

**REVISED ACTION PLAN FOR REJUVENATION OF RIVER  
LUKHA(LUNAR– MYNDIHATI)  
EAST JAINTIA HILLS DISTRICT, MEGHALAYA  
IDENTIFIED AS RIVER POLLUTED STRETCH  
UNDER PRIORITY - V**

**PREPARED**

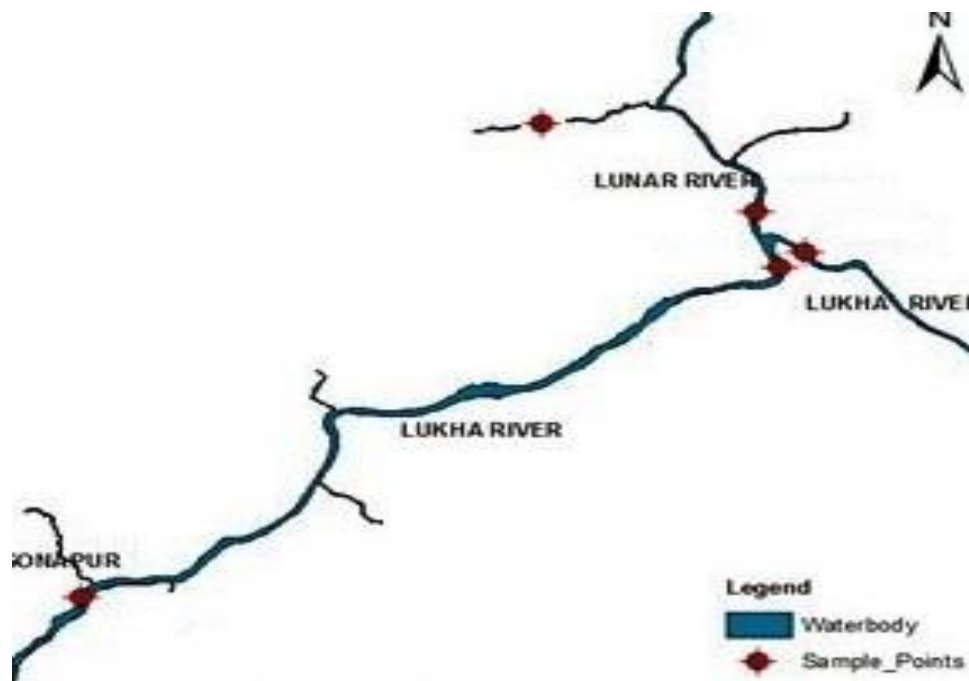
**RIVER REJUVENATION COMMITTEE  
GOVERNMENT OF MEGHALAYA**

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## 1.0 INTRODUCTION

Lunar River is formed by many tributaries arising from coal mining areas of Sutnga, Sahkhain, Myndihati and Khliehriat. One stream originating from Lumshnong area also joins the Lunar River. After travelling downward for some distance it meets the Lukha River at Khaddum. The Lukha River is originating from the reserved forest. The river water is free from human interference and without any contamination. The hilly terrain on either side of the Lukha River is covered by Reserve Forest-Narpuh Reserve Forest and Saipung Reserved Forest. There is no major industrial area in the catchment of the river. However, red category industries are located at isolated points along the catchment of the tributary originating from Lumshnong area. Figure below indicated the catchment area of Lukha River



**FIGURE 1: MAP INDICATING CATCHMENT OF LUKHA RIVER**

### a) Localities in the catchment of the River

The localities in the catchment of the River are Khliehriat, Myndihati, Sahkhain Sutnga, Lumshnong

### b) Major Industrial Areas in the Catchment of River

There is no major industrial estate in the catchment area of the River. However red category industries are located at isolated points in one of the tributary which is originating from the Lumshnong area

**c) Major Tributaries of Lukha River**

The following are the major tributaries of Lukha River. Table 1 below indicated the identified drains and their co-ordinates.

**TABLE 1: MAJOR TRIBUTARIES OF RIVER LUKHA(LUNAR AT MYNDIHATI)**

River	Drains	GPS Coordinates	Normal Discharge cumec
Lukha(Lunar at Myndihati)	Mookympad stream	N 25°20.467' E92°25.917'	1.24

**TABLE 2 : MAJOR TRIBUTARIES OF RIVER LUKHA (DOWNSTREAM OF LUNAR)**

River	Drains	GPS Coordinates	Normal Discharge cumec
Lukha	Lukha River before confluence with Lunar river	N 25°09.535' E92°26.942	-
	Ummutha river		-

**(Figure 1: Map indicating catchment area of Lukha River)**

**2.0 OBJECTIVES /ACHIEVABLE TARGETS FOR RESTORATION OF POLLUTED STRETCH OF LUKHA 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 Lukha(Lunar at Myndihati) River to meet the bathing standards

**3.0 Water Quality of the River, Drains and Ground Water Sources (located in the catchment of the river of the Lukha River)**

**3.1 WATER QUALITY DATA LUKHA RIVER**

The river water quality data for the year 2019 (Jan to December ) is provided at Table 1 below (The regular monitoring is carried out by Pollution control Board ).It may be mentioned that the Board is monitoring the water quality under National Water Monitoring Programme at the following Location.

- a. Lunar River at Myndihati

The regular monitoring is also carried downstream of the Lunar river at 2(two) locations

- b. Lukha River at Khaddum
- c. Lukha River at Sonapur

Based on the monitoring data the river water is polluted at Lunar River at Myndihati .The water quality data at different sampling locations is presented in tables below

**TABLE 2: WATER QUALITY DATA OF LUKHA (LUNAR RIVER) RIVER AT MYNDIHATI 2019**

<b>PARAMETERS MONTHS</b>	<b>pH</b>	<b>DO mg/L</b>	<b>BOD mg/L</b>	<b>FC MPN/100ml</b>	<b>TC MPN/100ml</b>
JAN	2.9	7.2	4.0	1.8	1.8
FEB	3.0	6.9	4.3	2	2
MARCH	3.0	5.0	5.5	<1.8	<1.8
APRIL	2.4	5.5	5.2	<1.8	<1.8
MAY	3.0	5.8	5.0	<1.8	<1.8
JUNE	3.3	6.0	4.0	<1.8	4
JULY	2.8	6.4	3.8	<1.8	<1.8
AUGUST	2.8	6.8	3.4	<1.8	12
SEPTEMBER	2.9	7.0	3.3	<1.8	9
OCTOBER	2.5	6.8	3.6	<1.8	4
NOVEMBER	2.3	6.8	3.4	<1.8	4
DECEMBER	2.3	6.9	3.4	<1.8	4

**TABLE 3: WATER QUALITY DATA OF LUKHA AT KHADDUM 2019**

<b>PARAMETERS MONTHS</b>	<b>Ph</b>	<b>DO mg/L</b>	<b>BOD mg/L</b>	<b>FC MPN/100ml</b>	<b>TC MPN/100ml</b>
JAN	Monitoring not yet started				
FEB	Monitoring not yet started				
MARCH	5.1	7.1	2.0	24	140
APRIL	5.6	7.9	1.8	26	150
MAY	5.2	7.5	1.7	24	140
JUNE	7.5	7.2	1.5	22	130
JULY	7.4	6.8	2.2	17	94
AUGUST	7.5	7.3	1.6	14	84
SEPTEMBER	7.4	7.0	2.0	12	79
OCTOBER	7.1	7.2	1.8	10	70
NOVEMBER	4.6	7.4	1.5	9	70
DECEMBER					

**TABLE:4 WATER QUALITY DATA OF LUKHA RIVER AT SUNAPUR 2019**

<b>PARAMETERS MONTHS</b>	<b>Ph</b>	<b>DO mg/L</b>	<b>BOD mg/L</b>	<b>FC MPN/100ml</b>	<b>TC MPN/100ml</b>
JAN	7.2	7.8	1.5	42	220
FEB	7.2	7.4	1.8	46	230
MARCH	7.1	7.5	1.5	47	240

APRIL	6.7	8.0	1.2	49	280
MAY	7.2	7.6	1.4	47	240
JUNE	7.1	7.6	1.6	43	220
JULY	7.2	7.3	1.6	17	140
AUGUST	7.3	7.5	1.5	14	120
SEPTEMBER	7.2	7.6	1.5	13	110
OCTOBER	7.3	7.6	1.4	13	120
NOVEMBER	7.1	7.7	1.5	14	130
DECEMBER	6.9	7.5	1.8	15	140

### 3.2 WATER QUALITY CHARACTERISTIC OF WASTE WATER FROM THE DRAINS

Tables 5 below provided the water quality characteristic of the tributaries that discharge into the Lukha River

**Table 5- WATER QUALITY DATA OF TRIBUTARIES THAT DISCHARGE INTO LUKHA RIVER**

Sl. No	Stream/Drain	pH	Dissolved oxygen (mg/l)	BOD (mg/l)	Total Coliform (MPN/100ml)	Faecal Coliform (MPN/100ml)	Zn (mg/l)	Cr (mg/l)	Ni (mg/l)	Cu (mg/l)	Mn (mg/l)
1.	Mookympad stream	2.2	5.6	3.8	8	<1.8	2.7	BDL	BDL	BDL	0.5
2.	Lukha river before confluence with Lunar river	8.1	7.4	1.0	<1.8	<1.8	BDL	BDL	BDL	BDL	BDL
3.	Ummutha river	8.0	7.0	2.5	280	70	BDL	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 Lukha (Lunar at Myndihati) river and the analysis data is provided below

**TABLE 6-GROUND WATER QUALITY– SEPTEMBER 2019**

Sampling Locations→ Parameters ↓	<i>Drinking Water standards as per IS 10500:2012</i>	Ringwell at Power Grid, Khliehriat	Borewell at Khliehwah Shasem A, Khliehriat	Borewell at Khliehwah Shasem B, Khliehriat
<b>pH</b>	6.5-8.5	6.5	5.2	4.8
<b>Conductivity (mg/l)</b>	-	200.0	128.0	103.0
<b>Turbidity (NTU)</b>	1.0	2.5	1.5	1.4
<b>Chloride (mg/l)</b>	250.0	14.0	12.0	14.0
<b>Alkalinity (mg/l)</b>	200.0	44.0	10.0	8.0
<b>Total Hardness (mg/l)</b>	200.0	80.0	30.0	30.0
<b>Nitrate-N (mg/l)</b>	45.0	3.0	0.19	0.28
<b>Iron (mg/l)</b>	0.3	0.14	0.48	0.66
<b>Total Coliform (MPN/100ml)</b>	Shall not be detected	ND	42	11
<b>Faecal Coliform (MPN/100ml)</b>	Shall not be detected	ND	ND	ND
<b>Zn (mg/l)</b>	5.0 mg/l	BDL	BDL	BDL

Cr (mg/l)	0.05	BDL	BDL	BDL
Ni (mg/l)	0.02	BDL	BDL	BDL
Cu (mg/l)	0.05	BDL	BDL	BDL
As (mg/l)	0.01	BDL	BDL	BDL
Lead (mg/l)	0.01	BDL	BDL	BDL
Nickel (mg/l)	0.02	BDL	BDL	BDL
Cadmium(mg/l)	0.003	BDL	BDL	BDL
Manganese(mg/l)	0.1	BDL	BDL	BDL

#### 4.0 IDENTIFICATION OF SOURCES OF POLLUTION:

*Major sources of pollution in River Lukha (Lunar at Myndihati) are:*

- a. Drainage from abandoned coal mines
- b. Industrial effluents from Industries

#### 5.0 COMPONENTS OF ACTION PLAN

Following components have 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:

##### 5.1 TREATMENT OF ACID MINE DRAINAGE

- a. Identification of drains carrying Acid mine drainage.

##### 5.2 INDUSTRIAL POLLUTION CONTROL

- a. Inventorization of industries
- b. Category of industry and effluent quality
- c. 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 Lukha 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

Small villages are located in the catchment of the river with scattered human settlement and the amount of sewage generated is negligible and the liquid waste management is covered under the scheme of Solid and Liquid Waste management under Swachh Bharat Mission. So there is no gap with respect to sewage management.

##### 6.2 INDUSTRIAL EFFLUENT MANAGEMENT

In the catchment of the River there is no industrial estate but the industries are isolated in pockets which are in operation. The total number of industries which fall in the catchment of Lukha River are 11(eleven) in number. The number of industries categorically located in and around the catchment area of the river stretch are as provided in Table 7

**TABLE 7: NUMBER OF INDUSTRIES OPERATING IN THE CATCHMENT**

Sl. No.	River	Identified River Stretch	Type of Industries/category	Number of Industries
1.	Lukha River	Myndihati to Shymplong	Red Category	8
			Water polluting /small scale	3

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 Lukha(Lunar at Myndihati )River are given in the

**Table 8**

**TABLE 8: 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
1.	Lukha	Red Category	8	8	-	0.184	0.15	0.147	.003	Treated Effluent is Disposed off to Drains
		Water polluting /small scale	3	-	3					



### **6.3 SOLID WASTE MANAGEMENT**

The amount of wastes generated from the small villages with scattered population is very negligible and the same is managed under Swachh Bharat Mission. As such there is no gap with respect to solid Waste management.

### **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**

There is one common bio-medical waste treatment facilities in the state of Meghalaya which at present is nonfunctional. The Common Bio-medical Waste Treatment Facility (CBMWTF) is under repair and renovation. The HCF have their own treatment facilities like Deep burial pits and sharp pits constructed in accordance to Biomedical Waste Management Rules 2016. The biomedical wastes are disposed by deep burial and the liquid portion by direct discharge into drains after chemical disinfection. Some of the HCF also have autoclaves, shredders and incinerators for the treatment of the Biomedical wastes.

### **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 generated is used for land filling and leveling.

## **7.0 LUKHA( LUNAR AT MYNDIHATI) RIVER REJUVENATION PLAN:**

### **7.1 Action plan for management of Acid mine Drainage**

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

- a. All the industries (water polluting) will be directed to have captive ETPs and ensure to compliance to effluent discharge norms.
- b. All the water polluting industries will be directed to have online Continuous Effluent Monitoring System (OCEMS).
- c. Industries will be directed to adopt best practices to minimize water consumption and for recycling of treat waste water.
- d. Provision of waste water treatment system.

## **8.0 GREENERY DEVELOPMENT- PLANTATION PLAN/BIODIVERSITY PARKS:**

The river is covered by Reserved Forest on both sides; as such greenery development is not needed.

#### 9.0 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   | -- Chairman         |
| 2. Director, Urban Affairs Department, Meghalaya             | -- Member Secretary |
| 3. Director, Commerce and Industries Department, Meghalaya   | -- Member           |
| 4. Member Secretary, Meghalaya State Pollution Control Board | -- Member           |

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

Sl. No	ACTION PLAN FOR REJUVENATION OF RIVER LUKHA( LUNAR AT MYNDIHATI)	Execution Agency/ Department	Time Target	Amount (in rupees)	Remarks
<b>1. ACID MINE DRAINAGE MANAGEMENT &amp; SEWAGE MANAGEMANT</b>					
	Bio-remediation of Drains	MSPCB & District Administration	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	MSPCB	Continuous Process		Directions, show cause notices and Closure notices are issued.

	standards or norms.				
<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	Land has been identified
<b>4. GROUND WATER QUALITY</b>					
	Groundwater quality monitoring at salient points in the catchment of river.	Meghalaya State Pollution Control Board,	Continuous activity		
<b>5. FLOOD PLAIN ZONE:</b>					
	Prohibition on illegal disposal of waste and removal of encroachment from river banks.	District Administration & Urban Affairs Department	Continuous activity	-	
<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	Forest & Environment Department	Proposal not required		Reserve Forest and green cover on both sides of the river

	individual land owner				
<b>8. CLEANING &amp; AWARENESS ACTIVITIES</b>					
	Public awareness programme through add on media	PHED, Urban affairs Deptt, District Administration , MSPCB	Regular Activities		