

**ACTION PLAN FOR THE
REJUVENATION OF POLLUTED RIVER
STRETCH**

BHRATHAPUZHA AT PATTAMBI

**Submitted by District Level Technical Committee (Palakkad
District)**

Before the River Rejuvenation Committee

As per G.O (Ms) No.12/2019/WRD Dated 30.04.2019

As per G.O (Ms) No.12/2019/WRD Dated 30.04.2019 , A District Level Technical Committee (Palakkad District) was constituted for preparing Draft Action Plan for the Rejuvenation of polluted river stretches. The polluted river stretches in the district were Bharathapuzha at Pattambi and River Bhavani at Elechivazhi , The members of the committee are as follows.

1. The Superintending Engineer, Irrigation Department : Chairperson
2. The Superintending Engineer, Kerala Water Authority : Member
3. The Environmental Engineer, District Office, Kerala state Pollution Control

Board : Member & Convenor

4. The District Co- ordinator, District Suchitwa Mission : Member
5. The General Manager, Industries Department : Member
6. Deputy Collector, LR Palakkad , Senior officer representing the Revenue Department and nominated by District Collector : Member
7. The Secretary , Pattambi Municipality : Member

Out of the two Polluted river stretches Named above , River Bhavani at Elechivazhi was considered by the committee as non-polluted based on water quality data of last several months and it was decided to report as such. The action plan for Bharathapuzha at Pattambi was prepared after several deliberations.

The committee hereby submits the draft action plan before the River Rejuvenation committee constituted by the Govt. of Kerala.

Dated this the 25th of May, 2019.

Member and Convener
Environmental Engineer
Kerala State Pollution Control Board
Palakkad

Chairperson
Superintending Engineer
Minor Irrigation Central Circle
Ernakulam

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EXECUTIVE SUMMARY

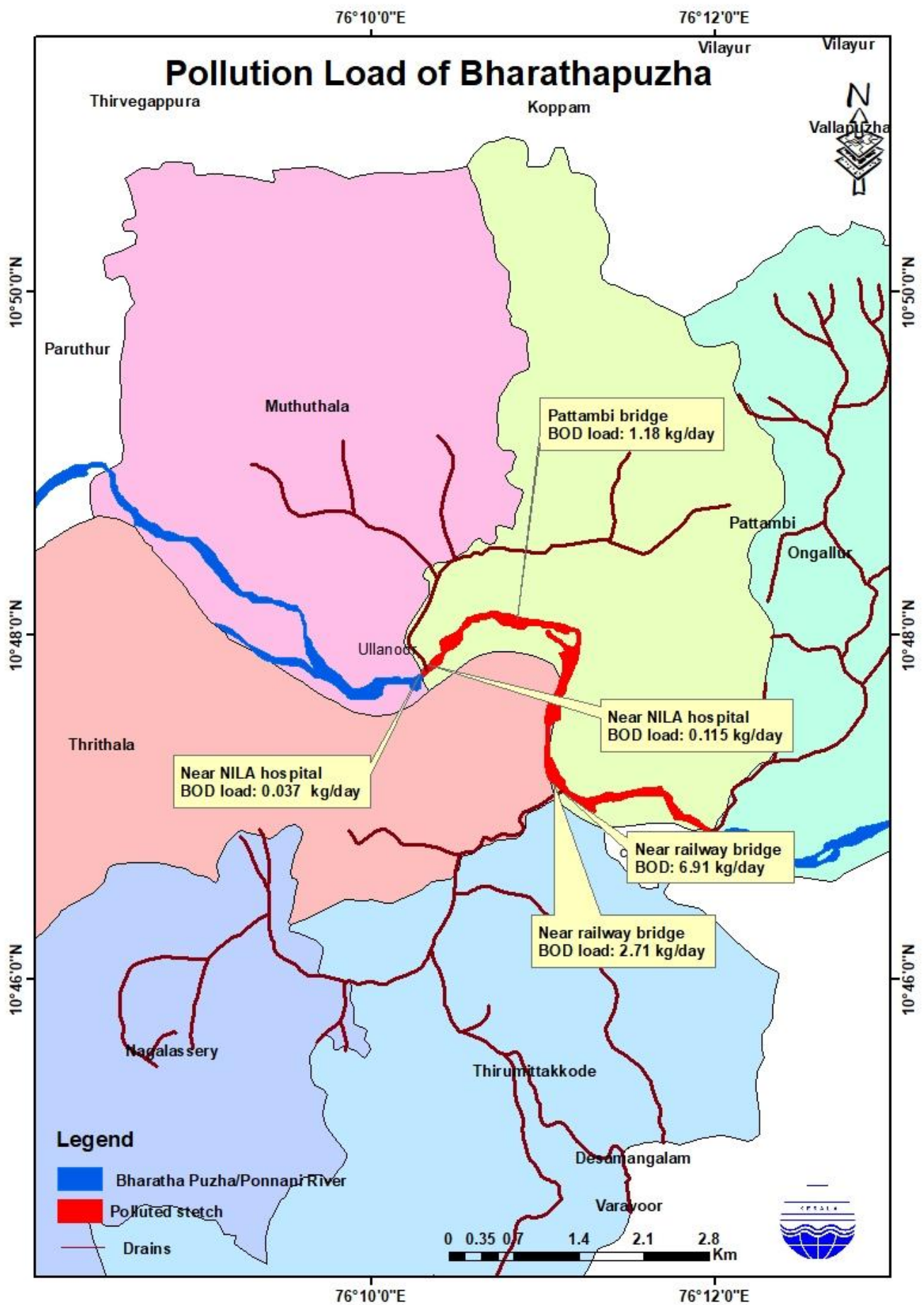
The draft action plan of Bharathapuzha River was submitted before Hon'ble NGT earlier on 15-12-2019. The modified action plan is given below.

Bharathapuzha River which has a length of 209 kms is the second longest river in Kerala. Pattambi is a Municipality and taluk headquarters at the western end of the Palakkad district of the state of Kerala. Bharathappuzha flows through Pattambi town. As per the list of polluted stretched submitted by CPCB in September, 2018, Bharthapuzha at Pattambi has been identified as one polluted stretch. It has been categorised as Priority IV polluted stretch since BOD value crossed 6.0 mg/litre on one occasion.

The drains were identified as joining this polluted stretch. The pollution load in terms of BOD were assessed. The map showing the drains and BOD load is given below.

DRAINS DISCHARGING POLLUTED WATER INTO THE RIVER AND THEIR POLLUTION LOAD

Sl. No:	Location	Latitude Longitude	Flow rate liters per day)	BOD (mg/l)	COD (mg/l)	Pollution load in terms of BOD (kg/day)	TC (CFU/ 100 ml)	TC (CFU / 100 ml)
1	Near NILA Hospital	10 ⁰ 48' 4.2" N 76 ⁰ 10' 30.6" E	1170.73	31.2	72	0.0365	3000	500
2	Near NILA Hospital	10 ⁰ 48' 4.2" N 76 ⁰ 10' 30.6" E	7200	16	40	0.115	2800	800
3	Near Pattambi railway Bridge (Nambram)	10 ⁰ 48' 00.5" N 76 ⁰ 11' 01.5" E	72000	96	160	6.912	2500	900
4	Left side of Pattambi Bridge	10 ⁰ 48' 02.1" N 76 ⁰ 10' 48.8" E	800	1480	2280	1.18	5600	2100
5	Right side of Pattambi Bridge	10 ⁰ 48' 02.1" N 76 ⁰ 10' 48.8" E	No flow at the time of study hence cannot determined					
6	Near Railway bridge (Nabram)	10 ⁰ 48' 04.3" N 76 ⁰ 11' 02.2" E	42352.9	64	120	2.71	3200	800



ACTION PLAN

Sl No	Ref para no:48 Item Nos as per NGT Order no 673/2018 dated 20.9.2018	Activity	Implementing agency	Estimated Expenditure in Lakhs	Source of Fund	Time line	Expected out come
1	A(a)	NIL	No industries	-	-	-	-
2	A(a)	Monitoring of river water quality by sampling	Kerala State Pollution Control Board	Rs. 12,08,000 per year	Ongoing NWMP project	2019-2020	Periodical water quality assessment
3	A(b)	Septage & Sewage Treatment Plant	Pattambi Municipality	200	Suchithwa Keralam – Urban	Tentatively 2019-2021	Reduce the pollution load and improve the water quality
4	A(b)	Installation of Modern Slaughter house and rendering plant	Pattambi Municipality	100	Pattambi Municipality	Tentatively 2019-2021	Reduce open dumping of slaughter house waste in to the river
5	C(ii)	Establishment of modernisation of Modernisation of MSW treatment Plant (Solid Waste Management)	Pattambi Municipality	19.91	Plan	2019-2020	Better Solid Waste Management (SWM) reduce the river pollution due to solid waste dumping
					Central		
					State		
6	C	Material collection Facility (Solid Waste Management)	Pattambi Municipality	7.42	Own	2019-2020	Better Solid Waste Management (SWM) reduce the river pollution due to solid waste dumping
					Central		
					State		
7	C	Resource recovery facility (Solid Waste Management)	Pattambi Municipality	5.30	Own	2019-2020	Better Solid Waste Management (SWM) reduce the river pollution due to solid waste dumping
					Central		
					State		
8	C	Installing house hold and community level solid waste management units	Pattambi Municipality	137.865	Central(Swach hBharath Mission-Urbun) through Suchithwa mission	2019-2020	Better Solid Waste Management (SWM) reduce the river pollution due to solid waste dumping
9	C	Door to Door Collection and Transportation of MSW	Pattambi Municipality	18	User fee / Viability Gap Fund	Tentatively 202-2021	Better Solid Waste Management (SWM) reduce the river pollution due to solid waste dumping
10	C	Construction of compound wall with fencing	Irrigation department	135.00	To be found	Tentatively 2020-21	Reduce the Tendency of people in throwing waste in to the river

11	C	Removing light jungle and muddies from river courses	Irrigation department	100.00	To be found	Tentatively 2020-21	Maintain better flow of river and self-cleansing
12	C	Electrical-Light arrangements and Surveillance cameras	Irrigation department	50.00	To be found	Tentatively 2020-21	Reduce the tendency of people in throwing waste in to the river
13	C	Regualting activites in flood plain zone, protection and management of flood plain zone	Irrigation department			Tentatively 2020-21	Government constituted a river basin conservation and management authority and a committee constituted for drafting river basin conservation act
14	C	Greenery development-Plantation plan. Plantation on both sides of the river, setting up biodiversity parks on flood plains by removing encroachment	Irrigation department	500.00 (For Bharathapuzh a only)	State fund	Tentatively 2020-21	Ecofriendly approach will create a positive attitude in public.
15	C (b) (ii)	Green Protocol implementation in all Offices institution & Public function	Pattambi Municipality	2.55	State Plan fund Suchithwa mission	Tentatively 2019-2021	Reduce solid waste generation in Municipality
16	D(a)	Issues relating to E-flow, maintaining minimum environmental flow of river(by having watershed management provisions)	Irrigation department	50.00	State fund	Tentatively 2020-21	Government constituted a river basin conservation and management authority and a committee constituted for drafting river basin conservation act
17	D (b)	Irrigation practices	Irrigation department	2500.00 (For Bharathpuzha basin)	State fund	Tentatively 2020-21	Community micro irrigation and Participatory irrigation management
18	E	Awareness programmes for sections of public	Kerala State Pollution Control Board	1.0	Plan Scheme, Suchithwa mission, IEC fund	2019	Awareness of statutory provision of deterrent to pollution
19	C	Management of municipal, plastic Hazardous, Bio medical, and electrical waste	LSGD	50.00	To be funded	-do-	Better solid waste management (SWM) reduce the river pollution due to solid waste Dumping

Action Plan by Ground Water Department

Sl.No	Ref para item nos as per NGT Order no.673/2018 dated 20.09.2018	Activity	Ground Water Department
1	B(i)	Ground Water resources and regulation of ground water extraction by industries particularly in over exploited as critical zones/blocks	As per Groundwater resources of Kerala, 2017 estimate a total number of 3 blocks (Pattambi, Thrithala and Vadakkanchery) comes under the Bharathapuzha river basin. Out of 3 blocks in the river stretch Pattambi and Thrithala are semicritical blocks and Vadakkanchery is safe block with stage of groundwater extraction ranges from 67% to 81.37%
2	B(ii)	Ground water recharging / rain water harvesting	The average pre monsoon groundwater level of the area ranges from 7.38 to 8.68 mbgl. The Department has not yet implemented recharge schemes in the blocks. During the current financial year, proposals for recharge schemes are prepared in semicritical blocks and which are under scrutiny.
3	B(iii)	Periodic ground water quality assessment and remedial actions in case of contaminated ground water tube wells/bore wells or hand pumps	Groundwater Department has 2 observation dug wells and 3 observation bore wells in this river stretch.
4	B(iv)	For regulating use of ground water for irrigation purpose, adopting good irrigation practices	The total irrigation draft in the area ranges from 771.9 - 1668.84 ha.m.

CHAPTER 1

INTRODUCTION

Central Pollution Control board (CPCB) is monitoring the water quality of aquatic resources all over the country at 3500 locations in 29 States and 6 Union Territories under National Water Monitoring Programme. The present monitoring network covers 2541 locations on the surface water and 989 on Wells (ground water). Water samples are being analyzed for 28 parameters consisting of physicochemical and bacteriological parameters for ambient water samples apart from the field observations. Besides this, 9 trace metals and 15 pesticides are analyzed in selected samples. Bio-monitoring is also carried out on specific locations.

1.1 OBJECTIVES OF WATER QUALITY MONITORING UNDER NWMP

- ❖ Rational planning of pollution control strategies and their prioritization;
- ❖ To assess nature and extent of pollution control needed in different water bodies or their part;
- ❖ Assimilative capacity of a water body thereby reducing cost on pollution control;
- ❖ The fitness of water for different uses;
- ❖ To evaluate effectiveness of pollution control measures already in existence;
- ❖ Water quality trend over a period of time;
- ❖ To understand the environmental fate of different pollutants

The water quality monitoring results obtained during the years indicate that the organic and bacterial contamination continue to be critical in water bodies. This is mainly due to discharge of domestic wastewater mostly in untreated form from the urban centres of the country. The municipal corporations and other urban local bodies at large are not able to treat increasing load of municipal sewage flowing into water bodies without treatment. Secondly the receiving water bodies also do not have adequate water for dilution. Therefore, the oxygen demand and bacterial pollution is increasing day by day. This is mainly responsible for water borne diseases. The water quality monitoring results were analysed with respect to indicator of oxygen consuming substances (Bio-chemical demand or BOD) and indicator of pathogenic bacteria (total coliform and faecal coliform).

1.2 IDENTIFICATION OF POLLUTED RIVER STRETCHES

The water quality data under National Water Quality Monitoring Programme for the year 2016 and 2017 is analysed statistically and monitoring locations exceeding the water quality criteria are identified as polluted. The polluted locations in a continuous sequence are defined as polluted river stretches and categorised in five priority classes based on BOD concentration exceeding to BOD levels >30 mg/l, BOD between 20&30 mg/l, BOD between 10&20mg/l, BOD between 6-10 mg/l and BOD between 3& 6 mg/l.

1.3 NGT ORDER ABOUT RIVER POLLUTED STRETCH

The National Green Tribunal (NGT) passed a landmark order on 20 September 2018 pertaining to increasing polluted river stretches in the country (NGT 2018). It ordered all states and union territories to prepare action plans within two months to improve the quality of polluted river stretches to –at least bathing purpose|| within six months of the finalisation of the plans. The NGT observed that the State Pollution Control Boards (SPCBs) have failed to check pollution. The tribunal distinctly stated that the chief secretary of each state and the administrator of each union territory will be responsible for preparation of the action plan.

The NGT took suo-moto cognizance of a report published in the *Hindu* on 17 September 2018. The report was based on a study done by the Central Pollution Control Board (CPCB) for identifying polluted river stretches in the country (CPCB 2018). Similar studies were conducted by the CPCB in 2012 and 2015 (CPCB 2012, 2015). The 2018 study observed that the number of polluted stretches in the country was 351, an increase from 302 in 2015 and 150 in 2012. The 2018 data highlights that there are 45 river stretches attracting Priority I (Biochemical Oxygen Demand (BOD) value ≥ 30 mg/l) for restoration. Out these, five are in Gujarat, nine in Maharashtra and four in Tamil Nadu—the three most industrialised states in the country.

CHAPTER 2

BHRATHAPUZHA AT PATTAMBI

Bharathapuzha River which has a length of 209 kms is the second longest river in Kerala. Pattambi is a Municipality and taluk headquarters at the western end of the Palakkad district of the state of Kerala. Bharathappuzha flows through Pattambi town. Pattambi is one of the biggest towns in Palakkad district which connects roads from three districts – Palakkad, Malappuram and Thrissur. As per the list of polluted stretched submitted by CPCB in September, 2018, Bharthapuzha at Pattambi has been identified as one polluted stretch. It has been categorised as Priority IV polluted stretch since BOD value crossed 6.0 mg/litre on one occasion.

Bharathapuzha River passing through Shoranur to Pattambi stretch is sharing boundary with Thrissur district in the left bank and Palakkad district in the right bank. The panchayaths located in the left bank are Vallathol Nagar and Desamangalam of Thrissur district and Thirumittakode and Thrithala of Palakkad district. Shoranur Municipality, Ongallur Panchayath, Pattambi Muncilpality are located in the right bank. The major water retaining structures along the river course in this stretch are Cheruthurthy Check dam, Chenganamkunnu regulator and Velliyamkallu regulator. Major drinking water schemes of Kerala Water Authority located at (i) Shornur for Shornur Municipality and Vaniyamkulam Grama panchayath, (ii) Karakkad for Ongalloor panchayath, (iii) Kodumunda for Muthuthala panchayath, (iv) Thrithala for water supply schemes to Anakkara, Pattithara and Kappur panchayaths, (v) also at Thrithala for Temple city of Guruvayoor Municipality, Chavakkad Municipality, Kadappuram and Orumanayyur of Thrusssur District, (vi) for 10 Grama panchayaths under Pavaratty regional water supply scheme (out of which 4 Grama Panchayaths namely Thrithala, Thirumittakode, Chalissery and Nagalssery of Palakkad district and balance 6 of Thrissur District), and , (vii) water supply schemes to Wadakanchery and Deshamangalam are falling in the Shornur - Velliyankallu (Pattmbi) Stretch of Bharathapuzha. Nearly 100 MLD (Million Litres per Day) is drawn through these schemes. Therefore maintaining the water of the river free from pollution is important activity of the locality.

As per 2011 Census of India, total population of Pattambi Panchayath was 28,632. Now it has been converted into a Municipality. The records of the Pattambi Municipality shows that there are almost 1500 trades including shops, lodges, hotels, bakeries, etc. in Pattambi with valid trade licenses. All these trades are carried out in the town area, the drains from which naturally flow to river Bharathapuzha. Other than the trades, the residential

localities are all away from the bank of the river, with sufficiently large households to manage their wastewater and solid waste themselves.

2.1 WATER QUALITY DATA OF STATION AT PATTAMBI UNDER NWMP

NWMP2				Station:Pattambi 2016								
Parameter	Jan	Feb	March	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Temp (°C)	29	30	29	28	28	28	26	29	26	29	30	29
pH	7.1	8.2	7.7	7.4	7.3	7.2	7.3	6.7	6.4	6.7	7.9	7.5
EC (µS/cm)	262	232	260	245	312	140	155	182	211	190	315	299
Turbidity (NTU)	BDL	BDL	BDL	BDL	BDL	BDL	5	BDL	BDL	BDL	BDL	BDL
Alkalinity (mg/l)	62	70	72	78	84	34	3	50	65	42	79	81
Chloride(mg/l)	31	27	33	31	41	18	23	26	24	33	30	38
COD(mg/l)	4	4	4	4	8	4	12	4	3	4	4	4
TKN(mg/l)	0.12	0.1	0.1	0.12	0.1	0.12	NIL	NIL	NIL	NIL	NIL	NIL
Amm.N(mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
T.hardness(mg/l)	80	82	84	90	88	42	48	22	68	44	97	78
Ca.hardness(mg/l)	46	52	50	54	46	34	28	11	40	30	60	59
Mg.hardness(mg/l)	34	30	34	36	42	8	20	11	28	14	37	19
Sulphate(mg/l)	11	11	12	12	15	7.9	7	1.86	5.3	4.12	33.26	11.9
Sodium(mg/l)	18.59	16.38	18.65	18.1	28.66	11.31	12	13	14	19	20	25
TSS(mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	9	BDL	BDL	BDL	BDL	BDL
TDS(mg/l)	135	135	160	140	180	80	86	120	120	105	185	167
FDS(mg/l)	122	125	144	126	162	72	80	101	102	69	168	151
Phosphate(mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	0.002	BDL	BDL	BDL	BDL	BDL
Boron(mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Potassium(mg/l)	3.32	2.15	2.78	1.62	5.45	3.02	1.91	5	7.2	5.2	8.9	15
BOD(mg/l)	1.2	0.9	1.2	1	1	1.2	2.1	2	0.8	0.9	1	0.9
Fluoride(mg/l)	0.16	0.197	0.172	0.47	0.25	0.39	1	0.22	1.2	0.041	0.019	0.033
DO(mg/l)	7	6.9	7.3	6.9	5.8	0.68	7.1	9.4	8.1	8.9	8.1	9.4
Nitrate-N(mg/l)	0.33	0.41	0.74	0.41	0.71	0.65	0.9	0.5	0.743	0.58	0.259	0.23
TC (CFU/100ml)	400	420	300	360	240	240	175	NIL	60	140	60	520
FC(CFU/100ml)	320	360	240	240	160	180	45	NIL	38	126	55	470

NWMP2					Station:Pattambi 2017							
Parameter	Jan	Feb	March	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Temp(°C)	28	30	30	29	NO WATER FLOW	29	26	30	28	29	30	29
pH	8.5	7.6	8.4	8.1		7.6	7.5	8.1	7.5	6.2	6.3	7.2
EC(µS/cm)	340	318	251	242		228	175	211	227	191	178	224
Turbidity(NTU)	BDL	BDL	BDL	BDL		4	8	7	7	8	9	8
Alkalinity(mg/l)	108	88	82	38		55	53	40	60	56	30	58
Chloride(mg/l)	50	50	31	55		35	22	35	27	25	25	36
COD(mg/l)	8	8	4	14		8	4	4	4	4	4	4
TKN(mg/l)	BDL	BDL	BDL	BDL		0.019	0.19	0.17	0.18	0.19	0.19	0.18
Amm.N(mg/l)	BDL	BDL	BDL	BDL		BDL	BDL	BDL	BDL	BDL	BDL	BDL
T.hardness(mg/l)	97	86	69	40		80	45	52	62	64	35	76

Ca.hardness(mg/l)	66	60	57	28	60	29	32	32	36	20	42
Mg.hardness(mg/l)	31	26	12	12	20	16	20	30	28	15	34
Sulphate(mg/l)	5.9	6.2	6.2	BDL	13	3.5	11	2.1	1.24	17	2.359
Sodium(mg/l)	25	29	26	25	10	18	23	19	13.93	20	15.9
TSS(mg/l)	BDL	BDL	BDL	BDL	2	5	4	7	6	16	15
TDS(mg/l)	188	185	149	150	126	100	121	125	106	98	124
FDS(mg/l)	170	167	130	133	113	83	99	110	92.4	82	108
Phosphate(mg/l)	BDL	BDL	BDL	BDL	0.03	0.032	0.03	0.03	0.02	0.031	0.018
Boron(mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Potassium(mg/l)	4.5	5	6	6	2	5	6	2.1	2.97	2.97	3.6
BOD(mg/l)	6.6	3.6	1	4.8	2	1.2	1.4	0.3	3.4	8	5.6
Fluoride(mg/l)	0.15	0.79	0.2	0.23	0.723	0.71	0.66	0.25	0.321	0.143	0.18
DO(mg/l)	11.4	6.8	10.1	9.5	7.3	7.5	7.4	6.8	8.8	9	8
Nitrate-N(mg/l)	0.62	0.2	0.98	0.99	0.729	0.373	0.65	0.576	0.32	0.48	0.34
TC(CFU/100ml)	NIL	NIL	360	420	100	520	60	60	980	NIL	420
FC(CFU/100ml)	NIL	NIL	285	300	NIL	460	40	NIL	580	NIL	240

Station:Pattambi 2018											2019			
Parameter	Mar ch	Ap ril	Ma y	Ju ne	Jul y	Aug ust	Septe mber	Octo ber	Novem ber	Decem ber	Janu ary	Febu ary	Mar ch	Ap ril
Temp(°C)	31	32	31	32	32	28	29.5	29	30.5	27	22.5	29	31.5	33
pH	6.6	7.4	6.2	7.5	7.2	7.6	7.8	7	7.3	7.3	6.5	6.6	7.7	7.8
EC(µS/cm)	248	231	268	143	176	223	290	125	480	409	293	191.8	272	250
Turbidity (NTU)	3	3	4	3	4	6	BDL	6	NIL	2	3	2	1	2
Alkalinity (mg/l)	68	54	80	31	32	68	46	16	180	150	100	74	108	85
Chloride (mg/l)	34	44	26	23	28	20	38	20	26	16	10	8	8	12
COD(mg/l)	4	4	4	4	4	4	4	44	12	12.8	12	4	4	12
TKN(mg/l)	0.21	0.23	0.19	0.16	0.2	0.14	0.1	0.1	0.1	0.11	0.8	0.13	0.012	0.03
Amm.N (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
T.hardness (mg/l)	82	55	91	43	48	80	58	50	190	170	120	94	115	104
Ca.hardness (mg/l)	65	46	60	30	36	66	40	42	140	105	70	50	60	54
Mg.hardness (mg/l)	17	9	30	13	12	14	18	8	50	65	50	44	55	50
Sulphate (mg/l)	1.2	4.22	6.45	1.365	8.56	2.03	15	9	0.87	11.67	16	9.19	1.4	12.66
Sodium (mg/l)	17	22	14	15	16	12	22	6	8	6	5	2	3	4
TSS(mg/l)	18	8	14	12	2	1	1	1	BDL	BDL	5	5	BDL	BDL
TDS(mg/l)	136	128	147	79	96	123	160	80	280	250	176	115.1	150	150
FDS(mg/l)	120	110	128	70	86	110	144	72	250	225	158	103.5	135	135
Phosphate (mg/l)	0.07	0.06	0.059	0.03	0.03	0.02	0.02	0.04	0.02	0.04	0.02	0.06	0.06	0.1
Boron(mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Potassium (mg/l)	2.1	3.1	1.3	1.3	1.9	3	12	4	2	2	1	1	1.3	1.2

BOD(mg/l)	3.6	2.2	1.2	0.5	0.3	2.7	1.5	1.6	1.2	3	1.7	2.4	1.4	2.6
Fluoride (mg/l)	1.1	0.87	0.2	0.2	0.014	0.01	0.99	0.99	1.3	0.5	0.8	0.2	0.12	0.5
DO(mg/l)	8.6	8.9	9.3	7.2	7.9	7	7.9	6	7.2	6.4	6.7	6.9	7.06	5.8
Nitrate-N (mg/l)	0.261	0.016	1.75	0.145	0.81	0.74	1.18	1	0.065	0.55	0.5	0.383	0.486	0.56
TC (CFU/100ml)	980	440	300	240	480	100	720	200	260	860	220	440	100	170
FC (CFU/100ml)	360	260	180	180	160	NIL	260	NIL	NIL	700	NIL	40	NIL	40

CHAPTER 3

ACTION PLAN OF BHARATHAPUZHA

3.1 DISTRICT LEVEL TECHNICAL COMMITTEE FOR REJUVENATION OF POLLUTED STRETCHES

Based on the orders of the Hon'ble national Green tribunal (NGT) and other related documents, Government of Kerala, vide G.O.(Ms) No.12/2019/WRD dated 30-04-2019, constituted a District Level Committee for preparing an action plan for rejuvenation of polluted stretches in each district. The Committee in Palakkad district is constituted as follows.

- 1.The Superintending Engineer, Irrigation Department : Chairperson
- 2.The Superintending Engineer, Kerala Water Authority : Member
- 3.The Environmental Engineer, District Office, Kerala State Pollution Control Board : Member & Convenor
- 4.The District Co- ordinator, District Suchitwa Mission : Member
- 5.The General Manager, Industries Department : Member
- 6.Deputy Collector, LR Palakkad , Senior officer representing the Revenue Department and nominated by District Collector : Member
- 7.The Secretary , Pattambi Municipality : Member

The Government order specified that the first meeting of the Committee shall take place on 3-5-19 and after subsequent meetings and field visits, shall submit draft action plan to the Member Secretary of the Kerala State Pollution Control Board for being submitted to the River Rejuvenation Committee on or before 25-5-2019. But the actual communication of the formation of the Committee and time line was obtained in the field level offices almost two weeks after the date of order. Thus the first meeting of the committee in Palakkad took place only on 17.5.2019.

3.2 1ST MEETING OF THE DISTRICT LEVEL TECHNICAL COMMITTEE (DLTC) ON 17-5-2019

The first meeting of the Committee (DLTC) was held at 3 pm on 17-5-19 at the office of the JWR Division at Palakkad. The Committee considered the existing data about the two polluted stretches in the district namely Bharathapuzha along Pattambi and Bhvani river along Elaichivazhi. It pursued the pollution data prepared by the Pollution Control board

(PCB). It was decided by the Committee to carry out a field visit to the site at Pattambi on 21-5-2019.

3.3 FIELD VISIT TO BAHARATHPUZHA AT APATTAMBI AND FINDINGS

The major sources of pollution of the river at Pattambi were found out as follows.

- i. Six drains from Pattambi town opening to the river which carries domestic wastewater from the trade establishments located in the town area from Mele Pattambi to Nila Hospital
- ii. Solid waste dumping into the sides of the river and solid waste reaching the river carried by the drains
- iii. Possibility of open defecation in the river
- iv. Possibility of discharging of septage (liquid waste from periodic cleaning of septic tanks) into river by persons engaged in cleaning of septic tanks

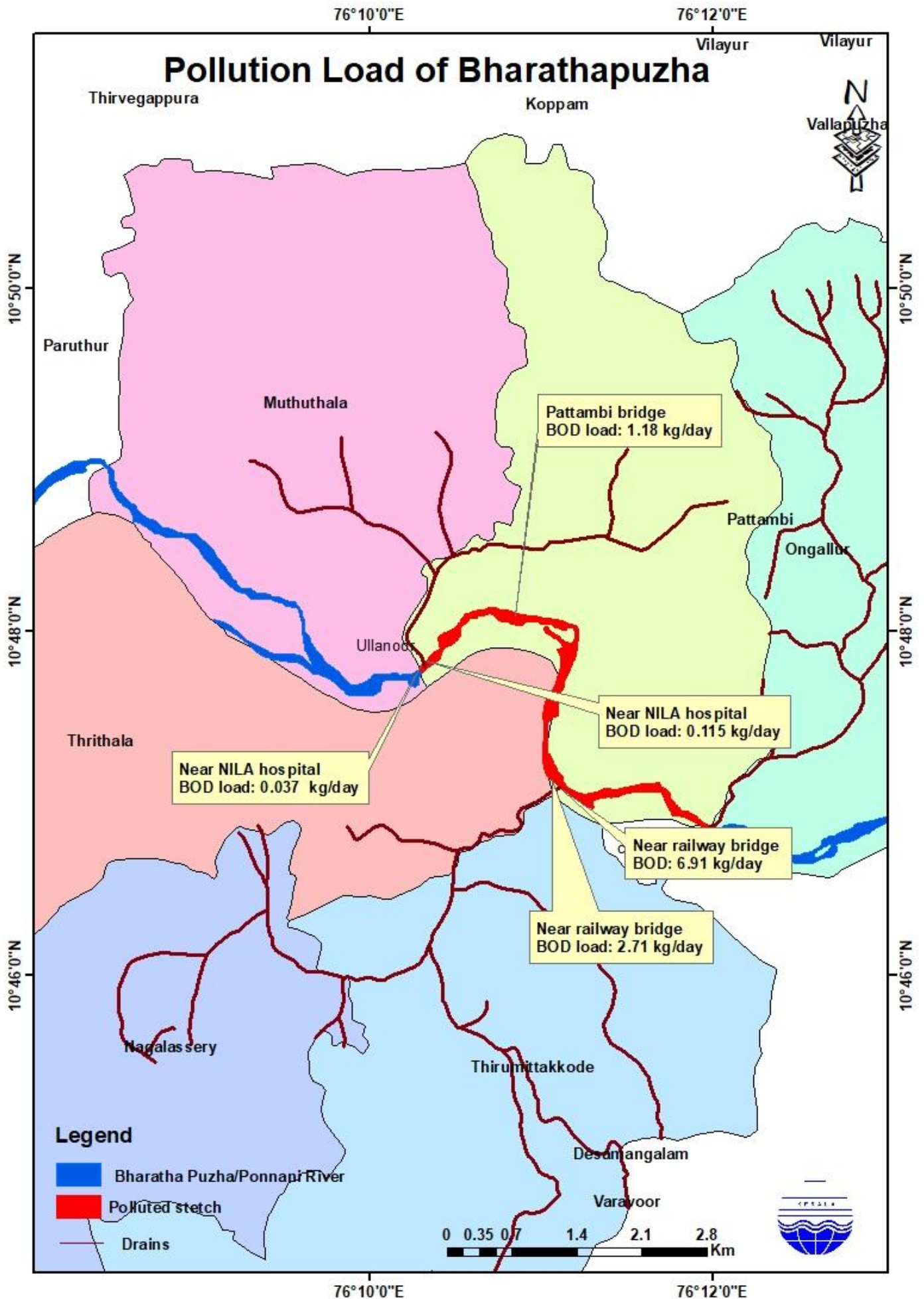
Other findings of the field visit were as follows.

- i. There are no storm water drains discharging any water into the river from the other bank of Pattambi, which belongs to Thrithala Panchayath, in the stretch.
- ii. Storm water drains from upstream of Pattambi, from Ongallur Panchayath, are dry.
- iii. There is a virtual no-flow effect in the stretch due to the barraging effect of Velliyankallu regulator which is about six kilometres downstream. This regulator remains closed during summer months
- iv. The stretch is the source of water supply in two intake wells for supplying water in the Pattambi Municipality making the stretch important in the view of pollution

3.4 DRAINS DISCHARGING POLLUTED WATER INTO THE RIVER AND THEIR POLLUTION LOAD

Sl. No:	Location	Latitude Longitude	Flow rate liters per day)	BOD (mg/l)	COD (mg/l)	Pollution load in terms of BOD (kg/day)	TC (CFU/ 100 ml)	TC (CFU/ 100 ml)
1	Near NILA Hospital	10 ⁰ 48'4.2" N 76 ⁰ 10'30.6" E	1170.73	31.2	72	0.0365	3000	500
2	Near NILA Hospital	10 ⁰ 48'4.2" N 76 ⁰ 10'30.6" E	7200	16	40	0.115	2800	800
3	Near Pattambi railway Bridge (Nambram)	10 ⁰ 48'00.5" N 76 ⁰ 11'01.5" E	72000	96	160	6.912	2500	900
4	Left side of Pattambi Bridge	10 ⁰ 48'02.1" N 76 ⁰ 10'48.8" E	800	1480	2280	1.18	5600	2100
5	Right side of Pattambi Bridge	10 ⁰ 48'02.1" N 76 ⁰ 10'48.8" E	No flow at the time of study hence cannot determined					
6	Near Railway bridge (Nabram)	10 ⁰ 48' 04.3" N 76 ⁰ 11' 02.2" E	42352.9	64	120	2.71	3200	800

3.5 MAP OF THE STUDY AREA



ACTION PLAN

Sl. No	Ref para no:48 Item Nos as per NGT Order no 673/2018 dated 20.9.2018	Activity	Implementing agency	Estimated Expenditure in Lakhs	Source of Fund	Time line	Expected out come
1	A(a)	NIL	No industries	-	-	-	-
2	A(a)	Monitoring of river water quality by sampling	Kerala State Pollution Control Board	Rs. 12,08000 per year	Ongoing NWMP project	2019-2020	Periodical water quality assessment
3	A(b)	Septage & Sewage Treatment Plant	Pattambi Municipality	200	Suchithwa Keralam – Urban	Tentatively 2019-2021	Reduce the pollution load and improve the water quality
4	A(b)	Installation of Modern Slaughter house and rendering plant	Pattambi Municipality	100	Pattambi Municipality	Tentatively 2019-2021	Reduce open dumping of slaughter house waste in to the river
5	A(b)	Construction of sanitary complex in public place	Pattambi Municipality	19.6	Central – Swatch Bharath – Urban	Tentatively 2019-2021	Reduce the open defecation in river basin
6	C(ii)	Establishment of modernisation of Modernisation of MSW treatment Plant (Solid Waste Management)	Pattambi Municipality	19.91	Plan	2019-2020	Better Solid Waste Management (SWM) reduce the river pollution due to solid waste dumping
					Central		
					State		
7	C	Material collection Facility (Solid Waste Management)	Pattambi Municipality	7.42	Own	2019-2020	Better Solid Waste Management (SWM) reduce the river pollution due to solid waste dumping
					Central		
					State		
8	C	Resource recovery facility (Solid Waste Management)	Pattambi Municipality	5.30	Own	2019-2020	Better Solid Waste Management (SWM) reduce the river pollution due to solid waste dumping
					Central		
					State		
9	C	Installing house hold and community level solid waste management units	Pattambi Municipality	137.865	Central(Swach hBharath Mission-Urbun) through Suchithwa mission	2019-2020	Better Solid Waste Management (SWM) reduce the river pollution due to solid waste dumping
10	C	Door to Door Collection and Transportation of MSW	Pattambi Municipality	18	User fee / Viability Gap Fund	Tentatively 202-2021	Better Solid Waste Management (SWM) reduce the river pollution due to solid waste dumping
11	C	Construction of compound wall with fencing	Irrigation department	135.00	To be found	Tentatively 2020-21	Reduce the Tendency of people in throwing waste in to the river

12	C	Removing light jungle and muddies from river courses	Irrigation department	100.00	To be found	Tentatively 2020-21	Maintain better flow of river and self -cleansing
13	C	Electrical-Light arrangements and Surveillance cameras	Irrigation department	50.00	To be found	Tentatively 2020-21	Reduce the tendency of people in throwing waste in to the river
14	C	Regualting activites in flood plain zone, protection and management of flood plain zone	Irrigation department			Tentatively 2020-21	Government constituted a river basin conservation and management authority and a committee constituted for drafting river basin conservation act
15	C	Greenery development-Plantation plan. Plantation on both sides of the river, setting up biodiversity parks on flood plains by removing encroachment	Irrigation department	500.00 (For Bharathapuzh a only)	State fund	Tentatively 2020-21	Ecofriendly approach will create a positive attitude in public.
16	C (b) (ii)	Green Protocol implementation in all Offices institution & Public function	Pattambi Municipality	2.55	State Plan fund Suchithwa mission	Tentatively 2019-2021	Reduce solid waste generation in Municipality
17	D(a)	Issues relating to E-flow, maintaining minimum environmental flow of river(by having watershed management provisions)	Irrigation department	50.00	State fund	Tentatively 2020-21	Government constituted a river basin conservation and management authority and a committee constituted for drafting river basin conservation act
18	D (b)	Irrigation practices	Irrigation department	2500.00 (For Bharathpuzha basin)	State fund	Tentatively 2020-21	Community micro irrigation and Participatory irrigation management
19	E	Awareness programmes for sections of public	Kerala State Pollution Control Board	1.0	Plan Scheme, Suchithwa mission, IEC fund	2019	Awareness of statutory provision of deterrent to pollution

3.7 LONG TERM ACTION - ENVIRONMENTAL FLOW ASSESSMENT AND MECHANISM FOR IMPLEMENTATION

In order to maintain a natural healthy ecosystem in any river basin, the environmental flows (E Flows) should be maintained. Even though the present proposal is for the abatement of pollution in a particular stretch of Bharathapuzha, the scientific assessment of E flows requirement of the basin should also be considered as an important step in the comprehensive rejuvenation of this basin. It includes the identification of the quantity, quality and distribution of flow patterns along the length of the river and it provides a balance between the use and protection of natural water resources for people and biodiversity. A preliminary study has already been conducted and its results are published. This study report is cited below.

Padikkal, S. and Rema, K.P., 2013. Informed decision making process for managing environmental flows in small river basins. *Journal of The Institution of Engineers (India): Series A*, 94(1), pp.43-52.

The results in this study are based on the Wetted Perimeter approach for E Flows assessment. However, more detailed E Flows modelling tools are now available. A typical modeling exercise in this line has been carried out for the adjacent basin Chalakkudipuzha and its results are also published. This is cited below.

Padikkal, S., Sumam, K.S. and Sajikumar, N., 2019. Environmental flow modelling of the Chalakkudi Sub-basin using 'Flow Health'. *Ecohydrology & Hydrobiology*, 19(1), pp.119-130.

For planning comprehensive rejuvenation of Bharathapuzha basin, a study similar to this must be commissioned. This is more or less applicable for all the basins in Kerala which are subjected to significant hydrological alteration due to construction of large number of storage reservoirs. Since the Bharathapuzha basin has several reservoirs, the assessed E-flow can be maintained by the synchronized operation of the reservoirs only. Hence the suitable mechanism to be followed for maintaining the E-flows should also be formulated in this study.

An amount of about 50 Lakhs is required for commissioning this study. It is recommended that this amount may be allotted.

Action Plan by Ground Water Department

Sl.No	Ref para item nos as per NGT Order no.673/2018 dated 20.09.2018	Activity	Ground Water Department
1	B(i)	Ground Water resources and regulation of ground water extraction by industries particularly in over exploited as critical zones/blocks	As per Groundwater resources of Kerala, 2017 estimate a total number of 3 blocks (Pattambi, Thrithala and Vadakkanchery) comes under the Bharathapuzha river basin. Out of 3 blocks in the river stretch Pattambi and Thrithala are semicritical blocks and Vadakkanchery is safe block with stage of groundwater extraction ranges from 67% to 81.37%
2	B(ii)	Ground water recharging / rain water harvesting	The average pre monsoon groundwater level of the area ranges from 7.38 to 8.68 mbgl. The Department has not yet implemented recharge schemes in the blocks. During the current financial year, proposals for recharge schemes are prepared in semicritical blocks and which are under scrutiny.
3	B(iii)	Periodic ground waste quality assessment and remedial actions in case of con taminated ground water tube wells/bore wells or hand pumps	Groundwater Department has 2 observation dug wells and 3 observation bore wells in this river stretch.
4	B(iv)	For regulating use of ground water for irrigation purpose, adopting good irrigation practices	The total irrigation draft in the area ranges from 771.9 - 1668.84 ha.m.

3.8 MAP OF DRAINAGE IN TO THE RIVER

