

ACTION PLAN
KAVVAYI RIVER
(Priority V)

DISTRICT LEVEL TECHNICAL COMMITTEE

Kerala State Pollution Control Board

Irrigation Department

Kerala Water Authority

Suchithwa Mission

Revenue department

Payannur Municipality

Ramanthali GP

Kankol- Alappadamba GP

Contents

Chapter 1

1 Introduction.....4-6

General.....4

Physiography of the Basin.....5

Land Use Pattern.....6

Climate and Rain Fall.....6

Chapter 2

2 The study area of Kuppam River.....7-12

The Study Area.....7

Identified points of pollution.....8

Causes of pollution.....9

Sanitary survey conducted by KSPCB and Local body.....9

Chapter 3

3 Sample analysis and results.....13

Restoration Plan: - Statutory Intervention.....13

Monitoring conducted by KSPCB.....13

Chapter 4

4 Action Plan.....15-22

Action plan by Local bodies.....15

Action plan by Suchithwa mission.....16

Action plan by KWA.....16

Action plan by Irrigation department.....16

Conclusion.....22

Chapter 1

INTRODUCTION

General

Kavvayi has been mentioned by name by significant global travelers, including Marco Polo 1293AD, Ibn Battuta 1342AD and Abdul Fida 1273AD. The island of Kavvayi was originally named KavvilPattanam, but renamed by Sir William Hogan, the then district collector of the area. Kavvayi was the headquarters for an area of 125 square miles (320 km²) which housed a large port and the magistrate court, including during British East India Company rule. It declined after the headquarters were moved to other parts of Malabar. This island is famous for having a history of zamindars.

Kavvayi River emerges from the Cheemeni village at elevation 114 m above mean sea level having the length of 31 km and join directly to Kavvayi backwater. This river has its origin in Cheemeni village (385m) on the banks of Kariangode river. The 31Km long river enters Padannabackwaters which extends from Cheruvathur in the north to Ramanthali in the south. The river has a total basin area of 143km². It has a navigable length of 9.6 km. Kavvayi River is typical among the 14 midland originated rivers in Kerala. It has watershed area confined to midland hillocks and their valley. River Kavvayi has tributary streams Kankol, Vannathichal, Kuppithodu, and Kuniyan. The river flows through Kankole-Alppadamba, Karivellur- Peralam, Thrikkaripur Grama Panchayats and Payyanur Municipality.

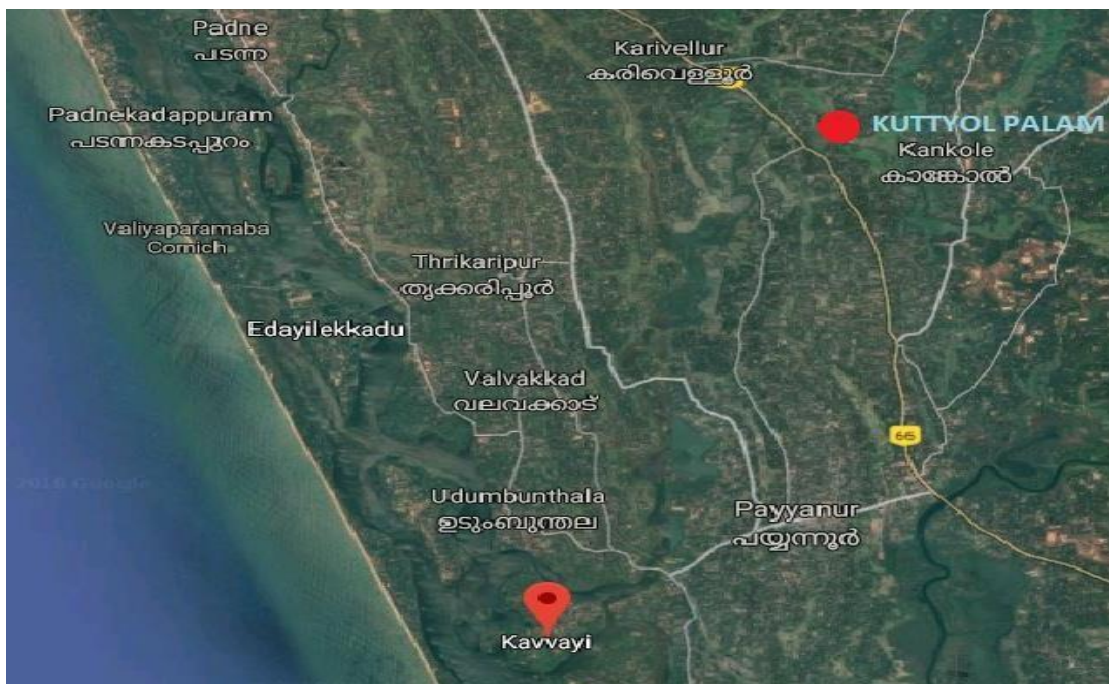


Fig 1: Satellite Map of Kavvayi River

Physiography of the Basin

Kavvayi river basin is a typical lateritic biotope situated in the Northern part of Kerala. It has different ecological units such as lateritic vegetation, agro-ecosystems, seasonal pools, Grass lands, Sacred groves, Mangrove marsh and riparian vegetation. The Kavvayi river basin is located between 12.005° to 12.015° North latitude and 75.005° to 75.020° East longitudes. It spreads over the district of Kannur and Kasaragod. It has a total area of 164.76 km^2 covering 14 villages spread over 9 local bodies in the two districts. The Ezhimala region, at the confluence of Ramapuram, Peruvamba, and Kavvayi river system support a rich growth of mangroves.

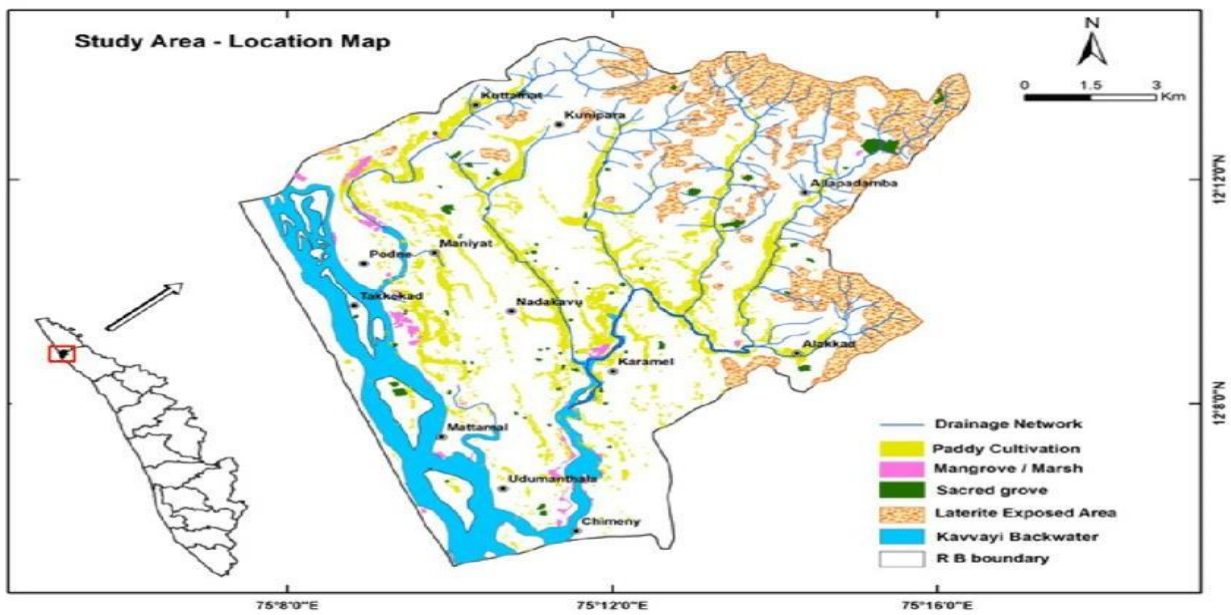
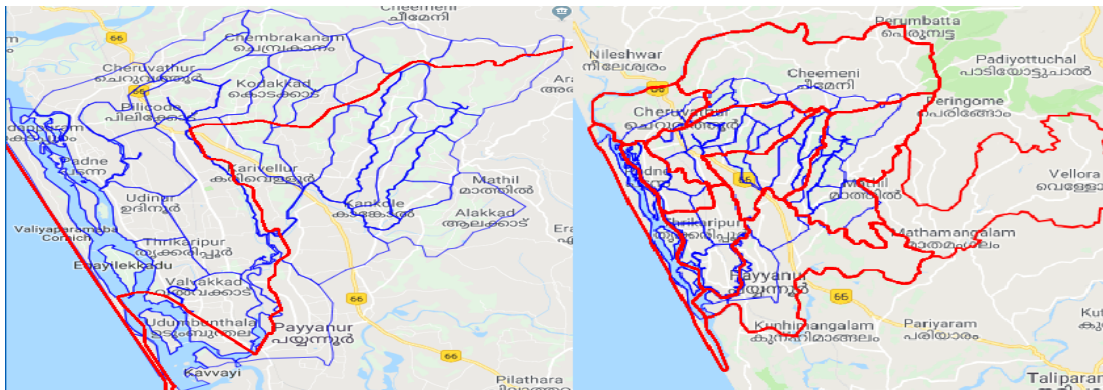


Fig1: Location map of Kavvayi River basin



Water shed Map of Kavvayi river

The river flows as small streams initially and join together at different places towards down ward stretch. The main river originating as small stream near Cheemeni village flows as Vannathichal through Puthur, Kozhummal and Peralam in KarivellurPeralamgramapanchayath joins the stream flowing through Kankol in the KankolAapadambaPanchayath just before reaching KuttyolPalam, the NWMP station in the river. Another stream namely Kuppithodu reaches the river at 1km downward of KuttyolPalam. The river then flows through Palathara, Annur and Karamel. Kuniyanpuzha joins the river at Thattarkadavu. The lower stretches are saline and in uplands the river is used for irrigation purposes.

Land Use Pattern

The land use pattern is mainly agriculture/residential. Majority of the population depends on agriculture for lively hood.The river flows through the midland and coastal region. Paddy, Coconut Arecanut, Tapioca and Pepper are cultivating in the midlands. Towards the lower stretches the river is used for fishing activities.

Climate and Rain Fall

Kannur experiences humid tropical monsoon climate in the district. Relative humidity is more during south west monsoon season from period of June to September. It is more during morning hours and is less during evening hours. Evaporation is more during summer months of March to May and low during the months of June to November. Rain fall is the only source of fresh water and it records wide spatio-temporal variations in its availability. Once the rain water reaches surface of the earth and start flowing either as surface run off or infiltrates to recharge ground water the entire process is subject to land and land use management. Based on rainfall and clouding characteristics four seasons can be identified in Kerala, the South- West monsoon (June to September), North-East monsoon (October and November), Winter (December-February) and Pre-monsoon (March-May). Kannur district receives a total annual rainfall of 3438 mm. District experiences heavy rainfall during the South West monsoon season followed by North East monsoon. South West monsoon during June to September contributes 70 % of the total rainfall of the year. The northeast monsoon contributes only about 30%.

Chapter 2

The Study Area of Kavvayi River

The Study Area

The river stretch from its origin near Cheemeni village in Kasaragad district to the mixing point in Kavvayi back waters is selected for the study. . The river flows through Kankol-Alapadamba, Karivellur- Peralam, TrikarapurGrama Panchayats and Payyanur Municipality. Monthly monitoring of water quality of the river is conducting for years under the National Water Quality Monitoring Programme (NWMP) at KuttyolPalam in Vellur Village of Payyannur Municipality. Here the river borders Karivellur-PeralamGrama Panchayat and the Municipality. The river flows through Kankol-Alapadamba, Karivellur- Peralam, TrikarapurGrama Panchayats and Payyanur Municipality.

Map of the River indicating sampling stations

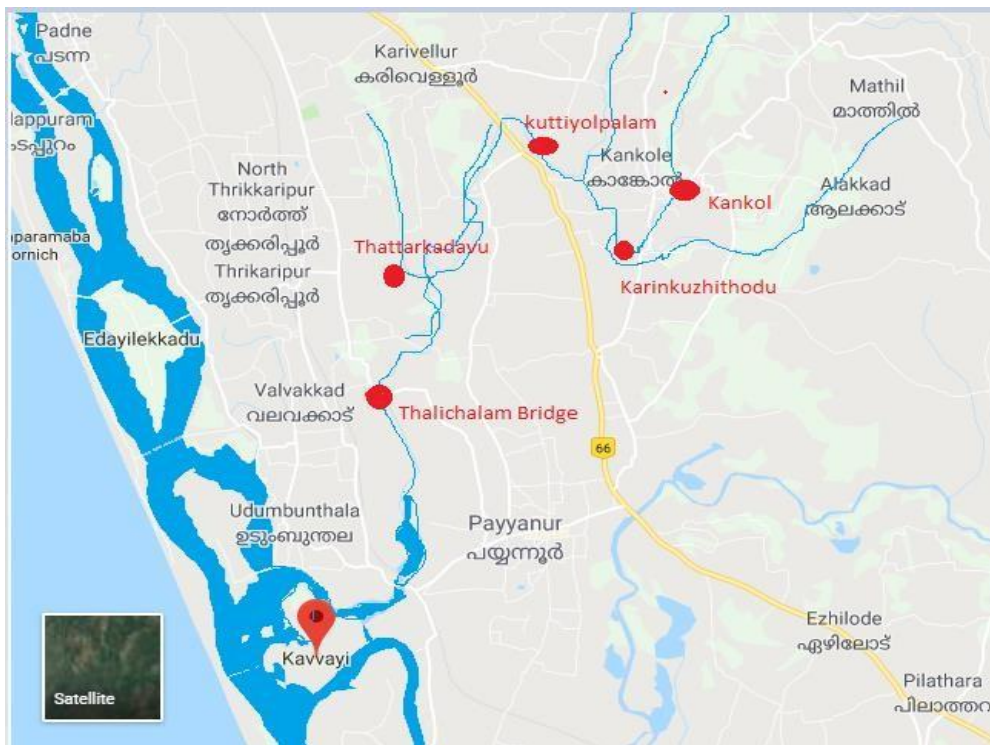


Fig 3: Map of the polluted stretch indicating sampling stations

The details of panchayats and municipality through which the river flows is as follows;

Identified points of Pollution

Polluting sources of industrial origin are not identified near to the river stretch. The townships in the panchayat as well as in the municipal area situated away from the river bed and no direct discharge of sewerage and sewage noticed. The main activities in the Grama Panchayats of Kankol-Alapadamba, Karivellur- Peralam and Trikarapur are in the agricultural sector. Paddy, Coconut, Areca nut etc. are the main crops cultivated. Domestic pollution is the main source of contaminants in the entire stretch. There are places along the river side where dumping of wastes are seen. All kinds of wastes materials like plastics, glass bottles, construction debris, and organic wastes from towns/ market places are practicing. Throwing of all kinds of wastes materials is seen along the river. Non degradable materials like plastics, glass bottles etc and littering of other solid wastes are seen. Waste dumping in the main river as well as in the streams joining the river adversely affects its water quality.



KankolKarinkuzhiThodu





Causes of Pollution

Improper disposal of various types of solid wastes from the river bank is one of the reasons. In some market area wastes from slaughter houses and hotels is another cause of pollution. It is also identified that some of the houses on the bank of the river are not having proper sanitation facility.

Sanitation survey

Sanitation survey of Karivellur- Peralam

Sanitation survey was earlier carried out by the Payyannur municipality. Based on the survey, following recommendations were made.

A. Short term recommendations to control pollution of Payyannur Municipality

Providing household latrines

Single pit conversion to bio toilet

New bio toilets for no latrine households and those which are directly connected to drains to water body

Community latrines

Community toilet will be provided wherever necessary with scientific septic tank

Solid waste management(Biodegradable waste)

Decentralized solid waste management is the best option for solid waste management and action has taken in almost all local bodies for disposal of biodegradable wastes from its origin itself through bio bins, aero bins, biogas plants etc.

Non-Biodegradable waste management

Material Collection Facility has already been started functioning for the management of non-biodegradable waste.

Awareness programme

1. Awareness for residence association: Suchitwamission/LSGD/Corporation
2. SWM training to children, youth, Asha workers and other stake holders
3. Follow up systems: Capacity building of community groups, monitoring system and active involvement of residence association is necessary.

Sanitation survey of Kankol-AlapadambaPanchayath

Providing household latrines

Single pit conversion to bio toilet

Community latrines

Maintenance of existing community toilet and construction of modern septic tank.

Construction of new community toilet

Solid waste management(Biodegradable waste)

For decomposition of biodegradable waste at its origin itself pipe compost and biogas plants are being issued.

Non-Biodegradable waste management

Material Collection Facility has already been started functioning for the management of non-biodegradable waste.

Awareness programme

1. Awareness for residence association: Suchitwamission/LSGD/Corporation
2. SWM training to children, youth, Asha workers and other stake holders

3. Follow up systems: Capacity building of community groups, monitoring system and active involvement of residence association is necessary.

Sanitation survey of Trikarapur Panchayath

Providing household latrines

Single pit conversion to bio toilet

Community latrines

Maintenance of existing community toilet and construction of modern septic tank.

Construction of new community toilet

Solid waste management (Biodegradable waste)

For decomposition of biodegradable waste at its origin itself pipe compost and biogas plants are being issued.

Non-Biodegradable waste management

Material Collection Facility has already been started functioning for the management of non-biodegradable waste.

Awareness program

1. Awareness for residence association: Suchitwamission/LSGD/Corporation
2. SWM training to children, youth, Asha workers and other stake holders
3. Follow up systems: Capacity building of community groups, monitoring system and active involvement of residence association is necessary.

Sanitation survey of Payannur Municipality

Providing household latrines

Single pit conversion to bio toilet

Community latrines

Maintenance of existing community toilet and construction of modern septic tank.

Construction of new community toilet

Solid waste management (Biodegradable waste)

For decomposition of biodegradable waste at its origin itself pipe compost and biogas plants are being issued.

Non-Biodegradable waste management

Material Collection Facility has already been started functioning for the management of non-biodegradable waste.

Awareness program

- a. Awareness for residence association: Suchitwamission/LSGD/Corporation
- b. SWM training to children, youth, Asha workers and other stake holders
- c. Follow up systems: Capacity building of community groups, monitoring system and active involvement of residence association is necessary

B. Long term Recommendations

Enforcement of rules for proper designing and construction of septic tanks has to be implemented. As the MCF and RRF are not fully activated in the local bodies such types of solid wastes are depositing on the river as well as on the Drains .So MCF and RRF shall be activated and all the waste generating within the local body must be collected and disposed through MCF and RRF. To prevent pollution of River through waste dumping, strict enforcement of rules is required. Local body has to identify suitable location for live. monitoring facilities. . The role resident's association is crucial in monitoring the pollution abatement enforcement of rules is required.

Chapter 3

Sample Analysis

3.1. Restoration Plan: - Statutory Intervention

Water quality management through setting up of standards for discharge of municipal wastewater and industrial effluents are enforced through the consent to establish and consent to operate require a fresh look in view of ambient water quality requirements of aquatic resources. The prevailing standards prescribed in the consent to industrial sector and general discharge standards adopted for sewage treatment require change in approach from consumption to disposal to treat, recycle, reuse and discharge to aquatic system if matches with the norms of water quality of aquatic resources.

Polluted river stretches have been targeted for restoration of water quality through identification of sources of pollution and interventions through treatment for the municipal as well as industrial effluents.

3.2 Monitoring Conducted by KSPCB

The tributaries coming under Payyannur Municipality Ramanthali GP and Madayi GP are major causes to the polluted river identified through National Water Quality Monitoring Programme and the reconnaissance survey for river restoration. Most of the drains connecting to the Kavvayi River are completely dry since it is summer season. Only from drains with flow were able to check the flow rate and take the sample. Samples were collected from available drains and tested in the lab.

Kavvayi River 2018

Station Name: Kuttolpalam														
Station Code: 2301														
Sl.no	Parameters	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Average
1	pH	7.2	6.6	7.26	7.3	7.0	6.6	6.0	6.0	7.5	6.4	7.2	7.4	6.83
2	EC, μ S/cm	66.2	90.5	186.9	165.6	99.6	66.3	51.8	48.5	49.8	68.4	116.8	85	91.28
3	Turbidity, NTU	0.6	1	0.9	2.8	2.4	0.1	0.3	0.2	0.1	0.2	0.1	0.2	0.74
4	Dissolved Solids, mg/L	40	55	160	120	90	35	30	40	30	40	52	52	62.00
5	Total Alkalinity, mg/L	18	20	25	30	25	7	7	9	14	13	21	20	17.42
6	Chlorides, mg/L	13	18	26	24	35	4	6	8	8	8	11	7	14.00
7	TH,mg/L	14	22	28	26	29	16	18	16	18	22	22	33	22.00
8	Ca,mg/L	9	13	10	13	11	9	6	8	7	10	11	11	9.83
9	Mg,mg/L	5	9	18	13	18	7	14	10	11	12	11	22	12.50
10	AmmN,mg/L	0.01	0.002	0.001	0.18	0.104	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.06
11	Nitrates,mg/L	0.2214	0.107	0.593	0.41	0.947	BDL	0.0061	0.113	BDL	BDL	BDL	0.14	0.32
12	Sulphates,mg/L	2.09	BDL	1.19	0.75	BDL	BDL	BDL	BDL	BDL	BDL	BDL	5	2.26
13	Phosphates,mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
14	Boron,mg/L	BDL	0.02	BDL	0.031	0.001	BDL	BDL	BDL	BDL	0.012	0.34	0.1	0.08
15	BOD,mg/L	0.7	1.3	3.9	1.3	0.9	1.73	1	2	3	0.74	0.2	0.1	1.41
16	Dissolved Oxygen,mg/L	4.1	4.2	4.6	81	7.3	5.3	7.3	8.1	6.7	6.8	3.9	7.6	12.24
17	TC, cfu/100ml	180	1500	2000	1400	700	1600	350	210	1000	1400	210	750	940
18	FC, cfu/100ml	160	1000	1500	300	400	1230	340	180	800	700	80	100	565

Chapter 4

Action Plan

Action plan for local body

Sl. No	Ref para no.48 Item Nos as per NGT Order no 673/2018	Local body	Activity	Implementing Agency	Unit	Fund and cost	Time of Completion
1	A (b)	Payyannur municipality	Sanitation Facility Septage treatment facility shall be provided by Local Bodies in various places.	- Local Body	Scientific Septic Tank and Soak pit		
	C(ii)	Payyannur municipality	Bio degradable waste disposal	Local Body	Bio bins (2061), Pit Compost(10992), Bio gas Plant(687)	Suchitwa Mission fund, Plan fund (2.00 crores)	2022
	A (b)	Payyannur municipality	Non bio degradable Waste Disposal	Municipality	MCF and RRF	Suchitwa Mission Fund, Plan Fund	2022

	E		Awareness	youth, Asha workers and other stake holders and Harithasahaya Samithi		Plan fund (6.00 Lakhs)	
2	E	Kankol	Installation of CCTV cameras at major points	Local body	camera	Donation (30.00 Lakhs)	2019

	C (ii)		Bio degradable waste disposal	Local body	Bio bins, Pit Compost, Bio gas Plant (2460 Nos)	Plan Fund (24.40 Lakhs)	Ongoing
	A (b)		Non bio degradable Waste Disposal	Haritha karma sena	MCF	Plan fund (14.00 Lakhs)	Ongoing
	E		Awareness	youth, Asha workers and other stake holders	Gramasabha	Own Fund (2.00 lakhs)	Once in a month
3	A (b)	Ramanthali GP	Sanitation Facility in markets	Haritha Karma Sena	Soak pit (15 Nos)	Toatal Sanitation fund, Own fund, development Fund (30.00 Lakhs)	2020
	A (b)		Non bio degradable Waste Disposal	Haritha Karma Sena	MCF	Toatal Sanitation fund, Own fund, development Fund (2.00 Lakhs)	2020
	A (b)		Drain Cleaning and side protection	Local Body		MGNREGS fund, Total Sanitation fund, Beneficiary contribution(35.00 Lakhs)	2022
	A (b)		Sanitation Facility in markets	Haritha Karma Sena	Soak pit (15 Nos)	Toatal Sanitation fund, Own fund, development Fund (30.00 Lakhs)	2020
4	E	Trikkaripur	Renovation of Ponds & Construction of Platform to openwell (Implementation of Map of Kavvayi Wetland system of Northern Kerala)	CWRDM		2,53,500 CWRDM	2019

Action Plan by Irrigation Department

Sl no	Activity	Implementin g Agency	unit	No of units	Cost in crores	Source of fund	Time for completion
1.	Desilting and rejuvenation of NarangaThodu in Payyannur Municipality	Irrigation Department	1	1	0.05	Plan Fund	2020

1. Proper awareness among the inhabitants in the area is to be given for protecting the water bodies. Basic training for the people at the grass root level is to be provided for river management. All efforts for maintaining the quality of water bodies may be done by the Panchayat/Municipal authorities only with people's participation.
2. The nearby gramapanchayath and municipalities are mainly responsible for not providing municipal waste collection and treatment facilities in the locality. So they must be instructed to provide the required facility for scientific disposal of municipal solid waste as per the MSW rules 2016. The citizens as well as the municipal/gramapanchayath authorities need to be aware of the importance of scientific disposal of waste generated. Their attitude towards handling waste has to be changed. Reducing waste, recovering recyclable materials, return of nutrients to the eco system as well as generation of energy from waste are to be practised. There has to be a valid scheme for collection, segregation, transportation, processing and safe disposal of waste by the authorities. For this affordable and viable waste to energy conversion technologies apart from conventional composting is to be implemented by the municipalities seeking technical expertise.
3. Propagation of vegetative cover in water shed will reduce soil erosion and enhance percolation of rain water into the sub surface. In downstream stretches where the river is saline, propagation of mangroves are essential.
4. Strict monitoring from the part of implementing as well as monitoring agencies is required for effective functioning of waste treatment facilities in waste generating units.
5. The practice of waste dumping into the river is to be prevented legally and strict action against this practice is to be adopted at panchayath and municipality level.
6. Re-survey of the river boundaries throughout the entire stretch is to be done urgently so as to prevent encroachment of the river.
7. The municipalities as well as the panchayaths are to be directed to provide proper waste management facilities of their own. All towns and cities must have Sewage Treatment Plants (STPs) that clean up the sewage. Facility for collection, segregation, transport, processing and scientific disposal of waste generated are to be provided by the local authorities in strict adherence to the Municipal Solid Waste Management Rules, 2016. For this, affordable and viable waste to energy conservation technologies apart from conventional composting is to be implemented seeking technical expertise.
8. Strict monitoring from the part of implementing as well as monitoring agencies is required for effective functioning of waste treatment facilities in waste generating units. The riverine stretches are to be monitored periodically at identified locations for water quality assessment.

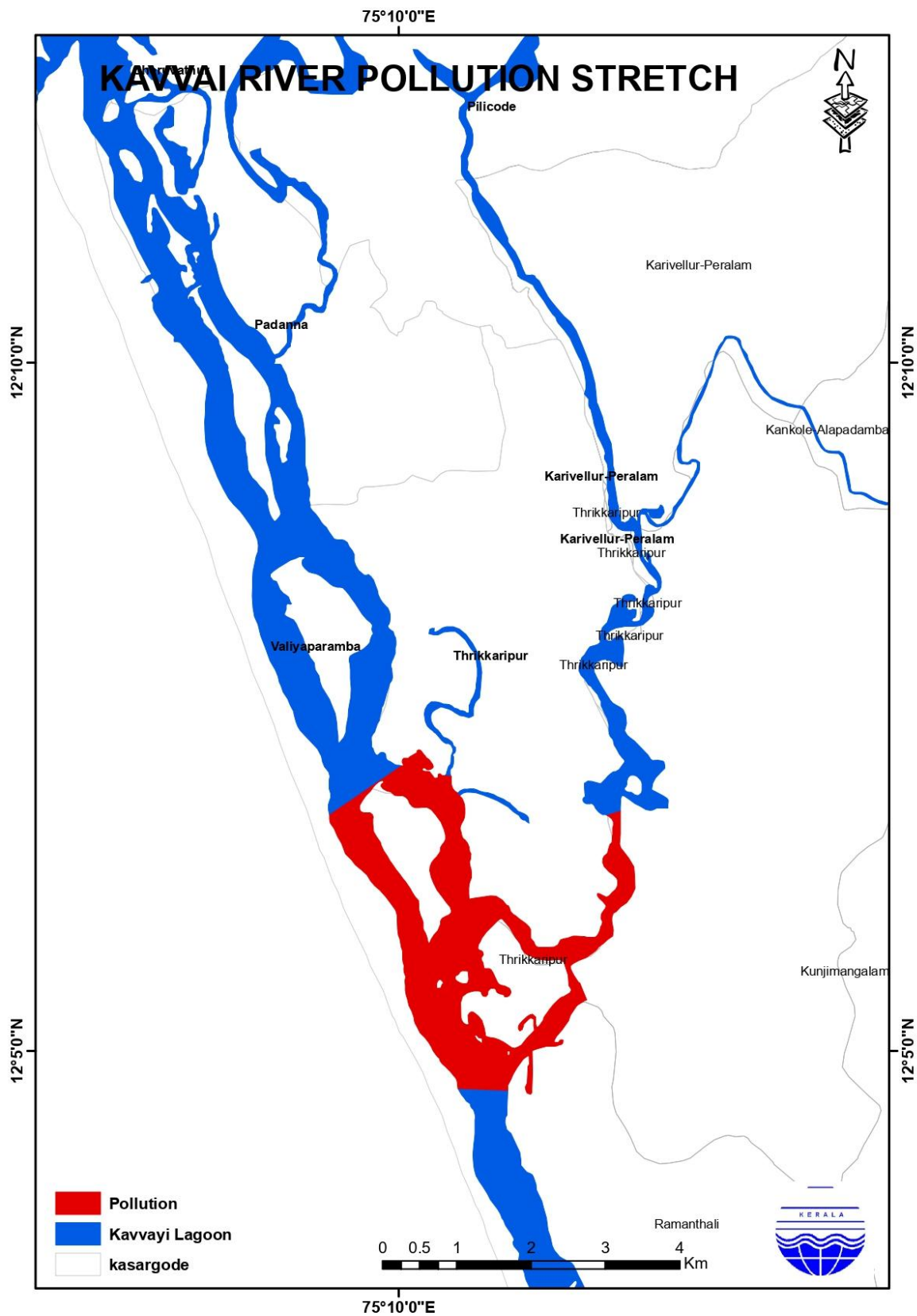
9. Modern agricultural practices and technologies introduce the use of inorganic fertilizers with Nitrogen, Phosphorous, Potash and inorganic pesticides in farm lands and play important role in the river pollution. These may concentrate into the water body through run off causing algal blooms by which whole stretch of water become choked. Fertilizers and chemicals application in agricultural lands are to be strictly under technical expertise.
10. Rain water recharging measures must be adopted.
11. Eco tourism and water tourism projects are to be designed giving due importance for protecting the environment. The activities are to be organized in such ways which do not induce any types of pollution to the water body. Strict monitoring from the concerned authorities are recommended in functioning of the tourism projects.
12. Implement Green Protocol effectively in local self-governments. Prohibit littering of plastics in the area. Plastic wastes shall be handled as per the provisions of Plastic Waste (Management and Handling) Rules, 2018.
13. The existing waste water treatment facilities of Taliparamba Municipality shall be augmented in such a way so as to operate round the year.
14. Actions shall be taken by the local bodies to clean the storm water drains. Rejuvenation of small streams, creeks leading into the river is to be done.
15. Round the clock patrolling shall be provided so as to prevent waste dumping on public places.

CONCLUSION

Wastes dumping are a common practice across the river banks. This may be from households, markets, industries, commercial establishments etc. There is no point source of pollution noticed in the banks. But the cumulative effect from non-point sources is to be counted. The untreated sewage flowing from nearby towns, households, and other establishments may reach the river leading to organic pollution to the water body.

Strict monitoring is required for effective functioning of waste treatment facilities in waste generating units. Proper awareness among the inhabitants in the area is to be given for protecting the water bodies. People's participation is a necessity in protecting the quality of water bodies. Basic training for the people at the grass root level is to be provided for river management. Propagation of vegetative cover in water shed will reduce soil erosion and enhance percolation of rain water into the sub surface. The nearby gramapanchayath and municipalities are mainly responsible for not providing waste collection and treatment facilities in the locality. So they must be instructed to provide the required facility for scientific disposal of municipal solid wastes as per the MSW rule, 2000. The citizens as well as the municipal/gramapanchayath authorities need to be aware of the importance of scientific disposal of waste

generated. Their attitude towards handling waste has to be changed. Reducing waste, recovering recyclable materials, return of nutrients to the ecosystem and generation of energy from waste have to be practiced. There has to be a valid scheme for collection, segregation, transportation, processing and safe disposal of the waste by the authorities. For this, affordable and viable Waste to Energy conversion technologies apart from conventional composting is to be implemented by the municipalities, seeking technical expertise.



4.6 Conclusion

Wastes dumping are a common practice across the river banks. This may be from households, markets, industries, commercial establishments etc. There is no point source of pollution noticed in the banks. But the cumulative effect from non point sources is to be counted. The untreated sewage flowing from nearby towns, households, and other establishments reach the river leading to organic pollution to the water body.

Strict monitoring is required for effective functioning of waste treatment facilities in waste generating units. Proper awareness among the inhabitants in the area is to be given for protecting the water bodies. People's participation is a necessity in protecting the quality of water bodies. Basic training for the people at the grass root level is to be provided for river management. Propagation of vegetative cover in water shed will reduce soil erosion and enhance percolation of rain water into the sub surface. The nearby grama panchayath and municipalities are mainly responsible for not providing waste collection and treatment facilities in the locality. So they must be instructed to provide the required facility for scientific disposal of municipal solid wastes as per the MSW rule, 2000. The citizens as well as the municipal/grama panchayath authorities need to be aware of the importance of scientific disposal of waste generated. Their attitude towards handling waste has to be changed. Reducing waste, recovering recyclable materials, return of nutrients to the ecosystem and generation of energy from waste have to be practiced. There has to be a valid scheme for collection, segregation, transportation, processing and safe disposal of the waste by the authorities. For this, affordable and viable Waste to Energy conversion technologies apart from conventional composting is to be implemented by the municipalities, seeking technical expertise.

1. CHAIRMAN
2. CONVENOR
3. KWA
4. SUCHITWA MISSION
5. INDUSTRIES DEPT
6. REVENUE DEPT
7. MUNICIPALITY SECRETARY
8. PANCHAYATH SECRETARY

- Y. Shanmukhan.
 - ANITA KOYAN
 - P. Gopalan.
 - ABIJITH.T.M.
 - Mangal. V. P.
 - Chandrasekhar
 - Aji. K. R.
 - H. S. Sadas. cm.
 Sec. Kamanthali GP.
 Baburaj. M. B. Secretary
 Kankol. Arapamba G.P.

