

**ACTION PLAN FOR RESTORATION OF POLLUTED
STRETCH (PULIYANNOR_ KECHERY)
OF RIVER KECHERY RIVER
(PRIORITY - V)**

May 2019

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Executive Summary

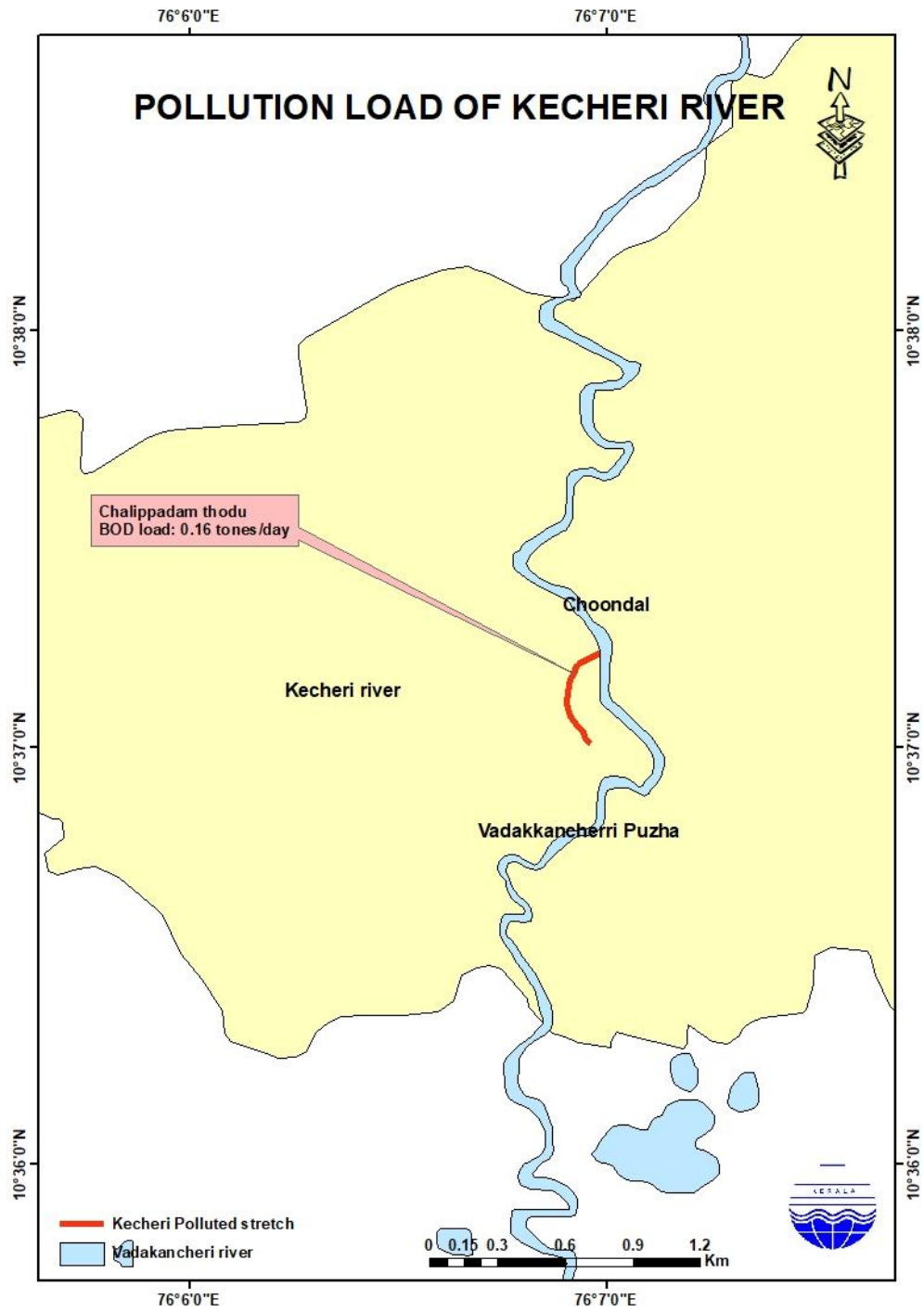
The draft action plan of Keecheri River was submitted before Hon'ble NGT earlier on 15-12-2019. The modified action plan is given below.

The Kechery River or KecheryPuzha also known as Wadakkancherypuzha is a west flowing river which has its origins at Machad hills in Thrissur District. The river is 51 kilometres in length and empties to Arabian Sea at Chettuva Lake. It is linked with backwaters at Enamaakkal. ChoondalThodu is the only tributary of this river. It has a basin area of 401m². One drain was identified as joining this polluted stretch. The pollution load in terms of BOD was assessed. The map is given below.

Pollution load in drain is given below;

Pollution load in drains

	Drain	Pollution load (BOD) TPD
1	Chalippadamthodu	0.1584



Short term plan(Wadakkancheri river)

No.	Ref para item nos as per NGT Order no.673/2018 dated 20.09.2018	Activity	Implementing agency	Cost (Rs. Cr)	Source of fund	Time line	Expected outcome
2.1.1	2.1.1 A (b)	Identification of illegal outlets from houses and shops/other establishments in town and imposing fine	Wadakkanchery Municipality, Ayyakali Urban Employment Guarantee Scheme & health squad	Department work	Municipal own fund	In progress	“
2.1.2	2.1.2 'E'		Wadakkanchery Municipality	0.02	Own fund	6 months	“
2.1.3	2.1.3 C (ii)	Material recovery facility	Wadakkanchery Municipality	0.03	Plan fund	6 months	“
2.1.4	2.1.4 C (ii)		Wadakkanchery Municipality	0.04	Plan fund	6 months	“
2.1.5	2.1.5 C (ii)		Wadakkanchery Municipality	0.03	Plan fund	6 months	“

Monitoring

	Ref para item nos as per NGT Order no.673/2018 dated 20.09.2018	Activity	Implementing agency	Cost	Source of fund	Time line	Remarks
3.1	3.1 Aa (iv)	River water quality monitoring	Kerala State Pollution Control Board	Proposed station	Proposed station	Monthly	Monitoring
3.2	3.2 A (b)	Inspection and effluent quality monitoring of the flats, industrial units, service stations, hospitals, hotels etc	Kerala State Pollution Control Board	As per sampling charge-10,36,000/-		On going	

Long term Plan

	Ref para item nos as per NGT Order no.673/2018 dated 20.09.2018	Long term measures proposed	Implementing agency	Amount Required (Rs.in Crore) and Source of fund	Time line	Remarks
4.1	4.1 E	Identification and cleaning of polluted drains reaching wadakkan	Irrigation Dept	2 Plan fund	2 yrs	

		cheri river				
4.2	4.2 A(b)	Common STP	Wadakk anchery Municipal ity Kerala Infrastruc ture Investme nt Fund Board	1 KIIFB	2 yrs	
4.3	4.3 C (ii)	Windro w composti ng at Kumbala ngad yard	Wadakk anchery Municipal ity	0.14 Plan fund,Suchitwa mission	1yr	
4.4	4.4 C (ii)	Modern slaughter House	Wadakk anchery Municipal ity Kerala Infrastruc ture Investme nt Fund Board	3 KIIFB	2yr	
4.5	4.5 E	Forestat ion,desilt ing& deepenin g of Wadakk anchery river and fitting river	Wadakk anchery Municipal ity	1.5 Ayyankali urban guarantee employment scheme	1 yr	

		side with coir geo net				
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Short term Plan(Kecheri river)

No.	Ref para item nos as per NGT Order no.673/2018 dated 20.09.2018	Activity	Implementing agency	Cost (Rs. Cr)	Source of fund	Time line	Expected outcome
5.1	5.1 E	Installation of CCTV in different locations along river side	PWD electronic division	0.01	Plan fund	Dec 2019	Prevention of solid waste and septage dumping
5.2	5.2 E	Fixing Boards	Choondal GramaPan chayat	0.01	Own fund	Dec 2019	-do-
5.3	5.3 A(a) (iv)	Surveillance to prevent flow of sewage /effluent to river	Choondal GramaPan chayat	-	-	Dec 2019	-do-
5.4	5.4 A(b)	Stoppage of effluent from residential apartment(Shajan's flat) and pig farm into the river.	Choondal GramaPan chayat	-	-	-	Direction issued to units

Long term Plan (Kechery river)

	Ref para item nos as per NGT Order no.673/2018 dated 20.09.2018	Long term measures proposed	Implementing agency	Amount Required (Rs.in Crore) and Source of fund	Time line	Remarks
4.1	4.1 E	Side protection by fixing coir geo nets	Choondal Grama Panchayat,	0.35 (Central Sponsored Fund of MGNREGS)	Not reported	Protection of Kechery river
4.2(i)	4.2(i) E	Survey process of Kechery river portion belong to Choondal Grama Panchayat to mark the boundary and encroachment.	Revenue Department	0.04 (Choondal GP - Finance Grand)	Not reported	On going
4.2 (ii)	4.2 (ii) E	Laying of survey station	Choondal Grama Panchayat	0.02 (Choondal GP - Finance Grand)	Not reported	On going
4.2(iii)	4.2(iii) E	Digital mapping and seminar on pollution control	Forestry College, Vellanikkara	0.01 (Choondal GP - Plan fund)	Not reported	On going

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 Chowannur block comes under the Keecheri river basin and the block in the river stretch is semi -critical with stage of groundwater extraction is 75.94%
2	B(ii)	Ground water recharging / rain water harvesting	The pre-monsoon groundwater level is 8.7mbgl. Groundwater Department has not implemented any recharge structures in this area.
3	B(iii)	Periodic ground waste 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 8 piezometers(5 in Thrissur and 3 in Malappuram) along the 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 is 1473.082 ha.m.

4.ACTION PLAN BY GRAMAPANCHAYATH

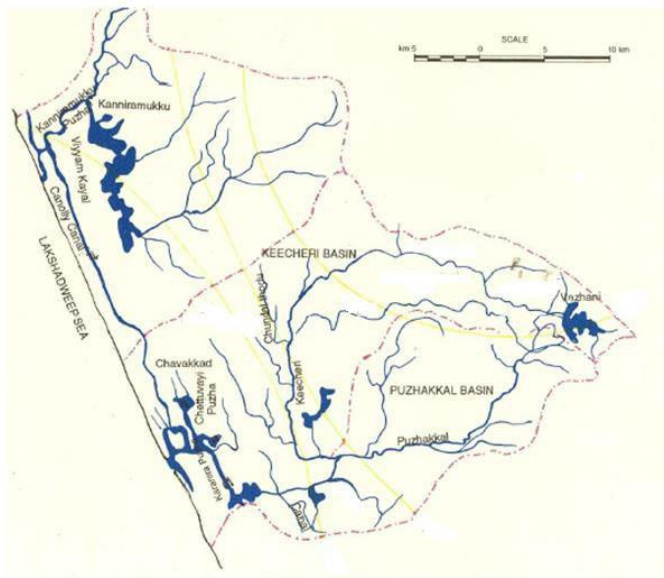
	Name of Grama panchayath	Ref para item nos as per NGT Order no.673/2018 dated 20.09.2018	Activity	Implementing agency	Cost	Source of fund	Time line	Remarks
1	Choondal	C	Punarjani Kecherri river	Grama panchayath	300,000	Finance Commission Grant	31.03.2020	
2	Choondal	C	Surveying of river side eviction and planting trees	Panchayath	382,000	Plan fund , CFC	31.03.2020	
3	Choondal	C	Side Protection	Panchayath	300,000	CFC	31.03.2020	
4	Choondal	C	Bio fencing related to river bank protection – water and soil Conservation project ward 3,4,7	MGNRES	900,000	MGNREG	31.03.2020	

CHAPTER 1

INTRODUCTION

The Kechery River or KecheryPuzha also known as Wadakkancherypuzha is a west flowing river which has its origins at Machad hills in Thrissur District. The river is 51 kilometres in length and empties to Arabian Sea at Chettuva Lake. It is linked with backwaters at Enamaakkal. ChoondalThodu is the only tributary of this river.

The river has a basin area of 401m² and average annual rain fall of 3000mm and average stream flow 1024Mm³



KEECHERI AND PUZHAKKAL RIVER BASINS

Fig 2.1 Kechery and puzhakkal river basin

ACTIVITIES

The river irrigates 3560 hectares of land in Thalapillytaluk in Thrissur District through Vazhani irrigation project. One of the important project in the river is Parannurchira .It serves irrigation purposes of the near villages surrounded. Nowadays ParannurChira getting more popular for tourism and film shooting.Kechery is surrounded with Perumala hill (East), Choondal hill (South), Choondal rock (West), Pattikara backwater and Parappur backwater (North). Actual use of the river is irrigation andbathing.

CHAPTER 2

ASSESSMENT OF RIVER WATER QUALITY

2.3 Results of analysis of water quality monitoring for the past three years with respect to BOD

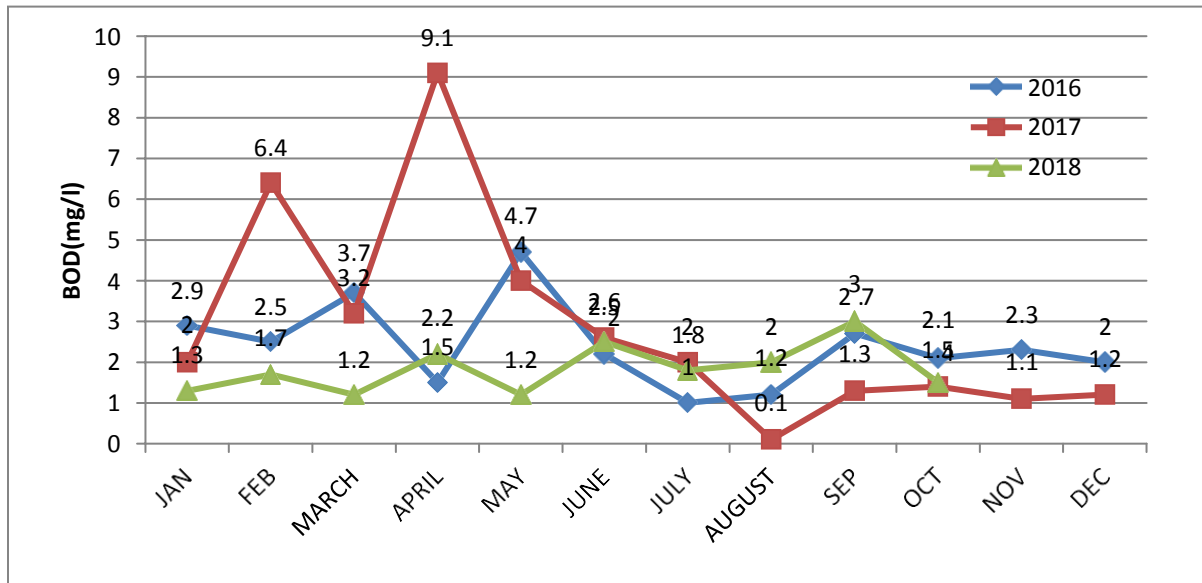


Fig 2.2 BOD graph

Month	2016			2017			2018		
	P _H	TC	FC	P _H	TC	FC	P _H	TC	FC
JAN	8	460	130	7.8	400	220	7.2	430	150
FEB	7.6	580	170	7.6	500	210	7.3	360	120
MAR	7.2	400	320	7.4	480	220	7.3	100	60
APR	8	190	60	7.7	530	260	7.3	480	150
MAY	7.4	230	190	7.6	200	160	7.4	450	300
JUN	6.8	520	220	7.4	270	140	6.8	170	120
JULY	7.5	240	100	7.4	330	200	7.1	400	200
AUG	7.9	340	70	7.6	190	60	6.9	620	150

SEPT	7.2	300	160	7.6	300	180	6.6	400	100
OCT	7.5	360	120	7.3	600	220	7.1	500	300
NOV	6.4	360	200	7	750	180	-	-	-
DEC	7.7	300	200	7.3	550	150	-	-	-

It can be observed from the graph that the value of BOD has not crossed the limit of 3 mg/l in the year 2018.

RESULTS OF ANALYSIS OF THE SAMPLES COLLECTED FROM THE DOWNSTREAM OF 3 IDENTIFIED POLLUTION SOURCES ON 26/11/18

S No	Parameter	Unit	Old bridge @Kechery	D/s of shajans apartment	D/s of pig farm@ Pattikkara
1	pH		6.5	4.6	4.6
2	EL.CONDUCTIVITY	µmhos/cm	108.1	117.2	114.6
3	TURBIDITY	NTU,	3	5	4.3
4	PHENOL.ALKALINITY	mg/l	BDL	BDL	BDL
5	TOTAL ALKALINITY	mg/l	24	26	24
6	CHLORIDES	mg/l	18	20	18
7	COD	mg/l	4	8	8
8	AMMONIACAL NITROGEN	mg/l	0.3	0.6	0.4
9	HARDNESS AS CaCO ₃	mg/l	32	28	34
10	CALCIUM HARDNESS AS CaCO ₃	mg/l	16	16	18
11	MAGNESIUM HARDNESS AS CaCO ₃	mg/l	16	12	16
12	SULPHATES	mg/l	4.8	5.0	3.3
13	SODIUM	mg/l	4.3	6.8	2.66
14	TOTAL DISSOLVED SOLIDS	mg/l	65	70	62
15	TOTAL FIXED SOLIDS	mg/l	23	26	19
16	TOTAL SUSPENDEED SOLIDS	mg/l	9	8	8

17	PHOSPHATES	mg/l	6.6	8.1	6.4
18	POTASSIUM	mg/l	1.1	2.4	1.03
19	BOD	mg/l	2.5	3.9	2.0
20	FLOURIDES	mg/l	BDL	BDL	BDL
21	DISSOLVED OXYGEN	mg/l	8	7.3	9.9
22	NITRATE NITROGEN	mg/l	0.6	0.2	0.16
23	TOTAL COLIFORMS	CFU/100ml	1000	500	200
24	FEACAL COLIFORMS	CFU/100ml	800	400	100

It is obvious from the results that there is dumping of solid waste and discharge of untreated waste water into the river.

CHAPTER 3

STUDY AREA OR IDENTIFIED POLLUTED STRETCH IN THE RIVER IS FROM PULIYANNUR TO KECHERY

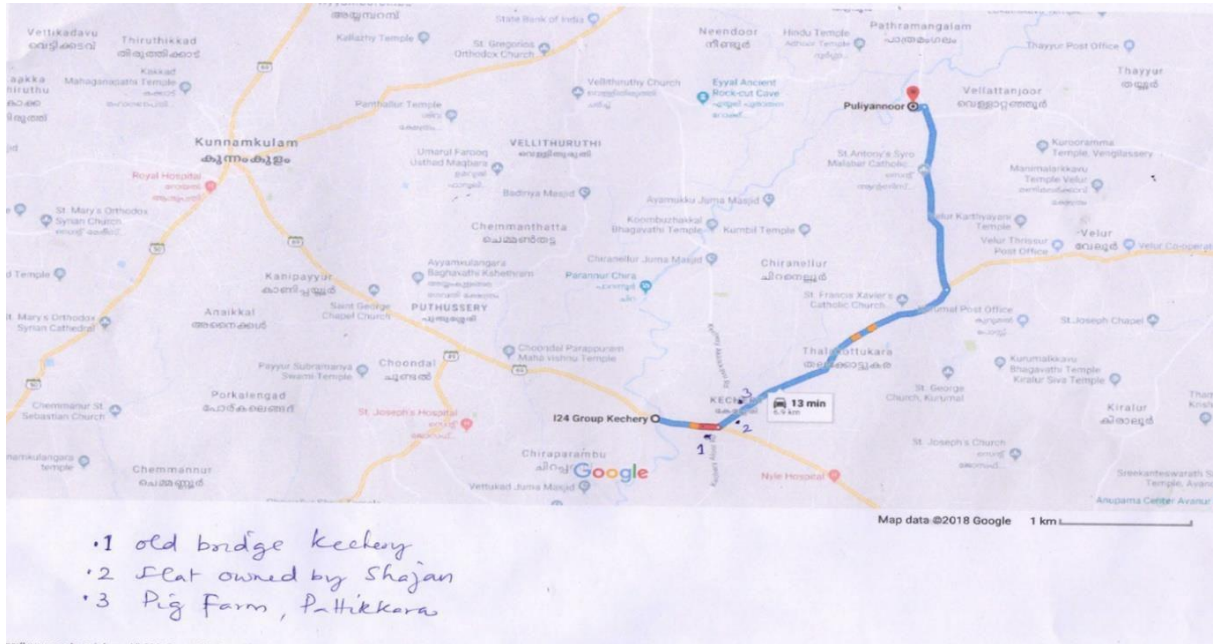


Fig 2.3. polluted stretch - Puliyanur to Kechery

The river falls under priority IV category. There are no industries along the banks of river directly discharging effluent, or industries which have water intake from the river. Solid waste dumping was noticed near Kechery bridge (Thrissur-Kuttippuram Highway). A pig farm functioning in Pattikkara and a residential apartment situated on the river side were found discharging untreated effluent directly into the river.



Fig. 2.4 Waste from pig farm at Pattikkara



Fig 2.5 Waste dumped near oldbridge, Kechery



Fig 2.6 Shajan's apartment

CHAPTER 4

ACTION PLAN FOR RIVER KECHERI, THRISSUR – KERALA

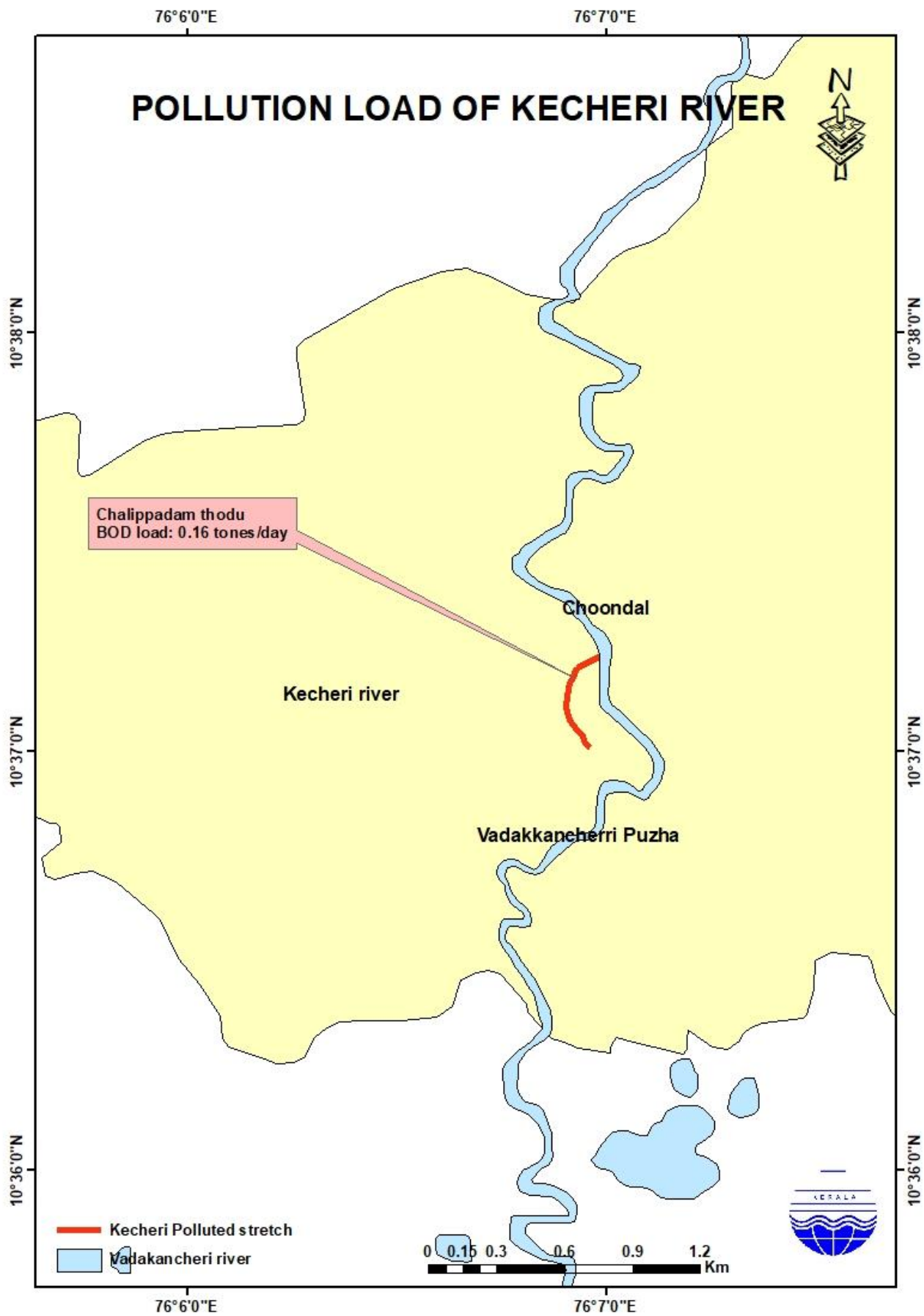
1. Pollution load in drains

Joint inspection was conducted by KSPCB, Kerala Irrigation Department, Kerala Water Authority and Suchitwa Mission. No drains which directly open into the Kechery river could be identified. The river flows in the midst of agricultural land in Choondal Grama Panchayath. But there are chances of dumping of solid waste and dumping of septage into the river from Kechery bridge on Thrissur – Kuttippuram Highway.

The upstream of Kechery river, known as Wadakkanchery river is flowing through Wadakkanchery Municipal area. The municipal drains were seen emptied into the river. The BOD load of one such drain Chalippadamthodu was determined and it was found to be 0.1584 TPD. During inspection there was no flow in the river. But when there is a flow, there are chances of pollution in the downstream. Hence for the rejuvenation of Kechery river, rejuvenation of Wadakkanchery river is essential. Hence one station may be included under SWMP for monitoring of Wadakkanchery river.

Pollution load in drains

	Drain	Pollution load (BOD) TPD
1	Chalippadamthodu	0.1584



1. Direction to be issued to local bodies in the catchment area, to plan and execute facilities for sewage treatment and solid waste treatment and disposal to prevent dumping of sewage and solid wastes into the river.
2. Direction to be issued to local bodies to make rain water harvesting system mandatory in all residential and commercial buildings.
3. Direction to be issued to local bodies to install CCTV cameras along the river to identify those who dump solid wastes and sewage into the river, and police authorities to strictly monitor and catch the violators.
4. Direction to be issued to local bodies and other concerned departments to remove encroachments and to curb illegal sand mining.
5. Direction to be issued to pig farm and residential apartment to stop discharge of untreated effluent into the river and to provide adequate waste water treatment and disposal facility

District administration has already taken initiation for the rejuvenation of the river and KILA is coordinating the project with the assistance of 11 panchayaths, 4 block panchayaths and Wadakkanchery municipality situated on the river side and other government departments. Survey work to remove encroachments is almost over and further steps include protection of river side, cleaning of river and actions to prevent dumping of solid and liquid waste into the river.

2.Short termplan(Wadakkancheri river)

No.	Ref para item nos as per NGT Order no.673/2018 dated 20.09.2018	Activity	Implementing agency	Cost (Rs. Cr)	Source of fund	Time line	Expected outcome
2.1.1	2.1.1 A(b)	Identification of illegal outlets from houses and shops/other establishments in town and imposing fine	Wadakkanchery Municipality, Ayyakali Urban Employment Guarantee Scheme & health squad	Department work	Municipal own fund	In progress	“
2.1.2	2.1.2 E	Installation of CCTVs on the bank of river in town	Wadakkanchery Municipality	0.02	Own fund	6 months	“
2.1.3	2.1.3 C(ii)	Material recovery facility	Wadakkanchery Municipality	0.03	Plan fund	6 months	“
2.1.4	2.1.4 C(ii)	Resource recovery facility	Wadakkanchery Municipality	0.04	Plan fund	6 months	“
2.1.5	2.1.5 C(ii)	Renovation of existing biogas	Wadakkanchery Municipality	0.03	Plan fund	6 months	“

		plant					
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3.Monitoring

	Ref para item nos as per NGT Order no.673/2018 dated 20.09.2018	Activity	Implementing agency	Cost	Source of fund	Time line	Remarks
3.1	3.1 Aa(iv)	River water quality monitoring	Kerala State Pollution ControlBoard	Proposed station	Proposed station	Monthly	Monitoring of water quality
3.2	3.2 A(b)	Inspection and effluent quality monitoring of the flats, industrial units, service stations, hospitals, hotels etc	Kerala State Pollution ControlBoard	As per sampling charge	As per sampling charge- 10,36,000/-	On going	

4. Long termPlan

	Ref para item nos as per NGT Order no.673/2018 dated 20.09.2018	Long term measures proposed	Implementing agency	Amount Required (Rs.in Crore) and Source of fund	Time line	Remarks
4.1	4.1 E	Identification and cleaning of polluted drains reaching wadakkancheri river	Irrigation Dept	2 Plan fund	2 yrs	
4.2	4.2 A (b)	Common STP	Wadakkancher y Municipality Kerala Infrastructure Investment Fund Board	1 KIIFB	2 yrs	
4.3	4.3 C(iii)	Windrow composting at Kumbalangad yard	Wadakkancher y Municipality	0.14 Plan fund,Suchitwa mission	1yr	
4.4	4.4 C(ii)	Modern slaughter House	Wadakkancher y Municipality Kerala Infrastructure Investment Fund Board	3 KIIFB	2yr	
4.5	4.5 E	Forestation,de silting& deepening of Wadakkanche ry river and fitting river side with coir geo net	Wadakkancher y Municipality	1.5 Ayyankali urban guarantee employment scheme	1 yr	

5.Short termplan(Kecheri river)

No.	Ref para item nos as per NGT Order no.673/2018 dated 20.09.2018	Activity	Implementing agency	Cost (Rs. Cr)	Source of fund	Time line	Expected outcome
5.1	5.1 E	Installation of CCTV in different locations along river side	PWD electronic division	0.01	Plan fund	Dec 2019	Prevention of solid waste and septage dumping
5.2	5.2 E	Fixing Boards	Choondal Grama Panchayat	0.01	Own fund	Dec 2019	-do-
5.3	5.3 A(a)(iv)	Surveillance to prevent flow of sewage /effluent to river	Choondal Grama Panchayat	-	-	Dec 2019	-do-
5.4	5.4 A(b)	Stoppage of effluent from residential apartment(Shajan's flat) and pig farm into the river.	Choondal Grama Panchayat	-	-	-	Direction issued to units

6.Long termPlan(Kecheri river)

	Ref para item nos as per NGT Order no.673/2018 dated 20.09.2018	Long term measures proposed	Implementing agency	Amount Required (Rs.in Crore) and Source of fund	Time line	Remarks
4.1	4.1 E	Side protection by fixing coir geo nets	Choondal GramaPanchayat,	0.35 (Central Sponsored Fund of MGNREGS)	Not reported	Protection of Kechery river
4.2(i)	4.2(i) E	Survey process of Kechery river portion belong to Choondal Grama Panchayat to mark the boundary and encroachment.	Revenue Department	0.04 (Choondal GP - Finance Grand)	Not reported	On going
4.2 (ii)	4.2 (ii) E	Laying of survey station	Choondal Grama Panchayat	0.02 (Choondal GP - Finance Grand)	Not reported	On going
4.2(iii)	4.2(iii) E	Digital mapping and seminar on pollution control	Forestry College, Vellanikara	0.01 (Choondal GP -Plan fund)	Not reported	On going

7. Action Plan by Ground Water Department

Sl.No	Ref para No:48 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 Chowannur block comes under the Keecheri river basin and the block in the river stretch is semi -critical with stage of groundwater extraction is 75.94%
2	B(ii)	Ground water recharging / rain water harvesting	The pre-monsoon groundwater level is 8.7mbgl. Groundwater Department has not implemented any recharge structures in this area.
3	B(iii)	Periodic ground waste 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 8 piezometers(5 in Thrissur and 3 in Malappuram) along the 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 is 1473.082 ha.m.

ACTION PLAN BY GRAMAPANCHAYATH

	Name of Grama panchayath	Ref para No:48 as per NGT Order no 673/2018 dated 20.9.2018	Activity	Implementing agency	Cost	Source of fund	Time line	Remarks
1	Choondal	C	Punarjani Kecherri river	Grama panchayath	300,000	Finance Commission Grant	31.03.2020	
2	Choondal	C	Surveying of river side eviction and planting trees	Panchayath	382,000	Plan fund , CFC	31.03.2020	
3	Choondal	C	Side Protection	Panchayath	300,000	CFC	31.03.2020	
4	Choondal	C	Bio fencing related to river bank protection – water and soil Conservation project ward 3,4,7	MGNRES	900,000	MGNREG	31.03.2020	