



# ENVIS NEWSLETTER

Centre for Environmental Studies (CES)

Dept. of Forest & Environment, Govt. of Odisha



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## From the Coordinator's Desk...



Odisha ENVIS Centre is always trying to bring out environmental issues those are most vital in the State in newsletters. We have covered many issues of environment of the State in our previous publications. The objective is to disseminate information to the users and bring awareness among the society and policy makers.

This time we are covering an issue of **Ambient Air Quality in selected areas of Odisha**. I hope the information contained in the issue will be useful to users.

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Director, CES-cum- ENVIS Coordinator

## Ambient Air Quality in selected areas of Odisha

### Introduction

Ambient Air Quality in terms of the concentration of air pollutants present is not only depend on the quantities of pollutants emitted from air polluting sources but also on the ability of the atmosphere to either absorb or disperse these emission. The concentration of pollutants varies spatially and temporarily due to changes in meteorological and topographical condition. The presence of air pollutants above the prescribed limit in the ambient air adversely affects the environment including health of the human being.

Pollution of air from natural sources include volcanic eruptions, forest fires, storm winds, gas from decay and dust from erosion & air borne pollen. Another source is man made which include stationery combustion sources, mobile combustion sources and manufacturing sources. Stationery combustion sources include combustion of fuel, coal, biomass or petroleum which generates fly-ash, smoke and gaseous substances like oxides of sulphur and nitrogen. The principal pollutants emitted by petrol fuelled vehicles are carbon monoxide, unburnt hydrocarbons, nitrogen oxides, while from diesel fuelled vehicles are particulate matter, polycyclic aromatic hydrocarbons and sulphur dioxide. Pollutants emitted from industries, commerce and households are unwanted particulate matters and gases.



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Govt. of India, New Delhi



Following is the details of prescribed National Ambient Air Quality Standards notified on 4th November 2009.

Sl. No.	Pollutants	Time weighted Average	Concentration in Ambient Air		Methods of Measurement
			Industrial, Residential Rural and other Areas	Ecologically Sensitive Area (Notified by Central Govt.)	
1	Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	Annual *	50	20	Improved West and Gaeke Method and Ultraviolet fluorescence
		24 Hours**	80	80	
2	Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	Annual *	40	30	Jacob & Hochheiser Modified (NaOH-NaAsO <sub>2</sub> ) Method, Gas Phase Chemiluminescence
		24 Hours**	80	80	
3	Particulate Matter (Pm <sub>10</sub> ), µg/m <sup>3</sup>	Annual *	60	60	Gravimetric, TEOM and Beta attenuation
		24 Hours**	100	100	
4	Particulate Matter (PM <sub>2.5</sub> ), µg/m <sup>3</sup>	Annual *	40	40	Gravimetric, TEOM and Beta attenuation
		24 Hours**	60	60	
5	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	8 Hours *	100	100	UV Photometric Chemiluminescence Chemical Method
		1 Hour**	180	180	
6	Lead (Pb), µg/m <sup>3</sup>	Annual *	0.50	0.50	AAS/ICP Method sampling on EPM 2000 or equivalent filter paper, ED-XRF using Teflon filter
		24 Hours**	1.0	1.0	
7	Carbon Monoxide (CO) µg/m <sup>3</sup>	8 Hours *	02	02	Non dispersive Infrared (NDIR) Spectroscopy
		1 Hour**	04	04	
8	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	Annual *	100	100	Chemiluminescence Indophenol blue method
		24 Hours**	400	400	
9	Benzene (C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	Annual *	05	05	Gas Chromatography (GC) based continuous
10	Benzo(a) Pyrene (BaP) particulate phase only, µg/m <sup>3</sup>	Annual *	01	01	Solvent extraction followed by HPLC/GC analysis
11	Arsenic (As), µg/m <sup>3</sup>	Annual *	06	06	AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), µg/m <sup>3</sup>	Annual *	20	20	AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper

\* Annual Arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

\*\* 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

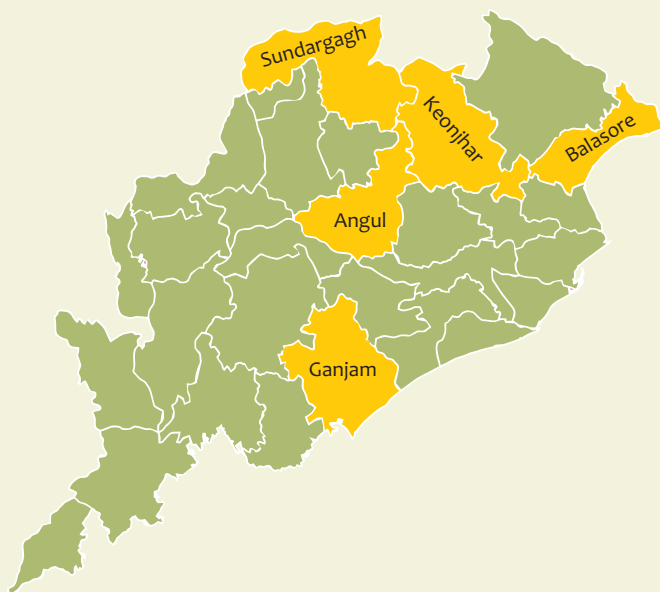
For our present analysis we have considered only 4 parameters namely SO<sub>2</sub>, NO<sub>x</sub>, SPM, RSPM taking annual average data. All the information has been collected from the State Pollution Control Board, Odisha.

As per the same standard of 2009, Ambient Air Quality parameters have been considered as follows.

Pollution Level	Residential (R), Industrial (I)		
	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	RSPM(µg/m <sup>3</sup> )
Low (L)	0-25	0-20	0-30
Moderate (M)	25-50	20-40	30-60
High (H)	50-75	40-60	60-90
Critical (C)	>75	>60	>90
<b>Standard for Annual Average Value</b>	<b>50</b>	<b>40</b>	<b>60</b>

### Locations

We have selected 5 important areas namely Angul, Balsore, Ganjam, Keonjhar and Sundargarh.



### Angul District

Angul District situated at the heart of Odisha State covering an area of 6232 sq.km, inbetween Latitude 20.50 North to 85.00 East Longitude. The altitude of this place is 564 to 1187 mts. Many public sector undertakings have setup up plants and offices here, like National Aluminium Company Limited (NALCO), Mahanadi Coal Fields Limited (MCL), National

Thermal Power Corporation (NTPC) and Talcher Thermal Power Station (TTPS). One of the major coalfields is the Talcher coalfield, which contains huge reserves of power grade non-coking coal. Engineering Units, Rice Mills, Hotels, Fly Ash Brick units, Stone Crushers, Service Units, Bleaching units, Bread and Bakery units, Tyre Retreading units, Flour Mills and Spices Grinding units etc. are some of the small scale industries functioning here.

### Balasore District

Balasore is one of the coastal Districts of Odisha which is located at 20.48 to 21.59 North Latitude and 86.16 to 87.29 east Longitude. It covers an area of 3634 sq kms. It's climate is generally hot with high humidity. Industries, Agriculture, Fishing and Tourism are the four major revenue sources of Balasore District. Birla Tyres, Balasore Alloys Limited, Emami Paper Mills Limited and Polar Pharma India Limited are some of the large-scale industries functioning in this district.

### Ganjam District

It is located on the boarder of Andhra Pradesh having 8070.60 sq km. geographical area lying between 19.4 to 20.17 degree North Latitude and 84.7 to 85.12 degree East Longitude. Agriculture

is a traditional occupation. Because the agro-climatic condition Ganjam is included as the agricultural district.

### Keonjhar District

The District is bounded by Mayurbhanj District and Bhadrak District to the east, Jajpur District to the south, Dhenkanal District and Sundargarh District to the west and West Singhbhum district of Jharkhand State to the north. Geographical area of 8240 sq kms, the Keonjhar District lies between 21° 1' N to 22° 10' N latitude and 85° 11' E to 86° 22' E longitude. The climate of this district is characterized by an oppressively hot summer with high humidity.

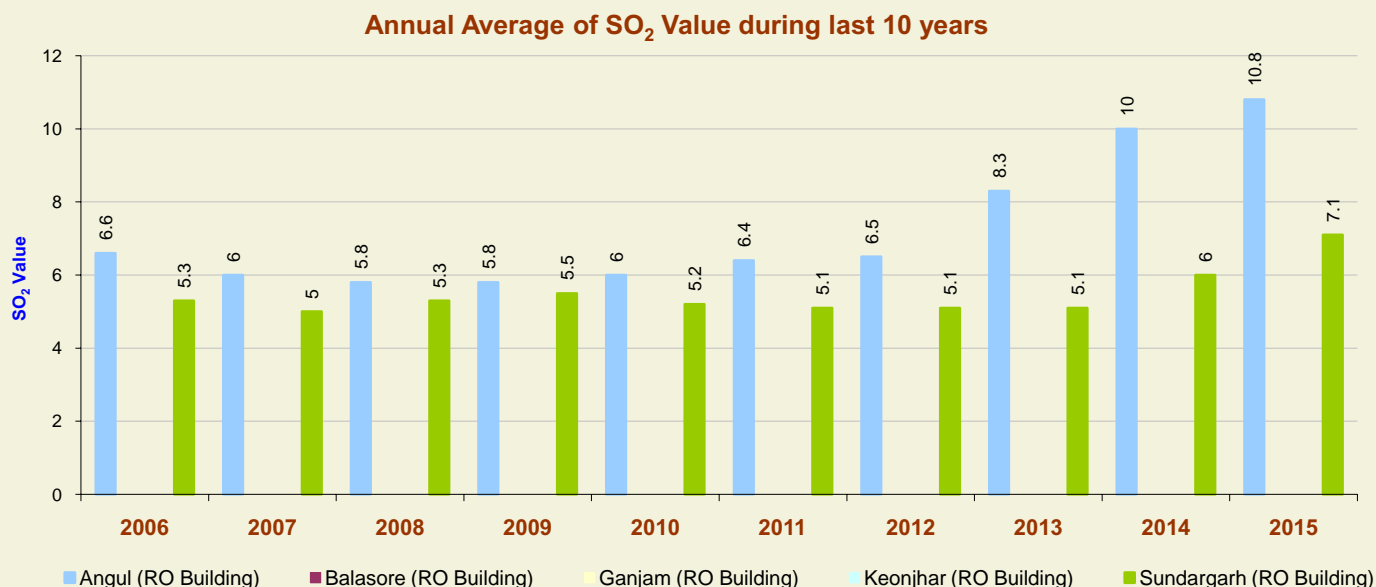
Keonjhar is one of the major mineral producing Districts of Odisha. Iron ore, Manganese ore, Chromate, Quartzite, Bauxite, Gold, Pyrophillite and Lime Stone are the major minerals found in this District. The Kalinga Iron Works (Barbil), Ferro Manganese Plant (Joda),

Ipitata (Beleipada), Charge Crome (Brahmanipal) are the major names in the industrial scene of Keonjhar. There are also engineering and metal based industries (53 numbers), chemical and allied industries including plastic industries (48 numbers) and agro and marine based industries (242 numbers) functioning in this District.

### Sundargarh District

It is located between latitude 21 degree 36' N to 22 degree 32' N and longitude 83 degree 32' E to 85 degree 22' E longitude. The geographical area is 9712 sq.km. The climate of this District is characterized by extremely hot summers and cool winters. Sundargarh is recognized as an industrial district in the map of Odisha. Steel Plant, Fertilizer Plant, Cement factory, Ferro Vanadium Plant, Machine building factory, Glass and china clay factory and Spinning mills are some of the major industries of this District. Rourkela is recognized as Industrial Town of Sundargarh district.

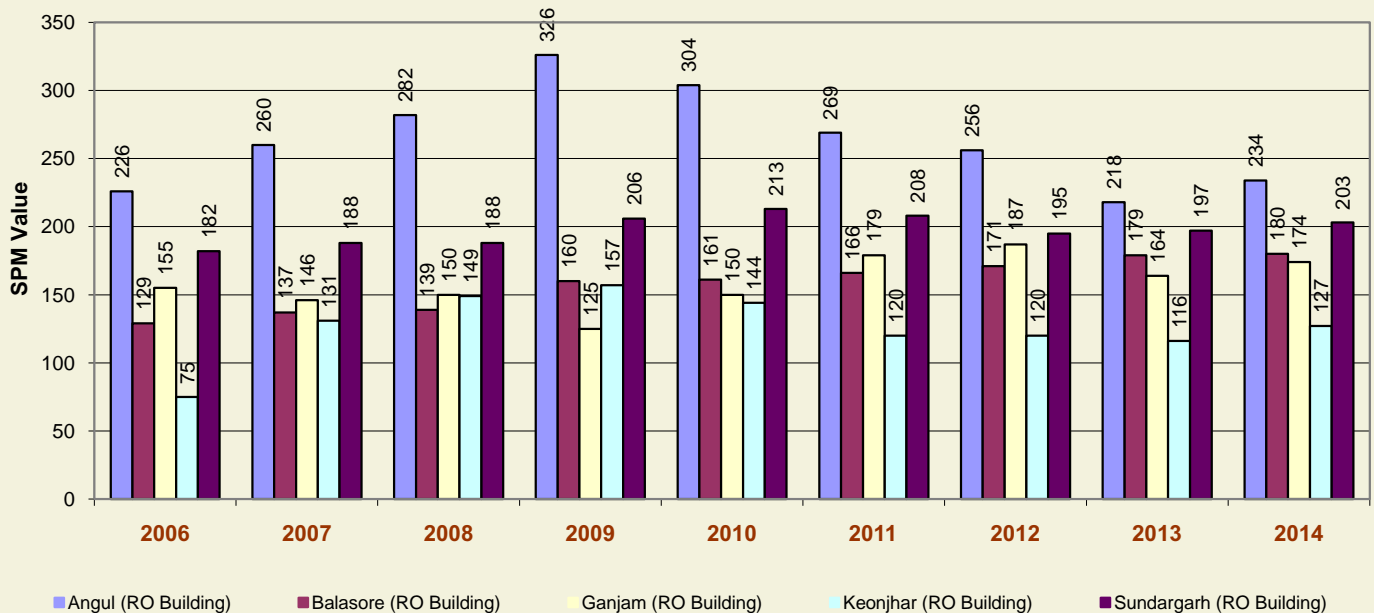
### Sulphur Dioxide (SO<sub>2</sub>) (Value in µg/m<sup>3</sup>)



While observing the average annual Sulphur Dioxide (SO<sub>2</sub>) concentration in 5 areas from 2006 to 2015, it indicates that SO<sub>2</sub> ranges between 5.8 to 10.8 µg/m<sup>3</sup> in Angul district. There is sudden increase in concentration from 2013 onwards. Value is below detection limit (BDL) in Balasore, Ganjam & Keonjhar. However, in case of Sundargarh district, the concentration ranges between 5 to 7.1 µg/m<sup>3</sup> but gradual increase from 2013 was also noticed.

## Suspended Particulate Matter (SPM) (Value in $\mu\text{g}/\text{m}^3$ )

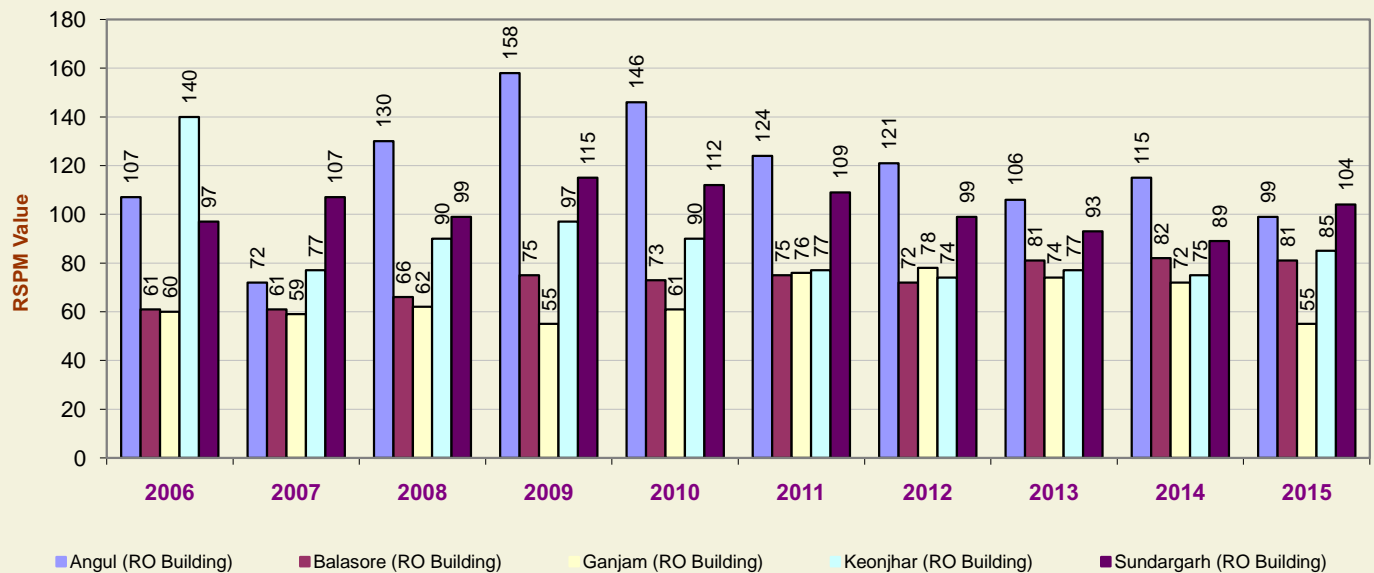
Annual Average of SPM Value during last 10 years



During last 10 years (from 2006 to 2015), it is noticed that the concentration of Suspended Particulate Matter (SPM) ranges between 218 to 282  $\mu\text{g}/\text{m}^3$  in Angul and it fluctuates. In other areas, the value is increasing.

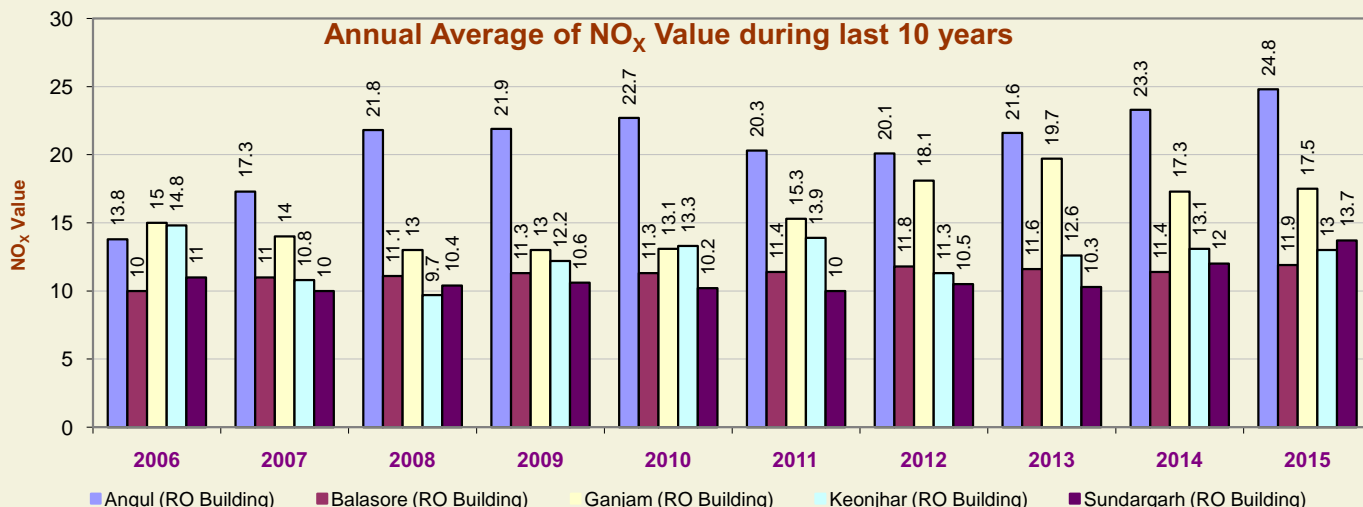
## Respirable Suspended Particulate Matter (RSPM) (Value in $\mu\text{g}/\text{m}^3$ )

Annual Average of RSPM Value during last 10 years



Respirable Suspended Particulate Matter (RSPM) concentration in Angul varies from time to time. But within 150  $\mu\text{g}/\text{m}^3$ . Similar situation is in Ganjam but the concentration is within 78  $\mu\text{g}/\text{m}^3$ . In case of Keonjhar and Balasore, the concentration is gradually increasing. Concentration was increased during 2009-2011 in Sundargarh but it is decreasing later.

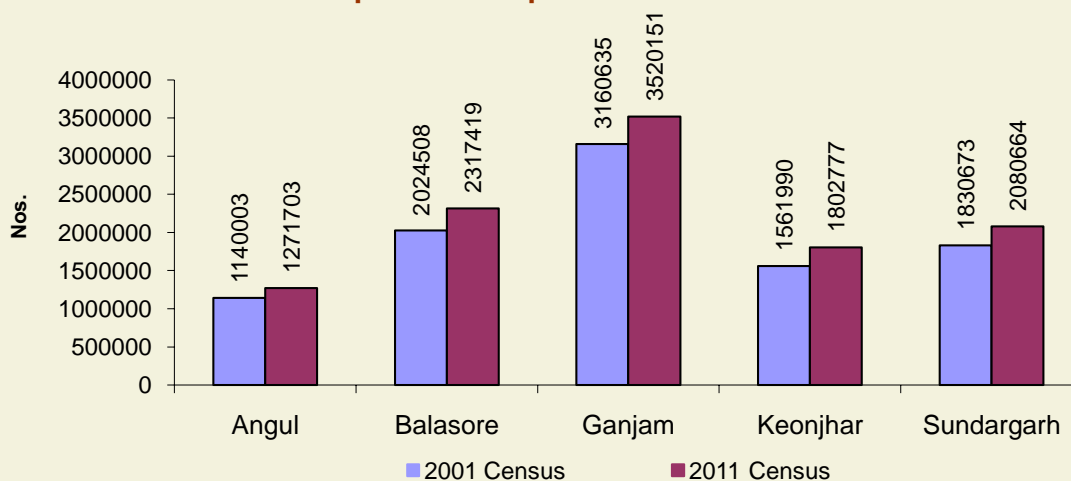
## Nitrogen Oxides (NO<sub>x</sub>) (Value in µg/m<sup>3</sup>)



During last 10 years (from 2006 to 2015), NO<sub>x</sub> value in Angul, Balasore and Sundargarh are increasing gradually. There is increase from 2010 in Ganjam. But in Keonjhar, the value is fluctuating.

## Population Growth

**Total Population as per 2001 and 2011 Census**



While looking into the population growth which also impacts the condition of ambient air quality due to their anthropogenic activities, it was noticed that

maximum population was increased in Ganjam. However, compared to 2001 Census, the population increased more in Balasore, Keonjhar and Sundargarh districts.

## Conclusion

For ecological balance and sustainable ecosystem, the concentration of Ambient Air Quality parameters must be well within the prescribed standards. Industrial development may not be the main reason of fluctuation of these parameters. There are some other man made sources of emission of air pollutants which are also to be checked. Only 5 areas have been selected for this report which are very important areas of this state. Similarly other parameters of Ambient Air Quality could be considered. But all these parameters are having very low concentration and well within the prescribed standards. Conservation measures and awareness creation among society are to be taken up for avoiding imbalance of air quality parameters.



## A Report on the Celebration of World Environment Day on 5th June 2016

World Environment Day (WED) is the most important day for encouraging worldwide awareness and action for the protection of our environment. The WED theme selected by UNEP for the year 2016 was “Illegal Trade in Wildlife”.

On 5<sup>th</sup> June 2016, the Centre for Environmental Studies organized the World Environment Day Function at Rabindra Mandap, Bhubaneswar. Also CES organized an eco-model exhibition on the theme of WED-2016. 58 models from eco-clubs of different districts participated in the exhibition.

The exhibition was inaugurated by Shri Debidutta Biswal, IFS, Director, Environment-cum-Special Secretary, Forest & Environment Department, Govt. of Odisha.



*Director, Environment inaugurating Eco-model Exhibition*

The students from various eco-clubs participated in state level model exhibition in Rabindra Mandap at 8.00 am on 5<sup>th</sup> June 2016. After valuation 1<sup>st</sup> prize winning model awarded with cash prize of Rs.5,000/-, 2<sup>nd</sup> model awarded with cash prize of Rs.4,000/- and 3<sup>rd</sup> model awarded with cash prize of Rs.3,000/-. Besides, all participants received Rs.1,500/- as model fee. The best three models received certificates from Shri Naveen Patnaik, Hon'ble Chief Minister, Odisha. Dr. Sudarsan Panda, IFS, RCCF, Angul; Shri Rajiv Kumar, IFS, Member Secretary, Odisha State Pollution Control Board; Shri H.S. Upadhay, IFS, Chief Executive, Regional Plant Resource Centre and Shri A.C. Dinakar, IFS, Special Project Director, ICZMP, Odisha were the judges for model exhibition.



*Hon'ble Chief Minister visiting the Eco-model Exhibition*

Shri Naveen Patnaik, Hon'ble Chief Minister, Odisha inaugurated this function by lighting the lamp. The function was started with the welcome song by Madhur Sangeet Group, IRC Village, Bhubaneswar. Shri Naveen Patnaik, Hon'ble Chief Minister, Odisha; Shri Bikram Keshari Arukha, Hon'ble Minister, Forest & Environment, Odisha; Shri Suresh Ch. Mahapatra, IAS, Principal Secretary, Forest & Environment Department; Shri Debidutta Biswal, IFS, Director, Environment-cum-Special Secretary, Forest & Environment Department and Dr. Sailabala Padhi, Director, Centre for Environmental Studies, Forest & Environment Department were present in this function. During the function 3<sup>rd</sup> issue of Eco-club Newsletter “ECO SAMACHAR” was released by the Guests.



*Hon'ble Chief Minister releasing the Eco-club Newsletter*

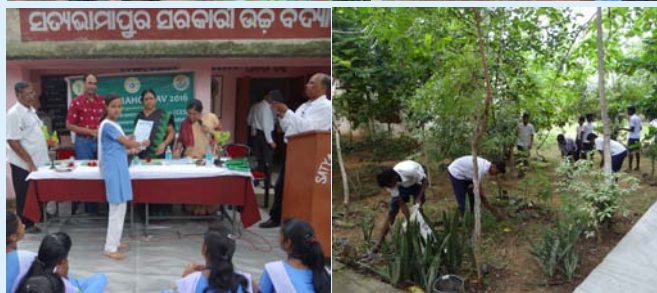
Hon'ble Chief Minister of Odisha distributed “Prakruti Mitra” prizes to 217 organisations. Dignitaries from all Departments, Retired Officers, all staff of Environment Department, State Pollution Control Board, Chilika Development Authority, Regional Plant Resource Centre, students and general public attended this function.

## Observation of Van Mahotsav Week 2016

Odisha ENVIS Centre, Centre for Environmental Studies (CES) organized a drawing & painting competition at Satyabhama Pur High School, Balipatana, Bhubaneswar on 05.07.2016 for the celebration of Van Mahotsav Week 2016.

Then, the school campus was cleaned by the students. The cleaning of polythene bags, collecting dirty materials and the wastage was dispersed in to the dumping yard. The students also cleaned the playground which was partially covered with unnecessary plants. The school campus was clean by the students with enthusiastic effort.

Then CES organized an awareness meeting at Satyabhama Pur High School, Balipatana, Bhubaneswar to spread awareness among the students & public. Dr. Sailabala Padhi, Director, CES-cum-ENVIS Cordinator; Pravat Mohan Dash, Program Officer, ENVIS; Pramod Ch. Behera, HM, Satyabhama Pur High School & staffs were present in this meeting. They shared their views on the importance of Van Mahotsav. Van Mahotsav was started to create awareness in the mind of the people for the conservation of forests and planting of new trees. On this occasion, they advised to students to celebrate Van Mahotsav by planting more no. of trees & take care of these trees.



**Acknowledgment:** We are thankful to State Pollution Control Board, Odisha as the issue has been completed on the basis of the information collected from their reports.

### For Subscription & Query; Please Contact to :

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