

***ACTION PLAN FOR POLLUTED RIVER
STRETCHES***

UPPALA RIVER (PRIORITY V)



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

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Chapter 1: Introduction

General River Profile

The Uppala River is also known as Kalai River, originates from the Veerakamba and Kudipadi hills at an elevation of 150+ m above MSL in Karnataka State and enters Kerala state in Kasaragod taluk and forms a back water just before ending in the Arabian Sea. It flows through the villages Bekrabail, Minja, Kuluru, and Uppala. The upper reaches of the river falling in Karnataka are known as Vittal Hole near Padanuru and Anekal Hole near Kolnad. In the initial reaches, the river flows southwards for about 7 km, then turns west and flows in that direction for about 13 km, through villages in Karnataka and then flows in south-westerly direction for 6km following the Karnataka Kerala border. It then enters Kasargod taluk of Kerala State and continues to flow in a south-westerly and westerly direction. Then it turns north-west and flows in that direction for about 6 km, before falling into the backwaters formed at the sea mouth, which is approximately 2 km away from the Uppala bridge, the NWMP sampling station.

Physiography

The river stretch falls in all three regions viz, Coastal plains, Mid land region, High land region. The river has a length of 50 km with drainage area of 250 sq. km of which 174 sq. km of the catchment lie in Karnataka and 76 sq.km is in Kerala. The ancient Uppala Bridge constructed at NH 17, across Uppala river is located at Hosangadi.

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 characterised by secondary soils which are sandy 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 normal monthly rainfall in mm at Kasargod for the period 1901-1999 is given below.

Jan	Feb	Mar	April	May	Jun	July	Aug	Sept.	Oct.	Nov.	Dec.	Total
4.4	2.4	12.1	51.7	216.6	996.2	1067.4	612.2	272.6	210.2	91.7	23.4	3560.9

The climate is generally hot and humid with the Temperature ranging from 22 deg C and 37 Deg C.



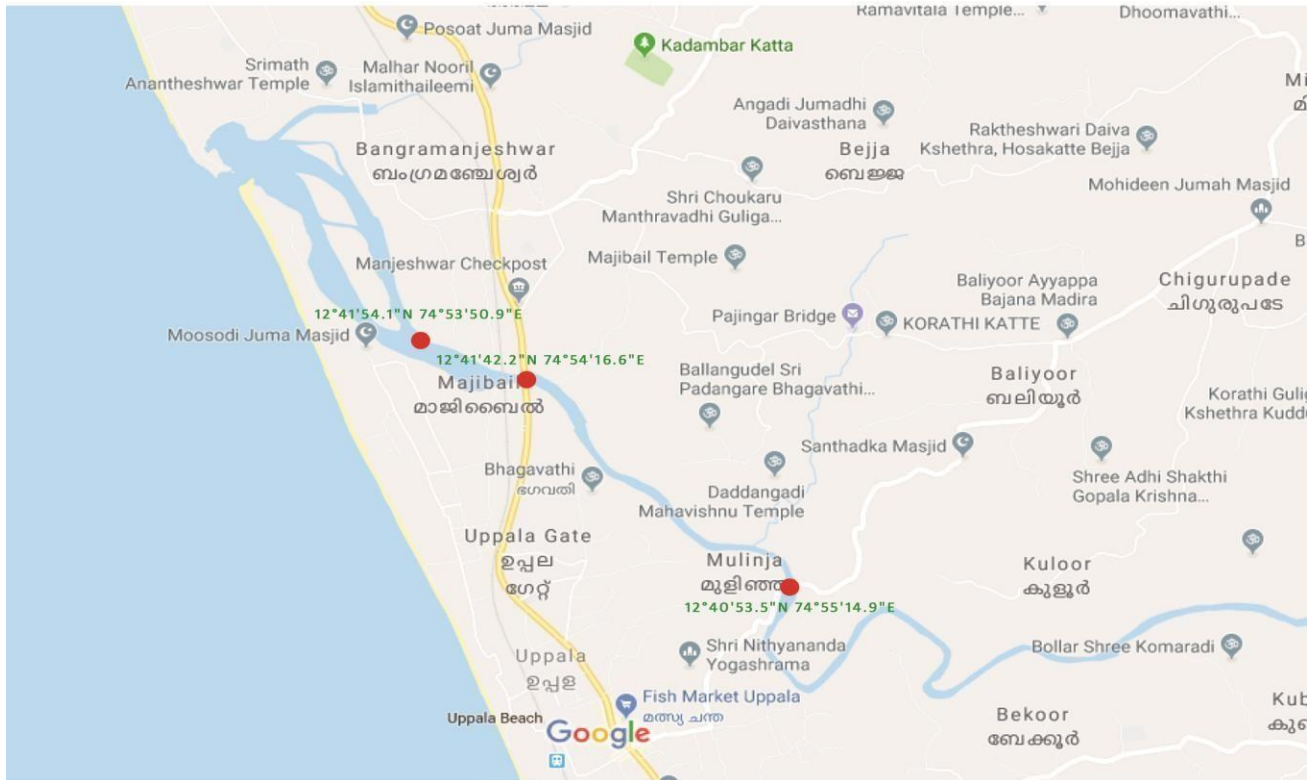
Fig 1: Uppala Bridge (NWMP Sampling Station)

Chapter 2: Study Area

The 3 km length from Poyya to Mulinja is the study area. The place Poyya is 1 km downstream of the NWMP sampling station at Uppala Bridge and Mulinja 2 km upstream of it. Bangra Manjeswar joins the back water at Poyya. This stream is seen littered with wastes. Different kinds of wastes, ie, fish / chicken/meat, non- degradable plastics, household wastes, wastes from commercial establishments, etc are seen dumped in this stream and the water in that area was stagnated. There are small prawn farms in the area. Waste pipes from nearby households were seen opening directly into the river.

Along the stretch from Poyya to Mulinja 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.

In November 2018 samples were collected from Bengra and Mulinja for water quality analysis. Bengra is situated in the Manjeswaram river and Mulinja in Uppala river is near Miyapadavu Bridge.





2.1 SURVEY OF SOURCES OF POLLUTION

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

The Uppala River flows mainly through the Mangalpady and Manjeshwar grama panchayaths. No efficient solid waste collection system, treatment and disposal facilities found. The solid waste bundled in plastic covers were seen accumulated all along the road side and at the ends of the Uppala bridge. In Kubannur, a solid waste management plant is constructed under Mangalpady panchayath. A plastic shredding unit is also established but yet to be started due to non availability of electric connection.

2.2 IDENTIFIED DRAINS

A drain near Pajingar Bridge is the only one drain entering into the river in the identified stretch. The location of the sampling point on the river is at latitude of $12^{\circ}69'78.62''N$ and longitude of $74^{\circ}92'45.14''E$. As this drain was found dry, sample could not be collected.

DATA EVALUATION

The results of the analysis of samples taken during study period are tabulated in Table 1 below.

Table 1. Analysis report of the water samples during study period

SAMPLING LOCATION			BANGRA	MIYAPADAVU BRIDGE, MULINJA	UPPALA BRIDGE
DATE OF SAMPLING			21.11.2018	21.11.2018	03.11.2018
SL. NO.	PARAMETERS	UNIT	U 1	U 2	U 3
1.	<i>Temperature</i>	$^{\circ}\text{C}$	28	28	29
2.	<i>pH</i>	-	8.3	8.75	7.89
3.	<i>Electrical Conductivity</i>	$\mu\text{mhos/cm}$	390	318.3	133.4
4.	<i>Turbidity</i>	NTU	3.9	3.3	1.1
5.	<i>Total Alkalinity</i>	mg/l	30	25	17
6.	<i>Chlorides</i>	„	50	41	21
7.	<i>Ammoniacal Nitrogen</i>	„	BDL	BDL	BDL
8.	<i>Total Hardness</i>	„	51	40	27
9.	<i>Calcium Hardness</i>	„	36	29	14
10.	<i>Magnesium Hardness</i>	„	15	11	13
11.	<i>Sulphate</i>	„	2.71	2.05	2.67
12.	<i>Dissolved Oxygen</i>	„	7.6	8.1	7.6
13.	<i>BOD (3 Days at 27$^{\circ}$C)</i>	„	2.4	2.1	2.66
14.	<i>Nitrate. N</i>	„	0.008	0.006	.0032
15.	<i>Total Dissolved Solids</i>	„	350	260	152
16.	<i>Total Coliforms</i>	Cfu/100ml	3800	2350	1320
17.	<i>Feacal Coliforms</i>	Cfu/100ml	1020	496	416

The annual average of the water quality data of Uppala river at Uppala 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**, because of High Electrical Conductivity being located in coastal area. Except this with other parameters this river can be classified as Class C.

Table 2. Annual Average of monthly data under NWMP project

ANNUAL AVERAGE OF MONTHLY DATA			
PARAMETERS	2016	2017	2018
<i>Temperature</i>	27.8	27.6	29.7
<i>pH</i>	7.0	7.32	7.23
<i>Electrical conductivity μmhos/cm</i>	24315	21226	17934
<i>Turbidity,NTU</i>	1.7	5.48	3.2
<i>Total Alkalinity, as CaCO_3 mg/l</i>	63	70	61
<i>Chlorides, mg/l</i>	9695	10167	9635
<i>Hardness, as CaCO_3 mg/l</i>	3855	3581	3365
<i>Calcium Hardness as CaCO_3, mg/l</i>	879	693	508
<i>Magnesium Hardness as CaCO_3, mg/l</i>	2976	2888	2857
<i>Sulphate, mg/l</i>	291	209	285
<i>Total Dissolved Solids, mg/l</i>	17551	17430	16299
<i>Nitrate-N, mg/l</i>	0.046	0.67	0.19
<i>Ammoniacal Nitrogen, mg/l</i>	BDL	BDL	BDL
<i>Dissolved Oxygen, mg/l</i>	6.4	5.9	6.2
<i>BOD (3days at 27⁰ C), mg/l</i>	1.6	1.8	1.9
<i>COD, mg/l</i>	7.6	8.53	7.52
<i>Total Coliforms ,Cfu/100ml</i>	1260	788	1183
<i>Fecal Coliforms, Cfu/100ml</i>	278	205	330
CLASS OF WATER	Below E	Below E	Below E

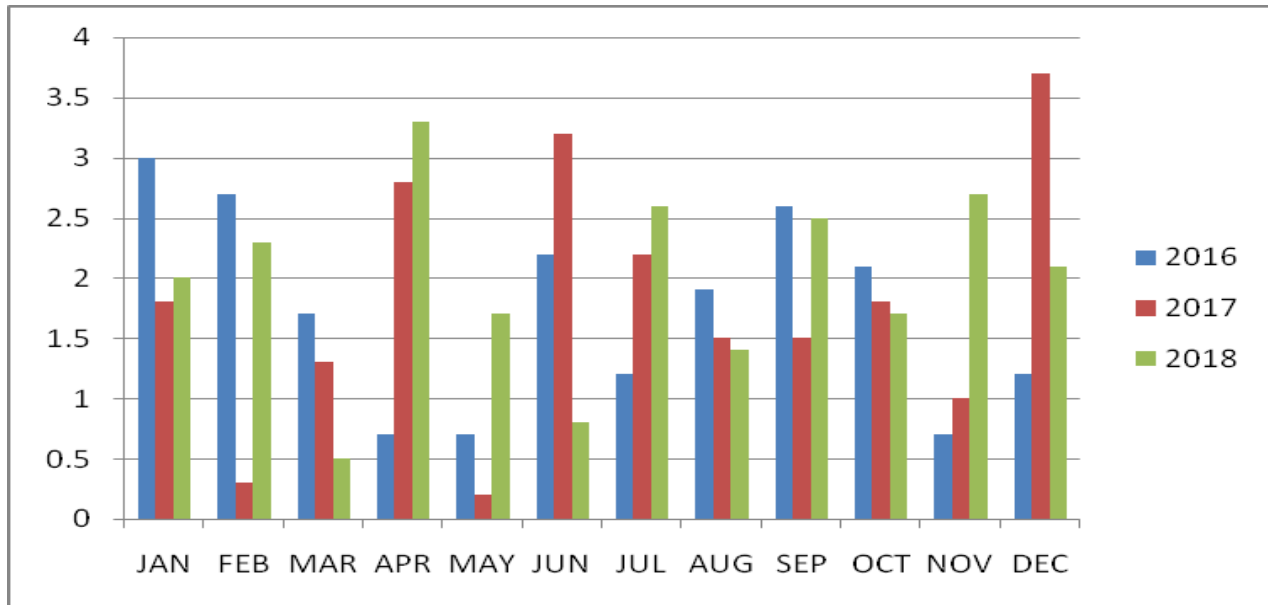
MONTHLY DATA

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

Biochemical Oxygen Demand (BOD)

Table 3. Monthly data of BOD

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2016	3.0	2.7	1.7	0.7	0.7	2.2	1.2	1.9	2.6	2.1	0.7	1.2
2017	1.8	0.3	1.3	2.8	0.2	3.2	2.2	1.5	1.5	1.8	1	3.7
2018	2	2.3	0.5	3.3	1.7	0.8	2.6	1.4	2.5	1.7	2.7	2.1

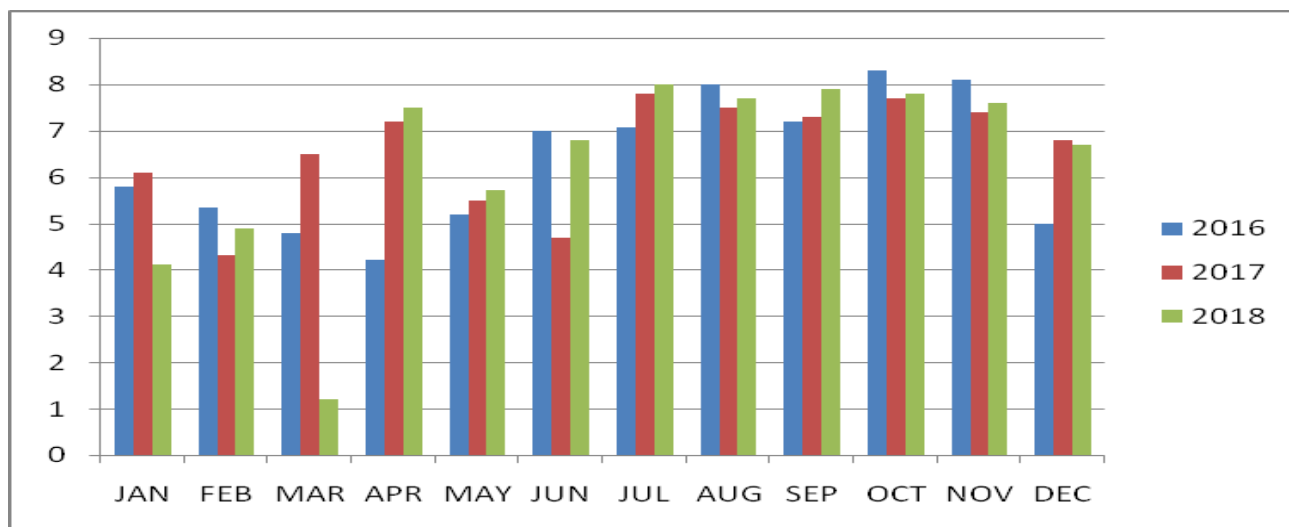


BOD monthly data graphical representation of Uppala river at Uppala bridge for the years 2016, 2017 and 2018

Dissolved Oxygen

Table 4. Monthly data of Dissolved Oxygen

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2016	5.8	5.33	4.8	4.2	5.2	7	7.06	8	7.2	8.3	8.1	5
2017	6.1	4.3	6.5	7.2	5.5	4.7	7.8	7.5	7.3	7.7	7.4	6.8
2018	4.1	4.9	1.2	7.5	5.71	6.8	8	7.7	7.9	7.8	7.6	6.7

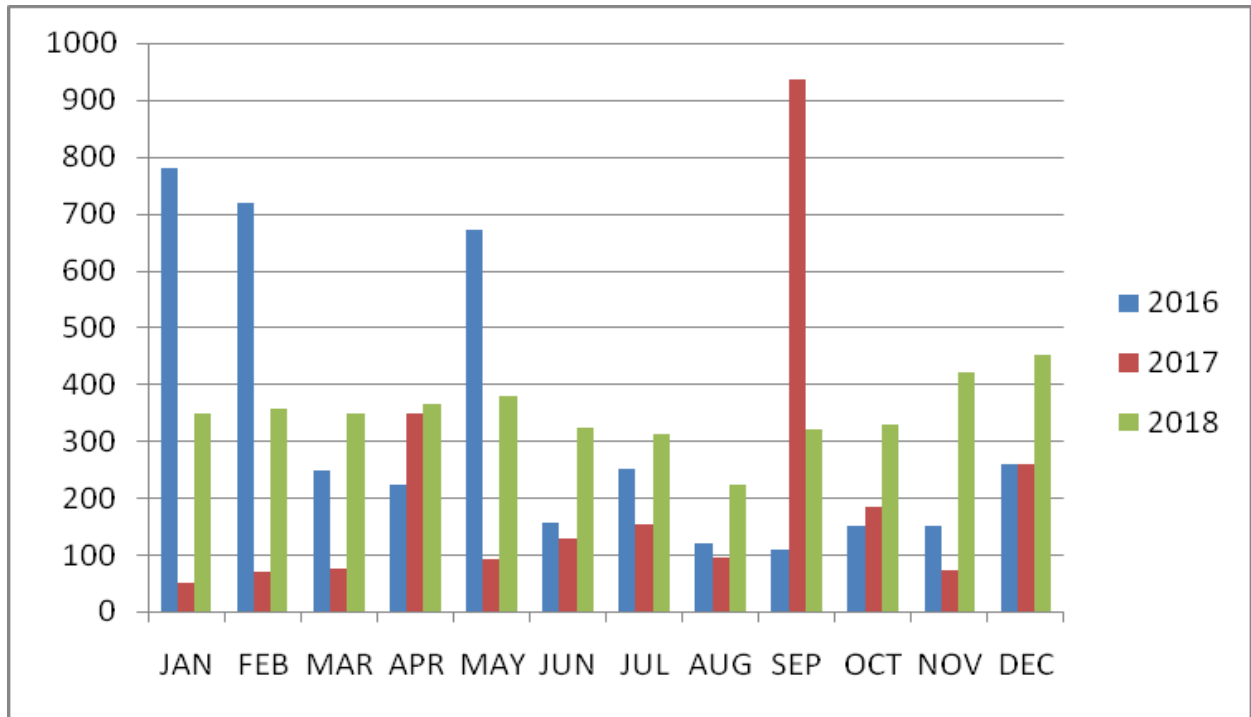


DO monthly data graphical representation of Uppala river at Uppala bridge for the years 2016, 2017 and 2018

Fecal Coliform

Table 5. Monthly data of Fecal Coliform

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2016	780	720	248	224	672	156	252	120	108	150	150	260
2017	50	70	75	348	92	128	152	96	936	184	72	260
2018	348	356	348	364	380	324	312	224	320	328	420	450



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

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 Uppala bridge as well as Bangra in Manjeshwaram river and Mulinja in Uppala river can be classified into Class C (Table no. 1) if considering without electrical conductivity (since coastal area). The BOD values reported are within 3 mg/l. The values vary considerably due to the seasonal nature of flow of water in river.

The annual average of water quality parameters at Uppala bridge for the years of 2016, 2017 and 2018 is tabulated in the table no. 2. The water quality at Uppala Bridge is classified into below E in all these years. The average BOD value for the years 2016, 2017 and 2018 is within 3 mg/l.

Since Uppala Bridge is the sampling station selected in the river and since it is located in the extreme downward stretch just before draining into the sea, the water quality at this station cannot be considered as representative of the entire river.

2.6 CONCLUSION

Human intervention in the area pollutes the river stretch. People misuse the river for open dumping of wastes of all sorts. Wastes from households, markets, commercial establishments, fish trucks etc are reaching the river. The tidal effect makes the wastes swing to and fro in the river for up to a considerable length from sea mouth. Falling of leaves and branches of plants located all along the river banks also increase the pollution load in the river. Consistent efforts from the part of Local bodies to prevent littering of wastes in water bodies and regulation to curb the domestic discharge into the water bodies will help reclaim the quality of the stream.

Chapter 3: Action Plan

1. The nearby Local bodies are mainly responsible for not providing solid waste collection and treatment facilities in the locality. So they are instructed to provide the required facility for scientific disposal of municipal solid wastes as per the MSW rule, 2016. The citizens as well as the Municipal/ Grama panchayath authorities need to be aware of the importance of scientific disposal of waste generated. Reducing waste, recovering recyclable materials, return of nutrients to the ecosystem as well as generation of energy from wastes are to be practiced. There has to be well planned scheme for collection, segregation, transportation, processing and safe disposal of the waste by the authorities. For this, affordable and viable waste management to energy conversion technologies apart from conventional composting are to be implemented by the local bodies.
2. The local bodies also need to provide common septage treatment facilities to collect, treatment and disposal of sewage, in areas of thickly populated areas.

The action plan initiated/ proposed are as below:

- 1) The Mangalpady and Manjeshwaram Grama Panchayaths were instructed to provide proper solid waste disposal facilities at the Panchayath level as per the solid Waste Management Rules, 2016.
- 2) Providing of wire mesh net fencing on both sides of bridge, to prevent waste dumping and installing surveillance cameras in waste dumping locations and imposing fine on defaulties are need to be done.
- 3) Directions were already issued to remove the wastewater discharge pipes from houses and small hotels, discharging directly into the public drains/ road side drains leading to the water bodies.
- 4) Directions are being given to all local bodies to take steps to provide septic tank soak pit system for domestic wastewater.
- 5) For residences septic tank facility and septage treatment facility are to be provided by the local bodies.

- 6) Trucks carrying fish, discharge their waste water near the bridge. Instructions have been given to the local police to have a vigil on this matter. Manjeshwar Panchayath is also instructed on this and to take actions.
- 7) 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 (ii)	Mangalpady Grama Panchayath	Material collection facility. Operation	Work complete d Under progress	Rs 15 lakhs	2019
2	C	Mangalpady Grama Panchayath	Waste management including purchase of vehicle to collect waste.	Proposal submitted to higher authorities	Rs 60 lakhs	2019-2020
3	E	Mangalpady Grama Panchayath	Installation of camera	Proposal being submitted	Rs 20 lakhs	March 2020.
4	C	Manjeshwaram Grama Panchayat	Electrificatio n of material collection facility	Estimation submitted	Rs 2 lakhs	2019-2020
5	C	Manjeshwaram Grama Panchayat	Transportation of collected waste	Work under progress	Rs 3 lakhs	March 2020
6	E	Manjeshwaram Grama Panchayat	Installation of camera	Proposal being prepared	-	March 2020
7	C	PWD Roads Division	Tying of net on both sides of the bridge	Letter send to EE, PWD Roads Division	-	-
8	E	Police Department	Continuous vigil on waste dumping on roads	Warning boards have been put up by the Police.	-	-
9	A(a)	KSPCB	Water quality monitoring	Being done regularly	Rs.11,08,000/-	-

