

**REVISED ACTION PLAN FOR REJUVENATION OF RIVER KYRHUKHLA,  
EAST JAINZIA HILLS DISTRICT, MEGHALAYA  
IDENTIFIED AS RIVER POLLUTED STRETCH  
UNDER PRIORITY - IV**

**PREPARED BY**

**RIVER REJUVENATION COMMITTEE  
GOVERNMENT OF MEGHALAYA**

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## 1.0 INTRODUCTION

The river is originating from the uphill region of Jalyiah and Khliehriat area flowing across the coal mining areas. The drainage from the abandoned coal mines directly discharge into the river, thereby affecting the water quality to a greater extent. The water quality is also affected by the waste generation from small scale industries located along the bank of one of the tributary Wah Kajit at Lad Rymbai. There is no major industrial estate nor any individual major industries along the catchment of the river. The total length of the polluted stretch is 5.0 Kms. Map showing the catchment area of Kyrhukhla River is shown in figure below

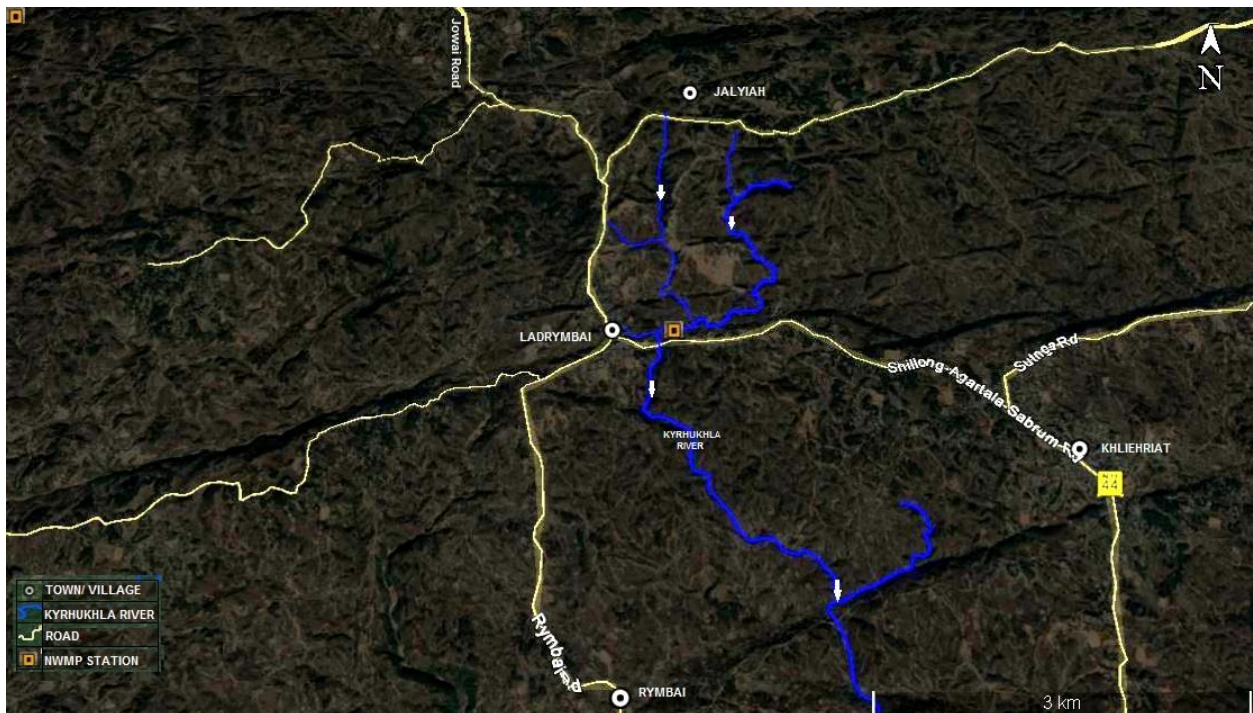


FIGURE 1: MAP INDICATING CATCHMENT OF KYRHUKHLA RIVER

- Localities in the catchment of kyrhukhla river:** The localities in the catchment of kyrhukhla river are khlieh-Myntriang, Jalyah and Lad-rymbai
- Major Industrial Areas in the Catchment of River Kyrhukhla:** There is no major industrial estate in the catchment area of the Kyrhukhla River.
- Major Drains contributing to Pollution of Kyrhukhla river:** There is tributary (Wah kajit) which carries the untreated sewage from the hotels /car servicing located in the catchment of Kyrhukhla river and Wah Sadakha carries the mine drainage. Table 1 below indicated the identified drains and their co-ordinates

**Table 1- MAJOR TRIBUTARIES CONTRIBUTING TO POLLUTION IN RIVER KYRHUKHLA**

River	Drains	GPS Coordinates	Flow (Cumec)
Kyrhukhla	Wah Kajit	N 25°21.725' E92°19.779'	0.07
	Wah Sadakha	N25°22.778' E92°20.087'	0.10

## 2.0 OBJECTIVES /ACHIEVABLE TARGETS FOR RESTORATION OF POLLUTED STRETCH OF KYRHUKHLA RIVER

In pursuance of the Hon'ble National Green Tribunal (Principal Bench), New Delhi, orders dt. 20.09.2018 and 19.12.2018 in original application No. 673/2018 in the matter on News item published in "The Hindu" Titled more river stretches are now critically polluted - Central Pollution Control Board, an action plan has been evolved with the objective of restoration of Kyrhukhla river to meet the bathing standards

## 3.0 Water Quality of the River, drains and ground water sources located in the catchment of the of the Kyrhukhla River

### 3.1 Water quality data Kyhukhla River

The river water quality data for the year 2019 (Jan to December) is provided at Table 2 below (The regular monitoring is carried out by Pollution control Board )

**Table 2-WATER QUALITY DATA OF KYRHUKHLA RIVER AT 2019**

PARAMETERS MONTHS	pH	DO mg/L	BOD mg/L	FC MPN/100ml	TC MPN/100ml
JAN	2.8	7.2	3.5	14	58
FEB	3.2	7.0	4.0	9.2	14
MARCH	2.7	6.0	5.0	<1.8	<1.8
APRIL	2.7	5.8	5.5	<1.8	<1.8
MAY	3.2	6.0	5.4	<1.8	<1.8
JUNE	3.5	6.3	5.0	<1.8	14
JULY	<b>3.6</b>	<b>6.5</b>	<b>4.0</b>	<1.8	<b>12</b>
AUGUST	<b>3.0</b>	<b>7.0</b>	<b>3.5</b>	<1.8	<b>14</b>
SEPTEMBER	<b>3.5</b>	<b>7.2</b>	<b>3.5</b>	<1.8	<b>15</b>
OCTOBER	<b>4.2</b>	<b>7.6</b>	<b>3.3</b>	<1.8	<b>9</b>
NOVEMBER	<b>4.0</b>	<b>7.5</b>	<b>3.2</b>	<1.8	<b>6</b>
DECEMBER	<b>4.1</b>	<b>7.4</b>	<b>3.2</b>	<1.8	<b>4</b>

### 3.2 Water quality characteristic of waste water from the drains

Tables 3 below provided the water quality characteristic of the drains

**Table 3- WATER QUALITY DATA OF TRIBUTARIES THAT DISCHARGE INTO KYRHUKHLA RIVER**

Sl. No.	Stream/Drain	pH	Dissolved oxygen (mg/l)	BOD (mg/l)	Total Coliform (MPN/100 ml)	Feecal Coliform (MPN/100 ml)	Zn (mg/l)	Cr (mg/l)	Ni (mg/l)	Cu (mg/l)	Mn (mg/l)
1.	Wah Kajit	6.7	4.8	5.5	35	21	0.1	BDL	BDL	BDL	0.03
2.	Wah Sadakha	4.1	7.0	3.2	14	<1.8	0.15	BDL	BDL	BDL	BDL

### 3.3 GROUND WATER GROUND QUALITY

The Meghalaya State Pollution Control Board is monitoring the water quality of ground water located in the catchment of Kyrhukhla River and the water quality is provided at Table 4 below

**Table 4: GROUND WATER QUALITY IN THE CATCHMENT OF KYRHUKHLA RIVER - SEPTEMBER 2019**

Sampling Locations→ Parameters ↓	<i>Drinking Water standards as per IS 10500:2012</i>	<b>Borewell at Good Shepherd Parish, Lad Rymbai</b>	<b>Dug Well Myntriang WSS</b>
<b>pH</b>	6.5-8.5	7.4	7.7
<b>Conductivity (mg/l)</b>	-	157.0	48.0
<b>Turbidity (NTU)</b>	1.0	1.0	1.0
<b>Chloride (mg/l)</b>	250.0	7.0	5.0
<b>Alkalinity (mg/l)</b>	200.0	60.0	12.0
<b>Total Hardness (mg/l)</b>	200.0	72.0	16.0
<b>Nitrate-N (mg/l)</b>	45.0	0.57	0.39
<b>Iron (mg/l)</b>	0.3	0.11	0.12
<b>Total Coliform (MPN/100ml)</b>	Shall not be detected	34	ND**
<b>Faecal Coliform (MPN/100ml)</b>	Shall not be detected	Not detected	Not detected
<b>Zn (mg/l)</b>	5.0 mg/l	0.02	BDL
<b>Cr (mg/l)</b>	0.05	BDL	BDL
<b>Ni (mg/l)</b>	0.02	BDL	BDL
<b>Cu (mg/l)</b>	0.05	BDL	BDL
<b>As (mg/l)</b>	0.01	BDL	BDL
<b>Lead (mg/l)</b>	0.01	BDL	BDL
<b>Nickel (mg/l)</b>	0.02	BDL	BDL

<b>Cadmium(mg/l)</b>	0.003	BDL	BDL
<b>Manganese(mg/l)</b>	0.1	BDL	BDL

***The analysis result indicated that the water conforms to the Drinking Water Norms as per IS 10500:2012***

#### **4.0 IDENTIFICATION OF SOURCES OF POLLUTION:**

**Major sources of pollution in River Kyrhukhla are:**

- a. Drainage from abandoned coal mines
- b. Industrial effluents from the small scale Industries
- c. Open defecations

#### **5.0 COMPONENTS OF ACTION PLAN**

Following components have been identified for preparation of action plan for rejuvenation of river in compliance to the Hon'ble NGT Orders as detailed below:

The proposed action plan covers following components:

##### **SOURCE CONTROL**

Source control includes disposal of domestic sewage, and industrial pollution as detailed below:

##### **5.1 Channelization, treatment, utilization and disposal of treated domestic sewage**

- a. Identification of houses which do not have septic tanks latrines in the villages located in the catchment of river Kyrhukhla
- b. Controlling open defecation.
- c. Identification of drains carrying Acid mine drainage.

##### **5.2 Industrial Pollution Control**

- a. Treatment of effluents, compliance with standards and mode of disposal of effluents

##### **5.3 Solid Waste Management**

- a. Collection, segregation, transportation, disposal and treatment of municipal solid wastes generated from town in accordance of provisions of the Solid Waste Management Rules, 2016.
- b. Restriction of illegal disposal of solid waste along the river bank of Kyrhukhla River and flood plain zones.
- c. Burning of solid waste should be strictly prohibited.
- d. Construction and demolition wastes should be disposed in designated areas and no case it should be disposed into river beds or flood plain zone.

##### **5.4 Flood Plain Zone**

- a. Regulating activities in flood plain zone.
- b. Management of Municipal, Plastic, Hazardous, Bio-medical and Electronic wastes.

- c. Afforestation in the catchment and aesthetic plantation programs.
- d. Improve irrigation practices.

**5.5 Ecological/Environmental Flow (E-Flow)**

- a. Issues relating to E-Flow
- b. Irrigation practices

**6.0 Detailed Gap Analysis With Regard To Sewage Management , Industrial Effluent Management, and Solid Waste Management to be carried**

**6.1 Sewage management**

Although there is no discharge of the waste water from the residential areas, however gap analysis has been carried out. The sewage flow is considered as 80% of the net water supplied to the consumer. Considering 135 lpcd water supply, the rate of sewage generation works out as 108 lpcd and the same has been adopted. The population in the catchment of Kyrhukhla river as per 2011 census is about 7450. The detailed gap analysis is given in the **Table 5** below for the Kyrhukhla River:

**TABLE 5: GAP ANALYSIS WITH RESPECT TO SEWAGE**

Rivers	Towns	Population (2011)	Population (2032)	Projected Total Water Consumption (135 lpcd) (MLD)	Projected Estimated Average Sewage Generation(MLD)*	Existing STPs		Gap (MLD)
						Nos	Capacity	
Kyrhukhla	Ladrymbai & khliehriat	7450	9909	1.33	1.07	-	-	1.07

**6.2 INDUSTRIAL EFFLUENT MANAGEMENT**

In the catchment of the Kyrhukhla River there is no industrial estates but 12 small scale industries are in operation in the catchment .

**TABLE 6 : NUMBER OF INDUSTRIES OPERATING IN THE CATCHMENT**

Sl. No.	River	Identified River Stretch	Type of Industries/category	Number of Industries
1.	Kyrhukhla	Ladrymbai & Khliehriat	Water polluting /small scale	12

The total water consumption of the industries, the total effluent generated and number of captive ETPs along with the Gap Analysis within the catchment of Kyrhukhla River are given in the **Table 7**

**TABLE 7 : GAP ANALYSIS OF EFFLUENT GENERATED BY INDUSTRIES**

Sl. No.	River	Type of Industries/ category	No. of Industries	No. of Industries having Captive ETPs	No. of Industries not having Captive ETPs	Total Water Consumption by the Industries (MLD)	Industrial Effluent Generated by the Industries (MLD)	Industrial Treated Effluent	GAP	Mode of Disposal
		Water polluting /small scale	12	3	9	0.036	0.029	0.009	0.02	Treated Effluent is Disposed off to Drains

### 6.3. SOLID WASTE MANAGEMENT

Sl. No.	Town or City	Population (2011)	Expected population (in 2032)	Future Total solid waste generation (at 0.35 kg per head per day) in TPD	Existing treatment facility		GAP (TPD)
					Total no. of Treatment facilities	Total capacity	
1.	Lad-Rymbai & Khliehriat (Catchment of Kyrhukhla River)	7450	3419	4547	-	-	1.60

### 6.4 INDUSTRIAL HAZARDOUS WASTE

Automobile Service Centers are already covered under consent mechanism under Water Act (Prevention and Control of Pollution) Act 1974. The Committee advised the Meghalaya State pollution Control Board to bring all these under the HW & OW (M&H) Rules, 2016 and regulate them through authorization process.

### 6.5 BIOMEDICAL WASTE MANAGEMENT –

Presently, there is neither hospital nor clinic in the catchment of Kyrhukhla River.

### 6.6 CONSTRUCTION & DEMOLITION WASTE

No major large scale construction or demolition is carried out within the catchment area of the river. Small scale housing construction and demolition is carried out where in the waste is used for land filling and leveling.

### 7.0. KYRHUKHLA RIVER REJUVENATION PLAN:

#### 7.1 Action plan for management of sewage:



- a. Each household within the catchment area of the Kyrhukhla river needs to have a septic tanks and a soak pit under the scheme of SBM(G)
- b. The flow in each drain should exclude monsoon flow.

**7.2** *Action plan for management of industrial effluents:*

- a. Hotels/Restaurants particularly located on road-side should not dispose untreated sewage and solid waste into nearby public drain or rivers. Such establishments should be properly regulated and levied with fines in case of any violation.

**7.3** *Action plan for management of Solid Waste Management:*

- a. Implementation of Door-to-Door collection.
- b. Source segregation as biodegradable and non-biodegradable wastes.
- c. Identification of suitable site for setting up common waste processing and secure landfill facility.
- d. Transportation, disposal and treatment facilities of municipal solid wastes generated from town in accordance of provisions of the Solid Waste Management Rules, 2016.
- e. Restriction illegal disposal of solid waste along the river bank and flood plain zones.
- f. Prohibition on burning of solid wastes.
- g. Development of integrated solid waste management facility (provision of segregation, treatment, compost, pellets making as well as landfill with leachate treatment provision in accordance with solid waste management rules, 2016 as further amendments made thereof.

**7.4** *Flood Plain Zone (FPZ)*

Department of Water Resources should identify /demarcate Flood Plain Zone and regulate the activities. Such regulations would also cover;

- a. Plantation in Flood Plain Zone (FPZ) – By Forest and Environment Department, Meghalaya  
Checking and removal of encroachments periodically- District Administration

**7.5** *Greenery development- Plantation plan/Biodiversity Parks:*

River bank plantation and proposal for bio-Diversity Park to be taken by the Forest Department.

**7.6** *Sand Mining in river stretches:*

There has been no account of sand mining in the Kyrhukhla river stretch.

**7.7** *Environmental Flow (E-Flow):*

The river Kyrhukhla carries natural waters during the monsoon and even during the lean season as the river is perennial. Provisions of roof top rain water harvesting in Govt. building; commercial buildings, hotels and Houses will be emphasized. By-laws are made in the Urban

Affairs Department for provisions of roof top rain water harvesting. Hydrological Stations will be set up along the stretch of the river Kyrhukhla by Water Resources Department

#### **8.0 MONITORING OF ACTION PLAN**

In compliance with the order passed on OA No. 673/2018 dated 20.09.2018 by the Hon'ble National Green Tribunal (NGT) Principal Bench, New Delhi, "River Rejuvenation Committee" was constituted by the Governor of Meghalaya vide order NO. ENV.5/2018/44 Dated 24.01.2019. The proposed Action Plans will be monitored by the River Rejuvenation Committee (RRC) which has been constituted by Government of Meghalaya. CPCB experts also shall be invited for the RRC review meetings for taking feedback and suggestions.

Action Plan for River Rejuvenation of polluted river stretches shall be prepared and monitored by the Committee.

#### **River Rejuvenation Committee:-**

1.	PCCF & HOFF, Forest & Environment Department, Meghalaya	a	--	Chairman
2.	Director, Urban Affairs Department, Meghalaya		--	Member convener
3.	Director, Commerce and Industries Department, Meghalaya		--	Member
4.	Member Secretary, Meghalaya State Pollution Control Board		--	Member

Action plans with time lines and executing authorities are given in the following Table below

Sl. No	Action Plan for rejuvenation of River Kyrhukhla	Execution Agency/ Department	Time Target	Amount (in rupees)	Remarks
<b>1. ACID MINE DRAINAGE MANAGEMENT &amp; SEWAGE MANAGEMENT</b>					
	Bio-remediation of Drains	MSPCB	30 <sup>th</sup> March 2021	DPR to be prepared	Under swach Bharat Mission (G)
	Construction of septic latrines with soak pits	PHED			
<b>2. INDUSTRIAL POLLUTION CONTROL</b>					
	Action against the industries not installed ETPs or ETPs exist but not operating or ETP outlet or treated effluent is not complying to the effluent discharge standards or norms.	MSPCB	Continuous Process		Directions, show cause notices and Closure notices are issued.
<b>3. SOLID WASTE MANAGEMENT:</b>					
	Solid Waste Management Project. Development of integrated solid waste management facility (provision of segregation, treatment, compost, pellets making as well as sanitary landfill with leachate treatment provision in accordance with solid waste management rules, 2016 as further amendments made thereof.	Urban Affairs Department	30 <sup>th</sup> March 2021	DPR yet to be prepared	
<b>4. GROUND WATER QUALITY</b>					
	Groundwater quality monitoring at salient points in the catchment of river Kyrhukhla	Meghalaya State Pollution Control Board,	Continuous activity		
<b>5. FLOOD PLAIN ZONE:</b>					
	Prohibition on illegal disposal of waste and	District Administration &	Continuous activity	-	

	removal of encroachment from river banks.	Urban Affairs Department			
<b>6. ENVIRONMENTAL FLOW (E-FLOW) AND GROUNDWATER RECHARGE MEASURES:</b>					
	Provisions of roof top rain water harvesting in Govt. building, commercial buildings, hotels and Houses	District Administration/ Urban Affairs Department	Continuous activity	-	By-laws are made in the Urban Affairs Department.
	Setting up of Hydrological Stations. (non- recurring cost)	Water Resources Department	30 <sup>th</sup> March 2021	0.054 Crores	Funding through State Government
<b>7. GREEN DEVELOPMENT:</b>					
	Plantation on both sides of the river and in the private land and individual land owner	Forest & Environment Department	30 <sup>th</sup> march 2021	0.0496 803 crores	Funding through State Government
<b>8. CLEANING &amp; AWARENESS ACTIVITIES</b>					
	Public awareness programme through add on media	PHED, Urban affairs Deptt, District Administration , MSPCB	Regular Activities		