

**ACTION PLAN FOR RESTORATION OF POLLUTED STRETCH OF
BHEDEN RIVER ALONG BHEDEN
UNDER PRIORITY CATEGORY-V**

EXECUTIVE SUMMARY ON PROPOSED ACTION PLANS

Sl. No.	DESCRIPTION OF ITEM	Details
1.	Name of the identified polluted river and its tributaries	: Bheden River No Tributary
2.	Is river is perennial and total length of the polluted river	: Bheden River is a small stream with a length of approximately 45 Km from its origin to its outfall into Ib river.
3.	No of drains contributing to pollution and names of major drains	: No drains
4.	Whether 'River Rejuvenation Committee (RRC) constituted by the State Govt./UT Administration and If so, Date of constitution of 'RRC'	: Yes. Constituted by the State Government vide letter No. 24426 dated 12.11.2018
5.	Whether 'River Rejuvenation Committee (RRC) have approved the Action Plan :	Yes. RRC have approved the Action Plan in its 3 rd meeting held on 04.06.2018.
6.	Major Towns on the banks of the river with population	: Jharsuguda Municipality Population : 97,730 (as per 2011 census). However, wastewater of the City is being discharged to Ib river.
7.	a. Total no. of existing STPs and the total capacities in MLD	: No STP has been established. Wastewater of Industrial township is being treated through three captive STPs of total 3.12 MLD capacity.
	b. Total MSW generation in TPA	: Insignificant
	c. Existing treatment and disposal facilities and total capacity	: Total MSW is being disposed in the earmarked dumping yard.
8.	a. Major industrial estates located with total no. of industries	: Three numbers of large 17 category industries operating in the catchment.
	b. No of CETP's and their treatment capacity	: Nil
	c. Gaps in treatment of industrial effluent	: Nil
	d. Existing HW Treatment and Disposal Facilities and total capacity with life span	: Hazardous waste are disposed in secured landfill area within the industry premises

List of Figures and Tables

Fig.1. Satellite image of Bheden river and location of water quality monitoring station location

Table-1 Monthwise BOD (mg/l) in Bheden river during 2017 and 2018

Table-2 Ground Water quality in the catchment of Bheden river

CONTENTS

		Page No.
1.0	Background	1
2.0	Water quality of Bheden River	1
3.0	Identification of Pollution Sources	3
4.0	Ground water quality in the catchment of Bheden River	5
5.0	Action plan for restoration of Water quality of Bheden River	6
6.0	Implementing Authority	7
7.0	Conclusion	7

1.0 Background

Water quality assessment of Bheden river has been carried out by the State Pollution Control Board, Odisha under the project “National Water Quality Monitoring Programme” at only one location, near Jharsuguda town in Jharsuguda district. The Biochemical Oxygen Demand (BOD) range in this stretch of Bheden river during 2017 was observed to be 0.1-3.6 mg/l. BOD has exceeded the tolerance limit of 3.0 mg/l in this stretch only once during the total period of observation.

The polluted river stretches are categorized under five different priorities based on the BOD values as per Central Pollution Control Board (CPCB) classification. Monitoring locations with BOD concentration exceeding 30 mg/l have been categorized as Priority-I. Monitoring locations with BOD concentrations in the range 20-30 mg/l, 10-20 mg/l, 6-10 mg/l and 3-6 mg/l are categorized as Priority-II, Priority-III, Priority-IV and Priority-V respectively. Based on this classification, the river stretch of Bheden river has been categorized by CPCB under Priority-V with the maximum BOD value being 3.6 mg/l.

2.0 Water quality of Bheden river

Bheden river, flows out of Bonai sub-division in the State of Odisha into Sambalpur district after travelling through Kuchinda and Laida, then enters Jharsuguda district and finally merges with river Ib which falls into Hirakud Dam Reservoir. The flow in the river is marginal during non-monsoon season. Satellite image of Bheden river and location of water quality monitoring station are shown in Fig. 1.

Water quality of Bheden river is being monitored by the Board on regular basis at only one location, Jharsuguda town, before its confluence with Ib river. Monthwise water quality data of Bheden river with respect to Biochemical Oxygen Demand (BOD) during the year 2017 and 2018 are given in Table-1.



Fig.1. Satellite image of Bheden river and location of water quality monitoring station

Table-1 Monthwise BOD (mg/l) in Bheden river during 2017 and 2018

Month	BOD, mg/l	
	Bheden river at Jharsuguda	
	2017	2018
January	0.1	2.4
February	0.8	1.0
March	1.0	0.8
April	1.6	0.6
May	0.6	2.8
June	1.1	2.0
July	0.9	2.1
August	1.2	0.8
September	1.9	0.6
October	3.6	1.4
November	1.1	1.1
December	1.8	1.0
Minimum BOD, mg/l	0.1	0.6
Maximum BOD, mg/l	3.6	2.8
Average, BOD, mg/l	1.3	1.4

The data shows that BOD has exceeded the tolerance limit of 3.0 mg/l marginally only once (October, 2017) during the period 2017-2018. Otherwise, BOD remained within the tolerance limit of 3.0 mg/l during rest period.

3.0 Identification of Pollution Source

(a) Industrial Wastewater :

There are one thermal power plant, one aluminium smelter plant and one integrated iron and steel industry under 17 category operating in the catchment of Bheden river. All the industries have installed effluent treatment plant to treat the industrial wastewater.

Thermal power plants have adopted recirculation of ash pond effluent for control of water pollution and have adopted Zero discharge concept during non-monsoon season.

The only one smelter plant in the catchment of Bheden river has installed effluent treatment plant of 5040 KLD capacity to treat the industrial wastewater prior to discharge to Kharkhari nallah, a tributary of Bheden river. The industry has installed two number of continuous effluent quality monitoring station to monitor the quality of treated wastewater being discharged to Kharkhari nallah.

The only one Iron and steel plant in the catchment of Bheden river have provided garland drains around dump sites for control of water pollution. Water used for cooling is recycled. The plant has installed effluent treatment plant of 1200 KLD capacity to treat the industrial wastewater and the treated wastewater are being reused within the industry premises.

There is no Common Effluent Treatment plant installed in the catchment of Bheden river. The industrial effluent are treated through captive ETPs. The quality of wastewater discharge to the river are being regulated through Consent administration of the Board.

(b) Domestic wastewater :

There is only one major urban local body, Jharsuguda, situated in the catchment of River Bheden. Besides it, three number of industrial townships also exist within this catchment area. To restrict the discharge of wastewater from these townships to nearby water bodies, the respective industries have installed Sewage Treatment Plants and the treated wastewater are used for horticultural purposes. In this area about 3.12 MLD wastewater are being treated through three captive STPs in different industrial townships/colonies.

Wastewater of Jharsuguda town are stored in ponds or low lying areas within the municipality area and the overflow is discharged to Ib river rather than to Bheden river because of natural slope of the area.

Therefore there is remote possibility of contamination of water of Bheden river by organized domestic wastewater discharge in the catchment.

(c) Industrial Waste :

Ash generation from the thermal power plant is the major industrial waste in the catchment of Bheden river. The thermal power plants dispose their ash in slurry form in the earmarked ash pond areas. To implement the Fly ash Utilization Notification of Ministry of Environment, Forests and Climate Change, Thermal power plants have installed ash silos for storage of fly ash for further beneficial uses such as for making ash based products, as soil conditioner, for back filling of coal mine void areas, for filling up of low land areas.

Other hazardous wastes generated by different industries are either being dumped in secured landfill area within the industry premises.

Therefore, the dumping of solid/ hazardous waste in the area do not have impact on the water quality of Bheden river.

(d) Municipal Solid Waste :

Municipal solid waste generated in the Jharsuguda Municipality and industrial establishments are being dumped in earmarked areas which are far away from the river embankments. Therefore, the municipal solid waste dumping have no impact on the river water quality.

(e) Biomedical Waste :

There exists only one non-bedded dispensary in the catchment of Bheden river. Therefore, the generation of biomedical waste is insignificant in this catchment area and there is remote possibility of contamination of Bheden river by bio-medical waste in the city.

4.0 Ground Water Quality in the catchment of Bheden river

State Pollution Control Board, Odisha monitors the ground water quality at two locations, such as Bhurkhamunda and Badmal, in the catchment of Bheden river in the month of April and October of each year. Ground water quality data with respect to BOD,

total coliform and fecal coliform bacteria during the year 2017 and 2018 are given in **Table-2**. The water quality data show that there is no groundwater contamination due to domestic sources of pollution.

Table-2 Ground Water quality in the catchment of Bheden river

Station name	Month of Monitoring	2017			2018		
		BOD, mg/l	TC, MPN/ 100 ml	FC, MPN/ 100 ml	BOD, mg/l	TC, MPN/ 100 ml	FC, MPN / 100 ml
1. Bhurkamunda	April	1.0	<1.8	<1.8	0.3	<1.8	<1.8
	Oct	0.4	<1.8	<1.8	0.2	<1.8	<1.8
2. Badmal	April	1.5	<1.8	<1.8	0.3	<1.8	<1.8
	Oct	0.5	<1.8	<1.8	0.5	<1.8	<1.8

5.0 Action plan for restoration of Water quality of Bheden River

As evidenced from the foregoing discussions, there is no identified point source of pollution to Bheden river. This is also reflected in the BOD values of Bheden river at the monitoring stations, which most of the time remained within the tolerance limit of 3.0 mg/l during the period 2017-2018 excepting only one occasion.. Such single marginal deviation may be treated as outlier or may be due to some incidental effects.

In Para 42 of the order of the case No. 673/2018 (More river stretches are now critically polluted), Hon'ble NGT has suggested a two-fold concept for restoration of polluted river stretches as follows.

1st concept : To target enhancement of river flow through interventions on the water sheds/ catchment areas for conservation and recharge of rainwater for subsequent release during lean flow period in year. This concept will work on dilutions of pollutants in the rivers and streams to reduce concentration to meet the desired level of water quality.

2nd concept : Regulation and enforcement of standards in conjunction with the available flow in rivers/ streams and allocation of discharges with stipulated norms.

BOD value in the river most of the time remains within 3.0 mg/l excepting a single occasion. The water quality of the river can be maintained within the tolerance limit by enhancement of river flow through interventions of the river catchment area for conservation and recharge of rainwater for subsequent release during lean flow period in the year.

The implementation of Swachh Bharat Abhiyan and construction of individual household toilets and community/public toilets, provision of water supply and increase in awareness among local inhabitants have significantly reduced the open defecation practice of the local inhabitants in the stretch.

Since Bheden river is a small river with a length of approximately 45 Km, action plans covering aspects w.r.t. Flood Plain Zone protection and its management, maintaining E-Flows and water shed management, good irrigation practices setting up of Bio-Diversity parks, removal of encroachment and Plantation on both sides of the river are not feasible in the catchment of such river.

Industries operating in the catchment of Bheden river have been instructed by the State Pollution Control Board to install rain water harvesting structures and undertake plantation programme as a mean to ground water recharge.

6.0 Implementing Authority

Panchayati Raj and Drinking Water Department in Govt. of Odisha has the mandate to implement Swachh Bharat Abhiyan (Gramin) in all the village and make the people of peripheral villages of river aware to use toilets and to provide health sanitation facilities.

7.0 Conclusion

Single marginal deviation in BOD values from the tolerance limit of 3.0 mg/l observed in the period 2017-2018 in the identified stretch of Bheden river may be attributed to some sporadic events or in-stream activities. The single marginal deviation of

BOD values (3.6 mg/l in 2017) may be treated as an outlier and **therefore the river stretch may be considered as not polluted.**

On the above background, the categorization of the river stretch of Bheden River by CPCB under Priority category – V with the identified stretch “Along Bheden” and maximum BOD values in the range 3.6 mg/l needs reconsideration. Because of single marginal deviation in BOD value over a two year of observation 2017 and 2018, the **stretch may be deleted from the list of polluted river stretch.**
