

ACTION PLAN FOR POLLUTED RIVER STRETCHES

MOGRAL RIVER (PRIORITY V)



**KERALA STATE POLLUTION CONTROL
BOARD DISTRICT OFFICE KASARAGOD**

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Chapter 1: Introduction

.General River Profile

The **Mogral River** is a west-flowing river in the Kasaragod district. The river originates in Kanathur in the Karadka Reserve Forest, in Kasaragod. After flowing in a north-westerly direction through Bettipadi and Muliya, it is joined by another stream rising from the northern part of Karadka Reserve Forest. From Yedhir, the river takes a meandering course and flows through the fairly flat regions of Madhur and Patla . At Mogral, the river takes an abrupt turn parallel to the coast towards north. Toward the end of its course, it forms a long stretch of backwaters several kilometers long.

It gets its name from Mogral, a coastal village on its northern banks. The river empties into the Arabian Sea in Mogral Puthur. Mogral River is having a total length of about 34 km of which a distance of 2 km from sea mouth is tidal.

Physiography

The river stretch falls in all three regions viz, Coastal plains, Mid land region, High land region. The river has a length of 34 km with drainage area of 132 sq. km. The sea mouth is approximately 2.0 km away from Mogral bridge, the monthly NWMP sampling station.

Soil Type

Lateritic soil is the most predominant soil type of the district and it occurs in the midland and hilly areas and it is derived from laterites. Brown hydromorphic soil is confined to the valleys between undulating topography in the midlands and in the low lying areas of the coastal strip. They have been formed as a result of transportation and sedimentation of

materials from adjoining hill slopes. The alluvial soil is seen in the western coastal tract of the district. The coastal plain is characterized by secondary soils which are sandy and sterile with poor water holding capacity.

Meteorology and Climate

The district receives an average of about 3500 mm rainfall annually. The major source of rainfall is southwest monsoon from June to September which contributes nearly 85.3% of the total rainfall of the year. The northeast monsoon contributes nearly 8.9% and balance of 5.8% is received during the month of January to May as pre monsoon showers. Out of the 106 rainy days in a year, 87 rainy days occur during south west monsoon season. The climate is generally hot and humid with the Temperature ranging from 22 deg C and 37 deg C.



Fig 1: Mogral river at Edneer bridge

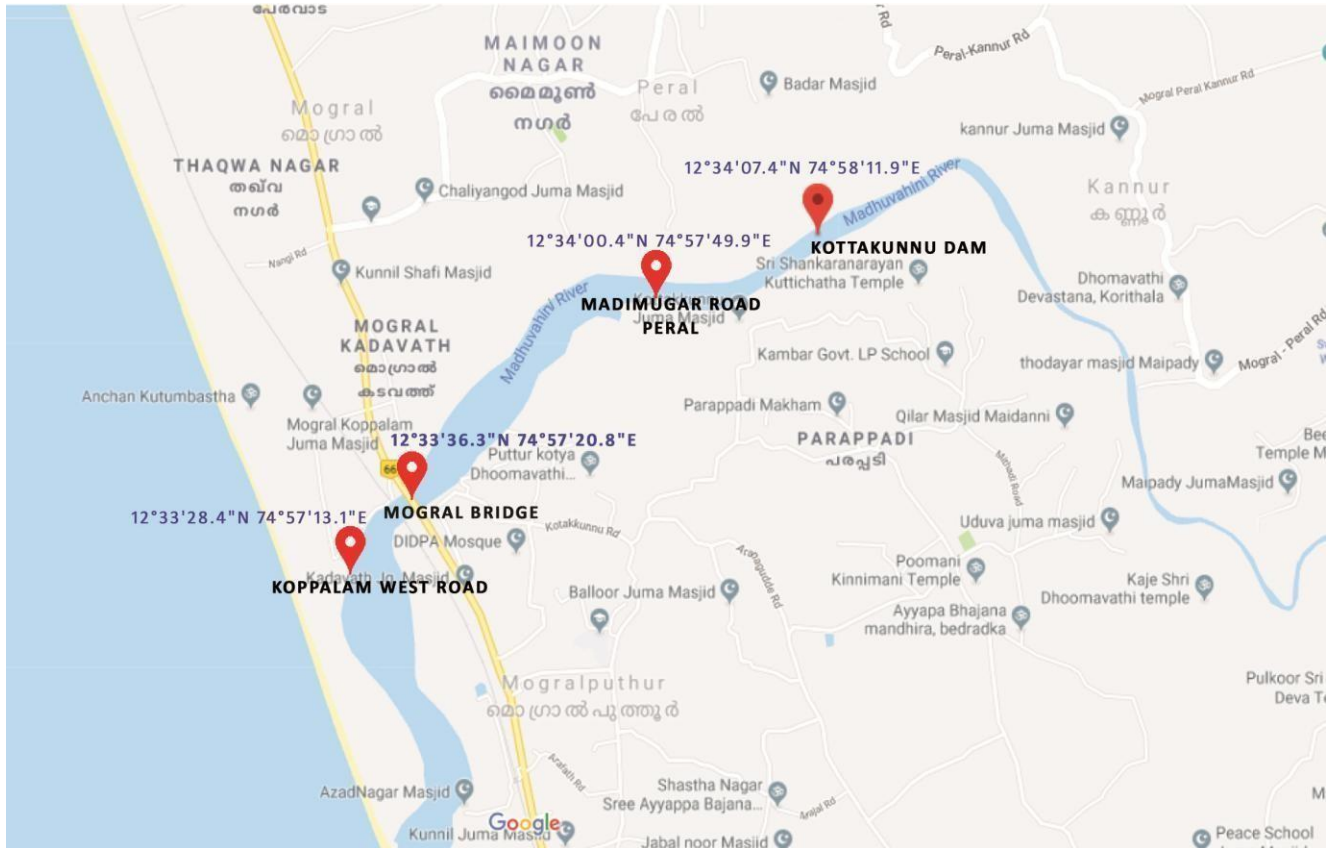
Chapter 2: Study Area

The study area of Mogral river is the entire stretch. However the pollution problems were observed mostly in the downstream near the NWMP sampling station. The place Kottakkunnu dam is 2 km upstream of the NWMP sampling station at Mogral Bridge and Koppalam west road 2 km downstream of it.

Along the stretch the river flows through paddy fields. Coconut and arecanut plantations are also found in the area. No cities or towns are situated in the banks of the river and there is no industrial activity along the river bank.

The selected sampling points are:

Sampling point	Latitude	Longitude
Kottakunnu Dam	12° 34' 07.4" N	74° 58' 11.9"E
Madimuger Road	12° 34' 00.4" N	74° 57' 49.9"E
Mogral Bridge	12° 33' 36.3" N	74° 57' 20.8"E
Koppalam West Road	12° 33' 28.4" N	74° 57' 13.1"E



Sampling points

SURVEY OF SOURCES OF POLLUTION

As part of our study, the panchayats through which the polluted river stretch flows were visited to identify the sources of pollutions.

The Mogral River flows mainly through the Mogral – Puthur, Kumbala, Madhur and Chengala grama panchayaths. In Mogral – Puthur panchayath, it was informed that often solid wastes were dumped into the river from the highway bridge at Mogral into Mogral river. The local Panchayath is planning to install a CCTV in order to track the waste dumping activity. It was told that regular inspection and strict warnings are being given to local slaughter houses to reduce waste dumping. Sand mining is being carried out widely in the river, and also close to our NWMP sampling station.

In Chengala panchayath, no pollution problem was reported. They have also installed a CCTV nearby the river to monitor the pollution.

The Madhur panchayath have conducted public awareness programme against throwing of wastes into the river. As part of the solid waste management, they have started to collect the plastic wastes from this year onwards.

In Kumbala panchayath, no pollution problem was reported . They are about to start the collection of plastic as a part of the solid waste management.

All the local bodies were instructed to remove the outlet pipes discharging in public drains leading to the river.

As per the G. O. (Ms) No. 12/2019/WRD dated 30.04.2019, the District Level Technical Committee conducted a meeting for preparing a action plan for the rejuvenation of the identified polluted river stretches on 14.05.2019 at the Conference Hall, Collectorate, Kasaragod. The members/ representatives of the committees from Irrigation Department, Kerala Water Authority, District Suchitwa Mission, Industries Department, Mogral – Puthur Grama Pnachayth, Madhur Grama Panchayath, Chengala Grama Panchayath, Kumbala Grama Panchayath, Mangalpady Grama Panchayath and Manjeshwar Grama Panchayath participated in the meeting. The details of the sources of pollution and the

remedies to reduce the effect of pollution were discussed and also visited the polluted river stretch. During the site visit the channel which is about 2 km long nearby the Mogral Bridge was observed with decayed coconut leaves and solid wastes dumped by humans. This is also a contributing factor to pollution of the river.

IDENTIFIED DRAINS

A drain near Maipady – Patla Bridge is the only main drain entering into the river. The location of the sampling point on the drain is at latitude of 12°56'16.64"N and longitude of 74°99'77.70"E. As this drain was found dry, sample could not be collected. Apart from this drain, there is one channel about 2 km long which is meant for rain water runoff. During high tide water from the main river enters into this channel. It was observed that coconut leaves from the coconut trees standing on the banks falling into the channel. As these are not removed for long time they get decayed.

DATA EVALUATION

The data obtained is tabulated below along with the data of the monthly sampling at Mogral bridge conducted during the month of November.

Table 1. Analysis report of the water samples

SAMPLING STATIONS			KOTTAKUNN U DAM	MADIMUG ER ROAD, PERAL	KOPPALA M WEST ROAD	MOGRAL BRIDGE
DATE OF SAMPLING			21.11.2018	21.11.2018	21.11.2018	03.11.2018
SL. NO	PARAMETERS	UNIT	M1	M2	M3	M4
1.	Temperature	°C	28	30	32	30
2.	pH	-	7.64	6.88	7.47	6.82
3.	Electrical	µmhos/c	576.6	23030	19650	13920

	Conductivity	m				
4.	Turbidity	NTU	2.0	3.3	1.4	0.4
5.	Total Alkalinity	mg/l	36	71	75	42
6.	Chlorides	„	187	1230	980	7000
7.	Ammoniacal Nitrogen	„	BDL	BDL	BDL	BDL
8.	Total Hardness	„	82	5100	3800	3800
9.	Calcium Hardness	„	59	600	800	600
10.	Magnesium Hardness	„	23	4500	3000	3200
11.	Sulphate	„	9.11	389.2	386.7	373.1
12.	Dissolved Oxygen	„	5.06	3.73	5.2	5.8
13.	BOD (3 Days at 27°C)	„	0.86	1.26	3.33	1.26
14.	Nitrate. N	„	0.0032	0.0043	0.005	.0073
15.	Total Dissolved Solids	„	484	28020	21955	15320
16.	Total Coliforms	TC/100m l	1250	1540	1380	1780
17.	Feacal Coliforms	FC/100m l	284	212	184	384

The annual average of the water quality data of Mogral river at Mogral bridge for the years 2016, 2017 and 2018 is tabulated below in table no. 2. As per the water quality criteria proposed by the CPCB, the station falls under **Below E**.

Table 2. Annual Average of monthly data under NWMP project

ANNUAL AVERAGE OF MONTHLY DATA			
PARAMETERS	2016	2017	2018
Temperature	28	28	29
pH	6.7	6.9	7
Electrical conductivity μ mhos/cm	25799	23717	19538
Turbidity,NTU	8.6	2.7	2.5
Total Alkalinity, as CaCO_3 mg/l	71	83	71
Chlorides, mg/l	10606	11368	10355
Hardness, as CaCO_3 mg/l	4030	4219	3587
Calcium Hardness as CaCO_3 , mg/l	1198	872	568
Magnesium Hardness as CaCO_3 , mg/l	2831	3347	3019
Sulphate, mg/l	255	246	343
Total Dissolved Solids, mg/l	182275	18770	17574
Nitrate-N, mg/l	0.1	0.6	0.1
Ammoniacal Nitrogen, mg/l	0	0	0
Dissolved Oxygen, mg/l	5.4	5.3	5.2
BOD (3days at 27 ⁰ C), mg/l	1.5	1.4	0.9
COD, mg/l	9	8	6
Total Coliforms ,Cfu/100ml	773	786	1562
Fecal Coliforms, Cfu/100ml	134	180	448
CLASS OF WATER	Below E	Below E	Below E

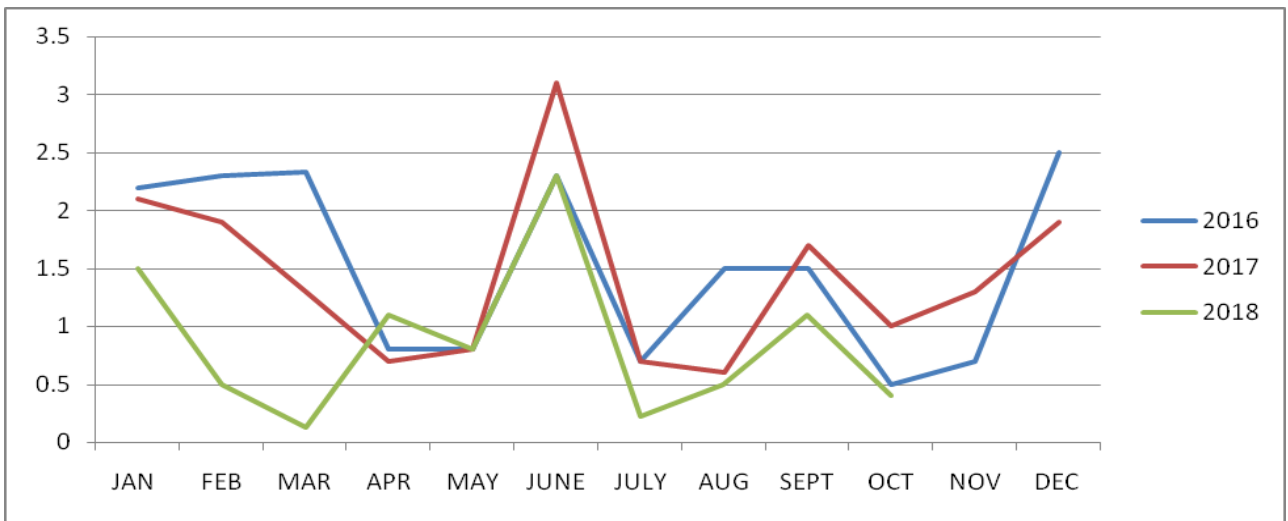
MONTHLY DATA

The average monthly data and the graphical representation of water quality of Mogral river at Mogral bridge for the years 2016, 2017 and 2018 is given below.

Biochemical Oxygen Demand (BOD)

Table 3. Monthly data of BOD

MONTH		JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
BOD	2016	2.2	2.3	2.33	0.8	0.8	2.3	0.7	1.5	1.5	0.5	0.7	2.5
	2017	2.1	1.9	1.3	0.7	0.8	3.1	0.7	0.6	1.7	1	1.3	1.9
	2018	1.5	0.5	0.13	1.1	0.8	2.3	0.23	0.5	1.1	0.4	1.3	1.3

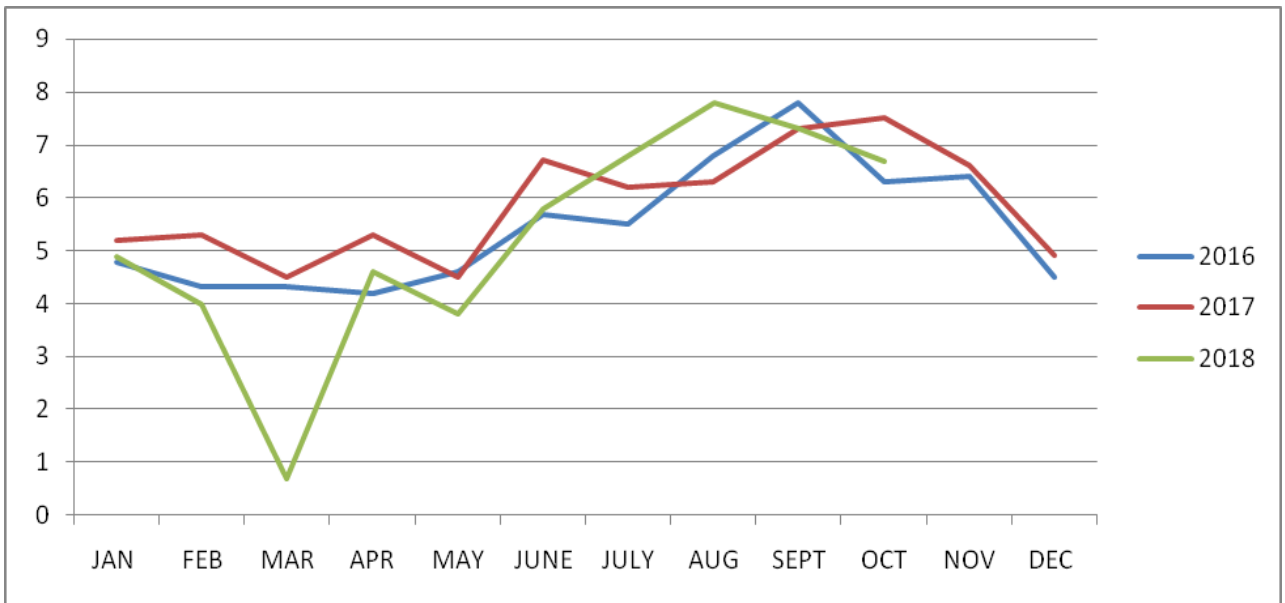


BOD monthly data graphical representation of Mogral river at Mogral bridge for the years 2016, 2017 and 2018

Dissolved Oxygen

Table 4. Monthly data of Dissolved Oxygen

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
2016	4.8	4.33	4.33	4.2	4.6	5.7	5.5	6.8	7.8	6.3	6.4	4.5
2017	5.2	5.3	4.5	5.3	4.5	6.7	6.2	6.3	7.3	7.5	6.6	4.9
2018	4.9	4	0.7	4.6	3.8	5.8	6.8	7.8	7.3	6.7	5.8	5.6

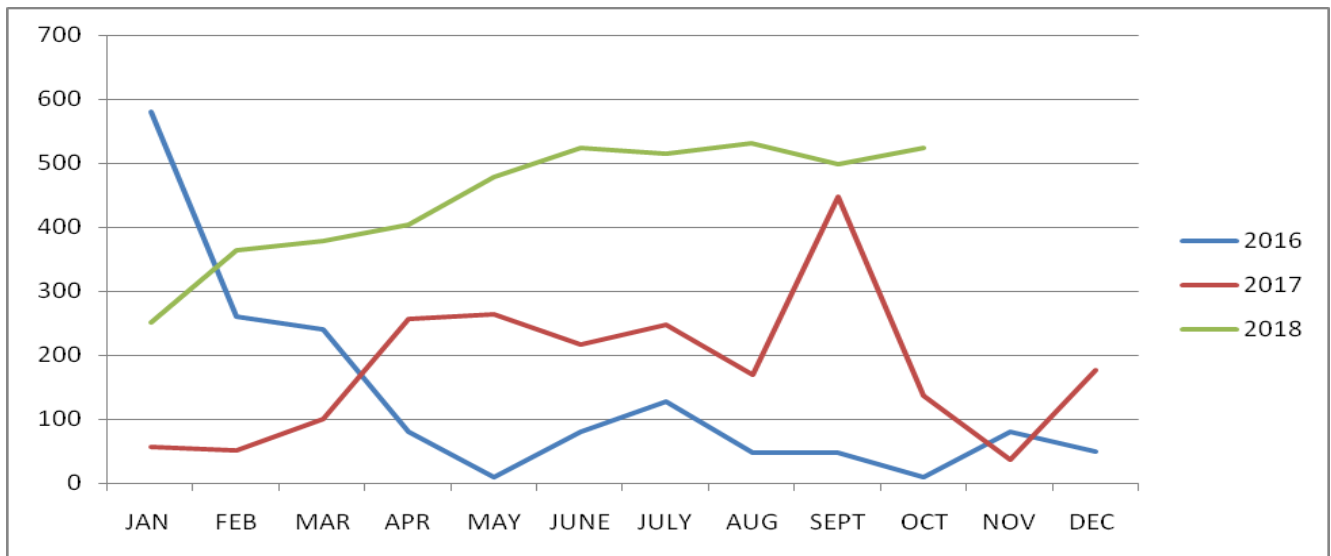


DO monthly data graphical representation of Mogral river at Mogral bridge for the years 2016, 2017 and 2018

Fecal Coliform

Table 5. Monthly data of Fecal Coliform

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
2016	580	260	240	80	10	80	128	48	48	10	80	50
2017	56	50	100	256	264	216	248	169	448	136	36	176
2018	252	364	380	404	480	524	516	532	500	524	380	390



FC monthly data graphical representation of Mogral river at Mogral bridge for the years 2016, 2017 and 2018



Sand mining



Mogral River at Eruthumkadavu Bridge

DISSCUSSION ON WATER QUALITY AND CONTROL OF POLLUTION

As per the analysis report obtained for the month of November – 2018 the water quality of the river at NWMP sampling station at Mogral bridge as well as Kottakkunnu Dam and Madimoger Road and Koppalam west Road in Mogral river can be classified into Class E (Table no. 1). The BOD values reported are within 3 mg/l except Koppalam west Road

CONCLUSION

River got polluted due to human activities like encroachment, reclamation, sand mining and construction of bunds across the river, agricultural activities on the banks and littering of wastes along the river side. Here most of the organic and bacteriological contaminates are assumed to be entering the stretch from immediate vicinity itself than from up streams. Wastes dumping are common practice across the river banks. This may be from households, markets, industries, commercial establishments etc. Sand mining is carried out widely in the river, moreover the decaying of vegetation / leaves falling in to the river are also polluting the river.

Chapter 3: Action Plan

1. The Local bodies along the stretch of the river have not provided sufficient solid waste collection and treatment facilities. So they are being instructed to provide facility for the scientific disposal of solid wastes as per the MSW rule, 2016. Reducing waste, recovering recyclable materials, return of nutrients to the ecosystem as well as generation of energy from wastes are to be practiced. A well planned scheme for collection, segregation, transportation, processing and safe disposal of the waste by the authorities is the need of the hour.
2. The Local Bodies also need to provide common septage treatment facilities to collect, treat and dispose sewage, particularly for thickly populated areas.

The action plan initiated/ proposed are as below:

- 1) The Local bodies to provide efficient solid waste collection system and proper treatment / process, disposal facilities and material recovery facilities at the Panchayath level as per the solid Waste Management Rules,2016.
- 2) Wire mesh net fencing on both sides of the bridge, to prevent waste dumping are to be provided and surveillance cameras in waste dumping area are to be installed and fine be imposed on defaulters.
- 3) Directions were already issued to remove the wastewater discharge pipes from houses and small hotels, discharging directly into public drains / road side drains leading to the water body.

- 4) Directions were given to all local bodies to take steps to provide septic tank soak pit system for domestic wastewater.
- 5) Coconut palm leaves falling into the channels and other wastes dumped into the water bodies are to be removed periodically by the local bodies – during the recent visits it was observed that coconut leaves have been partially removed from the channel.
- 6) Police have put up display boards against throwing of wastes on road sides which has resulted a decrease in dumping in recent days.

Action plan prepared by concerned departments is detailed below

Sl. no	Ref para no.48 Item Nos as per NGT Order no 673/2018 dated 20.09.2018	Implementing agency	Action proposed	Action taken	Estimated Expenditure	Time limit
1	C	Mogral Puthur GramaPanch ayath	Material collection facility.	Work in progress	Rs 10 lakhs	March 2020
2	C	Mogral Puthur Grama Panchayath	Waste collection including vehicle hire charge to collect waste.	Work in progress	Rs 5.5 lakhs	March 2020
3	E	Mogral Puthur Grama Panchayath	Installation of camera	Proposal being prepared	Rs 50,000/-	June 2020
4	A(b)	Mogral Puthur GramaPancha yath	Ballor, Kottakkunnu, Majal, Neerchal, Blarkode, Goovathadka, Pernadka, Shankra, Eriyal, KK Puram Arjal Vishnu Temple Drainage Cleaning	MGNREGS	Rs. 8,55,000/-	2019
5	C(ii)	Mogral Puthur Grama Panchayath	Haritha Karmasena Activity/ Collecting Non Bio degradable materials including Plastics from households	Village Extension Officer	Rs 4 lakhs	On going
6	C(iii)	Mogral Puthur Grama Panchayath	Bamboo Capital Bamboo Planatin- aiming water conservation and raising water levels thus preventing solid erosion waste dumping in public places	MGNREGS	Rs 2,38,310/-	On going

7	E	Mogral Puthur Grama Panchayath	River cleaning	MGNREGS	Rs 10,000/-	2019
8	C(iii)	Madhur Grama Panchayath	Bamboo Plantation of Madhur	MGNREGS	Rs 93,000/-	2019
9	C(ii)	Madhur Grama Panchayath	Viability Gap Funding for Haritha Karmasena	Village Extension Officer	Rs 1 lakhs	2019
10	C(ii)	Madhur Grama Panchayath	Material recovery facility centre	AE LSGD	Rs 10 lakhs	2019
11	C(ii)	Madhur Grama Panchayath	Construction of Plastic Shredding Machine building	AE LSGD	Rs 6 lakhs	2019
12	C(ii)	Madhur Grama Panchayath	Purchase of Plastic shredding machine	Secretary	Rs 6 lakhs	2019
13	C	PWD Roads Division	Tying of net on both sides of the bridge	Letter send to EE, PWD Roads Division	-	-
14	A(a)	KSPC B	Water quality monitoring	Being done regularly	Rs.10,14,000/-	-

