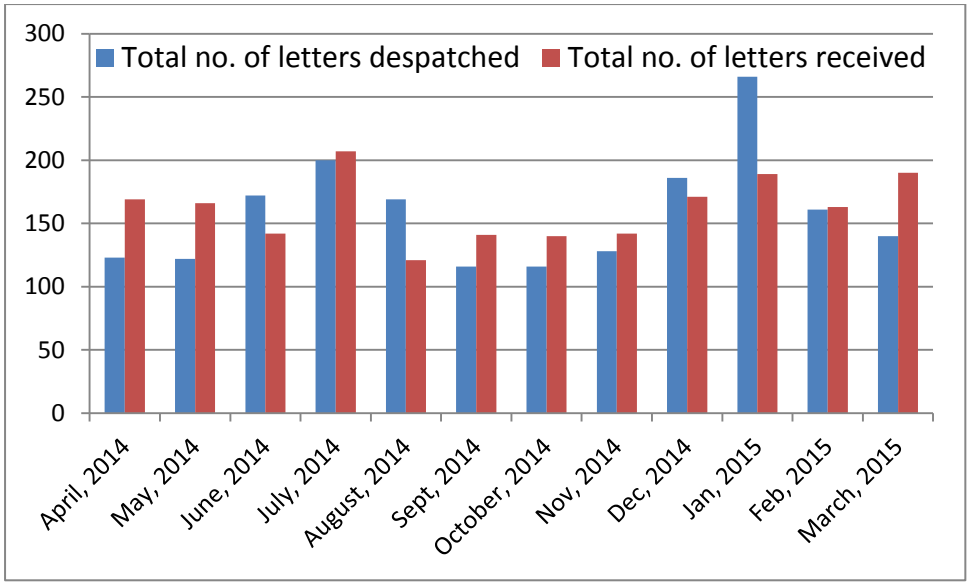


Figure 13: No. of letters despatched and received during 2014-15

11 Other Major Activities

Co-ordination with TNPCB, Kerala SPCB and Consultant under National clean energy Fund (NCEF) Project

As per the direction of Competent Authority of CPCB, Smt. H. D. Varalaxmi is Co-ordinating with Tamilnadu Pollution Control Board, Kerala State Pollution Control Board and M/s ERMS (Consultant) for organising meetings time to time to seek coordination from local authorities and to review the activities carried out under National Clean Energy Fund (NCEF) project for "preparation of DPR and providing consultancy services for remediation of 02 contaminated areas viz Ranipet in Tamilnadu and Eloor & Edayar in Kerala. And also officer from this office is supervising the field activities carried out by consultant and reporting the same to H.O. at regular interval.

Monitoring of AYUSH facilities

National Accreditation Board for Hospitals & Healthcare Providers vide its letter dated October 31, 2014 indicated that that wastes generated from AYUSH hospitals are disposed in their own indigenous ways which may contribute to soil and environment pollution and cause

serious public hazards. It was also felt that CPCB should devise guidelines for AYUSH hospital for waste disposal. In response to this, H.O requested all zonal offices to Ftraining

Monitoring of co-processing of Hazardous wastes in Cement plant during trail run

The Hazardous Wastes (Management and Handling & Trans boundary Movement) Rules, 2008, provided for a specific Section i.e. Rule 11 dedicated to utilization of Hazardous Wastes as a supplementary resource or energy recovery or after processing. Under this provision M/s JSW Steel Ltd., Pottaneri, Mechari, Mettur Taluk Salem District, has obtained permission from CPCB to utilise Iron Oxide (process waste) generated from Illemnite Chemical Beneficiation plant of M/s Kerala Minerals & Metals Ltd., (KMML) Kerala as a raw material in Sinter Plant. And also M/s Dalmia Cement Bharat Ltd., Ariyalur Cement Plant, Ariyalur has accorded permission from TNPCB to conduct trail run for the co-processing of tannery ETP sludge in the cement kiln to utilise 3000 Tonne of tannery ETP sludge using various proportions 1 %, 1.5 % and 2 % respectively. During Trail run officials from this office jointly monitored along with State Board officials and witnessed the trail run. The monitoring reports are submitted to H.O. Delhi.

Monitoring of Episodal Accidents in Industries/ ETP/CETP/ TSDF etc.

In reference to news Telecasted in Tamil news channels and news published in the leading English News Paper dated January 31, 2015 and February 01, 2015 regarding accidental death of 10 peoples at tannery located near to M/s Ranipet SIDCO Finished Leather Effluent Treatment Co. Ltd.,(Phase – 1), Ranipet, Vellore District, Tamilnadu on January 31, 2015, the officer from Zonal Office had visited the accident place to investigate the causes for accident and prepared detailed report including preventive measures to be taken to avoid such accidents and the same was submitted to H..O. Delhi.

Subsequently, Ammonia gas leak occurred in M/s Madras Fertilizer Ltd, Manali, Chennai on February 2, 2015 and the same was published in Tamil newspapers. The officials from this inspected the industry and report submitted to H.O.

Co-ordination and preparation of material for the study visit of Parliamentary Standing committee of science and Technology

The Parliamentary Standing Committee on Science & Technology is regularly visiting various cities for assessing the environmental status and conducting review meetings with all stake holders. This office has coordinated all such visits to Tirupati, Chennai and Vishakhapatnam. The desired technical material in bilingual covering all environmental issues has been prepared and given to MoEFCC for subsequent distribution among committee members. The proceedings of all such meetings has been recorded and sent for necessary action.

Chintan Shivir

Ministry of Environment, Forest and Climate Change organised two days "Chintan Shivir" during 8th & 9th February, 2015 at National Institute of Advanced Studies auditorium, IISc campus, Bengaluru. More than 200 officers from the field of Forest, Environment, Pollution Control Board's and Scientists from nine states participated in the event. The Hon'ble Union Minister of Environment, Forest and Climate Change were present on both days and the suggestions/ideas given by the participants were recorded for further action/implementation. The shivir was a grand success and largely people-centric which enabled officers to share their experiences. During the two days programme out of 200 participants, 64 interventions were made. The Hon'ble minister was present on both days and the suggestions/ideas given by the participants were recorded for further action/implementation.

Assessment of microbiological load in Vrishabawathi Drain, Bengaluru

Vrishabawathi River as it was known as a tributary of River Arkavathy till 1970s, which later transformed to be a major sewage drain passing through the heart of Bengaluru city. The Vrishabawathi drain flow is sustained by sewage flow from and carries bulk of the city waste. It had its origin near a small hillock near Dodda Ganapathi temple, Bull temple road, Basavangudi. As the Bengaluru city made leaps and strides to a cosmopolitan metro city, the river died and turned to a sewage drain. The river died completely when major sewer lines

were connected to the river and due to various commercial activities along the river banks. Now Vrishabawathi drain meanders through the Bengaluru city from Sheshadripuram, Okalipuram, Prakash Nagar, Guddadhalli, Bapuji Nagar, Rajarajeshwari Nagar, Kengeri, Kumbalgodu, and Byramangala and eventually empties into Arkavathy River near Kanakpura, Bengaluru rural district. The Vrishabawathi drain was monitored for the microbiological load and helminths at five locations along the drain inside Bengaluru city. Sampling was done at Near Mantri Mall, Okalipuram; Prakash Nagar; Near Mysore road Satellite bus stand, Bapuji Nagar; Near Rajarajeshwari Arch and Behind R. V. College, Rajarajeshwari Nagar. The last two sampling locations were after the Vrishabawathi sewage treatment plant located at Rajarajeshwari nagar, off Mysore road.

Total coliforms and fecal coliforms densities were higher in all samples (10^6 to 10^7 mL^{-1}) and opportunistic pathogenic microbial load in terms of *Pseudomonas, Salmonella, Shigella* and *Staphylococcus* were higher in all locations, however pathogenic *E. coli O157:H7* was not detected in any of the locations sampled. An effort was made to assess the parasitic helminthes load in the sewage and a lower load was observed as samples were not concentrated.

Table 5: Microbiological load at different sampling locations

Organisms	Media used	L-O	L-PN	L-BN	L-RA	L-RVC
		CFU ml^{-1}				
Total coliforms	m-Endo agar	$2.0x10^7$	$5.12x10^7$	$3.36x10^7$	$4.24x10^7$	$2.16x10^7$
Fecal coliforms	m-FC agar	$1.36x10^7$	$3.6x10^7$	$2.48x10^7$	$2.08x10^7$	$1.12x10^7$
E. coli / E. coli O157:H7	Maconkey Sorbitol agar	$1.76x10^7$ / 0	$2.88x10^7$ / 0	$2.64x10^7$ / 0	$1.44x10^7$ / 0	$2.72x10^7$ / 0
Pseudomonas spp.	Cetrimide Agar	$1.6x10^6$	$8.0x10^5$	$2.4x10^6$	$3.2x10^6$	$1.6x10^6$
Salmonella spp.	Salmonella Shigella agar	$8.8x10^6$	$2.08x10^7$	$1.52x10^7$	$7.2x10^6$	$8.8x10^6$
Shigella spp.	Salmonella Shigella agar	$6.4x10^6$	$1.44x10^7$	$1.84x10^7$	$1.44x10^6$	$2.08x10^6$
Staphylococcus spp.	Manitol Salt agar	$1.84x10^7$	$2.48x10^7$	$2.0x10^7$	$8.0x10^6$	$2.88x10^7$

Inspection of Chemfab Alkalis, Puducherry

In compliance with Hon'ble National Green Tribunal, Principle Bench, New Delhi a team consisting of experts from reputed organizations and Sh. Pattusamy, Sc-E from this office inspected M/s Chemfab Alkalis Limited, Puducherry during Match 14-15, 2015. The team carried out detailed inspection and submitted report to Hon'ble NGT.

Modelling of Air Pollution Dispersion in a Cement industry and its Application in Green Belt Design

In the present study, air pollution dispersion model was developed for a selected cement industry in the southern Karnataka using ISCST3 software and the model is used for designing suitable green belt to attenuate air pollution. The particulate matter (PM) emission load, CO_2 and CO emission loads were calculated based on the emission factors and production data. Gaussian dispersion model for PM, CO_2 and CO during summer and winter were developed to identify the major air pollution impact area and impact on receptors such as agricultural land and villages surrounding the industry.

The study revealed that continuous ambient air quality monitoring station may be installed in the south and south west region by the industry. The ambient air quality monitoring should be carried out in south and south west region. The green belt should be developed the green belt should be provided in the south and south west region within 1.2 kms from the industry. The plant species such as Tectona Grandis, Eucalyptus Deglupta, Artocarpus Heterophyllus, Ficus Religiosa are recommended to grow around the industry. Plantation of Acacia Auriculiformis, Eucalyptus Camaldulensis, Bambuseae, Leucaena Leucocephala are not efficient in carbon sequestration hence are not recommended for plantation.

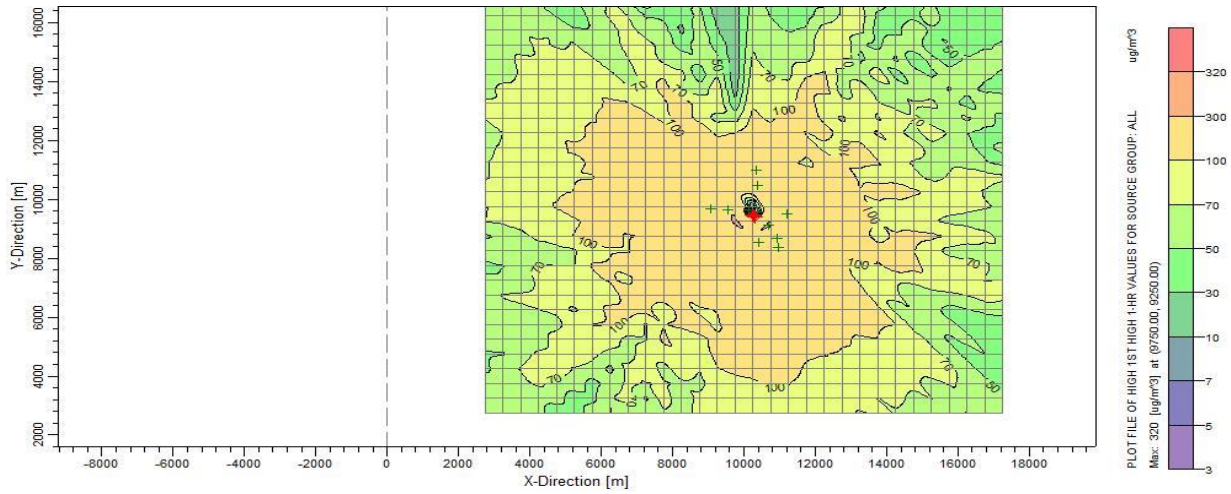


Figure 14: Plot of Particulate matter (PM_{10}) for winter season month of January and February

Publication of Research Article in International Journal

CPCB Zonal office, Bengaluru has published research article entitled ***"Evaluation of an organic soil amendment generated from municipal solid waste seeded with activated sewage sludge" in*** peer reviewed Journal: 'Journal of Material Cycles and Waste Management'; It is the official journal of the Japan society of material cycle & waste management and the Korea society for waste management and is published by Springer International Publishing AG, Japan. The article was the outcome of research projects involving two post graduate students, carried out at the Zonal laboratory, Bengaluru. The research article is available online at www.link.springer.com/article/10.1007/s10163-014-0329-8.

Participation as a member of different Environmental Committees

Zonal Officer as a member of Laboratory committee of Karnataka State Pollution Board, Bengaluru is participating in the meeting as and when organized and providing the valuable inputs for various issues being discussed in the committee.

Zonal Officer as a member of Environmental Management & Policy Research Institute, Bengaluru and Department of Ecology and Environment, Bengaluru is participating in the meeting as and when commenced and providing the valuable inputs for various issues being discussed in the committee.

CPCB, ZO(S) participated as a member in the Annual General Body and Governing Body meeting held by Environmental Management and Policy Research Institute, GOK, Bengaluru on June 25th, 2014.

Zonal Officer attended the Step-1 meeting on "Preparation of Detailed Project Reports (DPRs) and providing consultancy services for remediation of contaminated areas" at CPCB Head Office, Delhi during October 31, 2014.

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