ACTION PLAN FOR BHOGDOI RIVER AT JORHAT- PRIORITY V

1. Basic information about the Stretch

The Bhogdoi river is one of the south bank tributaries of the mighty Brahmaputra. It originates from Mokokchung in north hills of Nagaland. The river is known as Tsujenyong Nala at its origin and runs from north east to south west direction for a length of 25 KM, it then turns from south west to north east direction and in this reach the river is known as Tsurongor or Desoi. After covering a further length of about 25 KM, it turns from north east direction to north direction for a length of 16 KM. It again flows for a length of 32 KM from north and north west direction up to Jorhat town. From Jorhat town the river changes its direction towards north west for a length of 60 KM before joining Dhansiri river near its confluence with Brahmaputra and then flows through Gelabeel river, which run parallel to Brahmaputra river.

The length of the river is 160 KM. Out of which 95 KM is in plains and 65 KM in hills. The total catchment area of Bhogdoi river is 1545 sq.km.

There are three numbers of left bank tributaries of Bhogdoi river. The Junka is one of the left bank tributary of this river, the length is 17 KM and the catchment area of the sub basin is 42 sq.km. The Toku is also one of the left bank tributary of the Bhogdoi river. The length of Toku is 12.5 KM and the catchment area is 23 sq.km. Another left bank tributary is Kakodonga. Its length is 70 KM and the catchment area is 950 sq.km.

1.1. Polluted river stretch/length

The length of the polluted stretch of Bhogdoi River is 4 KM with an area of 28.1 sq.km. (Fig 1). The stretch identified as polluted is from 1 No. Bamungaon to Naubaisa gaon. The encroachment on the river banks are spreading due to which the width of the river is becoming narrower and shallower.

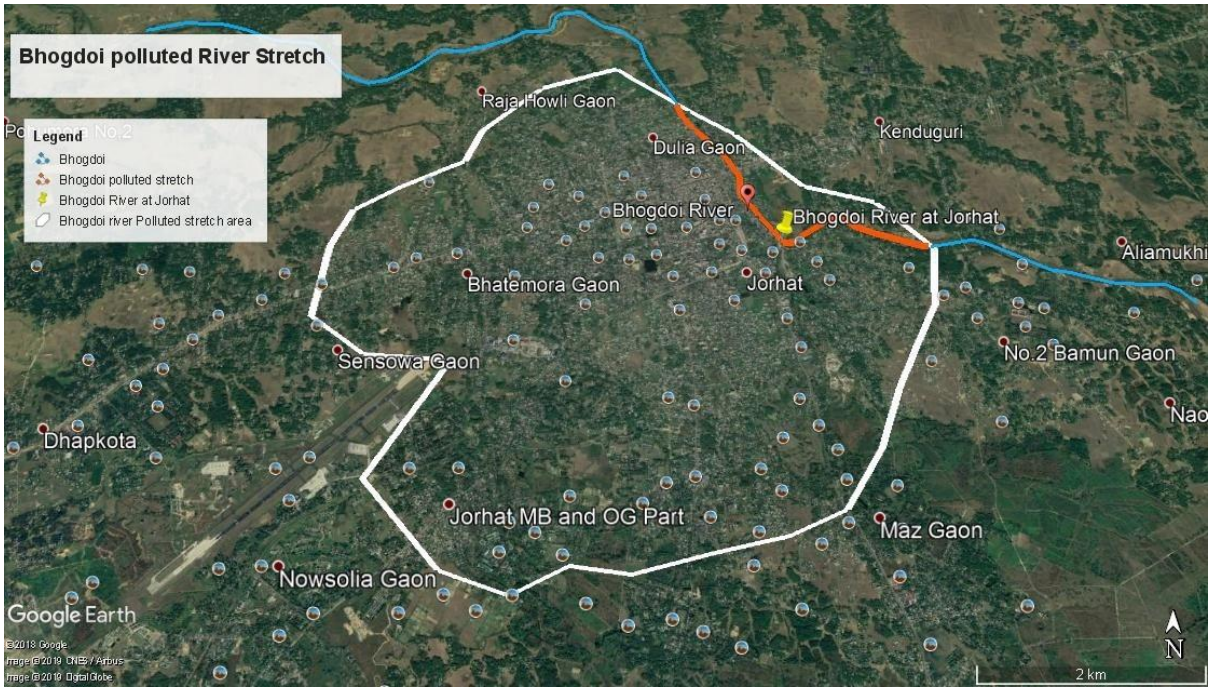

Fig 1: Map showing the polluted river stretch of Bhogdoi river

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, Tiltled 'More river stretches are now critically polluted CPCB', Government of Assam constituted River Rejuvenation Committrr (RRC) vide memorandum673/2018 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 Bhogdoi polluted river stretch

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

(f)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 Bhogboi river are as follows

5.1. Industrial Pollution Control

Classified industrial units are observed with infrastructural facilities (ETPs, STPs) in the periphery of 28.1 sq km of the polluted river stretch along with few small scale industrial establishments.

Further directions were issued by the PCBA to all the industrial units which have failed to comply with the discharged norms. Moreover, the Board has also issued direction to build their own set up in their premises which do not have STP/ETP

The classified industry details situated at the radius of the polluted river stretch is presented at **Table I.**

Following are the suggestions for control of industrial pollution control

- The industry that will extract groundwater for manufacturing process should not operate unless they possess valid permission for groundwater extraction from Central Ground Water Authority.
- No industries should discharge their effluent directly into drains without treatment, rather they should reuse their treated effluent/sewage.
- Direction to be issued to the units which are not complying to the effluent discharge norms as per Section 5 of the Environment (Protection) Act, 1986, by PCBA for ensuring compliance to the discharge norms.

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

6.1. Major towns located on the bank

Jorhat is the major town located on the bank of the Bhogdoi river. The approximate population of the Jorhat town is 2,20,534 as per Census 2011 with 51620 numbers of households. The major localities identified in and around the catchment areas are Duliagaon, Purana gayangaon, Sonali Jayanti nagar, Choladhara, Kakotigaon, bhetamoragaon, Atilagaon, kushal nagar, Nauboisagaon, 1no. Bamungaon, Barbheta and Rajatiyagaon.

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

The major town responsible for contribution of sewage in the Bhogdoi river is Jorhat. The waste generated by the Jorhat town is around 35285 KL per day.

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

As per the survey done one (01) STP has been proposed at Jorhat town in consultation with the District Administration

Table II: Sewage generation and gaps in treatment

S.N	Area	Population as per 2011 census	Water Consumption (KLD) @135 lpcd	Sewage Generation (KLD)	No. of STPs	Existing Treatment capacity (KLD)	Gaps in KLD
1	Jorhat Town	220534	44,106.8	35285	1	Nil	35285

6.4. Water Quality of the river stretch

There is one (01) sampling location of Bhogdoi River at Jorhat district under NWMP as per the following

Table III: Monitoring Locations Details

Sampling Location	Coordinates
Bhogdoi river at Jorhat	27°21'30.90" N 93°43'46.82" E

The change in the water quality of Bhogdoi river in terms of BOD value for the period 2016-2019 is presented below:

Table IV: BOD value in mg/l of Bhogdoi river from the year January, 2016-April, 19

Year	BOD Value	Year	BOD Value	Year	BOD Value	Year	BOD Value
Jan-16	1.1	Jan-17	2.6	Jan-18	1.6	Jan-19	2.2
Feb-16	**3.7**	Feb-17	2.0	Feb-18	1.0	Feb-19	1.3
Mar-16	2.2	Mar-17	2.8	Mar-18	**3.4**	Mar-19	2.0
Apr-16	2.0	Apr-17	**3.2**	Apr-18	1.8	Apr-19	1.7
May-16	1.0	May-17	2.3	May-18	**3.4**		
Jun-16	1.0	Jun-17	2.8	Jun-18	2.2		
Jul-16	**3.6**	Jul-17	2.9	Jul-18	1.2		
Aug-16	2.2	Aug-17	2.6	Aug-18	2.1		
Sep-16	2.6	Sep-17	2.8	Sep-18	**4.0**		
Oct-16	2.0	Oct-17	2.1	Oct-18	2.4		
Nov-16	**4.5**	Nov-17	2.1	Nov-18	2.3		
Dec-16	2.8	Dec-17	2.0	Dec-18	1.1		

The above data indicated that the BOD load is above 3 mg/l only on seven (07) occasions out of forty (40) occasions. This occasional increase of pollution load may be due to additional organic matter introduced in the river originating from domestic household waste into the river as a result of

continuous rainfall during periodic monsoon shower. Moreover, BOD level have also increased during dry period which is observed to be not very often and this may be due to decomposition and high concentration of organic matter as their rate of dilution is very low due to lean flow of the river. Hence this exceedance of BOD load can be considered as incidental and can be omitted from the polluted river stretch. Moreover, this occasional exceedance of BOD level does not reflect the extremity of pollution

6.5. Drains contributing to pollution

The river receives storm water along with municipal sewage by one major drains namely Tocklai drain at Goramur with its origin at Jorhat town. However, few small drains also exist that helps to drain off the city sewage.

Table IV: Major channels/drains contributing to the pollution load of the River

Channels/Drains	Description
Tocklai Drain	The drain is originated at Gormur and confluence with Bhogdai River

6.6. Characteristics of the major drains

The drains mainly carries industrial as well as residential wastes. Direct dumping of residential and commercial garbage into the channel is making it shallower and heavily silted. As a result, during rainy season water overflows and inundates the areas. It is also observed that the drains of the town are also becoming a regular garbage-dumping site.Moreover, these drains are not planned properly to carry even the regular water.

6.7.Flow details of the major drains contributing to river pollution

Action initiated to measure the flow of various out falling drains.

6.8. Sewage generation from the towns located on the banks of the polluted river

The main contributor of pollution in the river is municipal sewage. There are no treatment systems for the sewages which are dumped in open thereby ultimately finding their ways to water bodies without treatment. Moreover, Sewage treatment facility has not been set up yet in Assam.

6.9. Number of Sewage treatment plants present and treatment capacity, and gaps

There is no sewage treatment plant at present.

6.10. Number of STPs proposed and capacity

As per the survey done, one (01) number of STP has been proposed at Jorhat town with a capacity of approximately 36 MLD in consultation with the District Administration

6.10. Interception and diversion of drains /in situ treatment given

One (01) number of STP has been proposed along with interceptor drains for in situ treatment before outfall.

6.11. Drainage system/ sewerage network present/proposed

In Jorhat, some natural drainage of local origin is acting as the main drainage system. Six numbers of natural drainage system namely Rowriajan, Mohuajan, Tarajan, Tocklai Anthubhangajan and Jawkhariajanare connected directly or indirectly to the river Bhogdoi and they are responsible for draining off majority of the city sewage. On the right bank of Bhogdoi river, a 10 kms Bejijan channel has been identified which drains substantial number of areas.

There is no sewerage system at present. In this project one (01) number of STP along with interceptor drains for collection of the sewage of the basin has been proposed. All the sewage of the catchment area of the river shall be collected by interceptor drains and shall be treated in the proposed STP before outfall in to the river.

6.12. Treatment and Disposal of Septage and controlling Open Defecation

Some of the households in the towns are equipped with ordinary septic tanks and the slum dwellers in the catchment areas of the river have kuccha latrines. However, around 235 toilets have been constructed in the Jorhat district under the ‘Daan Toilet’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

- Sewage Treatment plant should be installed for treatment

- Every individual households should be connected to sewer lines.
- Roadside hotels/restaurants should not be allowed to dispose untreated sewage and solid waste into the nearby drains or rivers. These establishments should be properly regulated by the concerned authority.
- Public awareness to control open defecation and understand the sanitary hygiene.
- Local administration should provide proper pucca toilets for the individuals or atleast community toilets through the IHHL scheme under Swachh Bharat Mission.

7. Controlled Ground water Extraction and quality Assessment

Ground water development in the district is still in nascent stage. As per Central Ground Water Board, The net ground water availability is estimated to be 1273.71mcm. In Jorhat district stage of ground water development is 13%, which shows under the SAFE category as reported by CGWB. As long-term water level trend does not show any major change so the whole district may be considered as SAFE.

The details of estimated ground water resource in Jorhat district is presentedbelow in **Table V**

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

Ground water extraction details	Ground water	Ground water recharging mechanism	Rain water harvesting
Net Ground Water Availability	1273.71mcm	Recharging of groundwater are done by creation of Pond/lakes under government schemes.	The roof top rainwater harvesting is practiced.
Gross Ground Water Draft	171.09mcm		
Stage of Ground Water Development	13%		
Future provision for Domestic & Industrial Use	34.65mcm		
Future Provision for Irrigation Use	1093.68mcm		

(a) Irrigation Practices

At present, the district has undertaken some minor and medium irrigation schemes such as DTW and STW which is as per the following at **Table VI**

Table VI: Irrigation schemes in progress at Jorhat town

S.No	Name of Scheme	Created Potential
1	Khongia DTW Scheme	140 Ha
2	Extension Charaibahi DTW Scheme (3 Pts)	30 Ha
3	Charaibahi DTW Scheme (6 Pts)	180 Ha
4	Aug. of Well Pt. No.7 of Charaibahi DTW Scheme (1 Pt)	20 Ha
5	Bhakatua Machkhuwa DTW Scheme	60 Ha

7.1. Status of Ground Water

The water quality data generated by CGWB indicated the presence of iron content in the range of0.20 to 2.36 ppm. Whereas Fluoride content in ground water in the district is found to be within 0.37 to 1.49 ppm. The variation is very much within the permissible limit. The water quality is found to be well within the permissible limit for drinking, irrigation and industrial purposes except high iron concentration in scattered patches, which can be removed through the process of aeration before use.

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 element like Arsenic, Fluoride, Iron etc.
- Alternate sources of drinking water should be explored and prioritized.
- Awareness campaigns about health hazards due to intake of excessive Arsenic, Fluoride are the need of the time.
- Role of pesticides used for agricultural activity should be carefully observed.
- Survey should be conducted regarding ground water uses by different categories such as domestic, Industries etc. and also to identify the over exploited and critical areas in the river stretches with respect to ground water extraction.
- Effective management of industrial effluent or sewage for preventing contamination of ground water sources.

- The industry that will extract groundwater for manufacturing process should not operate unless they possess valid permission for groundwater extraction from Central Ground Water Authority.
- Strict vigilance and conducting inspection of the industries to rule out any forceful treated effluent injection in to ground water resources.
- 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 river stretch

Name of River	Flood plain areas
Bhogdoi River	No. 1 Bamungaon, Gohain Tekela Gaon, Kachariparia, Kachogoral and Naubaisa Gaon

Further, embankments are constructed to combat the annual flood which is presented as below in **Table VII**

Table VII: The embankment details of Bhogdoi river are as follows

Sl. No.	Embankments	Length (Kms)
1	Left Bank	16.75
2	Right Bank	18.42

8.1. Regulating activities in the Flood Plain Zone

The 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

8.2. Waste management status

Table VIII: Management of Industrial, Municipal, Biomedical, Plastic and Electronics Waste

Sl. No	Type	Status	Proposed actions	Authority

Sl. No	Type	Status	Proposed actions	Authority
1	**Industrial Waste**	➢ No industrial waste dumped on land or discharged into water bodies/river. ➢ Industrial wastes are managed by industries itself ➢ Authorisation have been granted to different industries in line with Water act 1974, Hazardous Waste (Management, Handling and Transboundary Movement) Rule, 2008 as amended. ➢ Regular monitoring by PCBA to ensure that the terms and conditions are strictly adhered in accordance with the prescribed standards.	Direction issued to the industries to identify the non-point sources and arrest contamination of storm water.	Pollution Control Board Assam
2	**Municipal waste**	➢ Municipal Body has incorporated collection of Municipal Solid Waste ward wise from the generation point for treatment and disposal. ➢ Dumping is carried out unscientifically in the open space. ➢ No proper segregation of bio-degradable and non-biodegradable waste ➢ No proper segregation of dry and wet waste ➢ Lack of scientific disposal facilities/infrastructure technology like decentralized composting or bio-methanation plant, waste to energy plant, solid waste management plant.	Municipal Body is in process of inducting the following activity ➢ Implementation of segregation of waste at source ➢ Door-to-door garbage Collection of waste ➢ Formation of Sanitation task Force ➢ Formation of Neighbourhood Community ➢ Awareness campaigns Processing and disposal of waste	Municipal Body
3	**Plastic Waste**	➢ Dumping is carried out unscientifically in the open space along with the municipal waste. ➢ No proper segregation of bio-degradable and non-		Municipal Body/Pollution Control Board Assam

Sl. No	Type	Status	Proposed actions	Authority
		biodegradable waste ➢ No proper segregation of dry and wet waste ➢ Lack of scientific disposal facilities/infrastructure technology like decentralized composting or bio-methanation plant, waste to energy plant, solid waste management plant.		
4	**Hazardous Waste**	➢ Hazardous waste are managed by hazardous waste generating industries itself by disposing the same through authorised recycler, secured landfill area, Bio-remediation etc. ➢ Lack of TSDF facility for commonly utilization by hazardous waste generating industries		Pollution Control Board Assam
5	**Bio-medical Waste**	➢ Biomedical waste generated from the HCFs are disposed through the facility available at Jorhat Medical College and Hospital. ➢ The HCFs have installed ETP for treatment of liquid waste generated	Direction issued to all HCF unit to implement the BMW Rules, 2016 as amended in all HCF Units. (As per guidelines of CPCB)	HCF units/Pollution Control Board Assam
6	**E –waste**	➢ Annual return in (Form-3) is submitted by E-Waste generating units to PCBA from time to time for onwards transmission to CPCB ➢ Most of the e-waste generator have sent their e-waste to their respective manufacturer. ➢ There is no authorised recycler, refurbisher, dismantler etc. available to	Few entrepreneur approached PCBA for registration and authorisation as Recycler	Pollution Control Board Assam

Sl. No	Type	Status	Proposed actions	Authority
		ensure environmentally sound management of E-waste. ➢ There is no "facility" wherein the process of dismantling, recycling, and disposal of e-waste are carried out.		

8.3. Gaps identified in waste management

Presently, around 132320.4 Kg/day of gaps has been identified for municipal solid waste management

8.4. Greenery development - Plantation Plan

State Government 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 runoff 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 recorded as per the master plan of Brahmaputra Board is 594.30 m^3/sec and the average water level recorded is about 86 m. It is also observed that even during the dry season, the river maintains 50% of the average flow recorded.

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. Different irrigation activities are underway and proposed under different government schemes in the form of LIS, FIS etc in the river.

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 and evaluation schedule and plan is proposed, which is 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:

- Upstream of River.
- Down Stream of the river Bhogdoi before confluence with Gelabeel.

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 Bhogdoi 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 IX: Action Points

Type	Action Points	Responsible Authority	Time Targeted
	a) Strict observation/ monitoring of industrial effluent/waste		

Type	Action Points	Responsible Authority	Time Targeted
Industries	water discharge strictly for compliance. a) Stringent action against non-complying industrial units b) No industry should operate or continue manufacturing process unless they possess valid permission for ground water extraction from Central Ground Water Authority (CGWA) c) Small service providing units like street food selling vendors, laundry etc should not be allowed to dispose solid, liquid or semi-liquid wastes directly into the drains or sewers. d) Set up online monitoring system in the major industries. e) To stress all the industrial units to adopt cleaner technology and take appropriate measures for reduction of effluent, recycling and reuse of treated water f) Directions has been issued for Zero Liquid Discharge (ZLD) in the major polluting industrial units	**Pollution Control Board Assam**	**3 Months (June, 2019 To August, 2019)**
Interception and treatment of raw sewage	a) The quality of waste water flowing in the drains of identified polluted stretch have to be analysed and studied to assess the drain wise characteristics of waste water. b) Concerned departments should design the installation of Sewage Treatment Plant (STP) based on flow details of the drains and utilization capacity and ensure that each	**PCBA/ Municipal Corporation/ ULBs/ District Administration/ Water Resource Department**	**2 Years (June,2019 to May, 2021)**

Type	Action Points	Responsible Authority	Time Targeted
	households are connected to the sewers as applicable. c) Sewage Treatment Plant should also consider treatment and disposal of sewage for river catchment area settlement including discharge from toilets constructed under Swachh Bharat Mission d) To trap the discharge using strainers before falling into river. e) Channelization including diversion of sewage generated from households to sewer lines/interception of all the drains presently carrying sewage and for ensuing proper treatment through the upcoming STPs. f) Local administration should provide pucca latrines to all the households through Individual Households Latrines (IHHL) Scheme under Swachh Bharat Mission.		
Ground Water Assessment **Ground Water**	a) Conducting survey regarding ground water usage by category wise such as domestic, community, industries 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. c) All the industries should have valid NOC from CGWA.	**PCBA/CGWA**	**Continuous** **6 Months (February,2020**

Type	Action Points	Responsible Authority	Time Targeted
Assessment	d) To promote roof top rain water harvesting by the industrial, commercial including individual households thereby recharging the ground water. e) Directions to be issued that no industries should inject their treated effluent for ground water recharging.		**to July, 2020)**
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/ Municipal Corporation /Forest Department/ Tourism Department/PWD Assam/District 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 a) Modification of consent conditions in and around the polluted stretches. b) Surveillance of sources of pollution in contrast to the norms. c) Assessment of water quality	**Pollution Control Board Assam**	**3 Months (June,2019 to August, 2020)** **c) Monthly Basis**

Type	Action Points	Responsible Authority	Time Targeted
	of the polluted stretches on monthly basis has already been commencing d) 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.	**ULBs/ 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.	**Environment & Forest Department /UDD/P&RD/ULBs/ Gram Panchayat**	**Continuous**

14. Budget Estimate

1	No. of STPs	01 No.
2	Capacity of STP	35 MLD
3	Life of STPs	25 years
4	Cost of STPs, Sewerage System, Pumping Station & other Accessories	Rs. 43 crores
7	For Captive power	0.5 Crore
Total Amount		**Rs. 43.5 Crores**