ACTION PLAN FOR DHANSIRI RIVER-PRIORITY V

1. Basic information about the Stretch

The river Dhansiri originates from the south-west corner of Naga hill below the laishang peak. The river course can be divided in to two reaches. i) from source to the confluence of the river Diyung. ii) from confluence of the Diyung to the Brahmaputra.

The Dhansiri basin is bounded by the river Brahmaputra in the north, Manipur in the south, Karbianglong district in the west, and the Jhanji basin in the east. The basin lies between latitude $26^0$42'N & $25^0$21'N and longitude $94^0$37'E & $93^0$10'E. The total length of the river from its source to outfall is approximately 352km and the total catchment area of the basin is 12,584 sq.km in plains. There are two major sub- tributaries of river Dhansiri) Kakodonga ii) Bhogdoi are also in Dhansiri catchment.

For the first 40 km from its source, the river flows in a north westerly direction and thereafter it flows to north-east for about 76km up to Dimapur. Beyond Dimapur, the direction of flow is generally northerly up to Golaghat, where the river takes an abrupt turn towards North West and ultimately joins the Brahmaputra at Dhansirimukh. It is the main river of Golaghat district of Assam and Dimapur of Nagaland.

The river attains a maximum breadth of 132 m near Golaghat and average depth is about 6.20 m. The hydrological station on the river at Numaligarh station indicates its danger level as 77.42 m and maximum, minimum and average water discharges as 209,185, 4.88 and 513 $m^3 s^{-1}$respectively.

1.1. Polluted river stretch/length

The length of the polluted stretch of Dhansiri River at Golaghat is 2.5 km (approx.) with an area of 15 sq.km. **(Fig 1)** andthe stretch identified as polluted is from Moinapara to Selengi for Dhansiri river at Golaghat.

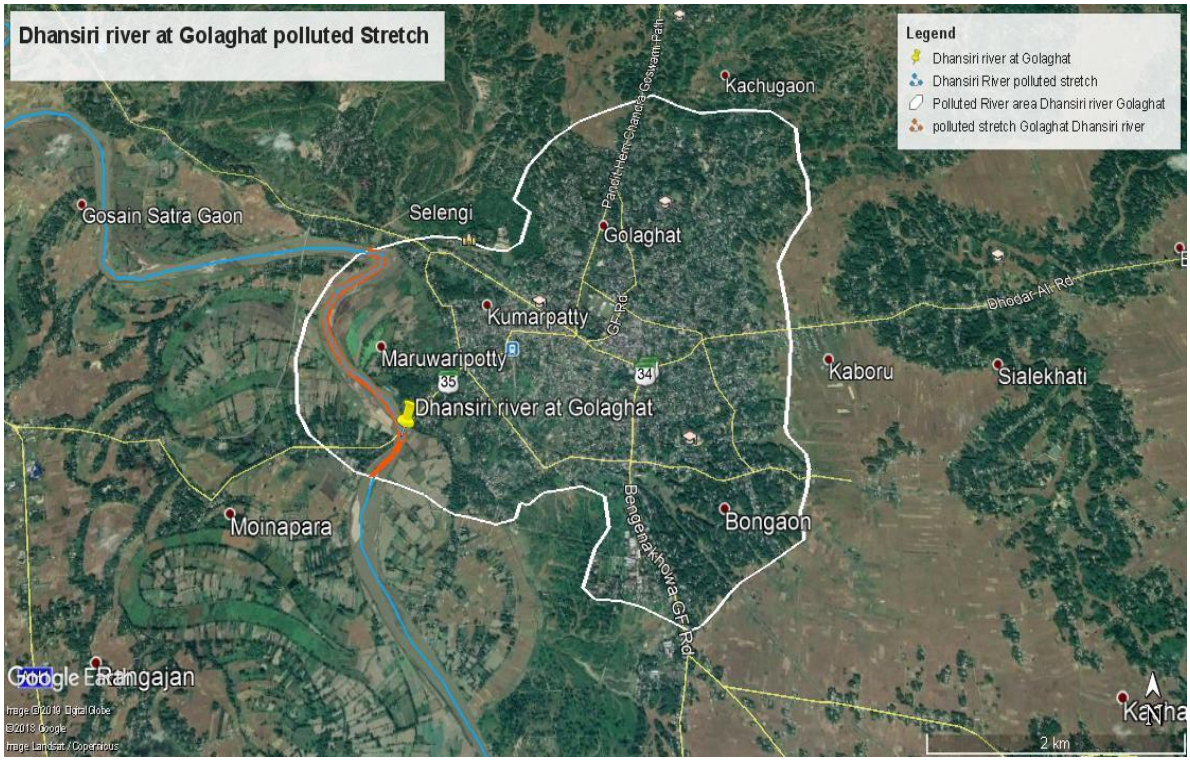

Fig 1: Map showing the polluted river stretch of Dhansiririver at Golaghat

The length of the polluted stretch of Dhansiririver at Jahajghat area about 2 kmwith an area of 3 sq.km. **(Fig 2)** and the identified polluted stretch is from Numaligarh town to Rowdawar Pahar

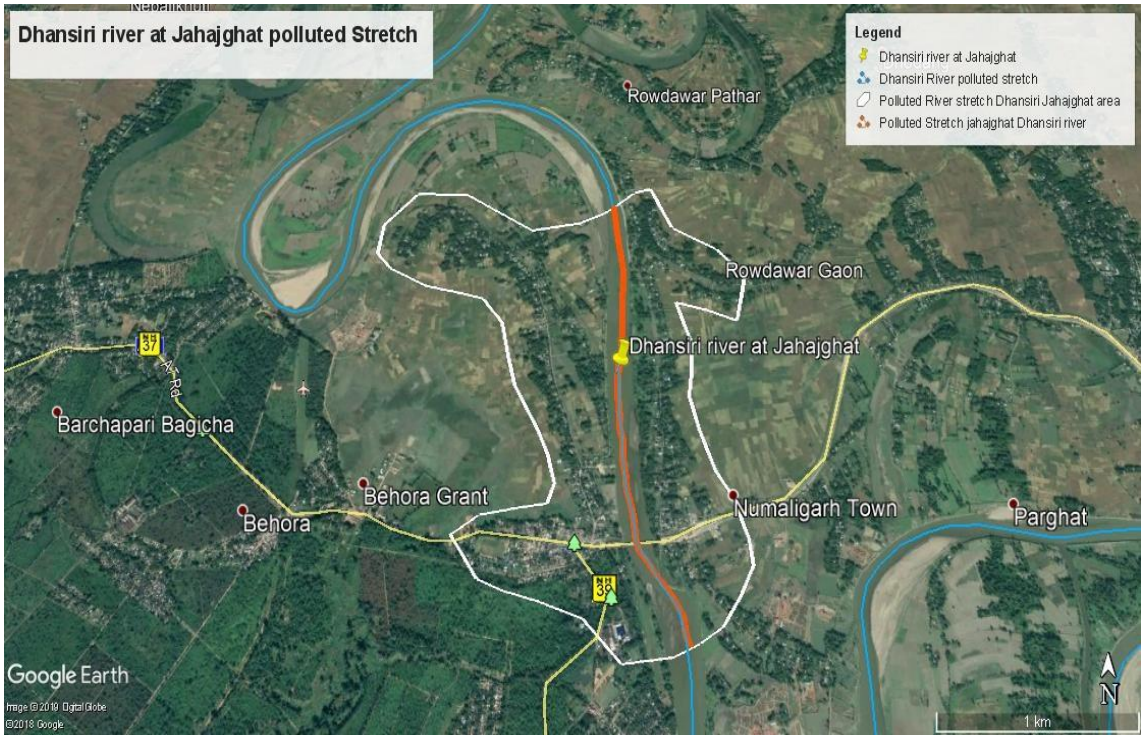

Fig 2: Map showing the polluted river stretch of Dhansiririver at Jahajghat

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 Committee (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 Dhansiri 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

(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 Dhansiririver are as follows

5.1. Industrial Pollution Control

Classified industrial units in the form of Health care Units, Hotels, Tea estates etc. are observed with infrastructural facilities (ETPs, STPs) in the periphery of the polluted river stretch at Golaghat and Jahajghat along with few small scale industrial establishments

The major heavy industrial unit Numaligarh Refinery is situated at a radius of approximately 6 kms from the polluted stretch of Dhansiri river at Jahajghat. However, Numaligarh Refinery has been practicing zero liquid discharge and hence the unit do not contribute any water pollution and the impact is negligible.

Further directions were issued by the PCBA to all the industrial units which has 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 periphery of the demarcated area of the polluted river stretch is presented at **Table I.**

Table I: Industry Details as per the following of the polluted river stretch of Dhansiri river at Golaghat

Sl. No	Name of the Industry	Category	Total Water Consumption (KLD)		Waste Water /waste Generation (KLD)	Without consent/Directions issued	ETPs		CETPs	OCEMS	Gaps	Proposed CETP
			Ground Water	Supply Water			**Functional**	Non-Functional				
1	Golaghat Nursing Home (P) Ltd., Golaghat	Orange	5.0		4.0	Under process	Functional					
2	GBM Nursing Home, Golaghat		5.0		4.0	Without Consent		Non-Functional			4.0	
3	HGM Nursing Home Hospital, Golaghat		3.0		2.0	Under process	Functional					
4	Life Line Hospital and Research Centre, Golaghat		3.0		2.0	Without Consent		Non-Functional			2.0	
5	M/S Arin Tea Pvt. Ltd., Golaghat	Green	2.0		2.0	Consent not applied for 2019-2020	Functional					Nil
6	M/S Golaghat Tea Pvt. Ltd., Golaghat		2.0		2.0	Consent not applied for 2019-2020	Functional		**Nil**	**Nil**		
7	M/S Halmira Tea Pvt. Ltd., Golaghat		2.5		2.0	Consent not applied for 2019-2020	Functional					
8	M/S Halmiramook Tea (Golaghat) Industries		1.5		1.5	Under process	Functional					
9	M/S MalpaniTea Co. Pvt. Ltd., Golaghat		2.0		2.0	Consent not applied for 2019-2020	Functional					
10	M/S Premier Tea Industry., Golaghat		2.0		2.0	Under process	Functional					
11	M/S Gauripur Tea Industry, Bengenakhowa, Golaghat		1.5		1.5	Under process	Functional					
12	M/S Jallan Udyog, Jallan Udyog Nagar, Golaghat		1.5		1.5	Consent not applied for 2019-2020	Functional					
13	M/S Hotel Luscious, New	Green	3.0		2.0	Consent not		Non			2.0	

	Amolapatty					applied for 2019-2020		Functional				
14	M/S Luscious Kitchen, Thana Chariali		1.5		1.0	Consent not applied for 2019-2020		Non Functional			1.0	
15	M/S Baloram Hotel, Dhodar Ali		2.5		1.5	Consent not applied for 2019-2020		Non Functional			1.5	
16	M/S Hotel Parichay, Near Bata Point, Golaghat		2.0		1.0	Consent not applied for 2019-2020		Non Functional			1.0	
17	M/S Hotel Bhog, Golaghat		3.0		2.5	Consent not applied for 2019-2020		Non Functional			2.5	
18	M/S Hotel Atithya, Dhodar Ali		2.0		1.5	Consent not applied for 2019-2020		Non Functional	**Nil**	**Nil**	1.5	Nil
19	M/S Priyam Bhawan, Main Road		2.0		1.5	Consent not applied for 2019-2020		Non Functional			1.5	
20	M/S Pandey Hotel, Golaghat		2.0		1.5	Consent not applied for 2019-2020		Non Functional			1.5	
21	M/S Maya Lodge, Golaghat		2.5		2.0	Consent not applied for 2019-2020		Non Functional			2.0	
22	M/S Indrani Guest House, Tapan Nagar, Golaghat		2.5		2.0	Consent not applied for 2019-2020		Non Functional			2.0	
23	M/S MadhuramHotel, Golaghat		2.0		1.0	Consent not applied for 2019-2020		Non Functional			1.0	
24	M/S Nambor Guest House, Station Road, Golaghat		3.0		2.0	Consent not applied for 2019-2020	Functional				2.0	
Total			**59**		**46**	**-**	**-**	**-**			**25.5**	

Table II: Industry Details as per the following of the polluted river stretch of Dhansiri river at Jahajghat

Sl. No	Name of the Industry	Category	Total Water Consumption (KLD)		Waste Water /waste Generation (KLD)	Without consent/Directions issued	ETPs		CETPs	OCEMS	Gaps	Proposed CETP
			Ground Water	Surface Water			Functional	Non-Functional				
1	M/S Numaligarh Refinery, Numaligarh, Golaghat	Red		10744.7	ZLD	Consent Valid till 31.03.2019	Functional	-	Nil	Nil	-	Nil
2	M/S Numaligarh Refinery (for STP and Composting Plant), Numaligarh			700.0 (Dhansiri river)	ZLD	Consent Valid till 31.03.2019	Functional	-			-	
3	VKNRL Hospital, Numaligarh		8.0		5.0	Consent under process	Treated jointly with NRL STP	-			-	
4	M/S Letukajan Tea Estate, Lettukajan	Orange	5.0		5.0	Consent under process	Functional	-			-	
5	M/S Marangi Tea Estate, Lettukajan	Green	1.5		1.5	Consent under process	Functional	-			-	
6	M/S Numaligarh Tea Estate, Numaligar		2.0		2.0	Consent under process	Functional	-			-	
Total			**16.5**	**11,444.7**	**13.5**	-	-	-			-	

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

Golaghat and Numaligarh are the major town/locality located on the bank of the polluted stretch of Dhansiri river. The Numaligarh area falls under the Golaghat district and located 28 km towards west from District head quarter Golaghat.

The approximate population of the Golaghat town is 41989as per Census 2011 with eleven (11) numbers of wards. The major localities identified in and around the catchment areas of polluted stretch of Dhansiri river at Golaghat are Maruwaripatty, Kumarpatty, Bongaon, Bhogagaon, Rupnagar, Chandannagar, Jyotinagar, Junai Nagar, Goranga etc. Moreover, the major localities identified in the catchment area of polluted stretch of Dhansiririver at Jahajghat are Numaligarh town, Rowdawargaon, Behora grant etc. The area is medium sizedlocalitywith a population of around 760 as per Census 2011. Around 164 families are residingand settled in a scattered plan.

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

The major towns responsible for contribution of sewage in the polluted stretches of Dhansiri river are Golaghat and Numaligarh. The waste

generated by Golaghat town is 4534.8 KLD and Numaligarh town is 82.1 KLD.

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

As per the survey done, one (01) number of STP has been proposed at Golaghat town in consultation with the Urban Local Body (ULBs). However, the sewage generation from the Numaligarh town is minimal and hence the untreated sewage can be taken care of by adopting stringent remedial actions.

Table II: Sewage generation and gaps in treatment

S.N	Area	Population as per 2011 census	Water Consumption (KLD) @135lpcd	Sewage Generation (KLD)	No. of STPs proposed	Existing Treatment capacity (KLD)	Gaps in KLD
1	Golaghat	41989	5668.5	4534.8	01	Nil	4534.8
2	Numaligarh	760	102.6	82.1	Nil	Nil	82.1

6.4. Water Quality of the river stretch

There are two (2) sampling locations of Dhansiri River at Golaghat district under NWMP.

Table III: Monitoring Locations Details

S.No	Sampling Location	Coordinates
1	Dhansiri river at Golaghat	26°30'9.68" N 93°57'7.52" E
2	Dhansiri river at Jahajghat	26°38'21.43" N 93°43'46.82" E

The water quality of Dhansiri river in terms of BOD value for the year 2016-2017 is presented below:

Table IV: BOD value in mg/l of Dhansiri river at Golaghat for the year 2016-17

Dhansiri river at Golaghat								Dhansiri river at Jahajghat					
Year	BOD	Year	BOD	Year	BOD	Year	BOD	Year	BOD	Year	BOD	Year	BOD
Jan-16	0.9	Jan-17	1.3	Jan-18	1.4	Jan-19	1.7	Jan-17	-	Jan-18	2.6	Jan-19	1.7
Feb-16	1.1	Feb-17	1.3	Feb-18	1.8	Feb-19	**3.0**	Feb-17	-	Feb-18	1.1	Feb-19	2.3
Mar-16	1.2	Mar-17	1.0	Mar-18	0.8	Mar-19	2.2	Mar-17	-	Mar-18	1.6	Mar-19	2.0
Apr-16	1.4	Apr-17	2.0	Apr-18	1.1	Apr-19	2.2	Apr-17	-	Apr-18	**3.1**	Apr-19	3.0
May-16	1.6	May-17	1.0	May-18	2.3	-	-	May-17	-	May-18	2.6	-	-
Jun-16	2.0	Jun-17	2.5	Jun-18	1.6	-	-	Jun-17	-	Jun-18	1.6	-	-
Jul-16	2.5	Jul-17	2.9	Jul-18	2.5	-	-	Jul-17	**4.3**	Jul-18	2.0	-	-
Aug-16	1.8	Aug-17	**3.0**	Aug-18	1.5	-	-	Aug-17	**3.3**	Aug-18	1.6	-	-
Sep-16	2.6	Sep-17	**3.6**	Sep-18	**6.2**	-	-	Sep-17	2.0	Sep-18	**4.3**	-	-
Oct-16	1.6	Oct-17	**5.6**	Oct-18	1.5	-	-	Oct-17	2.9	Oct-18	1.6	-	-
Nov-16	1.3	Nov-17	2.6	Nov-18	2.4	-	-	Nov-17	2.4	Nov-18	2.4	-	-
Dec-16	1.8	Dec-17	2.8	Dec-18	1.6	-	-	Dec-17	1.8	Dec-18	1.7	-	-

The above data indicated that BOD value has failed to meet the standard criteria in only five (05) occasions at Golaghat location. The Jahajghat location has been commenced from July, 2017 under the NWMP by CPCB, Delhi and has excceded the standard criteria in four (04) 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

This incidental exceedance of BOD level does not reflect the extremity of pollution. Hence this can be considered as incidental and can be omitted from the polluted river stretch

6.5. Drains contributing to pollution

Drains of natural origin and nullahs or constructed channels exist in the periphery of the polluted stretch area which is responsible for evacuation of the sewage originating from households, commercial establishments etc. into

the river. The two major drains that collects majority of the storm water and sewage are as per the following **Table V.**

Table V: Major drains contributing to pollution in the river

Sl. No	Name of Drain	Description
1	Chengajan Drain	Originated in the eastern side of the town and flows towards the west along the southern side
2	Hajokhurung	Originated in the eastern side of the town and flows towards the west along the northern side

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 riveris 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.

The BOD load generally increases due to discharge of untreated sewage in the river through different drains and channels.

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

There is no any 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 Golaghat town with a capacity of 4.6 MLD in consultation with the Urban Local Body (ULBs)

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

Some of the natural drainage of local origin are acting as the main drainage system. The major natural waterways are namely Gelabeel, Mahurajan, Dholajan, Kandhijan etc. and they are responsible for draining off sewage of the Golaghat and Numaligarh town into the Dhansiri river.

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. Under the Swachh Bharat Mission, Public Health Engineering has constructed 13403 numbers of IHHL to attain open defecation free status. Moreover, construction of community toilets under SoDP haven been proposed by the Local administration.

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.
- Every households should be recommended to have individual drainage that should be connected to soak pits or stagnated pool.
- The discharge should be trapped by strainers before draining off to the river.
- 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 tocontrol 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

The district is potential from ground water point of view as revealed by the studies carried out by CGWB. The stage of ground water development is 17%, which shows under the SAFE category. 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 inthe Golaghat district is presentedbelow in **Table VI**

Table VI: Estimation of ground water resource in the Golaghat district

Ground water extraction details	Ground water	Ground water recharging mechanism	Rain water harvesting
Net Ground Water Availability	1316.24 mcm	Recharging of groundwater are done by creation of Pond/lakes under government schemes.	The roof top rainwater harvesting is practiced.
Gross Ground Water Draft	221.43 mcm		
Stage of Ground Water Development	17%		
Future provision for Domestic & Industrial Use	31.39 mcm		
Future Provision for Irrigation Use	1087.34 mcm		

(a) Irrigation Practices

At present, the district is undertaking some minor and medium irrigation schemes such as Deep Tube Well and Shallow Tube Well which is as per the following in **Table VII**

Table VII: Irrigation schemes in progress and proposed at Golaghat

S.No	Name of Scheme	Created Potential
1	**NABARD DTW Scheme**	
	Habigaon	30 ha
	Chakaliapathar (5Points)	280 ha
	Rangamati (10 Points)	150 ha

	Betioni	30 ha
	Chetiagaon(1Pt)	30 ha
	Morangaon	30 ha
	Gomari (12 points)	-
	Athgaon (12 points)	-
	Betonipathar	-
	Gondhkoroi	-
	Sautoli	-
	Bilotia	-
	Dergaon	-
	Upper Khatuwal	-
2	**SCSP (DTW Scheme)**	
	RatanpurKaibatragaon (3 points)	-
	Dergaon (5 points)	-

7.1. Status of Ground Water

The ground water is suitable for domestic, irrigation and industrial purposes. However, the high concentration of iron beyond permissible limit in ground water in some areas only poses problem, which can be lowered by aeration and filtration method.

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

Sl. No	Name of River	Flood plain areas
1	Dhansiri river at Golaghat	Golaghat Grant, Maruwaripotty, Mowkhowa Grant gaon and Halmira Grant gaon
2	Dhansiri river at Jahjghat	Numaligarh Town

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

8.2. Waste management status

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

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	Direction issued to the industries to identify the non-point sources and arrest contamination of storm water.	Pollution Control Board Assam

Sl. No	Type	Status	Proposed actions	Authority
		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.		
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-biodegradable waste ➢ No proper segregation of dry and wet waste ➢ Lack of scientific disposal facilities/infrastructure technology like decentralized composting or bio-		Municipal Body/Pollution Control Board Assam

Sl. No	Type	Status	Proposed actions	Authority
		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**	➢ Segregation at the source under Biomedical waste Management Rules, 1998 as amended ➢ 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 ➢ There is no authorised recycler, refurbisher, dismantler etc. available to 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. ➢ Most of the e-waste generator sent their e-waste to their respective manufacturers.	Few entrepreneur approached PCBA for registration and authorisation as Recycler	Pollution Control Board Assam

8.3. Gaps identified in waste management

Presently, around 25193.4 Kg/day of gaps has been identified from the Golaghat town and 456 Kg/Day from the Numaligarh town 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 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 hydrological station on the river at Numaligarh station indicates its danger level as 77.42 m and the average water dischargeis 513 $m^3 s^{-1}$ with an average depth of about 6.20 m

9.2. Irrigation practices in the river

The high volume ofdischarge and water level of the river can be of great use for good irrigation practices for the people. The irrigation practices undertaken in the river under government proposed schemes are as per the following details in **Table IX.**

Table IX: Irrigation schemes in progress in the Dhansiririver

Sl. No.	Name of the Scheme	Created Potential
1	LIS from river Dhansiri in Podumoni area	50 ha
2	LIS from river Dhansiri in Thengalgaon Area	100 ha

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 ResourceDepartment
- 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:

- Downstream of the river at Dhansirimukh before confluence with Brahmaputra

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 DhansiriRiver, 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 X: 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	**PCBA/ ULBs/ District Administration/ Water Resource Department**	**2 Years (June,2019 to May, 2021)**

Type	Action Points	Responsible Authority	Time Targeted
	and ensure that each 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	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	**PCBA/CGWA**	**Continuous** **6 Months**

Type	Action Points	Responsible Authority	Time Targeted
Ground Water Assessment	valid NOC from CGWA. 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.		**(February,2020 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/ ULBs /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.	**Pollution Control Board Assam**	**3 Months (June,2019 to August, 2020)** **c) Monthly Basis**

Type	Action Points	Responsible Authority	Time Targeted
	c) Assessment of water quality 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/ Gram Panchayat**	**Continuous**

14. Budget Estimate

1	No. of STPs	01 No.
2	Capacity of STP	4 MLD
3	Life of STPs	25 years

4	Cost of STPs,Sewerage System, Pumping Station and other accessories.	6 crores
7	For Captive power	0.5 Crore
Total Amount		**Rs. 6.5 Crores**

Members of River Rejuvenation Committee (RRC)

Secretary to the Govt of Assam
Environment & Forest Department

Secretary to the Govt of Assam
Urban Development Department

23/7/19

Commissioner
Industries and Commerce Assam

Member Secretary
Pollution Control Board Assam