ACTION PLAN FOR RANGANADI RIVER-PRIORITY V

1. Basic information about the Stretch

The Ranganadi river is one of the major tributary of river Brahmaputra and lies in the northeastern part of Assam. It originates at an elevation of 3,440.00m near the border of Lower Subansiri and East Kameng districts. The total 2941 sq km catchment area of the Ranganadiriver is divided between Arunachal Pradesh and Assam of which 700 sq km lies in the Lakhimpur district of Assam and the remaining 2241 sq. km lies in Arunachal Pradesh. The total length of the river is 90 miles.

1.1. Polluted river stretch/length

The length ofthe polluted stretch of Ranganadi at D/S of Hydel project, Gerukamukh is 3km (approx.) with an area of 3.2 sq.km. (Fig 1).The stretch identified as polluted is from Ujani Miri to Nabhagani of Lakhimpur District.

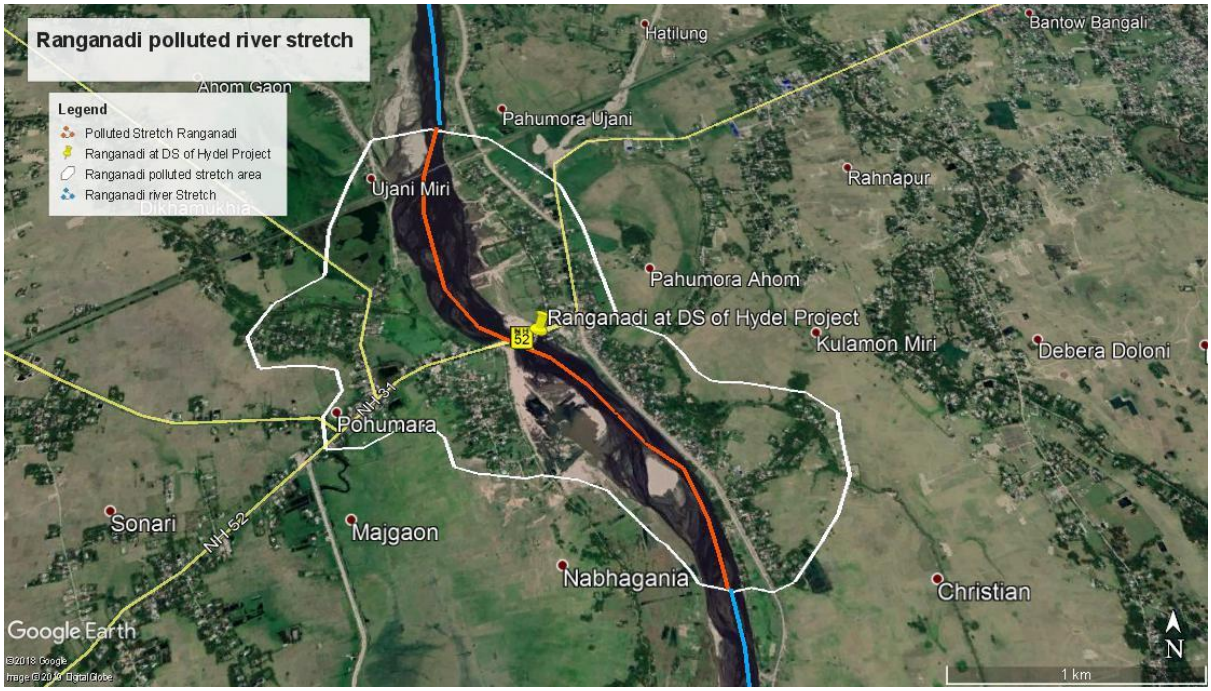

Fig 1: Map showing the polluted river stretch of Ranganadi at D/S of Hydel project

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 Ranganadi 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 Ranganadi river are as follows

5.1. Industrial Pollution Control

No industrial estate/notified industrial area is located within the periphery of the demarcated area of the polluted stretch of Ranganadi catchment area as presented in **Table I**

Table I: Industry details as per the following in the polluted river stretch

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

There has been no account of industrial estate/notified industrial area in the Ranganadi catchment area

5.3. Industries without consent/authorisation

No industrial estate/notified industrial area observed in the vicinity of the river

5.4 Number of directions issued to industries

No industrial estate/notified industrial area observed in the vicinity of the river

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

There has been no account of industrial estate/notified industrial area in the Ranganadi catchment area

5.6. Number of industries having captive ETPs and treatment capacity

There has been no account of industrial estate/notified industrial area in the Ranganadi catchment area

5.7. Number of industries are members of the CETPs

There is no any CETPs at present

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

There is no any CETPs at present in the catchment area of the wetland.

5.9. OCEMS installation status by industries

There has been no account of industrial estate/notified industrial area in the Ranganadi catchment area

5.10. Gaps in treatment of industrial effluent

There is no gap in treatment of industrial effluent.

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

6.1. Major towns located on the bank

The two major villages located at the radius of the demarcated area of the polluted stretch area Ujani Miri and Pohumara that belongs to Lakhimpur District.

The villages are medium sizedwith a total population of around 1407 with 287 households as per Census 2011.

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

The major localities responsible for contribution of sewage in the polluted stretch of Ranganadi river are Ujani Miri and Pohumara under Naobaicha Tehsil of Lakhimpur District. The waste generated is approximately 152.0 KLD

The households have their individual drainage that have been connected to soak pit, stagnated pool to drain off their waste whereas some of the discharges get absorbed in the soil. They also undertake composting and burial of the waste.

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

As per the survey done, the sewage generation from the identified villages under Naobaicha Tehsil of the Ranganadi polluted river stretch 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	Ujani Miri	457	61.7	49.4	Nil	Nil	49.4
2	Pohumara	950	128.3	102.64	Nil	Nil	102.64
Total		**1407**	**190**	**152.0**	**Nil**	**Nil**	**152.0**

6.4. Water Quality of the river stretch

There is one (01) sampling location of Ranganadi River at Lakhimpur District under NWMP which is presented as below in **Table III**

Table III: Monitoring Location Details

Sampling Location	Coordinates
Ranganadi at D/S of Hydel project, Gerukamukh	27°12'13.99" N 94°10'53.86" E

The change in the water quality of Ranganadi river in terms of BOD value for the period 2017-2019 is presented below:

Table IV: BOD value in mg/l of Ranganadi river at D/S of Hydel project from the year July, 2017-April, 2019

Year	BOD Value	Year	BOD Value	Year	BOD Value	Year	BOD Value
Jan-16	1.1	Jan-17	2.0	Jan-18	2.6	Jan-19	1.5
Feb-16	1.6	Feb-17	2.0	Feb-18	1.3	Feb-19	2.5
Mar-16	0.9	Mar-17	2.9	Mar-18	1.5	Mar-19	2.5
Apr-16	2.4	Apr-17	1.9	Apr-18	1.0	Apr-19	1.5
May-16	1.0	May-17	1.8	May-18	1.2		
Jun-16	2.4	Jun-17	1.6	Jun-18	**3.4**		
Jul-16	0.9	Jul-17	**3.8**	Jul-18	1.2		
Aug-16	0.4	Aug-17	0.5	Aug-18	2.6		
Sep-16	1.9	Sep-17	0.8	Sep-18	2.5		
Oct-16	1.7	Oct-17	1.6	Oct-18	1.3		
Nov-16	0.7	Nov-17	1.8	Nov-18	2.1		
Dec-16	1.9	Dec-17	1.2	Dec-18	2.5		

The above data indicated that BOD value has exceeded the standard normsin only two (02) occasions out of forty (40) occasions. Assam is

cursed with the catastrophic flood every year and hence theincidental exceedance of BOD load may probably be due to additional organic matter introduced in the river as a result of continuous rainfall during this disastrous calamity.Hence this exceedance can be considered as incidental and can be omitted from the polluted river stretch. Moreover, this marginal exceedance of BOD level does not reflect the extremity of pollution.

6.5. Drains contributing to pollution

Kucha nullahs or constructed drains of natural origin exist in the identified area to evacuate the domestic sewage originated from individual households. However, most of the households have individual drainage that has been connected to soak pit, kitchen garden and stagnated pool to take care of the waste. However, the discharges from the open dumping gets absorbed by the soil before making their way to the river. Some of the individuals follow segregation at the source and perform composting and burial of the waste in their premises.

6.6. Characteristics of the major drains

All the drains contributing to pollution of the river are domestic and commercial sewage carrying drains.

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 gets absorbed by soil or ultimately find their ways to water bodies without treatment.

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, STP is not required for such minimal sewage generated area.

6.11. Drainage system/ sewerage network present/proposed

Some natural drainage like streams and rivulets of local origin are acting as the main drainage system

There is no sewerage system at present. No sewerage system has been proposed under this project. The sewage generation is minimal and by adopting stringent remedial actions, sewage generation and treatment can be done.

6.12. Treatment and Disposal of Septage and controlling Open Defecation

Most of the households own individual toilets, however others depend on community and public toilets.The toilets they used are deep single pit/leach pit, double pits and properly equipped septic tanks. In the Lakhimpur district, 2319 numbers of IHHL under Swachh Bharat Mission have been constructed to achieve Open Defecation Free status. However, under Naobaicha Tehsil, the villages are deprived of the IHHL scheme under Swachh Bharat Mission.

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

- The discharge should be trapped by strainers before draining off to the river.
- Every households should be recommended to have individual drainage that should be connected to soak pits or stagnated pool.
- 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 in Lakhimpur district is 11%, 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

TableV: Estimation of ground water resource in the Lakhimpur district

Ground water extraction details	Ground water	Ground water recharging mechanism	Rain water harvesting
Net Ground Water Availability	1198.15 mcm	Recharging of groundwater are done by creation of Pond/lakes under government schemes.	The roof top rainwater harvesting is practiced.
Net Ground Water Draft	128.76 mcm		
Stage of Ground Water Development	11%		
Projected Demand for Domestic and Industrial Uses	32.14 mcm		
Future Provision for Irrigation Use	1060.03 mcm		

(a) Irrigation Practices

The Local Administration has undertaken new DTW schemes under PMKSY at Ujani Miri and Pohumara villages under the Naobaicha Tehsil and the details are as following in **Table VI**

Table VI: Irrigation schemes in progress at Ujani Miri and Pohumara under Naobaicha Tehsil

S.No	Name of Scheme	Created Potential
1	Pahumora DTW (2 pts.) New	50 Ha
2	Pahumora Ahom DTW (2 pts.)	50 Ha
3	Ujani Miri DTW (2 pts.)	50 Ha

7.1. Status of Ground Water

The quality of ground water in the Lakhimpur district is suitable for both the drinking and irrigation purposes except with higher concentration of iron (Fe) in the range of 0.13 to 6.98mg/l and is observed generally high in permanently water-logged areas like Bhogpur Chariali, Bihpuria and Kadam

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 and Location	Flood plain areas
1	Ranganadi at D/S of Hydel project, Gerukamukh	Ujani Miri

8.2. 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 VII: Management of Industrial, Municipal, Biomedical, Plastic and Electronics Waste

Sl. No	Type	Status	Proposed actions	Authority
1	**Industrial Waste**	No industrial units have been identified in the polluted river stretch	N/A	N/A
2	**Municipal waste**	➢ The individual households adopt insitu management like burial/composting in their premises. ➢ The households have individual drainage channels that is connected to soak pits, stagnated ponds and kitchen garden.	Village Panchayats and NGOs has inducted awareness generation regarding the solid waste management rules	Village Panchayats/NGOs
3	**Plastic Waste**	Negligible volume of plastic wastes are generated	Issue directions to village panchayats to segregate and collect plastic waste and intitiate necessary steps to channelize the waste to authorised agencies for recycling and reprocessing	Village Panchayats/NGOs
4	**Hazardous Waste**	No industrial units have been identified in the polluted river stretch	N/A	N/A
5	**Bio-medical Waste**	No healthcare units have been identified in the polluted river stretch	N/A	N/A
6	**E –waste**	No bulk consumers and generators have been identifed	N/A	N/A

8.3. Gaps identified in waste management

Presently, around 844.2 Kg/Day from the Ujani Miri and Pohumara villages under Naobaicha Tehsil 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 river discharges 170- 180 m^3/sec per second in winter and 1800-2000 m^3/sec per second in summer

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. Different major and minor irrigation activities are in progress and proposed in the river in the form of Lift Irrigation System (LIS), Farm Irrigation System (FIS) under different government schemes.

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:

- Upstream of the River

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 Ranganadi 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 VIII: 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	**PCBA/CGWA**	**Continuous**

Type	Action Points	Responsible Authority	Time Targeted
	the catchment area of the identified polluted stretch once in a year to ensure quality. 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/ ULBs /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 a) Modification of	**Pollution Control Board Assam**	**3 Months (June,2019 to August, 2020)** **c) Monthly Basis**

Type	Action Points	Responsible Authority	Time Targeted
	consent conditions in and around the polluted stretches. b) Surveillance of sources of pollution in contrast to the norms. 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.	**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	**Village Panchayats/PCBA/NGOs**	**Continuous**

Type	Action Points	Responsible Authority	Time Targeted
	related with the direct discharge of solid waste and open defecation. b) Mass awareness to conserve water.		

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