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From the Director's Desk...



The Environmental Information System (ENVIS) is providing information on issues related to State of Environment. Publication of newsletter is one of the major components of the ENVIS Programme; other being information dissemination through web-enabled system and query services. The Centre has been responding to various queries on environmental issues.

We have discussed on various issues in our earlier publications. This issue covers "**Water Quality of Brahmani River**".

Dr. Sailabala Padhi , M.Phil, Ph.D., D.Sc.
Director, Centre for Environmental Studies

Water Quality of Brahmani River

State's Water Resources:

Odisha depends largely upon monsoon for its water resources. South west monsoon triggers rainfall in the state. About 78% of total amount of rainfall occurs during the period from June to September and balance 22% remaining period. In addition to seasonal availability, the rainfall in the state also shows special variation i.e. from 1200 mm in the southern coastal plain to about 1700 mm in the northern plateau. The state is endowed with an extensive network of rivers and streams. The major river basins are Subarnarekha, Brahmani, Bahuda, Indrabati, Budhabalanga & Jambhira, Mahanadi, Vansadhara, Kolab, Baitarani, Rushikulya, and Nagavali. In this issue focus has been made on Mahanadi river basin.

State River System

The State is endowed with an extensive network of rivers and streams. There are eleven major rivers flowing in the State namely the Mahanadi, the Brahmani, the Baitarani, the Subarnarekha, the Budhabalanga, the Jambhira, the Rushikulya, the Bahuda, the



Source: WRIS-India website

vansadhara, the Nagabali, the Indravati and the Kolab. The Mahanadi is the longest and the Bahuda is the shortest. The rivers of Odisha are mainly rainfed.

The Brahmani

It is the second largest river in Odisha. Two major rivers, the Sankh and the Koel, originate from the Chhotnagpur Plateau and join at Vedavyasa near Rourkela in Sundergarh district of Odisha to form a major river called the Brahmani. It flows through Sundergarh, Keonjhar, Dhenkanal, Cuttack and Jajpur districts in the coastal plains and enters into the Bay of Bengal at Dhamra. The Brahmani is 799 km long. There are 45 major tributaries of the Brahmani, of which the important ones are Sankha, Chandrinalla, Katangamundanalla, Rukura, Badjore, Kaunishnalla, Kalanalla, Usthalinalla, Chudakhainallah, Gohira, Chilanti river, Tikira, Singadajore, Bangaru river, Nandiranalla, Nigra river, Bangusingha nalla, Barha, Dauri, Kumaria, Kelua river, Birupa, Hansua, Kharsuan, Patasala in right side and Koel, Suidihi, Champalijore, Kuradihi, Amrudi, Korapani, Mankada, Ambhari, Samakoi, Gambhira, Raijore, Indrajeet, Ramiala, Pandra, Kharasuan, Daudi in the left side. The drainage area of the Brahmani covers about 22516 sq.km in the State.

River System & Drainage Area

Basin	Catchment Area		
	Total (Sq.Km)	Within Odisha (Sq.Km)	% to Geog. area of State
Mahanadi	141134	65628	42.15
Brahmani	39116	22516	14.46
Baitarani	14218	13482	8.66
Budhabalanga & Jambhira	6691	6354	4.08
Subernarekha	19277	2983	1.92
Rushikulya	8963	8963	5.76
Indravati	41700	7400	4.75
Kolab	20427	10300	6.61
Vansadhara	11377	8960	5.75
Nagabali	9275	4500	2.89
Bahuda	1118	890	0.57
Area draining directly to sea		3731	2.40
Total	313296	155707	100

District wise coverage of the Brahmani

District	Catchment area in sq.km
Sundergarh	5794
Sambalpur	1371
Angul	4226
Dhenkanal	3957
Deogarh	2512
Keonjhar	1723
Jajpur	1825
Kendrapara	1107
Total	22516

The major tributaries of the Brahmani in Odisha are namely Sankh, Koel, Gohira, Tikira, Samakoi & Ramiala.

Source: Annual Report of Water Resource Department

Present & future scenario of availability of surface water from the Brahmani river

Present (Scenario: 2001)

Average Annual Flow (in BCM)			75% dependable flow (in BCM)		
Own	Outside State	Total	Own	Outside State	Total
11.391	7.186	18.577	8.849	5.521	14.011

Future (Scenario: 2051)

Average Annual Flow (in BCM)			75% dependable flow (in BCM)		
Own	Outside State	Total	Own	Outside State	Total
11.391	3.118	14.509	8.849	2.395	10.884

Source: Annual Report of Water Resource Department

As per the assessment by the Water Resource Department made in 2001 as above, the average annual availability of surface water of the Brahmani river from states own drainage boundary is estimated as 11.391BCM which is 13.75% of drainage from all rivers. Considering the topography and geological limitations, it has been assessed that 8.849 BCM (13.47% of all rivers) of water can be utilized. Due to increasing demands for water for various uses, assessment was also made to predict the availability of water by the year 2051. According to that assessment, the surface water availability from its own drainage boundary remains more or less fixed but the inflow of surface water from neighboring states will be reduced from 7.186 BCM to 3.118 BCM.

Activities nearby the Brahmani river

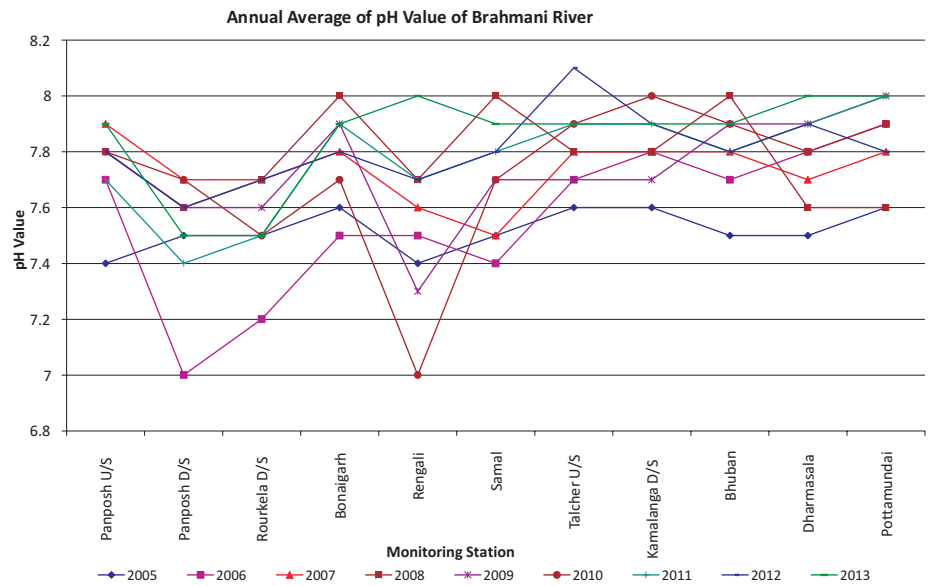
Large number of industries have been set up near Brahmani river basin. Large number of urban township have been developed due to setting up of industries and other ancillary facilities created to support the industrial development. The Brahmani basin is rich in mineral and to exploit the ores mines are in operation such as coal mines. The other mines which are in operation are chromite mines. There are some iron ore washing plants operating in this area. Besides, agricultural and township development are some activities which may contribute some pollutants to this river if not treated/checked properly at source.

Water Quality of River Brahmani

Generally, human settlements and its allied activities are being set up in nearby river system. Due to existence of the Brahmani river, being the second major river system, there are large number of human settlement and developmental activities in operation nearby this river system. Due to these activities, there will be impact on this river. Considering these facts analysis has been done to assess the quality of this river water. Information relating to water quality has been collected from the State Pollution Control Board, Odisha for the period year 2005 to 2013. Major parameters which were considered for the analysis are pH, Dissolved Oxygen (DO), Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Conductivity and Total Coliform (TC). Results of 11 monitoring stations set up by the State Pollution Control Board have been considered for analysis the trend of water quality these are namely Panposh Up stream (U/s), Panposh Down stream (D/s), Rourkels down stream (D/s), Bonaigarh, Rengali, Samal, Talcher Up stream (U/s), Kamalanga Down stream (D/s), Bhuban, Dharmasala & Pottamundai i.e. starting point to the sampling station near the river discharges to the Bay of Bengal . The results are in annual average of each parameter.

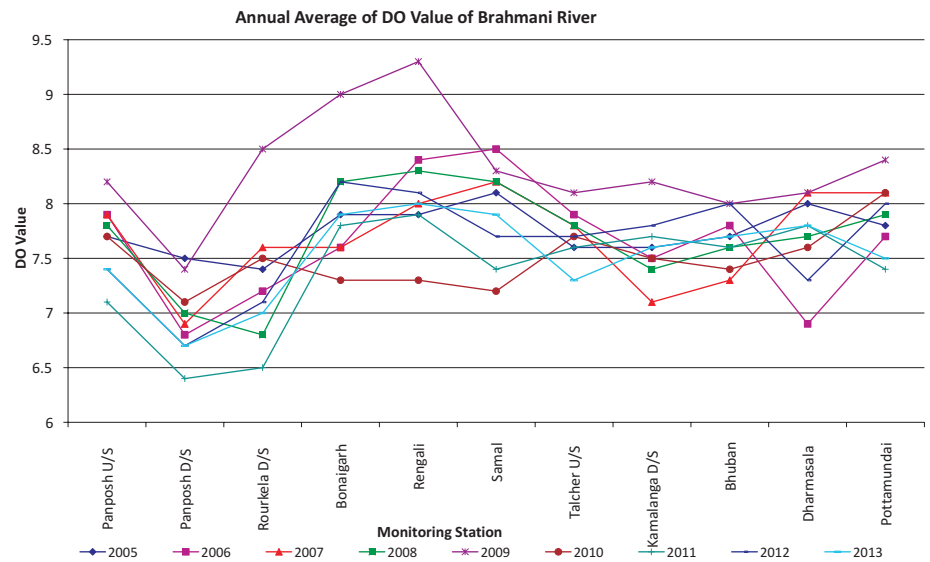
pH

During the year 2005, the pH value range was 7.4 to 7.6. It varied within the range at different stations. The minimum and maximum value has been increased gradually from 2005 to 2013. It has also been seen that the value has been increased from starting point (Panposh U/s) to ending point (Pottamundai). In some of the stations the value is less than 7.7 like Panposh D/s & Rourkela D/s.



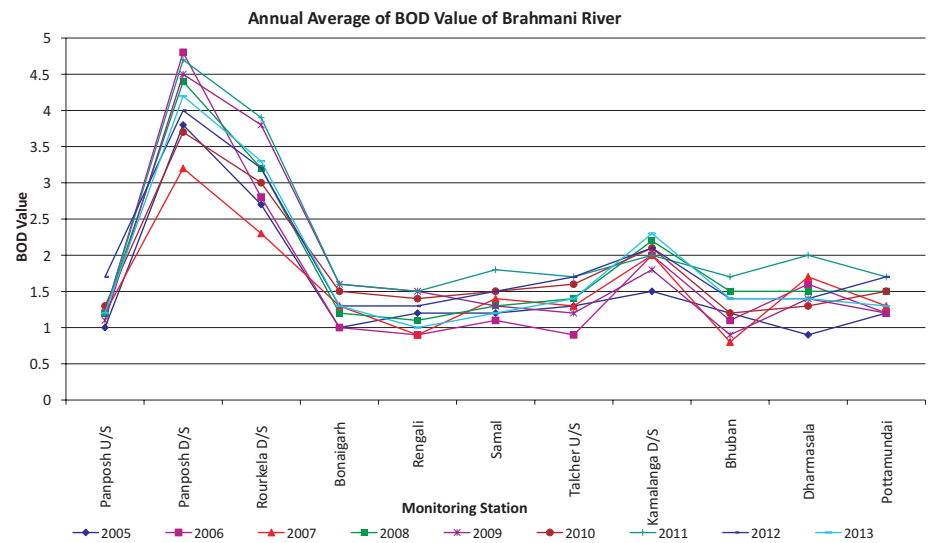
Dissolved Oxygen (DO)

The maximum value of DO has been recorded in 2009 at Rengali and minimum in 2011 at Panposh D/s. However the value decreases while going to end point. The maximum value in 2005 was at Samal (8.1) and in 2013 it was at Rengali (8.0).



Biological Oxygen Demand (BOD)

BOD value has increased gradually from 2005 to 2013 in all locations. The higher results were found at Panposh D/s, Rourkela D/s and Kamalanga D/s.



Conductivity

The value of conductivity during the period from 2005 to 2013 is between 130 to 300. Maximum value recorded at stations Panposh D/s and Pottamundai. There is very negligible change over the years at all stations.

Total Coliform (TC)

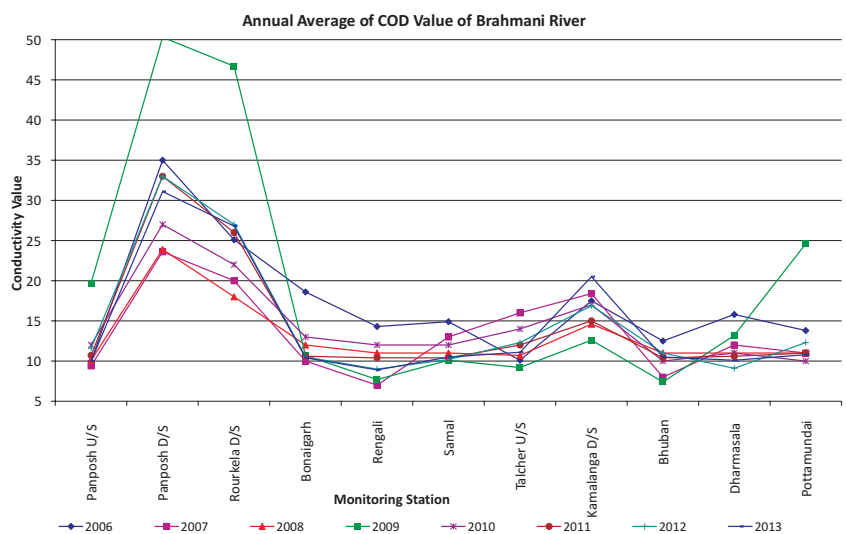
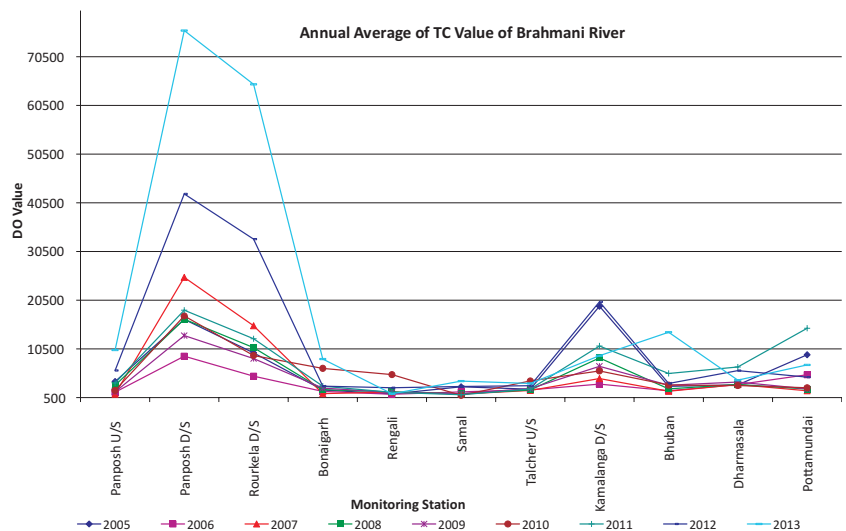
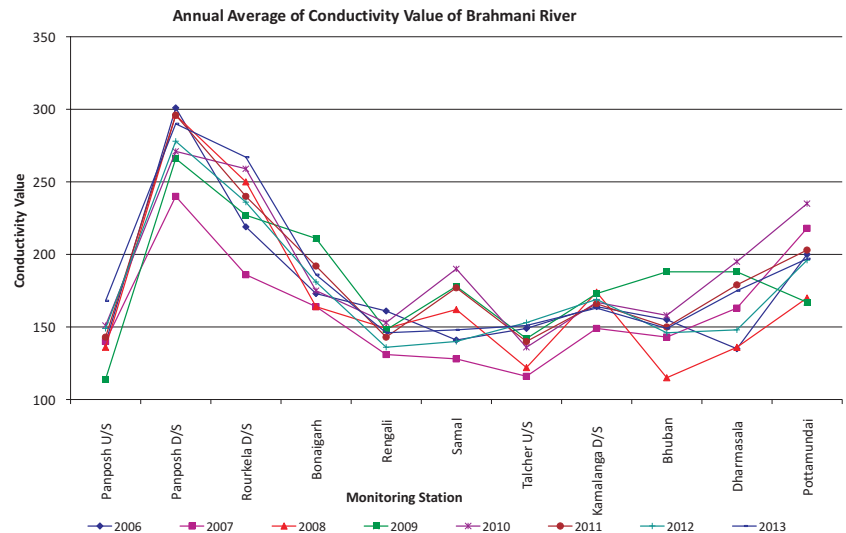
At all stations the value is more than 1000 MPN/100. During last 9 years from 2005 to 2013, the value at all stations some go down and go up. However, in 2013, stations namely Panposh U/s, Panposh D/s, Rourkela D/s and Bhuban recorded more than 10000. In case of stations at Panposh D/s & Rourkela D/s the value has crossed 64000.

Chemical Oxygen Demand (COD)

So far as COD is concerned, the value is more than 23 at Panposh D/s over the years. Similarly at Rourkela D/s and Kamalanga D/s the value is above 20 & 12 respectively in all 9 years. In other stations, the value remains in between 8 to 10.

Conclusion

Based on the analysis of values six important parameters during the period 2005 to 2013, one can say that some stations line Panposh D/s, Rourkela D/s and Kamalanga draw attention for improvement as most of the six parameters are crossed the standard limit exponentially. The reason may be due to industrial activities or domestic activities. However, caring for improvement of these sites is obviously needed for sustainable development.



ECO-ACTIVITIES : CELEBRATION OF "NATIONAL ENERGY CONSERVATION DAY-2014"

Centre for Environmental Studies (CES) under the Department of Forest & Environment organized Written Quiz Competition, Rally & Awareness Meeting at District & State level with the support of Engineer-in-chief (Electricity)-cum-Principal Chief Electrical Inspector & State Designated Agency (SDA) under the Department of Energy, Govt. of Odisha on the occasion of Energy Conservation Day 2014.

Total 9459 students participated in district level competition. 90 best students scoring highest marks from the district level competitions @ 3 best students per district participated in state level competition held in Regional Museum of Natural History (RMNH), Acharya Vihar, Bhubaneswar on 13th December 2014. After valuation 5 no. of students awarded with Platinum trophy along with cash prize of Rs.5000/-, 10 no. of students awarded with Gold trophy along with cash prize of Rs.3000/- and 25 no. of students awarded with Silver trophy along with cash prize of Rs.2000/-.



State level Written Quiz Competition on 13.12.2014

State level function on Energy Conservation Day was organized on 14 December 2014 at RMNH, Bhubaneswar. In the morning, a mass rally was organized by the large number of students & parents from all the 30 districts of the state from Kalinga



Hon'ble Minister, Energy inaugurating students rally on the occasion of Energy Conservation Day on 14.12.2014

Stadium to Power House square, Bhubaneswar. Participants wearing T-shirt & Caps participated in rally holding placards of various slogans on Conservation of Energy to save the nation. The said rally program was flagged off by Chief Guest Hon'ble Minister, Energy, Shri Pranab Prakash Das.



Snapshot of Rally on the eve of Energy Conservation Day-2014

The state level function was organized at RMNH, Bhubaneswar which was inaugurated by the Chief Guest Shri Suresh Ch. Mohapatra, IAS, Principal Secretary, Energy Department, Govt. of Odisha.



Principal Secretary, Energy Department lighting the lamp on the state level function of Energy Conservation Day on 14.12.2014



From (L-R): Er. D.C. Sahu, CEI (T&D); Er. S. S. Pati, EIC (E)-cum-PCEI; Shri Suresh Ch. Mohapatra, IAS, Principal Secretary, Energy Department; Dr. Sailabala Padhi, Director, CES; Shri G. N. Indresha, Director, RMNH on the eve of National Energy Conservation Day-2014

Acknowledment

We are thankful to Central Pollution Control Board, New Delhi; Water Resources Department, Government of Odisha and State Pollution Control Board, Odisha as the issue has been compiled taking information collected from their reports.

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