

**ACTION PLAN FOR RESTORATION OF POLLUTED STRETCH OF  
RIVER NANDIRA ALONG TALCHER STRETCH  
UNDER PRIORITY CATEGORY III**

## EXECUTIVE SUMMARY ON PROPOSED ACTION PLANS

| Sl. No.           | DESCRIPTION OF ITEM   | Details  |                   |                   |   |    |
|-------------------|---|--|-------------------|-------------------|---|----|
| 1.                | Name of the identified polluted river and its tributaries   | : Nandira River . It has no tributary  |                   |                   |   |    |
| 2.                | Is river is perennial and total length of the polluted river  | : Nandira rivers is a small stream with a length of approximately 39 Km from its origin to its confluence with Brahmani 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 <sup>rd</sup> meeting held on 04.06.2018.  |                   |                   |   |    |
| 6.                | Major Towns on the banks of the river with population   | : Talcher<br>(population : 40,841 as per 2011 census)  |                   |                   |   |    |
| 7.                | a. Total no. of existing STPs and the total capacities in MLD   | : <ul style="list-style-type: none"> <li>• One STP of 2 MLD for Talcher township</li> <li>• Eight Captive STPs for the industrial townships in the catchment area with total treatment capacity of 12.3 MLD</li> </ul>   |                   |                   |   |    |
|                   | b. Total MSW generation in TPA  | : MSW 18 MT per day<br>(6570 TPA)  |                   |                   |   |    |
|                   | 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  | : <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Industrial Estate</th> <th style="text-align: center;">No. of Industries</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">22</td> </tr> </tbody> </table> | Industrial Estate | No. of Industries | 1 | 22 |
| Industrial Estate | No. of Industries   |  |                   |                   |   |    |
| 1                 | 22  |  |                   |                   |   |    |
|                   | 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  | : Either dumped in secured landfill area within the industry premises or disposed off to the Common Hazardous Waste Treatment, Storage and Disposal Facility.  |                   |                   |   |    |

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## **1.0 Background**

Water quality assessment of river Nandira has been carried out by the State Pollution Control Board, Odisha under the project “National Water Quality Monitoring Programme” since January, 2017 at two locations, such as Nandira Upstream at Kukudanga and Nandira Downstream at Dasanali. The Biochemical Oxygen Demand (BOD) range in this stretch of Nandira river during 2017 was observed to be 0.8-3.2 mg/l. BOD has exceeded the tolerance limit of 3.0 mg/l at Dasanali **only once** during the total period of observation.

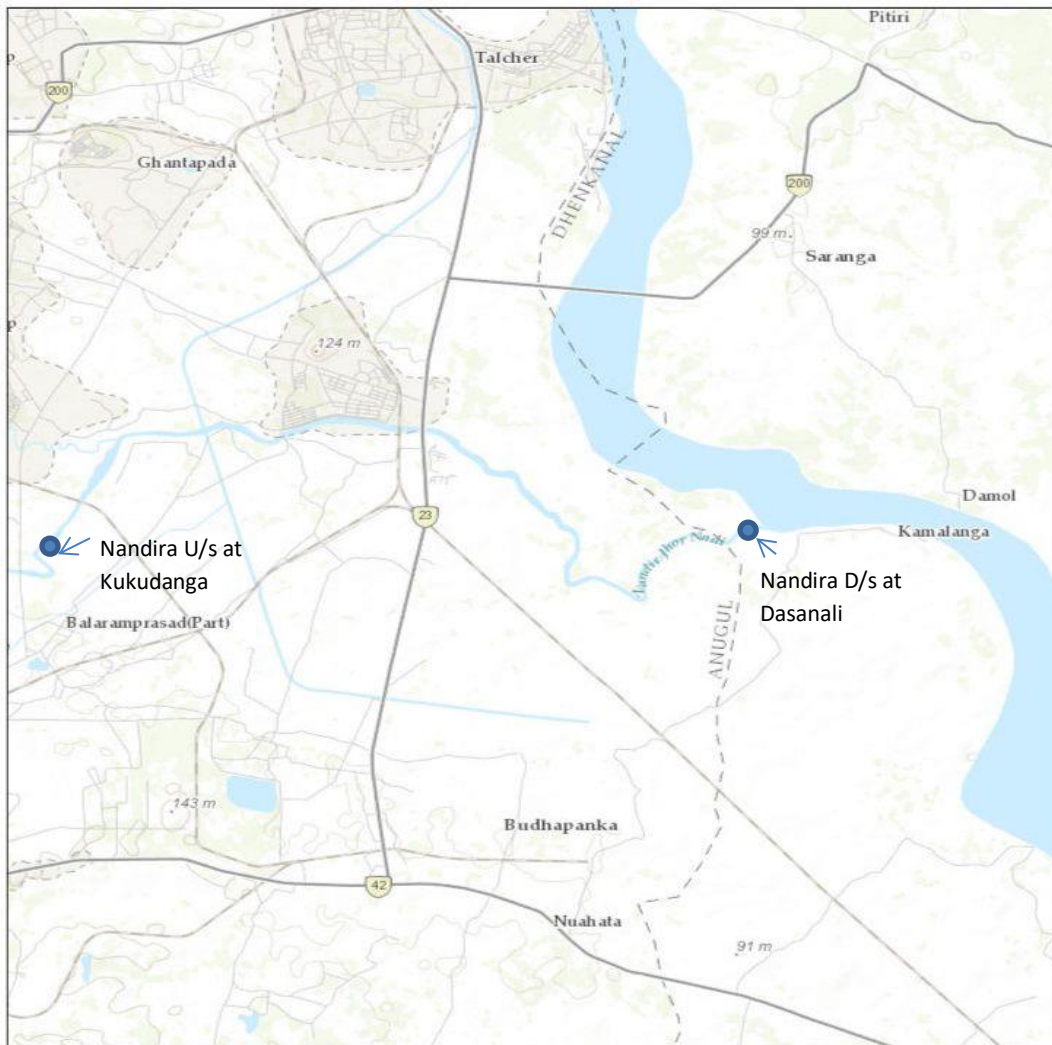
The polluted river stretches are categorized under five different priorities based on the BOD values as per Central Pollution Control Board (CPCB) classification. Monitoring locations with BOD concentration exceeding 30 mg/l have been categorized as Priority-I. Monitoring locations with BOD concentrations 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, Nandira river stretch should have been categorized under Priority-V with the State Board’s reported maximum BOD value 3.2 mg/l. But the river stretch has been wrongly categorized by CPCB under Priority III with maximum BOD value in the range 2.7-13.0 mg/l along Talcher.

## **2.0 Water quality of Nandira River**

Nandira River, a small tributary of the Brahmani river, originates at Golabandha and after travelling a distance of about 39 km, joins Brahmani at Kamalanga. Water quality monitoring stations are shown in Fig.1.

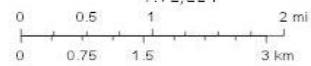
Water quality of NANDIRA river is being monitored by the Board on regular basis since January, 2017. Monthwise water quality data of river NANDIRA with respect to Biochemical Oxygen Demand (BOD) during the year 2017 and 2018 are given in Table-1. The data shows that BOD has exceeded the tolerance limit of 3.0 mg/l marginally only once during 2017 (3.2 mg/l) and also only once during 2018 (3.5 mg/l) at Dasanali, the downstream monitoring station.

However, in the list of polluted river stretches identified by CPCB, the maximum BOD range in the identified stretch during 2017 has been reported as 2.7-13.0 mg/l instead of the State Board’s reported value 0.8-3.2 mg/l and therefore, the priority level of this stretch should have been categorized as Priority-V.



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Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community. Sources: Esri, MapmyIndia, DeLorme, METI/NASA

OSPCB, BBSR  
Sources: Esri, MapmyIndia, DeLorme, METI/NASA | Esri, HERE, Garmin, USGS, METI/NASA, NGA | Map assembled by Corey LaMar |

**Fig.1. Water quality monitoring stations on Nandira river**

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

| Month                     | BOD, mg/l                |            |                         |            |
|---------------------------|--------------------------|------------|-------------------------|------------|
|                           | NANDIRA U/s at Kukudanga |            | NANDIRA D/s at Dasanali |            |
|                           | 2017                     | 2018       | 2017                    | 2018       |
| January                   | 1.2                      | 1.1        | 2.9                     | 1.3        |
| February                  | 1.8                      | 1.7        | 3.2                     | 1.4        |
| March                     | 1.0                      | 1.0        | 1.8                     | 0.8        |
| April                     | 1.6                      | 0.9        | 2.7                     | 2.7        |
| May                       | 0.9                      | 1.1        | 1.6                     | 1.1        |
| June                      | 0.8                      | 0.9        | 1.2                     | 1.2        |
| July                      | 0.8                      | 0.6        | 1.2                     | 1.6        |
| August                    | 1.0                      | 2.5        | 1.9                     | 3.5        |
| September                 | 1.4                      | 0.8        | 1.0                     | 1.5        |
| October                   | 1.0                      | 0.6        | 1.9                     | 1.2        |
| November                  | 0.5                      | 0.6        | 0.8                     | 0.9        |
| December                  | 0.9                      | 1.3        | 1.0                     | 1.6        |
| <b>Minimum BOD, mg/l</b>  | <b>0.5</b>               | <b>0.6</b> | <b>0.8</b>              | <b>0.8</b> |
| <b>Maximum BOD, mg/l</b>  | <b>1.8</b>               | <b>2.5</b> | <b>3.2</b>              | <b>3.5</b> |
| <b>Average, BOD, mg/l</b> | <b>1.1</b>               | <b>1.1</b> | <b>1.8</b>              | <b>1.6</b> |

### **3.0 Identification of Pollution Source**

#### **(a) Industrial Wastewater :**

There are two thermal power plants under 17 category industries operating in the catchment of Nandira river. Nine industries under Red category and four industries under Orange category and seven coal mines are presently operating in the catchment area. All the industries and mines have installed effluent treatment plants to treat the industrial wastewater/ mine drainage water.

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.

Mine drainage water are generally used for water sprinkling purposes in the mine lease area for control of dust emission. Excess water are being treated through the Effluent treatment plants and the treated water are reused within the mine lease hold area. Surplus

mine drainage water are being pumped to low land areas or mine voids for storage for further beneficial uses and groundwater recharge. During monsoon period only, the overflow from the mine drainage water reservoirs find their way to Nandira river.

Mine drainage water from underground mines after treatment are being supplied to peripheral villages for domestic purposes through pipe water supply and also through water tanker.

There is no Common Effluent Treatment plant installed in the catchment of Nandira river. The industrial effluent are treated through captive ETPs and there is either no or marginal wastewater discharge from these industries into the river. 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, Talcher, situated in the catchment of River Nandira. Besides it, eight 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 12.3 MLD wastewater are being treated through eight captive STPs in different industrial and mining townships/colonies.

Wastewater of Talcher town is being treated through a 2 MLD sewage treatment Plant prior to discharge to Brahmani river.

**(c) Industrial Waste :**

Ash generation from thermal power plants is the major industrial waste in the catchment of Nandira 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 or are being disposed off to the Common Hazardous Waste Treatment, Storage, Disposal Facility (CHWTSDF) situated at Kanchichuan village in Sukinda Tahasil of Jajpur district which is nearly 100 Km from the catchment of Nandira river. Therefore, the dumping of solid/ hazardous waste in the area do not have impact on the water quality of Nandira river.

**(d) Municipal Solid Waste :**

Nearly 18 MT per day of municipal solid waste are being generated in Talcher city which 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:**

Around 193.3 Kg of biomedical waste per day is generated from 30 health care units existing in the catchment area of Nandira river. The biomedical waste generated by the respective health care units are dumped in earthen pits constructed within its premises as per deep burial disposal practice suggested under Biomedical Waste (Management and Handling) Rule, 2016. Therefore, there is remote possibility of contamination of Nandira river by bio-medical waste in the city.

***4.0 Ground Water Quality in the catchment of Nandira river***

State Pollution Control Board, Odisha monitors the ground water quality at six locations in the catchment of Nandira 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 Nandira 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. Talcher town            | April               | 0.1       | <1.8            | <1.8            | 0.2       | <1.8            | <1.8             |
|                            | Oct                 | 1.2       | <1.8            | <1.8            | 0.5       | <1.8            | <1.8             |
| 2. NALCO Township          | April               | 0.2       | <1.8            | <1.8            | 0.5       | <1.8            | <1.8             |
|                            | Oct                 | 0.5       | <1.8            | <1.8            | 0.5       | 4.5             | 4.5              |
| 3. Talcher Thermal Area    | April               | 0.1       | <1.8            | <1.8            | 0.4       | <1.8            | <1.8             |
|                            | Oct                 | 0.6       | <1.8            | <1.8            | 0.2       | <1.8            | <1.8             |
| 4. Banarpal                | April               | 0.1       | <1.8            | <1.8            | 0.2       | <1.8            | <1.8             |
|                            | Oct                 | 0.7       | <1.8            | <1.8            | 0.4       | <1.8            | <1.8             |
| 5. Kulad                   | April               | 0.1       | <1.8            | <1.8            | 0.3       | <1.8            | <1.8             |
|                            | Oct                 | 0.2       | <1.8            | <1.8            | 0.3       | <1.8            | <1.8             |
| 6. Nandira Coal Field Area | April               | 1.0       | <1.8            | <1.8            | 0.4       | <1.8            | <1.8             |
|                            | Oct                 | 1.6       | <1.8            | <1.8            | 0.2       | <1.8            | <1.8             |

### **5.0 Action plan for restoration of Water quality of Nandira River**

As evidenced from the foregoing discussions, there is no identified point source of pollution to Nandira river. This is also reflected in the BOD values of Nandira river at the upstream and downstream monitoring stations, which mostly remained within the tolerance limit of 3.0 mg/l during the period 2017 and 2018 excepting only one occasion in each year. Such single 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.

**1<sup>st</sup> 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.

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

As per the 2<sup>nd</sup> Concept stated above, all the industries and mines located in the catchment of Nandira river are being regulated by the Board under Consent Administration and because of adoption of Zero discharge Concept by these units, there is no discharge to the river. The treated wastewater are either being recycled back or used for gardening purpose.

BOD value in the river most of the time remains within 3.0 mg/l excepting a single occasion in each year. 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, construction of low cost sanitation facilities, 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 40 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 Swaach Bharat Abhiyan (Gramin) in all the village and make the people of peripheral villages of a river aware to use toilets and to provide health sanitation facilities.

## **7.0 Conclusion**

There is no wastewater discharge to Nandira river in its catchment. Industries and mines treat their wastewater through captive effluent treatment plants and recycle the treated wastewater in compliance to Zero effluent discharge concept given in Consent to Operate order by the State Board. There is also remote possibility of contamination due to municipal solid waste disposal, hazardous waste disposal and biomedical waste disposal in the Talcher city.

Single marginal deviation in BOD values from the tolerance limit of 3.0 mg/l observed in both the years in the identified stretch of Kukudanga to Dasanali on Nandira river may be attributed to some sporadic events or in-stream activities. The single marginal deviation of BOD values (3.2 mg/l in 2017 and 3.5 mg/l in 2018) may be treated as an outlier and **therefore the river stretch may be considered as not polluted.**

The categorization of the river stretch by CPCB under Priority category –III with the identified stretch “Downstream of Talcher” and maximum BOD values in the range 2.7-13.0 mg/l needs reconsideration as such maximum values of BOD in the stretch have not been reported by the Board during the period 2017-2018.

On the above background, the stretch on Nandira river **may be deleted** from the list of polluted river stretch which has been prepared by CPCB only on the basis of deviation of BOD values from the tolerance limit of 3.0 mg/l.

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