

**MATERIAL FOR  
STUDY VISIT OF THE DEPARTMENT  
RELATED PARLIAMENTARY STANDING  
COMMITTEE ON SCIENCE AND  
TECHNOLOGY, ENVIRONMENT AND  
FORESTS TO BENGALURU  
ON JANUARY 08, 2014**



**MINISTRY OF ENVIRONMENT & FORESTS,  
GOVT. OF INDIA**

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## **1.0 Bengaluru City**

Bengaluru city is the capital of Karnataka, located on the Deccan Plateau in the south-eastern part of Karnataka. Bengaluru is known for its pleasant climate throughout the year, located at a height of over 3,000 feet (914.4 m) above sea level. It is known as the Silicon Valley of India because of its position as the nation's leading Information technology (IT) exporter. It is located at 12° 58' 12" N, 77° 33' 36" E and covers an area of 2,196 km<sup>2</sup>. The majority of the city of Bengaluru lies in the Bengaluru Urban District and the surrounding rural areas are a part of the Bengaluru Rural District.

### **1.1. Population and Density**

The population of the Karnataka State has increased 15.6% to reach 6.10 crore since 2001, though Karnataka retains the 9<sup>th</sup> place in the country. As much as 3.74 crore people or over two-thirds of the State's population live in rural areas. Urban population has increased by 4.68 per cent in the last decade. The Sex Ratio in Karnataka is 1000 males for every 968 females.

The population of Bengaluru district has gone up to 96.21 lakh. Bengaluru also has the dubious credit of having the highest density of 4,381 people per sq km, followed by Mysore with 476, while Kodagu has the least density of people at 135 per sq km. Out of the total Bengaluru population for 2011 census, 90.94 % (87,49,944) lives in urban regions of district and remaining 9.06 % (8,71,607) population of Bengaluru districts lives in rural areas of villages.

### **1.2 Industrial Areas**

The Karnataka Industrial Areas Development Board (KIADB) is a statutory body, constituted under Section 5 of Karnataka Industrial Areas Development Act, (KIAD Act) - 1966, which provides for expeditious acquisition of lands for industrial and infrastructure purposes. KIADB has so far developed 141 industrial areas in the State. Out of which 17 industrial areas are located in Bengaluru Urban and 10 industrial areas are located in Bengaluru Rural.

## **2.0 Highly Polluting Industries**

There are total 183 industries operating under the 17 category of highly polluting industries in the state of Karnataka as on March 31, 2013. Out of 183 industries, 31 industries are located in Bengaluru which is of Pharmaceuticals, Tannery, Dye & Dye

Intermediates and Distillery. These industries are required to comply with the provisions of the Water Act, the Air Act and the provisions of the Environmental (Protection) Act. The industrial activities are categorised as Red, Orange and Green based on the process involved and pollution load generated with respect to effluent, emission and hazardous wastes. Number of industries under 17, Red, Orange and Green Category located in Bengaluru is given below:

City	17 category	Red	Orange	Green	Total (R+O+G)
Bengaluru	31	3023	2192	7381	12627

Source: KSPCB as on 31.3.2012

## 2.1 Environmental Surveillance Squad (ESS) Programme

The Central Pollution Control Board (CPCB) under Environmental Surveillance Squad (ESS) programme carry out surprise inspections of industrial units, wherein the 17 categories of highly polluting industries such as distilleries, pulp & paper industries, tanneries, pesticide formulation, drug industries etc. are inspected through computerized random number generation system. This comprehensive programme of environmental surveillance ensures installation and regular operation of the effluent / emission control facilities in polluting industries. Under ESS since from August 2007 to till date four (4) numbers of industries were inspected in Bengaluru and directions issued under Section 18 (1) (b) of Water Act and Section 5 of EPA. The details are as follows;

### Industries inspected under ESS in Bengaluru

No of Industries Inspected	Direction under Section		General letter for improvement
	18 (1) (b) of Water Act	5 of EPA	
4	1	1	2

## 3.0 Common Effluent Treatment Plants

The Small Scale Industries are unable to put up the treatment systems individually, the concept of CETP's is envisaged to benefit such industries in treating its effluent before disposal whether it is in stream, land, sewerage system or in sea. CETPs are set up in the industrial estates where there are clusters of small scale industrial units (SSIs) and where many polluting industries are located. There are Eight (8) CETPs are operating with a total capacity of 1755 KLD in and around Bengaluru.

### 3.1 General Status of CETP:

- Two separate treatment system for treatment of High TDS Effluents and Low TDS effluents.
- There is no tertiary treatment to achieve Zero Discharge by utilising treated water in the member industries.

## **4.0 Sewage Treatment Plants**

The total sewage generated in Class I and Class II cities of Karnataka is 2023.77 MLD, of which treatment capacity is available for only 55.62 MLD, equal to only 3% of the sewage generation.

### **4.1 Sewage Treatment Plants in Bengaluru City**

The K & C Valley and V Valley were the first primary treatment plants established during 1970 to 1980. Subsequently, the treatment plants were upgraded to Secondary treatment. Third treatment plant was established at Hebbal. Latter, two Tertiary level treatment plants were established for recycling of wastewater under Cauvery Water Supply Scheme (CWSS) Stage II, Stage III and Indo French Protocol i.e. prior to CWSS Stage IV Phase I.

There was rapid growth in the city forcing the BWSSB to augment water to an extent of 270 MLD from the River Cauvery. The project was taken up under CWSS Stage IV Phase I. The additional water supplied to the city in turn converts in to wastewater and there was necessity to convey and treat this additional wastewater. The total capacity of 721 MLD treatment plant is in operation by BWSSB.

In addition to above, there are 626 STPs are in operation which includes Apartments (331 Nos.), Tech Parks (123 nos.), Educational Institutions (15 Nos.), Hotels (42 Nos.), Commercial complexes (44 nos.), Hospitals (49 Nos.) and Layouts/gated communities (7 Nos.). The total capacities of the STPs of various categories are 108.7 MLD excluding STP operated by BWSSB.

### **4.2 General Status of STP**

- Discharge of untreated sewage is single most important cause for pollution of surface & ground water since there is a large gap between generation and treatment of domestic wastewater in India.
- Several sewage treatment plants are established under centrally funded National River Action Plan. However, their operation and maintenance is generally not satisfactory.
- The problem is not only of adequacy of treatment capacity but also operation and maintenance of treatment plants.

## **5.0 Bio Medical Waste Management**

Bengaluru has identified 4779 Health Care Facilities (HCF). The waste is being disposed by common/captive facility with respect to solid waste and by captive facility with respect to liquid waste. The Karnataka State Pollution Control Board (KSPCB) has issued Authorization to 23 Common Bio-Medical Waste Treatment Facilities in the State, out of which 2 are operational and 3 are in commissioning stage in Bengaluru.

**5.1 Liquid Waste Disposal Practises:** KSPCB has taken following stand with respect to liquid waste from HCF:

- ❖ Existing hospital in sewer area with terminal STP may discharge in to sewers after disinfection
- ❖ Existing hospital in non-sewer area shall use within the premises after treatment
- ❖ New hospital in local authorities shall grant license after Hospital gets CFE from KSPC Board and shall use within the premises after treatment

**5.2 General Status of BMW Incinerators:**

- *Segregation of untreated bio-medical waste at facility against the provision of segregation of waste at source of generation as per BMW rules.*
- *Inadequate temperature at primary and secondary combustion chamber of incinerator as against the incinerator operating temperature of 800 ± 50 °C and 1050 ± 50 °C respectively.*
- *Poor implementation of automatic feeding system for charging of bio –medical wastes into incinerator to stop handling of manual charging.*
- *Inadequate effluent treatment system to treat the liquid waste generated from the facility.*

**6.0 Hazardous Waste Management**

Inventory of estimated HW Generation in Bengaluru from Working Industries (assuming units are operating at 100% capacity) by KSPCB as on 31.03.2013 is given below:

**Hazardous Waste generation in Bengaluru**

<b>Region</b>	<b>No. of Industries</b>	<b>Land fillable (MT/A)</b>	<b>Recyclable (MT/A)</b>	<b>In-cinerable (MT/A)</b>	<b>Total Qty. (MT/A)</b>
Bengaluru Urban	1,884	17,219.32	30,759.27	21,540.07	69,518.66
Bengaluru Rural	166	2,931.50	1,801.66	1,336.59	6,069.74
<b>Total</b>	2050	20150.82	32560.93	22876.66	75588.4

**6.1. Common Hazardous Waste Incinerators**

There are 5 Nos. of Common Hazardous Waste Incineration facilities located and operating at in and around of Bengaluru city.

**6.2 General Status of HW Incinerators**

- *The performance assessment of the common hazardous waste incinerator operating in Karnataka was monitored for its compliance with respect to emission standards notified under the Environmental (Protection) Act, 1986, the monitoring results reveals non –compliance of standards w.r.t Dioxins & Furans in most of the cases.*

### 6.3. H.W. Secured Landfills

A Common Hazardous Waste Treatment, Storage and Disposal Facility (TSDF) is operating in a 93 acres at Dobaspet about 45 kms from Bengaluru, operated by Ramky Enviro Engineers Ltd. This TSDF is meant for land fillable hazardous waste only. This facility started receiving wastes from July 2008 onwards from member industries, which is directly landfilled / after stabilization in a Secured Land Fill (Cell 1) of 25.86 acres. The total numbers of member industries are 529. The design capacity of TSDF is 40,000 MT per Annum for 20 years, but the facility is not receiving expected quantity. The quantity of land fillable wastes received since from inception to till date (Aug. 2013) is 1,23,700 MT.

### 7.0 Municipal Solid Waste Management in Bengaluru

- The Bengaluru Metropolitan Area is divided into 198 Revenue wards under the jurisdiction of Bengaluru Mahanagara Palike (BMP). Revenue wards are further divided into 294 health wards for proper management of the sanitation functions. Out of these, 112 are managed by BMP, while 182 wards have been assigned to private agencies on contract basis.
- The estimated Solid waste generation from all the zones of BBMP is about 4650 TPD. Per capita domestic waste generation is ~ 350 gmpd. The segregation of waste at source is 10%.
- The house hold wastes contribute to about 54%, markets & functional hall contribute to about 20%, commercial establishment & institutions contribute to 17% and others 9% of total waste generation.
- BBMP has acquired the following sites for waste processing and land filling:
  1. Mavallipura - 100Acres
  2. Mandoor - 135 Acres
  3. Kannahalli - 29.10 Acres
  4. Kyalasanahalli - 46 Acres

### 8.0 E - Waste Management

There are twenty four e-waste registered e-waste dismantlers & recyclers as authorised by KSPCB operating in Bengaluru. The total authorised quantity per annual is 22670 MT.

### 9.0 Ambient Air Quality Monitoring

Under National Ambient Air Quality Monitoring Programme (NAAQM), Ambient Air Quality is monitored at 21 locations in Karnataka. Bengaluru city is being monitored at six (6) locations for Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM), Sulphur Dioxide (SO<sub>2</sub>), and Oxides of Nitrogen (NO<sub>x</sub>). And also, there are five Continuous Ambient Air Quality

Monitoring Stations (CAAQMS) under operation in Bengaluru. Out of five, KSPCB has installed and commissioned two CAAQMS i.e. one at City Railway Station, Bengaluru and another at Nisarga Bhavan, Saneguruvanahalli, Bengaluru. Remaining three are established under Private Participation Project and operated by CPCB, the locations are Peenya, BTM Layout and Kadabeshnahalli.

These monitoring stations are equipped with various analysers as to measure about 15 pollutants namely Ammonia (NH<sub>3</sub>), Benzene (C<sub>6</sub>H<sub>6</sub>), Carbon Monoxide (CO), Ethyl Benzene (C<sub>8</sub>H<sub>10</sub>), M+P+O Xylene: Meta, Para & Ortho Xylene (C<sub>8</sub>H<sub>10</sub>), Methane (CH<sub>4</sub>), Nitrogen Dioxide (NO<sub>2</sub>), Nitrous Oxide (NO), Oxides of Nitrogen (NO<sub>x</sub>), Non Methane Hydro Carbon (NMHC), Ozone (O<sub>3</sub>), Respirable Suspended Particulate Matter (RSPM), Sulphur dioxide (SO<sub>2</sub>), Toluene (C<sub>6</sub>H<sub>5</sub>CH<sub>3</sub>) & Total Hydro carbon (THC) and 7 meteorological parameters namely Barometric Pressure (BP), Relative Humidity (RH), Solar Radiation (SR), Temperature (Temp), Vertical Wind Speed (VWS) & Wind Direction (W DIR) having internationally approved techniques.

The data generated are transferred to Central Networking system then validated and compiled. The monitoring figure reveals that the ambient air quality data with respect to Oxides of Nitrogen (NO<sub>x</sub>), Sulphur Dioxide (SO<sub>2</sub>), Ammonia (NH<sub>3</sub>) and Respirable Particulate Matter (RSPM) are well within the National Ambient Air Quality Standard limit (annual average) of 40µg/m<sup>3</sup>, 50µg/m<sup>3</sup>, 100µg/m<sup>3</sup> and 60 µg/m<sup>3</sup> respectively during 2011 and 2012. The concentrations of Carbon Monoxide (CO) and Ozone (O<sub>3</sub>) in the ambient air are found to be within the standard limit while compared with 8 Hourly average standard limits of 2mg/m<sup>3</sup> and 100µg/m<sup>3</sup>.

## 10.0 Polluted Area

The industrial clusters/ area having aggregated Comprehensive Environmental Pollution Index (CEPI) scores 70 and above are considered as critically polluted clusters / areas and between 60 to 70 considered as Severely Polluted Areas and shall be kept under surveillance and pollution control measures should be effectively implemented. Accordingly, the Peenya Industrial Area in Bengaluru was declared as Sever Level of Pollution Area in the state of Karnataka by MoEF on 13.01.2010.

The Peenya Industrial area (CEPI 65.11) is one of the old industrial area in Bengaluru which houses many small electroplating and surface treatment units in clusters. This industrial area is vulnerable for ground water contamination due to in adequate treatment facilities. The KSPCB has taken steps to mitigate pollution from such units by prohibiting the establishment of new units and issuing consents for the industries that possess required wastewater treatment facilities.

## 11.0 Vehicular Population

Bengaluru led to an increase in the vehicular population with an annual growth rate of 7-10%. The personalized modes of transport have grown at a tremendous rate and two wheelers along with the cars almost comprise 90% of the total registered vehicular population in the city. Two wheelers constitute more than 70% of the total volume, while cars comprise 15%, autos 4% and the remaining 8% includes other

vehicles such as buses, vans and tempos. Travel speed has dropped to 15 kmph during the peak hours.

### Vehicle Population in Bengaluru City (up to 31-08-2013)

Two Wheelers	L.M.V	A/R	H.T.V	H.G.V	Others	Total
3286892 (68.8%)	1021953 (21.4%)	133338 (2.8%)	105974 (2.2%)	68392 (1.4%)	162458 (3.4%)	4779007

The transport department of Karnataka is implementing emission norms stipulated to the vehicles as per the notification of the Ministry of Road Transport and Highways, Government of India, by issuing PUC certificate and monitoring of pollution through 268 emission testing centres in Bengaluru.

Air quality assessment, emission inventory and source apportionment study for Bengaluru city was carried out to measure the baseline air pollutants and air toxic levels at different parts of Bengaluru, which includes hot spots on kerb sides as well.

## 12.0 Other Environmental Issues in Bengaluru

- 1. Peenya Industrial Area :** The Peenya Industrial area (CEPI 65.11) is one of the old industrial area in Bengaluru, which houses many small electroplating and surface treatment units in clusters. This industrial area is vulnerable for ground water contamination due to in adequate treatment facilities. The KSPCB has taken steps to mitigate pollution from such units by prohibiting the establishment of new units and issuing consents for the industries that possess required wastewater treatment facilities. Assessment of Ground water condition and remediation needs to be taken up on priority.
- 2. Municipal Solid Waste Management in Bengaluru City:** It is permitted by KSPCB to handle up to 500 TPD against 300 TPD municipal wastes at Ramky's landfill facility. The facility receives between 750 tonnes and 1000 tonnes of municipal waste every day. Over the years, this has resulted in piling up of garbage. Due to which the environment of Mavallipura village and health of the people are affected.
- 3. Sewage Treatment Plant:** The total sewage generated in Class I and Class II cities of Karnataka is 2023.77 MLD, of which treatment capacity is available for only 55.62 MLD, equal to only 3% of the sewage generation. Discharge of untreated sewage is single most important cause for pollution of surface & ground water since there is a large gap between generation and treatment of domestic wastewater.

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