REVISED ACTION PLAN FOR REJUVENATION OF RIVER MYNTDU
WEST JAINTIA HILLS DISTRICT, MEGHALAYA
IDENTIFIED AS RIVER POLLUTED STRETCH
UNDER PRIORITY - V

PREPARED BY

RIVER REJUVENATION COMMITTEE
GOVERNMENT OF MEGHALAYA

CONTENTS

1.0 INTRODUCTION

The river originates at a place called Mih Myntdu, adjacent to Jowai town. This river encircles Jowai on three sides excluding the northern part of town. The river flows across Jowai town which is the second largest town in the state of Meghalaya, and then through Leshka (where a Hydro Project Dam is being constructed) to reach a village Borghat, within Jaintia Hills, before finally entering Bangladesh, where it is locally called 'Shari'. The total length of the polluted stretch is 9.9 kms. It receives the waste water discharges from the Jowai town and run off from the agricultural fields either directly or through drains.The total population in the catchment area of Myntdu river is 28,430 as per 2011 census. There is no industrial estate, however there are isolated small scale industries located in the catchment of the river. Map showing the catchment area of Mytdu River is shown in figure below

(a) Localities in the catchment of Myntdu River: Myntdu River is one of the major river encircling Jowai towns on three sides. Localities in the catchment of Myntdu river are Mooralong, lumpariat, Mookyndup, Tyndongwapung, Ladthaboh, Caroline Colony, New hill, Moosalyngkut, Salaroh, Mynthong, Chutwakhu, Khimusniang, Iawmusiang, Mission Compound, Tpep-pale, *Chah Tngait, Khim u sniang,* Moo-chu riaw, Um-Changpung, *Iaw Musiang Chilliangraij, Umchang-iar, Lower Chukwakhu, Lumkyrwiang, part of Mission Compound part of Iongpiah, and some part of Loomiongkjam* Panaliar, Dulong, Iongpiah, Loomiongkjam, Iaw Musiang", Tpep Pale, Moosylangkat, and Lathalaboh Soo Mer"and "Niaw Mer

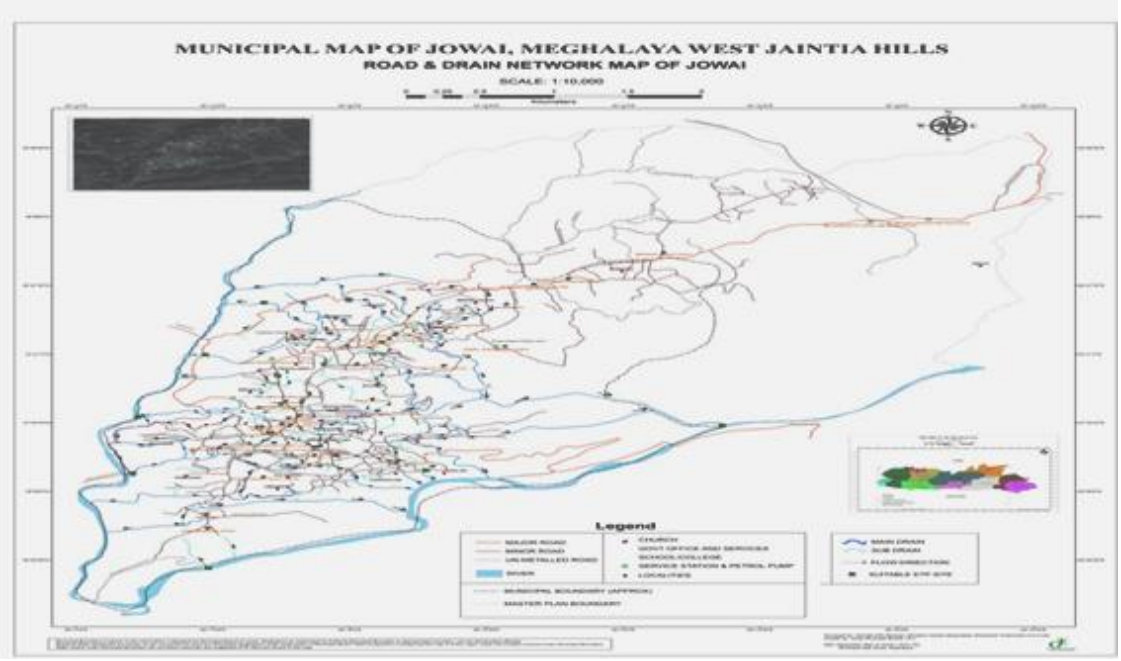

FIGURE 1: MAP INDICATING CATCHMENT AREA OF MYNTDU RIVER

(b) Major Industrial Areas in the Catchment of Myntdu River: There is no major industrial estate but only some small scale industries are located in the catchment area of the River.

(c) Major Drains contributing to Pollution in Myntdu River: There are 5 major drains/tributaries which pass through Jowai town that discharge the untreated sewage and municipal wastes into the Myntdu River. Table 1 below indicated the identified drains and their co-ordinates and flow

TABLE 1 -TRIBUTARIES/DRAINS OF MYNTDU RIVER

Sl.No	Major outfall/drains	GPS Co-ordinates	Discharge of Flow
1.	*Riatsiatsim*	25°26.592'N, 92°191.29'	0.053 Cumec
2.	*RampyrthaI*	25°26.030'N, 92°12.232E'	
3.	*Liar-Urkyrdeiñ*	25°25.852'N, 92°12.192E'	
4.	*Myn'twa*	25°26.463'N, 92°13.223'	0.334 Cumec
5.	*Soomer and Niawmer*	25°26.986'N, 92°15.814'E	0.200

The Meghalaya State Pollution Control Board is monitoring the water quality of the Myntdu River at Jowai. Based on the water quality monitoring data submitted by the Board, the CPCB has identified the Myntdu River at Jowai as polluted river stretch under Priority Class-V as the BOD value was observed to be above 3.0 mg/l.

2.0 OBJECTIVES/ACHIEVABLE TARGETS FOR RESTORATION OF POLLUTED

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 Myntdu River at Jowai to meet the bathing standards of Biological Oxygen Demand (BOD)

3.0 Water Quality of the River, drains and ground water sources (located in the catchment of the river of the Myntdu River) .

3.1 Water quality data of Myntdu 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)

Water quality of Myntdu River

The river water quality data for the year 2019 (Jan to December) is provided at Table 2 below.

TABLE 2: WATER QUALITY DATA OF MYNTDU RIVER AT JOWAI (JAN –DEC 2019)

PARAMETERS → MONTHS ↓	pH	DO mg/L	BOD mg/L	FC MPN/100ml	TC MPN/100ml

JAN	6.9	6.4	4.5	2300	4700
FEB	6.7	6.1	4.8	2400	4900
MARCH	6.7	6.3	4.0	2300	4700
APRIL	6.8	6.5	3.8	2100	4400
MAY	6.7	6.6	3.8	1700	3900
JUNE	6.9	6.9	3.5	1200	3400
JULY	7.1	7.0	3.3	430	1700
AUGUST	6.8	7.2	3.0	310	1300
SEPTEMBER	7.0	7.4	3.2	280	920
OCTOBER	6.8	7.0	3.3	240	840
NOVEMBER	6.8	7.2	3.2	220	790
DECEMBER	6.9	7.4	3.2	140	440

3.2 **The water quality of the drains is shown in Table 3 below**

TABLE 3-WATER QUALITY DATA OF THE DRAINS DISCHARGING INTO THE MYNTDU RIVER

	pH	Dissolved oxygen (mg/l)	BOD (mg/l)	Total Coliform (MPN/100ml)	Feacal Coliform (MPN/100ml)	Zn (mg/l)	Cr (mg/l)	Ni (mg/l)	Cu (mg/l)	Mn (mg/l
Riatsiatsim	7.4	4.5	6.6	5000	2400	0.03	BDL	BDL	BDL	0.14
Rampyrthal	7.4	3.2	10.5	8900	5200	0.08	BDL	BDL	BDL	0.12
Liar-Urkyrdeiñ	7.3	2.8	15.4	15000	10000	0.05	BDL	BDL	BDL	0.14
Myn'twa	7.6	4.5	3.6	500	110	0.10	BDL	BDL	BDL	0.01
Soomer & Niawmer	6.6	4.8	3.4	480	70	0.07	BDL	BDL	BDL	0.08

3.3 **GROUND WATER QUALITY**

The Meghalaya State Pollution Control Board is monitoring the water quality of ground water located in Jowai at the following locations and the water quality is provided at Table 3 below

TABLE 4: GROUND WATER QUALITY DATA IN THE CATCHMENT OF MYNTDU RIVER

Sampling Locations → / **Parameters ↓**	***Drinking Water Norms as per IS 10500:2012***	Dug Well, Riatsasim, Jowai	DTW, Thomas Jones Synod College, Iawmusiang	Dug well Mooralong, Ladthaboh	Borewell Khimusniang	Spring Chilliang Raij
pH	6.5-8.5	6.7	6.4	7.2	6.6	6.2
Conductivity (mg/l)	-	315.0	275.0	315.0	195.0	138.0
Turbidity (NTU)	1.0	0.65	1.8	1.0	7.2	1.0
Chloride (mg/l)	250.0	21.0	44.0	14.0	7.0	12.0
Alkalinity (mg/l)	200.0	82.0	16.0	122.0	58.0	42.0
Total Hardness	200.0	148.0	104.0	142.0	74.0	40.0

(mg/l)						
Nitrate-N (mg/l)	45.0	5.7	14.1	1.3	2.0	8.8
Iron (mg/l)	0.3	0.12	0.1	0.12		0.12
Total Coliform (MPN/100ml)	Shall not be detectable	10	8	12	28	ND
Faecal Coliform (MPN/100ml)	Shall not be detectable	ND	ND	ND	ND	ND
Zn (mg/l)	5.0 mg/l	BDL	BDL	BDL	BDL	BDL
Cr (mg/l)	0.05	BDL	BDL	BDL	BDL	BDL
Ni (mg/l)	0.02	BDL	BDL	BDL	BDL	BDL
Cu (mg/l)	0.05	BDL	BDL	BDL	BDL	BDL
As (mg/l)	0.01	BDL	BDL	BDL	BDL	BDL
Lead (mg/l)	0.01	BDL	BDL	BDL	BDL	BDL
Nickel (mg/l)	0.02	BDL	BDL	BDL	BDL	BDL
Cadmium(mg/l)	0.003	BDL	BDL	BDL	BDL	BDL
Manganese(mg/l)	0.1	BDL	BDL	BDL	BDL	BDL

4.0 IDENTIFICATION OF THE SOURCE OF POLLUTION IN RIVER MYNTDU

The sources of pollution of the river Myntdu include both point and non-point sources. Point sources of pollution are from the dry latrines located along the river Jowai and its tributaries, effluents from hotels, restaurants, automobile workshops, slaughter houses, vegetable, meat and fish markets, hospitals, diagnostic clinics, situated in the catchment areas. Non-point sources of pollution include indirect discharge of untreated sewage, municipal waste water, dumping of solid wastes, agricultural runoffs.

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:

SOURCE CONTROL

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

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

a. Identification of towns and villages in the catchment of rivers Myntdu and estimation of quantity of sewage generation.
b. Storm water drains now carrying sewage and sullage joining rivers Myntdu and interception and diversion of sewage to STPs.
c. Treatment and disposal of septage and controlling open defecation.
d. Identification of areas for installing decentralized sewage treatment plants.

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 Umkhrah 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**

6.1 **SEWAGE MANAGEMENT: MYNTDU CATCHMENTS**

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 Myntdu river as per 2011 census is about 28430 and projected population is about37812.The sewage generation of the floating population is also considered. Main source of water for Jowai is from Jowai Water Supply Scheme (PHED) which is a surface water source of Myntdu .The detailed gap analysis is given in the Table 4 below for the Myntdu River:

TABLE 5: GAP ANALYSIS WITH RESPECT TO SEWAGE

River	Towns	Population (2011)	Population (2032)	Projected Total Water Consumption (135 lpcd) (MLD)	Projected Estimated Average Sewage Generation(MLD)*	Existing STPs		Gap (MLD)
						Nos	Capacity	
Myntdu	Jowai	28430	37812	5.10	4.10	-	-	4.10

Base on the projected population, the estimated gap in sewage management is 4.10 ***MLD****.*

Presently, Septic tanks have been made by individual households for disposal of sewage and the supernatant is directly or indirectly disposed of in nearby drains which join the drains which joins the Myntdu River. There is no underground planned pipe sewerage system in Jowai and thus sewage management is being done with natural slope in open drain system leading to valleys**.** Due to the hilly terrain of Jowai , a common Sewage Treatment Plant is practically feasible. Hence decentralized type of Sewage Treatment Plants are proposed at the outfall of major drains

6.2 INDUSTRIAL EFFLUENT MANAGEMENT

In the catchment of the Myntdu 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 Myntdu River are 20(twenty) in number. The number of industries categorically located in and around the catchment area of the Myntdu river stretch are as provided in Table 6

TABLE 6: NUMBER OF INDUSTRIES OPERATING IN THE CATCHMENT

Sl. No.	River	Identified River Stretch	Type of Industries/category	Number of Industries
1.	Myntdu	Jowai to Pamhadem	Red Category	2
			Water polluting /small scale	18

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 Umkhrah 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
1.	Myntdu	Red Category	2	2		0.49	0.40	0.40	Nil	**Treated Effluent is Disposed off to Drains**
		Water polluting /small scale	18	18	-					

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
					Total no. of Treatment facilities	Total capacity	

1	Jowai (Catchment of Myntdu river)	28430	37812	13.23	-	-	13.23

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 Myntdu rivers. Small scale housing construction and demolition is carried out where in the waste generated is used for land filling and leveling.

7.0. MYNTDU RIVERS REJUVENATION PLAN:

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

a. Each household within the catchment area of the Myntdu River needs to have a septic tanks and a soak pit.

b. The flow in each drain should exclude monsoon flow. Further, any drain if receiving fresh water from any escape channel etc, should be examined for its diversion rather than mixing with sewage.

Decentralized Sewage Treatment Plants (STPs) using anaerobic waste water treatment process will be installed at 7 sewarage zones.

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. Industries will be directed to adopt best practices to minimize water consumption and for

recycling of treat waste water.

c. Provision of waste water treatment system.

d. 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, pellats making as well as landfill with leachate treatment provision in accordance with solid waste management rules, 2016 as further amendments made thereof.

h. Bio-mining and Capping of existing municipal dumpsite in accordance with the SWM rules, 2016

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

b. Checking and removal of encroachments periodically- District Administration

c. Prohibition of disposal of municipal and bio-medical waste particularly in drains-By District administration/Jowai Municipal Board;

d. Department of Water Resources, Meghalaya may notify FPZ - within one year.

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

Bio-diversity parks wherever feasible will be developed by the Forest & Environment Deptt. Greenery or plantation on both sides of the river will be carried out by the Forest Department.

7.6 *Sand Mining in river stretches:*

Sand mining on the river bed has been banned.

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

The river Myntdu carry natural waters during the monsoon and even during the lean season as the two rivers are perennial rivers. 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 Myntdu by Water Resources Department**.**

8 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 N0. 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 Convener
3.	Director, Commerce and Industries Department, Meghalaya	--	Member
4.	Member Secretary, Meghalaya State Pollution Control Board	--	Member

9. ACTION PLAN:

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

Sl. No	Action Plan for rejuvenation of River Myntdu	Execution Agency/ Department	Time Target	Amount (in rupees)	Remarks
1.	**SEWAGE MANAGEMENT**				
	Installation and commissioning of decentralized STPs Chanelization including diversion of sewage generated from household/ townships /interception of all the drains presently carrying sewage and for ensuring proper treatment through the upcoming Decentralized Sewage Treatment Plants at the major outfalls of the drains. Faecal Sludge Treatment Plant for treatment of Septage from individual households (1.5 MLD) along with site development works	Urban Affair Department, Jowai Municipal Board, Urban Affairs Department & Shillong Municipal Board	April 2021	41 crores (Rs.35 crores for ETP + Rs.6 crore for Septage management) 20 crore Include in the installation & commissioning of STPs	Preliminary Project proposal Reports for External aided project was taken up by the Directorate of Urban affairs
	Utilization of treated waste water Irrigating the nearby plantation areas within the vicinity of Faecal Sludge Treatment Plant Use of treated	Urban Affair Department, Shillong Municipal Board		-	After commissioning the project utilization of treated waste water will be started.

	waste water for construction of infrastructure projects or building activity. Flushing/cleaning of sewage drains. Fire brigades Flushing purposes in the upcoming buildings especially Govt building etc. Operation and maintenance of STP				
2.	**INDUSTRIAL POLLUTION CONTROL**				
	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.
3.	**SOLID WASTE MANAGEMENT:**				
	Solid Waste Management Project. 1. A Solid Waste Management Project is being initiated by the Urban Affairs Department for the development of the scientific waste management facilities for Shillong City will include Recycling Plant, bio-fertilizer production, particle board from waste	Urban Affairs Department Jowai Municipal Board		30.0 crores	DPR for sanitary landfill, compost plant, windrow platform etc was prepared by Anderson Biotech(P) Ltd (Consultant through Meghalaya Urban Authority and thereafter submitted to the Government. approval awaited.

	matters and bricks will be manufactured. Only 5 to 10 % of the waste will land filled. 2. Development of integrated solid waste management facility (provision of segregation, treatment, compost, pellats making as well as sanitary landfill with leachate treatment provision in accordance with solid waste management rules, 2016 as further amendments made thereof.				
4.	**BIO-MEDICAL WASTE MANAGEMENT:**				
	Development of one Common Biomedical waste treatment facility	Urban Affairs Department, Shillong Municipal Board	30th March, 2021	-	Cost is included in Umkhrah Action Plan
	Installation of Captive ETPs at all the Government Hospitals	Health Department (Engineering Wing)	30th March 2021	-	Works has started. Show Cause Notice has been issued by MSPCB to the Health Department
5.	**GROUNDWATER QUALITY**				
	Groundwater quality monitoring at salient points in the catchment of river Myntdu	Meghalaya State Pollution Control Board,	Continuous activity	-	
6.	**FLOOD PLAIN ZONE:**				
	Prohibition on illegal disposal of waste and removal of encroachment	District Administration & Urban Affairs Department	Continuous activity	-	

	from river banks.				
7.	**ENVIRONMENTAL FLOW (E-FLOW) AND GROUNDWATER RECHARGE MEASURES:**				
	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	30th March 2021	0.054 Crores	Funding through State Government
8.	**GREEN DEVELOPMENT:**				
	Plantation on both sides of the river and in the private land and individual land owner	Forest & Environment Department	30th April 2021	0.0743930 crore	
9.	**CLEANING & AWARENESS ACTIVITIES**				
	Public awareness programme through add on media	Forest & Environment Department, MSPCB, District Administration	Continuous activity		
			GRAND TOTAL AMOUNT	**91.12 Crore**	