ACTION PLAN FOR PUTHIMARI RIVER NEAR PUTHIMARI CHOWK AT NH 31 CROSSING

PRIORITY V

1. Basic information about the Stretch

The Puthimari river originates from the Himalayan ranges of Bhutan near latitude $27^0$16'N and longitude of $91^0$48'E at an altitude of 3750 m MSL. The river Puthimari flows in a north-south direction for 74 km up to $26^0$50'N in Bhutan. The river Puthimari is known as the Ooantang river and traverses 8 km from its origin. After crossing the Indo-Bhutan border the river is known as Jia-Barnadi. The river is named as Puthimari near Nagrijuli Tea Estate. The lower most portion of the river system is known as Lokhaitarra and this reach passes through a number of beels, swamps with inter connections with the Sessa river. The total length of the river system from its source at the foot hills of Bhutan to its outfall is approximately 116 km.

The Sukla is a tributary of the Puthimari river. It originates from the southern slope of Bhutan hill ranges and flows in south to meet the river Puthimari near Mukaldonga at latitude $26^0$35'N approximately.

The Sessa is another tributary of Puthimari river. It originates from the plain of north of Kamrup district from latitude $26^0$36'N and longitude $91^0$43'E near Tangajhar village.From its origin up to 27 km, it is known as Gerua nadi. Another stream originating near village Puthimari joins it near village Chungapara. The reach between Gossinpara and Madartala is known as Sessa Nadi.

1 (i) Polluted river stretch/length

The length of the polluted stretch of Puthimari River is approximately 1.5 KM with an area of 2.6 sq.km. (Fig 1). The stretch identified as polluted is from Kachuria to Sundarisal.

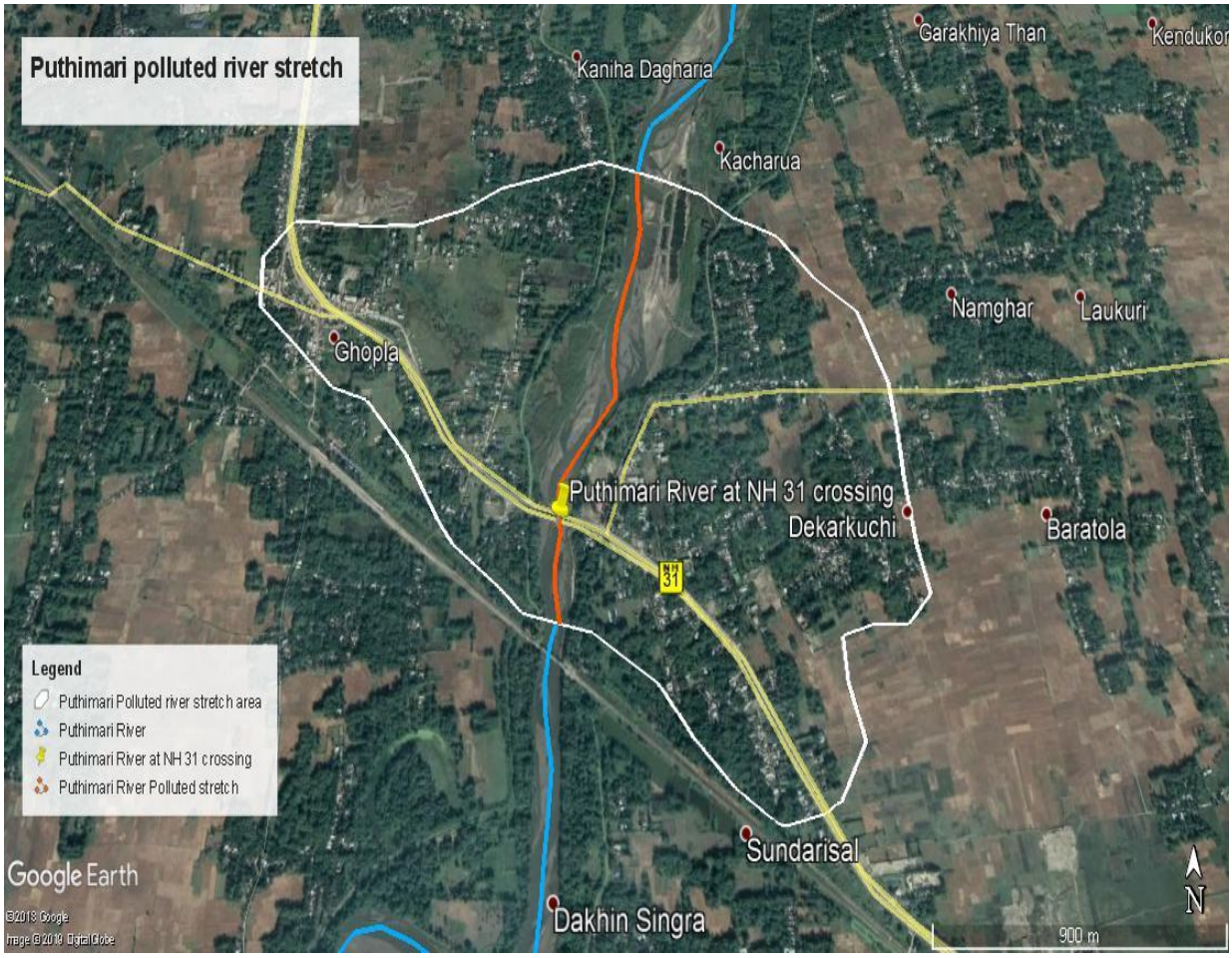

Fig 1: Map showing the polluted stretch of Puthimari river

2. Background:

In compliance of the direction of Hon'ble National Green Tribunal, Principal Bench, New Delhi in the matter of news published in 'The Hindu' authored by Jacob Koshy, Titled 'More river stretches are now critically polluted CPCB', Government of Assam constituted River Rejuvenation Committee (RRC) vide memorandum 673/2018 dated 19/12/2018 for effective abatement of pollution, rejuvenation, protection and management of the identified polluted stretches, for bringing the polluted river stretches to be fit at least for bathing purposes within six months

3. Basis of Action Plan for polluted stretch of Puthimari River

The action plan for rejuvenation, protection and management of the identified polluted river stretch of Assam has been prepared based on the following

- As per direction of Hon'ble National Green Tribunal, Principal Bench, New Delhi in the matter of news published in 'The Hindu' authored by Jacob Koshy, Tiltled 'More river stretches are now critically polluted CPCB'
- Comprehensive report on Prevention and Control of Pollution in River Hindon: An Action Plan for Rejuvenation' [Submitted in compliance to Hon'ble National Green Tribunal]

4. Components of Action Plan

(a) Industrial Pollution Control

- Inventorisation of industries
- Categories of industry and effluent quality
- Treatment of effluents, compliance with standards and mode of disposal of effluents
- Regulatory regime.

(b) Identification, Channelization, Treatment and Utilization of Treated Domestic Sewage

- Identification of towns in the catchment of river
- Town-wise Estimation of quantity of sewage generated and existing sewage treatment capacities to arrive at the gap between the sewage generation and treatment capacities;
- Identification of towns for installing sewerage system and sewage treatment plants.
- Storm water drains now carrying sewage and sullage joining river and interception and diversion of sewage to STPs,
- Treatment and disposal of septage and controlling open defecation.

(c) River catchment/Basin Management-Controlled ground water extraction and periodic quality assessment

- Periodic assessment of groundwater resources and regulation of ground water extraction by industries particularly in over exploited and critical zones/blocks.
- Ground water re-charging /rain water harvesting
- Periodic ground water quality assessment and remedial actions in case of contaminated groundwater tube wells/bore wells or hand pumps.
- Assessment of the need for regulating use of ground water for irrigation purposes.

(d) Flood Plain Zone

- Regulating activities in flood plain zone.
- Management of Municipal, Plastic, Hazardous, Bio-medical and Electrical and Electronic wastes.
- Greenery development- Plantation plan.

(e) Ecological/Environmental Flow (E-Flow)

- Issues relating to E-Flow
- Irrigation practices

(d) Such other issues which may be found relevant for restoring water quality to the prescribed standards.

5. **Action Plan as per direction of Hon'ble NGT**

The components to be discussed in the action plan for rejuvenation, protection and management of identified polluted stretch of Puthimari river are as follows

5.1. Industrial Pollution Control

No industrial estate/notified industrial area is located in the 500m periphery of the Puthimari river catchment area. Only few villages are located in the demarcated catchment area of the polluted river stretch as shown in the map.

Table I: Industrial Pollution Control status

Name of the Industry	Category	Total Water Consumption/ Waste Generation	Without consent/Directions issued	ETPs	CETPs	OCEMS	Gaps	Proposed CETP
NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

5.2. Number of industries- category Red or water polluting/ small scale

No major/minor industrial estate/cluster are located on the 500 m periphery of the river bank.

5.3. Industries without consent/authorisation

Not Applicable

5.4 Number of directions issued to industries

Not Applicable

5.5. Total water consumption and the waste water generation by the industries

As there is no any industrial zone/belt in the catchment area, there is no possibility of water consumption and waste water generation.

5.6. Number of industries having captive ETPs and treatment capacity

Not Applicable

5.7. Number of industries are members of the CETPs

Not Applicable

5.8. Number of CETPs existing in the catchment of the polluted river stretch and the treatment capacity

Not Applicable

5.9. OCEMS installation status by industries

Not Applicable

5.10. Gaps in treatment of industrial effluent

There is no gap in treatment of industrial effluent as the catchment area does not fall under any industrial estates/Clusters.

5.11. Present/proposed CETP capacity/ Member unit

Not Applicable

6. Identification, Channelization, Treatment and Utilization of Treated Domestic Sewage

6.1. Major towns located on the bank

There are few villages located in the catchment area of the river namely Ghopla, Dekarkuchi and Kendukona . These villages falls under Kamalpur Tehsil/Block of Kamrup district of Assam. Major town Nalbari is situated 23 km away and the nearest town is Rangia which is 8.5 km away from the catchment area. The catchment area does not fall under municipal area.

6.2. Town wise estimation of quantity of sewage generated and existing sewage treatment capacities

The population is very less in the catchment area of the river and are highly scattered. Approximate population of the villages in the catchment area of the river is 2975 as per census of India. The sampling point is located in a rural area predominantly agricultural in nature.

As the locality is sparsely populated, the individual households construct their own soak pit, artificial pond for the sewage generated by them. Also during its course soil absorbs the liquid waste.

There is no any existing sewage treatment Plant.

6.3. Identification of towns for installing sewerage system and sewage treatment plants.

There is no requirement of Sewage Treatment Plant at present as the locality is sparsely populated. Individual households may be encouraged for connecting the liquid waste to the soak pit. Further they can use it for gardening purpose.

Table II: Sewage generation and gaps in treatment

S. N	Area (sq.km)	Population as per 2011 census (Catchment villages of Jia Bharali river)	Water Consumption (KLD) @135 lpcd	Sewage Generation (KLD)	No. of STPs	Existing Treatment capacity (KLD)	Gaps in KLD
1	2.6	Ghopla – 1285 Dekarkuchi –719 Kendukona - 971 **Total = 2975**	402	322	NIL	NIL	322

6.4. Water Quality of the river stretch

There is one (01) sampling location of Puthimari River under NWMP as per the following.

Table III: Monitoring Locations Details

Sampling Location	Coordinates
Puthimari river near Puthimari Chowk at NH 31 crossing	26°22'0.57" N 91°39'10.29" E

The latest water quality trend of in terms of BOD value from July 2017 till April 2019 is presented below:

Table IV: BOD value in mg/l of Puthimari river

Year	BOD Value (mg/l)	Year	BOD Value (mg/l)	Year	BOD Value (mg/l)
Jan-17		Jan-18	3.2	Jan-19	2.9
Feb-17		Feb-18	2.2	Feb-19	2.1
Mar-17		Mar-18	2.8	Mar-19	1.6
Apr-17		Apr-18	2.5	Apr-19	1.7
May-17		May-18	0.8		
Jun-17		Jun-18	2.6		
Jul-17	4.4	Jul-18	2.0		
Aug-17	4.8	Aug-18	2.1		
Sep-17	4.8	Sep-18	1.4		
Oct-17	2.8	Oct-18	1.4		
Nov-17	2.6	Nov-18	2.0		
Dec-17	3.8	Dec-18	3.2		

The above data indicates that the BOD load is above 3 mg/l only at six (06) occasion out of twenty two (22) samplings carried out from July 2017 till April 2019.

During monsoon season breaching of embankment occurs due to high current of the river and the low lying areas are inundated with flood. The flood water washes out the top soil layer along with the debris in the catchment area of the river which is having high organic load resulting in increase of BOD level beyond permissible limit at some occasions.

6.5. Drains contributing to pollution

There is no any sewer line/major or minor drain connecting to the Puthimari river in the demarcated zone of the map.

6.6. Treatment and Disposal of Septage and controlling Open Defecation

Individual households in the villages are equipped with septic tanks. However, around 830 toilets have been constructed in the Kamrup district under the 'IHHL' mission which is an initiative of Swachh Bharat Abhiyan to achieve open defecation free area.

Following remedial actions will be taken in consideration of treatment and disposal of sewage

- Public awareness to control open defecation and understand the importance of toilets.

7. Controlled Ground water Extraction and quality Assessment

Table V: Estimation of ground water resource in the Kamrup district

Net Ground Water Availability	**1847.29 mcm**	**Ground water recharging mechanism**	**Rain water harvesting**
Net Annual Ground Water Draft	715.97 mcm	Recharging of groundwater are done by creation of Pond/lakes under government schemes.	The roof top rainwater harvesting is practiced.
Projected demand for domestic and industrial uses up to 2025	105.16 mcm		
Stage of Ground Water Development	43 %		
Future Provision for Irrigation Use	912.64 mcm		

Irrigation Practices in Kamrup District

Certain schemes such as Lift Irrigation Scheme (LIS), Flow Irrigation Schemes (FIS) and Deep Tubewell (DTW) have been taken up for Kamrup district by the irrigation Department of Assam in collaboration with the Central government.

7.1. Status of Ground Water

Ground water development is at low key at present and estimated to be 644 mcm. After allocation for domestic and industrial requirement of 105 mcm for a population estimated in 2025, the net annual dynamic resources of 790 mcm are still available for development. At present, groundwater draft is mainly for domestic and irrigation purposes and a negligible amount is for industry. The water supply schemes for drinking purpose are executed by Assam Public

Health Engineering Department through groundwater structures like dug well, hand pump and deep tube well. The groundwater draft for irrigation is mainly from shallow tube well implemented by Agriculture Department through the farmers. The existing draft for irrigation is estimated to be 586 MCM.

As per CGWB report the ground water of Kamrup district is fresh, potable and suitable for both domestic and irrigation purposes. However, due to slightly higher content of iron in some sporadic patches of the area and fluoride content exceeding permissible limit in some pockets in and around Guwahati City, water needs to be treated before being used for drinking purpose.

In Kamrup district, stage of ground water development is 43%. The district is still under 'Safe' category and sufficient resources are still available for future development. Iron Removal Plant should be installed to remove iron from ground water prior to human consumption.

7.2. Remedial Actions

The following remedial actions will be taken in consideration of contaminated ground water sources, controlled ground water extraction and periodic quality assessment

- Ground water of deeper aquifers should be analyzed for periodic assessment of Iron.
- Alternate sources of drinking water should be explored and prioritized.
- Awareness campaigns about health hazards due to intake of excessive Iron is the need of the time.
- Role of pesticides used for agricultural activity should be carefully observed.
- Survey should be conducted regarding ground water uses for domestic purpose and also to identify the over exploited and critical areas in the river stretches with respect to ground water extraction.
- Effective management of sewage for preventing contamination of ground water sources.
- Roof top rain water harvesting techniques should be encouraged for industrial, commercial or individual households and community.

8. Flood Plain Zone

The following are the identified flood prone area for the polluted Puthimari river stretch

Name of River	Flood plain areas
Puthimari River	Ghopla, Dekarkuchi and Kendukona, Kachuria, Sundarisal

Almost every year the district gets inundated by floods during monsoon season. The effect of flood and soil erosion is much more in southern part than in the northern part of the river.

The Puthimari river embankment details are as follows

S.N	Embankment	Length (km)
1	Left bank	82.85
2	Right Bank	85.02

8.1. Regulating activities in the Flood Plain Zone

Further following activities need to be regulated in the flood plain zones.

S.No	Action points	Responsible authority
1	Plantation in the flood plain zone	Forest Department
2	Checking Encroachment	Local administration
3	Demarcation of the flood plain zone	Water Resource Department
4	Prohibition of disposal of all kinds of wastes	District Administration/ Gram Panchayat

8.2. Waste management status and proposed actions for Municipal solid waste, industrial waste and Bio medical waste management

Table VI: Waste management status and proposed actions

Type	Status	Proposed Action	Authority
Industrial Waste	➢ No notified industrial area/cluster have been identified within 500 meters periphery of the catchment area.	➢ Not Applicable	Pollution Control Board Assam
Municipal waste management	➢ Since the catchment area of the river does not fall under any municipal bodies, the villagers manage and treat their own solid wastes by constructing composting pit and other vermi composting practices etc in their household.	➢ Village Panchayat concerned should collect municipal solid waste generated from the villages of the catchment area. ➢ Awareness generation regarding	Village Panchayat

Type	Status	Proposed Action	Authority
		solid waste management rule.	
Plastic waste	➢ Plastic wastes are being burnt by the villagers in their household	➢ Village panchayats to segregate and collect plastic waste and initiate necessary steps to channelize the waste to authorized agencies for recycling and reprocessing. ➢ Awareness campaign regarding health and other issues related to burning of plastics.	Village Panchayat
Hazardous waste	➢ No notified industrial area/cluster have been identified within 500 meters periphery of the catchment area.	➢ Not Applicable	Pollution Control Board Assam
Bio-Medical waste	➢ No notified industrial area/cluster have been identified within 500 meters periphery of the catchment area.	➢ Not Applicable	Health & Family Department
E –waste	➢ No bulk consumers and generators have been identified.	➢ Not Applicable	Producer Extended Responsibility

8.3. Gaps identified in waste management

No gaps has been identified in waste management

8.4. Greenery development - Plantation Plan

State has initiated afforestation in the degraded forestland, also raising roadside plantation besides creating check dams/embankments in the river catchment areas to combat erosion and soil conservation.

The following remedial actions has to be initiated in consideration of greenery development

- Raise plantation along the river bank to control the flow run off water directly to the river

- Bamboo species to be raised as it is a good soil binder thereby stabilize the banks of the river from erosion

9. Environmental Flow (E-Flow)

9.1. Stretch of river perennial or non- perennial/flow available/water usage in the stretch

The entire river stretch is perennial. The discharge of Puthimari river as per the master plan of Brahmaputra Board is 1588.38 Cum. It is also observed that even during the dry season, the river maintains 50% of the average flow recorded. All the major tributaries of Brahmaputra river are perennial in nature and maintains 50% of the average flow even during non-monsoon season.

9.2. Irrigation practices in the river

The high volume of discharge and water level of the river can be of great use for good irrigation practices for the people. But the farmers of the region usually depends on rain water for cultivation as rainfall is plenty in Assam.

10. Identified organisations responsible for preparation and execution of the action plans

Organisations responsible for preparation and execution of the action plans are as follows:

- Secretary to the Govt. of Assam, Environment and Forest department
- Secretary to the Govt. of Assam, Urban Development department
- Commissioner, Industries and Commerce, Assam
- Member Secretary, Pollution Control Board Assam
- Commissioner, Guwahati Municipal Corporation
- Commissioner to the Govt. of Assam, Water Resource Department
- Divisional Forest officer, Social Forestry, Basistha, Guwahati -29

11. Monitoring mechanism proposed for implementation of action plans

The water quality assessment and evaluation of impacts is necessary to understand the river state at various stages of the project implementation and post implementation of the project. Therefore the water quality assessment and evaluation of the project achievements is essential component for the long term

benefit of the project. The monitoring and evaluation also indicate for taking corrective measure at appropriate time. The ill effects may be controlled by taking step at right time for right cause. The monitoring & evaluation schedule and plan proposed is as under -

11.1 Water Quality Stations (WQS):

The water quality monitoring will include following parameters, which shall be monitored at monthly interval or as and when required. The one complete unit to be purchased and identified parameters to be monitored at defined sampling stations.

The sampling stations are:

- Puthimari river near Puthimari Chowk at NH-31 crossing.

The parameters to be monitored are as follows.

1	pH	6	Bio-Chemical Oxygen Demand (BOD)
2	Turbidity	7	Faecal coliform
3	Conductivity	8	Total coliform
4	Temperature		
5	Dissolved Oxygen (DO)		

Most of the parameters will be monitored manually and will be incorporated in database.

12. Public Mass awareness etc.

Any river conservation project to be implemented successfully, public awareness is of utmost importance. Unless the public are made aware about the irreversible damage and pollution caused by indiscriminate littering and dumping of waste and garbage in drain and water bodies connected to Puthimari River, the project cannot be implemented in true sense of the word to achieve conservation. Some members of the communities are already aware that there is a need for river conservation programme and that they will be benefitted. Hence, it should be ensured with the following points

- The communities are effectively involved in all the stages of the project cycle from conceptualization, to preparation, to finalization, to implementation and finally O & M.

- Public Awareness & Public Participation should be affront-end activity of the project
- The entire programme of conservation should be conceived, formulated, implemented, monitored and evaluated in close consultation with the stake holding communities.
- Therefore, education and awareness programmes are key to the sustainability of the various components implemented as part of the river restoration project.

13. Action Plan

Table VII: Action Points

Type	Action Points	Responsible Authority	Time Targeted
Industries	a) No industrial units have been identified within 500 meters periphery of the catchment area.	**Not Applicable**	
Interception and treatment of raw sewage	a) **No Sewage Treatment Plant (STP)** has been proposed at these villages.	**Not Applicable**	
Ground Water Assessment	a) Conducting survey regarding ground water usage by category wise such as domestic, community, etc. and also identification of over exploited and critical blocks in the river stretches with respect to the ground water extraction. b) Carry out assessment of ground water survey in the catchment area of the identified polluted stretch once in a year to ensure quality.	**PCBA/CGWA**	**Continuous**

Type	Action Points	Responsible Authority	Time Targeted
	c) To promote roof top rain water harvesting by individual households		
Flood Plain Zone	a) Conservation of the river through watershed management. b) Cleaning of the river bed and bank. c) Afforestation on both the banks to prevent soil erosion d) Recreational activities to be promoted. e) Erection of pathway of the river banks. f) Checking encroachment in the flood plain zone of the polluted river stretch g) Prohibition of disposal of municipal, plastic, biomedical and other wastes in the polluted stretch of the river bank h) Demarcation of the flood plain zone.	**Soil Conservation Department/Water Resource/ Forest Department/ Tourism Department/PWD Assam/Local Administration**	**6 Months (February,2020 to July, 2020)**
	The plan for the polluted stretches of the river may be implemented in a time bound manner by fragmenting activities as	**Pollution Control Board Assam**	**3 Months (June,2019 to August, 2020)** **a) Monthly Basis**

Type	Action Points	Responsible Authority	Time Targeted
	a) Assessment of water quality of the polluted stretches on monthly basis has already been commencing b) The monitoring committee may convene meeting of Stakeholder organizations on Quarterly basis with under the chairmanship of Chief Secretary		
Solid Waste	a) Prohibition of direct disposal of solid waste in the river banks. b) Frequent River Surface cleaning by removal of debris, plastics etc.	**Village Panchayats/ Water Resource Department**	**3 Months (November, 2019 to January, 2020)**
Environmental Flow	a) Flow measurement of the river should be carried out by the concerned department and the record has to be maintained b) Fresh water flowing through escape channels/small barrages should be checked. c) The river can be of good potential for irrigation practices and should be carried out by the farmers.	**Water Resource Department**	**Continuous**
Public Awareness	a) Awareness programs to highlight the issues related with the direct discharge of solid waste and open defecation. b) Mass awareness to conserve water.	**Village Panchayats/PCBA/NGOs**	**Continuous**

Members of River Rejuvenation Committee (RRC)

Secretary to the Govt of Assam
Environment & Forest Department

Secretary to the Govt of Assam
Urban Development Department

Commissioner
Industries and Commerce Assam

Member Secretary
Pollution Control Board Assam

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