KERALA STATE POLLUTION CONTROL BOARD
കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
Pattom P.O., Thiruvananthapuram – 695 004
പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004

PCB/HO/EE3/OA No.325/2015/01/2019 Date: 18.05.2020

From

The Member Secretary

To

Shri. A. Sudhakar
Division Head, WQM-I
Central Pollution Control Board
Parivesh Bhawan, East Arjun Nagar, Delhi-110032

Sub:- Restoration of water bodies as per OA NO. 325/ 2015- furnishing of information in the format -reg.

Ref:- 1. Letter F. No. A-14011/325/2020-WQM-I/3382 dated 06.03.2020
2. This office letter of even no. dated 30.04.2020 through e-mail on 17.03.2020
3. This office letter of even no. dated 30.04.2020
4. Letter F. No. A-14011/5/2020/(OA 325)/WQM-I dated 06.05.2020

Sir,

As per the Hon'ble NGT order dated 10/05/2019 passed in MA No. 26/2019 in OA No. 325/2015, 40,000 ponds were identified by Irrigation Design and Research Board (IDRB) for which Unique Identification No. has been marked. Kerala State Pollution Control Board (KSPCB), with GIS Specialization, marked the ponds in all the 14 districts of Kerala in the map. Field survey is envisaged with the participation of concerned departments/ agencies to check whether they have been included in the already rejuvenated ponds/lakes by different departments. If it is not included, immediate action will be initiated to rejuvenate by incorporating the concerned Departments. It may kindly be noted that different departments are already engaged in restoration of water bodies at their own level, a line of action in co-ordination & unique

identification of ponds/lakes which are abundant in the state of Kerala is needed. An action plan was prepared in co-ordination with various departments and was submitted to CPCB vide ref. (2).

Vide ref (1) a format was forwarded to this office for furnishing the information related to various departments. Accordingly the format was forwarded to all concerned departments for filling the data pertaining to them but the same is yet to be received as the State is under lockdown due to COVID-19 and the offices, excluding those offering essential services, are not functioning in full swing. Hence it was requested vide ref. (3) to grant two months time to submit the data in the formats after collecting information from concerned departments. However the available data are provided in the format attached.

Yours faithfully,

Member Secretary

Encl: as above

Copy to : CPCB, Bangalore

☎: General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: ms.kspcb@gov.in FAX: 0471 – 2318134, 2318152 web: www.keralapcb.nic.in

KERALA STATE POLLUTION CONTROL BOARD
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PCB/HO/EE3/OA NO.325/2015/01/2019 Date: 17/03/2020

From
The Member Secretary

To
The Member Secretary
Central Pollution Control Board
Parivesh Bhawan
East Arjun Nagar
Delhi-110032

Sub: M.A. No. 26/2019 in OA No.325/2015 in the matter of Lt. Col-Sarvadaman Singh Oberoi Vs UOI & Ors before Hon'ble NGT, PB, New Delhi

Ref: 1) Hon'ble NGT Order dated 10/05/2019 in OA No.325/2015
2) CPCB Letter No. A-14011/1/2019- WQM-I dated 26/07/2019
3) This Office letter of even no. dated 30/09/2019
4) E-mail from Hon'ble National Green Tribunal dated 16.11.2019
5)This Office letter of even no. dated 16/12/2019
6) Hon'ble NGT Order dated 20/02/2020 in OA No.325/2015

Sir,

Kind attention is invited to the Hon'ble NGT order vide ref(1);wherein the Hon'ble NGT directed the State Govt./UT administration for taking necessary action for restoration of all water bodies by preparing action plan within three months.

It may kindly be noted that the Kerala State Pollution Control Board had prepared the format of action plan as per the CPCB guidelines and it was circulated to concerned departments. Also a meeting was conducted in the chamber of Principal Secretary Environment Department on 09.12.2019 and in that meeting the State Pollution Control

Board was entrusted to prepare the action plan. A sub-committee was formed for the speedy preparation of the action plan for restoration of water bodies. This was already intimated vide ref. (5). Copy of the same is attached. Hence the action plan for the water bodies is prepared by Kerala State Pollution Control Board in coordination with concerned departments and is submitted along with copies of maps showing the location of ponds in all 14 districts for further necessary action.

Yours faithfully,

MEMBER SECRETARY

Encl: As above

Copy to: CPCB, Bangalore

☎: General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: ms.kspcb@gov.in FAX: 0471 - 2318134, 2318152 web: www.keralapcb.nic.in

KERALA STATE POLLUTION CONTROL BOARD

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PCB/HO/EE3/OA NO.325/2015/01/2019 Date:16 /12/2019

KERALA STATE POLLUTION CONTROL BOARD THIRUVANANTHAPURAM
26 DEC 2019
DESPATCHER

From
The Member Secretary

To
The Member Secretary
Central Pollution Control Board
Parivesh Bhawan
East Arjun Nagar
Delhi-110032

Sub: M.A. No. 26/2019 in OA No.325/2015 in the matter of Lt. Col-Sarvadaman Singh Oberoi Vs UOI & Ors before Hon'ble NGT, PB, New Delhi

Ref: 1) Order dated 10/05/2019 of the Hon'ble NGT in OA No.325/2015
2) CPCB Letter No. A-14011/1/2019- WQM-I dated 26/07/2019
3) This Office letter of even no. dated 30/09/2019
4) E-mail from Hon'ble National Green Tribunal dated 16.11.2019
5)This Office letter of even no. dated 16/12/2019 addressed to Hon'ble National Green Tribunal.

Sir,

Kind attention is invited to the Hon'ble NGT order vide ref(1);wherein the Hon'ble NGT directed the State Govt./UT administration for taking necessary action for restoration of all water bodies by preparing action plan within three months. Also Central Pollution Control Board directed to submit the action plan of water bodies on or before 09.08.2019 vide ref (2).

It may kindly be noted that the State Pollution Control Board had convened a meeting in this regard on 24.06.2019 and based on the decision taken during that meeting Principal Secretary , Environment Department was requested vide letter dated 03.07.2019 to take necessary action as co-operation of various departments is needed for preparation of action plan. Subsequently Principal Secretary, Environment Department conducted a meeting on 06.08.2019 with the concerned departments for preparing

plan for the restoration of water bodies and entrusted Local Self Government artment with preparation of action plan. The Kerala State Pollution Control Board ad prepared the format of action plan as per the CPCB guidelines and it was circulated to concerned departments. Also a meeting was conducted in the chamber of Principal Secretary Environment Department on 09.12.2019 and in that meeting the State Pollution Control Board was entrusted to prepare the action plan. It may kindly be noted that different departments are already engaged in restoration of water bodies at their own level, a line of action in co-ordination & unique identification of ponds/lakes which are abundant in the state of Kerala are being started. A sub-committee is also in consideration for the speedy preparation of the action plan for restoration of water bodies. Hence kindly extend some more time for preparation of the action plan. This was already intimated & requested to Hon'ble NGT order vide ref(5). This is reported for your kind information and necessary action.

Yours faithfully

MEMBER SECRETARY

a/c

Encl: As above

Copy to: CPCB ,Bangalore

ACTION PLAN ON

RESTORATION OF WATER BODIES

(Prepared as per the direction of NGT in M.P.26/2019 of O.A 325/2015 dated 10.05.2019)

KERALA STATE POLLUTION CONTROL BOARD

Pattom

Thiruvananthapuram-695004

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Content

ACTION PLAN ON RESTORATION OF WATER BODIES - PONDS

1. Preamble

Water is the most prime factor for sustenance of life. It exists in different forms such as rainfall, river water, ground water, ponds and lakes etc. Therefore management of water resources call for integrated management of all these components as a system. The restoration of water bodies is primarily a series of activity meant to protect and rehabilitate the physical and biotic processes of water bodies in a way that is conducive to the progression of ecosystems towards their natural state. In water bodies restoration, the focus should be on recovering, stabilizing and enhancing ecosystem functions and services of the rivers and the restoration activities may be socially driven with involvement of community and integrated with the area plan following the principle of sustainability science, which is trans-disciplinary, community based, interactive and participatory.

Lakes and ponds are an intrinsic part of the eco system. A lake or pond is the water body which holds certain volume of water generally in all seasons of the year. Lakes and ponds have traditionally served the function of meeting water requirements of the people for drinking, household uses like washing, for agriculture, fishing and also for religious and cultural purposes. Apart from these functions, which involve direct use of the lake water, lakes, ponds are also known to recharge groundwater, channelize water flow to prevent water logging and flooding. Lakes are also host to a wide variety of flora and fauna. Urban water bodies are a very important feature in the landscape. They are vital in easing out the hydrological severe conditions like drought and floods; they influence the micro-climate as well as enhance the aesthetic beauty of the landscape and offer various recreational opportunities. The water bodies in urban areas provide a diversity of values and uses ranging from ecological goods and services to direct production values. These are essentially relevant social benefits. Therefore, the need to initiate efforts to restore,

conserve, manage and maintain the lakes and ponds as an inseparable part of the whole ecosystem cannot be undermined.

2. Overview of water resource in Kerala

Kerala is known for its abundant natural resources, especially water. The state has 44 rivers, 27 backwaters (mostly in the form of lakes and ocean inlets), 7 lagoons, 41036 ponds (18681 public ponds) and over 30 lakh wells. Out of the 44 rivers, 41 are west flowing and three are east flowing which are tributaries of the Cauvery river.

Of the 44 rivers, 33 are less than 100 km long with a total length of 1577 kms covering a catchment area of 14949 sq. km.The remaining 11 rivers are above 100 kms in length and their total length is 1643 km, with a catchment area of 25058 sq. km and the effective catchment area of all the river basins is 38864 sq. km. Five major rivers, viz Periyar, Bhrathapuzha, Pamba. Chaliyar and Chalakudy altogether drain 40 per cent of the geographical area of the state. Apart from rivers. Backwaters, ponds and wells, springs also contribute to the water resources in Kerala. 67.29% of the surface water area of 3.61 lakh hectares is constituted by brackish water lakes, backwaters and estuaries.

The total annual yield of all these rivers together is 78.041 Million Cubic Meters (MCM) of which 70,323 MCM is in Kerala. The peculiarity of the rivers flowing across Kerala is short length of the river and the elevational difference between the high and the low land leading to quick flow of water collected from the river basin and quickly discharged into the Lakshadweep sea, the state has not been able to utilise the river water sources to a major extent.

On a rough estimate, the source wise dependence by rural households for domestic water supply dependent on traditional ground water systems is 80%, 10-15% use piped water supply systems, and 5% use traditional-surface and other systems.

3. Summary of Action Taken in the past five years, to preserve the water bodies

The Government of Kerala takes progressive steps to rejuvenate the water bodies periodically as well as amend the required acts from time to time. 41036 no. of ponds are being maintained by Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Department of Soil Survey and Soil Conservation, Directorate of urban affairs/Panchayats and Haritha Keralam Mission. The details are as given below:-

Department	No./length of water bodies rejuvenated in the past five years
Haritha Keralam Mission	390 km long rivers, 34289 km long streams,
Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)	7852
Irrigation Department (under Haritha Keralam Mission)	704
Department of Soil Survey and Soil Conservation	291

3.1. Haritha Keralam Mission

a. Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)

Regeneration of water bodies is one of the main objectives of Haritha Keralam Mission. Dumping of waste materials, particularly waste materials of construction is the main reason for the pollution of water bodies. Not only rivers but also groundwater also gets affected by this contamination. Regeneration of a no. of of rivers and streams becomes happen in various parts of the state with the support and leadership of Local Self Government institutions by exploring the possibilities of Mahatma Gandhi National Rural Employment Guarantee Programme workers.

As part of these activities, 390 km long rivers and 34289 km long streams have been revived.

b. Ini Njan Ozhukatte

On 8th December 2018, in connection with the second anniversary of the Haritha Keralam Mission, a river regeneration program was organized with people participation as ‘Ellarum Jaashayangalilekku’ and cleaned up 137 water springs covering a distance of 210 km from various local bodies. The programme has also decided that all local bodies should select at least one water stream for this drive.

The main reason our rivers are polluted is that their streams and flow into them become polluted. Therefore, the streams must be cleaned to avoid pollution. As part of 3rd anniversary of Haritha Kerala Mission, any one of the day between December 14 to 22, 2019, it was recommended to opt for one-day cleaning drive as part of this program.

HARITHAKERALAM MISSION - WATER SUB DIVISION
"LET ME FLOW" CAMPAIGN
2019 DECEMBER

SL. NO.	DISTRICT	LOCAL SELF GOVERNMENT INSTITUTES	DETAILS OF DRAINS		PARTICIPATION
			NOS.	TOTAL LENGTH (IN KM)	
1	Thiruvananthapuram	78	115	118	20278
2	Kollam	73	72	260.72	27827
3	Pathanamthitta	57	65	179.15	7000
4	Alappuzha	78	80	80	4500
5	Kottayam	77	51	186.25	15800
6	Idukki	54	49	130	2500
7	Ernakulam	96	68	120.4	2000
8	Thrissur	94	63	127.531	9000
9	Palakkad	95	95	100	2500
10	Malappuram	106	83	71.8302	800
11	Kozhikkode	78	98	225.272	21590
12	Wayanad	26	28	78.65	4000
13	Kannur	81	89	286.69	28000
14	Kasargod	41	50	70	16500
	TOTAL	**1034**	**1006**	**2034.4932**	**162295**

c. Kerala Water Summit: Jalasangamam (29th - 31st May 2019)

"Navakeralam Karma Padhathi (action to build a new Kerala)", comes as an array of comprehensive development programmes addressing four key areas of human life. The four Missions include Haritha Keralam, LIFE, AARDRAM and Public Education Improvement Yagnam.

Haritha Keralam Mission includes activities related to waste management, rejuvenation of agriculture and water resources. These three sectors are selected as sub-missions since they are closely interlinked. Aim of the sub-mission water resources is to rejuvenate the water bodies in the State to ensure water availability during summer and to keep them free from pollution. The Mission has drawn up plans based on micro watershed approach under the local self-government institutions. The Mission has initiated cleaning and rejuvenation of rivers, ponds and streams with public participation winning national awards. There are successful models in water conservation across the country and within the State. Showcasing successful models and addressing sustainability challenges was the aim of this summit

3.2. Irrigation Department

It was decided to take necessary action for achieving effective and scientific planning and utilization of the water resource, for collecting data regarding the water resource availability in different regions and to prepare the water budget. To determine the water storage capacity and its utilization in ponds and lakes for which restoration is undertaken by the Irrigation Department, the installation of water level scales were decided.

a. Minor irrigation Class 1 and Class 2

Minor Irrigation schemes are divided into Class-I and Class-II depending on the ayacut served. Schemes serving above 50Ha up to 2000Ha are classified as MI Class-I. Lift irrigation schemes are also Minor irrigation schemes serving at least 40Ha.

MI Class-I schemes: Minor works like improvements to tanks and rivulet, construction of check dams, sluices, regulators, bunds, vented crossbars, salt water barriers, layout of channels and drainage structures, etc., are usually undertaken under MI Class-I schemes.

MI Class-II schemes: Minor irrigation works including construction of vented cross bars, canals, improvements to natural drains, etc., are taken up under this scheme.

b. Renovation of tanks and Ponds

Ponds and tanks are the local source of water in many villages of the state. Kerala acquire 18681 number of public ponds. Irrigation department has been taking up renovation of ponds and water bodies in Kerala through de silting, repairing of sluices and constructing retaining structures, its inlet and outlet arrangements. Projects with financial support in the State budget are grouped in this category. Maintenance of projects and works taken up with budget support under Lump sum provisions for routine works are not included in this category.

Ponds are recognized as having at least four functions in irrigation-agriculture-water conservation, flood control and protection of ecology of the surrounding area. Renovation of ponds is proposed to improve ground water storage capacity, improvement in agricultural production, livestock, fisheries and human use.

3.3. Department of Soil Survey and Soil Conservation

a. Soil and Water Conservation on Watershed Basis – RIDF (NABARD assisted)

The Department has been implementing infrastructure development projects availing assistance under the Rural Infrastructure Development Fund of NABARD with a view to create required infrastructure backup for land development under various projects. Watershed based projects and projects for drainage protection and flood control are taken up under this sector. The main objective of the scheme is to

bring improved and sustainable agricultural productivity in identified watershed area by adopting scientific soil and water conservation activities.

Currently, the Department is implementing two types of Projects viz. Soil and Water Conservation Projects on Watershed basis and Drainage and Flood Prone Area Protection Schemes. Stone pitched Contour bunds, Graded bunds, Moisture Conservation Pits, Contour/ Staggered/ Bit Trenches for rain water harvesting, Side pitching, Water Harvesting Structures, Farm ponds, Dug out Ponds Retaining Wall, Check Dams, Agrostology measures, Live Fencing, Agro forestry etc are the major Soil and Water Conservation interventions taken up under the Watershed Projects. Proper blends of these measures are adopted for achieving aforesaid objectives pertaining to individual Projects.

b. Rashtriya Krishi Vikas Yogana (RKVY)

The State Level Sanctioning Committee of RKVY for 2014-15 had approved the projects for Mitigation of drought in Mullankolly and Pulpally panchayat in Wayanad District for an amount of Rs.200.40 lakhs and that of Poothadi panchayat in Wayanad District for Rs.123.70 lakhs as per NMSA norms. The interventions proposed under the project is construction of water harvesting structures and farm ponds. The Department has completed construction of 40 farm ponds and 18 water harvesting structures utilizing the fund of Rs. 168.23 lakhs released to the department.

c. Soil Conservation activities under Kuttanad Package

In order to mitigate agrarian distress in the fragile ecosystems of Kuttanad, Upper Kuttanad and Onattukara region and to sustain and restore ecological stability, this programme was introduced as a part of the Kuttanad Package funded by 13th Finance Commission of GOI. The Project gives emphasis for various water conservation activities aimed at ensuring potable water for domestic use and irrigation purposes. The various activities devised under the programme include renovation of wells , ponds , well curbing planting of vettiver, supply of medicinal and horticultural plants, etc.

Administrative sanction was received for an amount of Rs.15.25 crore as the 1st phase and for an amount of Rs.25.20 crore as the 2nd phase. An additional amount of Rs. 1.52 crore was also sanctioned to the Department for implementing the ongoing eco-restoration activities. Out of the administrative sanction of Rs 41.97 crore, only an amount of Rs. 29.48 crore was released for implementation of the project.

Utilizing the fund received, the Department has implemented various activities aimed for the mitigation of agrarian distress in the region through eco-restoration in the districts of Alappuzha, Kottayam and Pathanamthitta. Renovation of 204 ponds has been carried out in the districts which have augmented ground water regime. 3258 number of wells have been renovated by constructing parapet walls that has helped in ensuring hygienic water for domestic use and irrigation purpose. 24728 meter of vettiver planting has been undertaken and 71601 nos of seedlings of medicinal plants and fruit trees have been distributed to the beneficiaries in the project area as part of eco restoration.

3.4. Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)

Renovation of traditional Water Bodies including desilting of irrigation tanks and other water bodies is a permissible activity under the Mahatma Gandhi NREG Act. During the Financial Year 2018-19 16354 works were undertaken under this category and an amount of Rs.12594 lakh has been expended. During the Financial Year 2019-20 12426 works has been undertaken till now and an amount of Rs. 5688 lakh is expended. The District wise details of Public Works relating to Traditional Water Bodies under taken under Mahatma Gandhi NREGS during 2018-19 & 2019-20 is furnished below.

Renovation of traditional water bodies 2018-19					
Sl. No.	District	Nos. & Expenditure (In Lakhs)			
		Completed works	Expenditure	Ongoing works	Expenditure
1	ALAPPUZHA	785	751.57	879	1007.96
2	ERNAKULAM	869	677.41	942	502.25
3	IDUKKI	255	163.99	616	509.13
4	KANNUR	229	137.83	450	252.68
5	KASARGOD	125	157.32	231	74.71
6	KOLLAM	245	145.21	379	337.18
7	KOTTAYAM	411	401.16	1014	723.56
8	KOZHIKODE	133	196.54	344	209.11
9	MALAPPURAM	281	300.99	800	491.63
10	PALAKKAD	1094	959.58	1776	1201.9
11	PATHANAMTHITTA	278	290.64	601	377.5
12	THIRUVANANTHAPURAM	960	590.41	848	685.12
13	THRISSUR	509	405.69	935	779.43
14	WAYANAD	36	16.08	299	247.4
	Total	6210	5194.42	10114	7399.56

Renovation of traditional water bodies 2019-20					
Sl. No.	District	Nos. & Expenditure (In Lakhs)			
		Completed works	Expenditure	Ongoing works	Expenditure
1	ALAPPUZHA	90	22.96	1056	671.35
2	ERNAKULAM	144	52.97	1045	364.08
3	IDUKKI	130	14.64	570	155.58
4	KANNUR	29	12.31	572	228.95
5	KASARGOD	61	9.16	342	150.38
6	KOLLAM	30	6.26	430	174.49
7	KOTTAYAM	209	40.09	919	482.28
8	KOZHIKODE	55	20.13	354	184.29
9	MALAPPURAM	108	36.46	962	559.08
10	PALAKKAD	375	124.13	1565	983.98
11	PATHANAMTHITTA	104	12.56	589	198.99
12	THIRUVANANTHAPURAM	209	54.06	940	412.74
13	THRISSUR	93	16.77	928	253.35
14	WAYANAD	5	0	512	445.63
	Total	1642	422.5	10784	5265.17

3.5 Ayyankali Urban Employment Guarantee Scheme

Like MGNREGS, Ayyankali Urban Employment Guarantee Scheme is being implemented successfully for the preservation of water bodies in Urban Local Bodies in Kerala .

Under AUEGS , Urban Local Bodies are permitted to undertake the works like preservation of pond, renovation of canals , cleaning of water bodies , rain water harvesting, minor irrigation , gully plugging , rain water pit , well recharging etc.

The details of renovation of water bodies in Kerala under AUEGS in the last 4 years are as following

AYYANKALI URBAN EMPLOYMENT GUARANTEE SCHEME-WATER CONSERVATION DETAILS FROM 2016-17 TO 2019-20

	Streams		Ponds		Canals	
	Number	**Amount in lakh**	**Number**	**Amount in lakh**	**Number**	**Amount in lakh**
2019-20	2549	308.60	625	166.62	133	47.33
2018-19	1089	61.06	241	324.13	265	94.66
2017-18	2178	1221.25	482	648.26	530	189.32
2016-17	622	407.08	657	64.82	119	45.21
TOTAL	**6438**	**2547.58**	**2005**	**1203.84**	**1047**	**376.51**

3.6 KERALA LAND DEVELOPMENT CORPORATION

KLDC was incorporated under the administrative control off the Agriculture Department in 1972 with the objectives of promoting, undertaking and executing infrastructural development works in Kerala for land development, flood control, drainage, irrigation, prevention of salt water intrusion and water logging etc.

The Corporation has ongoing projects under RIDF aided by NABARD, RKVY, Plan fund works of Agriculture Department, RKI, NRHM, Social Justice Department, works entrusted by Schedule Cast Department, Department of Museum & Zoo, Tourism Department, MP&MLA local area development scheme etc. At present the Corporation has projects costing around Rs.500 crore including ongoing and newly sanctioned project.

Renovation of Ponds

The Corporation's new "Sahasra Sarovar Project" which means thousand pond renovation projects not only facilitates irrigation but also serve to the growing needs of fresh water preservation, ground water recharge, and moreover conserving the culture of the society. Many ponds as big as 14 acres or more were completed through this project. About 80 no. of ponds are renovated and renovations of 30 nos. are in progress. All the ponds are well maintained after the completion of the project by the beneficiaries and local bodies through the Department of Agriculture.

Major Projects

1. **Thrissur Ponnai Kole Development Project**

   This is a three phased project spanning area 13500 hectare of kole fields of Thrissur and Malappuram district with an outlay of 22,000 lakh. Paddy cultivation has enhanced from the previous 3 to 4 t/ha to 7 to 8 t/ha through this project. This project will also conserve the Biodiversity of the kole, enhance the ground water availability and conservation of water.

2. **Onattukara Drainage and flood protection**

   Onattukara in Kuttanadu is a major rice producing area of Kerala. This project will benefit an area of 5194 hectare and 5400 farmers. Total outlay for the project is 22.18 crores.

3. **Improvement works of Nooradithodu Canal and Valiathodu**

   The project will benefit an area of 4560 hectare and the total outlay is 54.37 crores, The project will improve the drainage facility of the area prevent flooding and increase ground water recharge.

KLDC has several project in major granaries of the state ie. Kuttanad, Palakkad, Kole lands of Thrissur and Ponnani, Pokkali, Kaipad etc. In addition to this KLDC is executing projects in other major padasekharams in the state. The projects not only increase agriculture production but also are useful for ground water recharge, water conservation, prevention of salt water instruction, flood control, pollution control and conserve the Biodiversity and Ecosystem.

3.7 THE KERALA STATE POLLUTION CONTROL BOARD

Study of hydrochemistry of Vembanad lake

The Kerala State Pollution Control Board conducted study of hydrochemistry of Vembanad lake through Cochin University of Science and Technology, Ernakulam under the plan scheme of the Board in 2017. Due to heavy floods & deluge occurred in several parts of Kerala from 13-16 August, 2018 study on impact of heavy flood on the environmental characteristics of Vembanad Backwaters was conducted through Department of Marine Biology, Microbiology & Biochemistry, Cochin University of Science and Technology, Ernakulam. Extensive sampling and analysis of various environmental parameters were done in selected locations in Vembanad Kol wetland extending from Alappuzha, Kottayam to Cochin area.

Sanitation Survey of Ashtamudi Lake

The Kerala State Pollution Control Board is conducting a sanitation survey of Ashtamudi Lake using a mobile application in co-operation with Kerala Remote Sensing environmental Centre (KSREC), Socio Economic Unit Foundation (SEUF) and concerned local bodies under the plan scheme of the Board in 2019. It is decided to conduct the survey of the area around 50 metres from lake, which includes houses, flats, establishments, manholes, drains joining the lake etc. It is envisaged that 5000 sources need to be surveyed in 11 Grama Panchayats and one Municipal Corporation. The data collection is proposed to be done with a mobile app.

KSREC was entrusted to develop the mobile app. SEUF has submitted a proposal for conducting sanitation survey. KSREC has completed the development of mobile app and the same has been handed over. Training was also provided to the concerned officers by KSREC. SEUF was addressed to arrange training to surveyors and commence the sanitation survey of Ashtamudi Lake and to carry out the survey in time bound manner in consultation with the Board. KSREC was also instructed to ensure the smooth functioning of mobile app and for

providing necessary assistance to SEUF. Accordingly SEUF has started preliminary steps for conducting the sanitation survey of Ashtamudi lake.

4. Abstract of Indicative Guidelines for the Restoration of Water Bodies – Framed by Central Pollution Control Board

The Central Pollution Control Board has framed indicative guidelines for restoration of water bodies to ensure compliance of the order of NGT and with the following objectives,

i. To make pollution free water bodies and to meet the desired water quality criteria;
ii. To preserve excess water during monsoon,
iii. To restore and augment storage capacities of water bodies
iv. To serve and enhance ground water recharge;
v. Increased availability of water for different intended purposes etc.,

The major activities involved in restoration are envisaged under five prominent phases, namely;

I. Recognition Phase

The activities involved are;

- Collection and maintenance of historical information relating to the water bodies.
- Collection of geographical details of the water body.
- Collection of Hydrological details of the water body.
- Collection and description of flora, fauna and ecological services of the water body
- Catchment Description of the water body.
- Digital mapping of all the collected information.

II. Restoration Phase / Gap Analysis Phase:

- Identification of "Designated use of the Water body" through assessment of the water quality.

- Identification of the sources of pollution, quantification and assessing detailed gap analysis (Sewage Management, Industrial effluent Management, Waste Management).
- Identification of any other associated issues which require attention.

III. Protection Phase / Planning and DPR Preparation Phase:

- Preparation of action plans for waste management.
- D-siltation
- De-weeding
- Mechanical and biological control measures.
- Prohibition of discharges or waste disposal or washing activity and action against violators.
- Stabilization of earthen bunds and the drainage channels along with silt and soil erosion control measures.
- Preparation of catchment conservation plan for the Protection of drainage basin
- Protection of drainage basin
- Removal of encroachments and blockages.
- Flood control measures.

IV. Improvement Phase / Planning and DPR Phase:

- Adoption of in-situ technologies for in-situ remediation.
- Drainage Basin Management
- Creation of Green or buffer zone
- Creation of Biodiversity environment.
- Monitoring the implementation of action plans.

Tendering and Implementation Phase

- Phasing out the numbers of water bodies identified for Rejuvenation as per the indicative guidelines provided by CPCB and implementing the same on field following the TTE Act.

V. Sustenance Phase / Monitoring and Evaluation Phase:

- Creation of awareness among citizen's groups, resident welfare associations, local organizations, activist groups, green organizations, educational organizations and Government agencies.
- Organizing periodic training though identified and reputed institutions.
- Promoting Public participation
- Dissemination of information through different means including information display boards
- Creation of Recreational centres

5. Timeframe / Action Plan

Based on the above guidelines, the Kerala State Pollution Control Board has formulated an Action Plan with specific time frame for the restoration of all water bodies in consultation with various departments/ agencies as detailed below:

Sl. No.	Key Activities and Components	Implementing Agencies	Proposed Time Frame for Implementation and Completion of activities (End Date)
A. Recognition Phase			
40,000 ponds were identified by Irrigation Design and Research Board (IDRB) for which Unique Identification No. has been marked. Kerala State Pollution Control Board (KSPCB), with GIS Specialization, marked the ponds in all the 14 districts of Kerala. Copies of maps showing the location of ponds in all 14 districts are attached. Field survey is envisaged with the participation of all concerned departments/ agencies and check whether they have been included in the already rejuvenated ponds/lakes by different departments. If it is not included, immediate action will be initiated to rejuvenate by incorporating the concerned Departments. Proposal for constituting the field inspection team has been forwarded to the Government by KSPCB for approval. Expected time of completion is 31/12/2020.			
1. Collection and maintenance of historical information relating to the water bodies			
a	Collection of Geographical data of ponds	Local Bodies/MGNREGS/Irrigations Dept	30.10.2020
b	Collection of Hydrological data of identified ponds	Local Bodies/MGNREGS	
c	Collection and Description of flora, fauna and Ecological Services of the Water Bodies.	Kerala State Biodiversity Board	

D	Details on natural drains/flood channels and their flow to ponds	MGNREGS / Local Bodies	30.10.2020
e	Details on total sewage generation/industrial effluent generation/Total waste generation and treatment facilities (STPs/ETPs)	KSPCB	
f	Bio-diversity details (list of plant/ animal/conservation significance species)	Kerala State Biodiversity Board	
2.	Digital Mapping of all the collected information	KSREC (will generate the digital map of geocoded information provided by KSPCB.)	
B. Restoration Phase			
a.	Identification of designated use of water bodies through assessment of water quality criteria (As per National Restoration Goals)	KSPCB	31.07.2021
b.	Details on management and conservation plans for ponds and formulation of strategies for long term management	Local Bodies/ Soil Conservation/ Agriculture/ MGNREGS/ Irrigation/Fisheries	30.04.2021
c.	Identification of the sources of pollution quantification and detailed gap analysis (Sewage Management, Industrial Effluent Management & Waste Management)	KSPCB, LSGD	31.07.2021
d.	Identification of other associated issues which requires attention	LSGD	
e.	Awareness and training requirements	KSPCB	30.04.2021 (KSPCB already conducted awareness programme regarding restoration of water bodies in all 14 districts of Kerala during the period of February to

			March with 2020 the participation of all concerned departments.)
C. Protection Phase			
a.	Preparation of action plans for Sewage Management, Industrial Effluent Management & Waste Management	KSPCB, LSGD,	30.04.2021
b.	De-Siltation, De-Weeding, Mechanical and biological control measures, Stabilization of earthen bunds and the drainage channels as well as silt and soil erosion control measures, Protection drainage basin including preservation of drainage channels	LSGD, Irrigation Department , Soil Survey & Soil Conservation Directorate, Kerala Land Development Corporation , MGNREGA, Agriculture Department	30.05.2021
c.	Prohibition of discharges or disposal of waste or washing activity and action against violators	KSPCB,LSGD	
d.	Preparation of catchment conservation plant for the protection of drainage basin	Irrigation Department	
e.	Necessary actions for removal of encroachments and blockades in water bodies spread area/ boundary/drainage channels and necessary flood control measures	LSGD , Irrigation , Revenue, KSREC (KSREC undertakes the activities entrusted in this segment as follows 1. Identification of blockades in water spread area/drainage channels etc using Mobile application. 2. KSREC will develop a mobile application for the specific purpose on project mode. 3. Survey part will be carry out by other agencies like LSGD/IDRB etc. 4. The uploaded information will be integrated and generated report form by KSREC)	
D. Improvement Phase			

1.	Adoption of In-situ techniques for in-situ remediation of ponds or lakes (Physical & chemical treatment)	KSPCB , LSGD	
2.	Drainage basin management involving rehabilitation and modernization monitoring programmes, Sediment control, structural and land treatment measures and Crop Management.	Local Bodies/ Soil Conservation/ Agriculture/ MGNREGS/ Irrigation	
3.	Creation & Monitoring of biodiversity environment by the side of river body to ensure adequate shelter for migrating birds and type of trees	Kerala State Biodiversity Board	30.03.2022
4.	Monitoring of Implementation of action plans for restoration of ponds or lakes including activity - wise action points, specific time lines, organization responsible for implementation, budget estimates as well as Program Evaluation and Review Technique	Kerala State Pollution Control Board in coordination with stake holder departments	
5.	Fund tie up for the implementation		Parallel activity from the beginning

6. Conclusion

Considering the number of water bodies and also considering the fact that the government has already initiated certain actions, the activities envisaged in the guidelines will be taken up concurrently wherever required and broadly covering the objectives in the guidelines adhering the timeline framed.

FORMAT FOR SUBMISSION OF INFORMATION ON PROPOSED ACTION PLANS FOR "RESTORATION OF POLLUTED WATER BODIES (LAKES AND PONDS)" IN COMPLIANCE TO HON'BLE NGT ORDERS DATED 10.5.2019& 25.02.2020 IN O.A. NO. 325/2015

Sl. No	Content		
1	Name of the State/UT	:	KERALA
	Contact Details (Department-wise)	:	

Name of the State/UT Department	Name of the Nodal Officer	Contact Tel. No	Mobile No.	E.mail
Local Self Government Department		0471-2518163		prlsecy.lsgd@kerala.gov.in
Water Resources Department		0471-2333174		acs.wrd@kerala.gov.in
Irrigation Department		0471-2322927		cea.irrgn@kerala.gov.in
Irrigation Design and Research Board (IDRB)		0471-2306159		idrbtvm@gmail.com
Soil Survey & Soil Conservation Directorate		0471-2339899		soildirector@gmail.com
Kerala Land Development Corporation		0471-2315001		kldctvm@gmail.com
Kerala State Land Use Board		0471-2307830		landuseboard@yahoo.com
Agriculture Department		0471-2304480		apc.agri@kerala.gov.in
MGNREGA		0471-2313385		mgnregakerala@gmail.com
Kerala State Remote Sensing & Environment Centre		0471-2301169		directorksrec@yahoo.co.in
Kerala Water Authority		0471-2328654		managingdirectorkwa@gmail.com
Revenue & Disaster Management		0471-2329227		prl.secy.revenue@gmail.com

			Kerala State Biodiversity Board		0471-2724740		keralabiodiversity@gmail.com
			Ground Water Department		0471-2431824		gwdkerala@gmail.com
			Kerala State Pollution Control Board		0471-2318151		ms.kspcb@gov.in
			Directorate of Urban Affairs		0471-2312886		duatvpm@gmail.com
			Directorate of Panchayat		0471-2323286		directorofpanchayat@gmail.com
			Directorate of Environment and Climate Change		0471-2326264		environmentdirectorate@gmail.com
			Harithakeralam Mission		0471-2449939		harithakeralamgok@gmail.com
2	Information on water bodies such as lakes & ponds		**Type of Water Body**	**Total No. of Water Bodies Identified**	**Ownership of Identified Water Bodies (Indicate No. of Water Bodies)**		**Status On-going Restoration of Water Bodies with Financial Support from NRCD/MoJS/with own resources of the State/UT**
					Government	**Private/ Individual**	**Total No. of Water Bodies Selected for Restoration** / **Total No. of Water Bodies restored so far** / **Total No. of Water Bodies presently under restoration**
			Lakes				
			Ponds	**ANNEXURE A**			
3	Whether water bodies are geo-tagged/ provided with Unique Identification Number (UIN)	**:**	Yes/No 40,000 ponds were identified by Irrigation Design and Research Board (IDRB) for which Unique Identification No. has been marked.				
4	Major causes of pollution in identified water bodies	**:**	Improper disposal of Sewage /Industrial Effluent/Waste like Municipal Solid Waste/Hazardous Waste/Plastic waste/Construction & Demolition Waste) (Pl. put √ whichever is correct) Field survey is envisaged with the participation of all concerned departments/ agencies				

<table>
<tr><td>5</td><td>Other Problems Associated with the Identified Water Bodies</td><td>:</td><td>Silting/Weeding/Encroachments/No Provision of inflow or outflow control measures/ Poor Embankment/Poor Watershed Management in Catchment/No Adequate Buffer Zone/Any other)
(Pl. put √ whichever is correct)
Field survey is envisaged with the participation of all concerned departments/ agencies</td></tr>
<tr><td>6</td><td>Water Quality Compliance Status of Identified lakes, and ponds in the State/UT</td><td>:</td><td>
<table>
<tr><th rowspan="2">Type of Water body</th><th rowspan="2">No. of identified water bodies</th><th rowspan="2">No. of Water Quality Monitoring Stations</th><th colspan="3">No. of Water Bodies complying to</th></tr>
<tr><th>Primary Water Quality Criteria for Bathing</th><th>Drinking Water Quality Criteria after Conventional Treatment</th><th>Water Quality Criteria for Agriculture/ Fishing/Any other criteria</th></tr>
<tr><td>Lakes</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Ponds</td><td colspan="5">ANNEXURE B</td></tr>
</table>
</td></tr>
<tr><td>7</td><td>Proposed Water Body-wise Action Plans for restoration of prioritised water bodies with timelines and implementing agencies</td><td>:</td><td>(Pl. attach water body-wise details as per Annexure-I)
Field survey is envisaged with the participation of all concerned departments/ agencies and check whether they have been included in the already rejuvenated ponds/lakes by different departments. If it is not included, immediate action will be initiated to rejuvenate by incorporating the concerned Departments. It may kindly be noted that different departments are already engaged in restoration of water bodies at their own level, a line of action in co-ordination & unique identification of ponds/lakes which are abundant in the state of Kerala is needed. Common action plan was prepared in co-ordination with various departments and was submitted to CPCB.</td></tr>
<tr><td>8</td><td>Any other relevant information</td><td>:</td><td>As the State is under lockdown due to COVID-19 the offices, excluding those offering essential services, are not functioning in full swing. Once the situation improves field survey will be done with the participation of all concerned departments/ agencies and waterbody-wise action plan will be prepared.</td></tr>
</table>

Date: Signature of the Designated Officer with Date and Seal

Annexure-I

(Pl. Provide Following Details Water Body-Wise)

NB: As the State is under lockdown due to COVID-19 the offices, excluding those offering essential services, are not functioning in full swing. Once the situation improves field survey will be done with the participation of all concerned departments/ agencies and waterbody-wise action plan will be prepared. It may kindly be noted that only after field survey the data asked below can be furnished.

1	Location details of the Water Body (Address with GPS location)	**:**	
2	Details of Area and Dimensions of the Water Body	**:**	
3	Water Depth (in m) (During monsoon and non-monsoon period)	**:**	
4	Ownership of the water body	**:**	
5	Allocated Unique Identification Number (UIN)	**:**	
6	Details on Habitat (Surrounding Areas/towns with population and no. of industries in the surrounding area /industrial estates in the catchment of pond or lake)	**:**	
7	Details on inflow/outflow, evaporation, flooding frequency, magnitude of flow into the water body	**:**	
8	Major Plant and Animal communities present in the water body	**:**	
9	Designated Use of Pond or Lake(Drinking/Irrigation/Aqua Culture/Tourism/ Protected Bio-diversity	**:**	
10	Major Drains outfall into Water Body	**:**	
11	Physical condition of the water Body	**:**	
12	Water Quality of Water Body	**:**	**(w.r.t** pH, Temperature, Turbidity; BOD, COD, DO, Salinity; Dissolved Gases; Dissolved or Suspended Nutrients; Dissolved Organic Carbon; Conductivity, Heavy Metals and Faecal Coliform)

11	Proposed Action Plans with action-wise implementing agency, estimated cost and timelines for completion							
12	Status of Sewage Management in the Catchment area	:	Total sewage inflow into the water body (in MLD)	Existing Sewage Treatment Capacity (in MLD)	Gap in sewage treatment (in MLD)	Proposed No. of Treatment Facilities	Proposed Sewage Treatment Capacity (in MLD)	Implementing Agency, Estimated Cost and Time lines for completion
13	Status of Industrial Effluent Management in the Catchment area	:	Total Industrial Effluent Inflow into the waterbody (in MLD)	Existing Industrial Effluent Treatment Capacity (both captive and CETPs) (in MLD)	Gap in Industrial Effluent Treatment (in MLD)	Proposed No. of Treatment Facilities	Proposed Treatment Capacity (in MLD)	Implementing Agency, Estimated Cost and Time lines for completion
14	Waste Management in the Catchment area of water body	:	Type of waste	Quantity of Waste Generation in the catchment area (TPD)	No. of Treatment and disposal Facilities and Capacity in the catchment	Gap in Treatment and Disposal of Wastein the catchment area	Proposed No. of Facilities and their (in TPD)	Implementing Agency, Estimated Cost and Time lines for completion

					area (in TPD)	(in TPD)			
			MSW						
			HW						
			BMW						
			C & D						
			Plastic						
15	Additional Measures (Pl. indicate action-wise implementing agency, estimated cost and the timelines for completion)		I & D of Sewage/Industrial effluent from drains to the nearby treatment or upcoming facilities; Restoration of natural drains: Silt control measures in natural drains contributing to inflow; Inflow and outflow flood control provisions (with sluice gates as well as constructed wetlands on u/s): Strengthening of Earthen embankment surrounding the pond or lake with stone revetment or pitching); In-situ measures (like desilting, de-weeding, surface aeration, floating adoption of biological treatment options); Buffer Zone and Development of Bio-diversity Park; Recreational Provision, Training and Awareness Programme; Public Participation for Cleaning of surroundings, any other actions					

The state has 44 rivers, 27 backwaters (mostly in the form of lakes and ocean inlets) and 41036 ponds. 40,000 ponds were identified by Irrigation Design and Research Board (IDRB) for which Unique Identification No. has been marked. Kerala State Pollution Control Board (KSPCB), with GIS Specialization, marked the ponds in all the 14 districts of Kerala. Field survey is envisaged with the participation of all concerned departments/ agencies and check whether they have been included in the already rejuvenated ponds/lakes by different departments. If it is not included, immediate action will be initiated to rejuvenate by incorporating the concerned Departments. It may kindly be noted that different departments are already engaged in restoration of water bodies at their own level, a line of action in co-ordination & unique identification of ponds/lakes which are abundant in the state of Kerala is needed.

The Government of Kerala takes progressive steps to rejuvenate the water bodies periodically as well as amend the required acts from time to time. 41036 no. of ponds are being maintained by Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Department of Soil Survey and Soil Conservation, Directorate of urban affairs/Panchayats and Haritha Keralam Mission. The details are as given below:-

Department	**No./length of water bodies rejuvenated in the past five years**
Haritha Keralam Mission	390 km long rivers, 34289 km long streams,
Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)	7852
Irrigation Department (under Haritha Keralam Mission)	704
Department of Soil Survey and Soil Conservation	291

3.1. Haritha Keralam Mission

a. Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)

Regeneration of water bodies is one of the main objectives of Haritha Keralam Mission. Dumping of waste materials, particularly waste materials of construction is the main reason for the pollution of water bodies. Not only rivers but also groundwater also gets affected by this contamination. Regeneration of a no. of of rivers and streams becomes happen in various parts of the state with the support and leadership of Local Self Government institutions by exploring the possibilities of Mahatma Gandhi National Rural Employment Guarantee Programme workers. As part of these activities, 390 km long rivers and 34289 km long streams have been revived.

b. Ini Njan Ozhukatte

On 8th December 2018, in connection with the second anniversary of the Haritha Keralam Mission, a river regeneration program was organized with people participation as 'Ellarum Jaashayangalilekku' and cleaned up 137 water springs covering a distance of 210 km from various local bodies. The programme has also decided that all local bodies should select at least one water stream for this drive.

The main reason our rivers are polluted is that their streams and flow into them become polluted. Therefore, the streams must be cleaned to avoid pollution. As part of 3rd anniversary of Haritha Kerala Mission, any one of the day between December 14 to 22, 2019, it was recommended to opt for one-day cleaning drive as part of this program.

HARITHAKERALAM MISSION - WATER SUB DIVISION
"LET ME FLOW" CAMPAIGN
2019 DECEMBER

SL. NO.	DISTRICT	LOCAL SELF GOVERNMENT INSTITUTES	DETAILS OF DRAINS		PARTICIPATION
			NOS.	TOTAL LENGTH (IN KM)	
1	Thiruvananthapuram	78	115	118	20278
2	Kollam	73	72	260.72	27827
3	Pathanamthitta	57	65	179.15	7000
4	Alappuzha	78	80	80	4500
5	Kottayam	77	51	186.25	15800
6	Idukki	54	49	130	2500
7	Ernakulam	96	68	120.4	2000
8	Thrissur	94	63	127.531	9000
9	Palakkad	95	95	100	2500
10	Malappuram	106	83	71.8302	800
11	Kozhikkode	78	98	225.272	21590
12	Wayanad	26	28	78.65	4000
13	Kannur	81	89	286.69	28000
14	Kasargod	41	50	70	16500
	TOTAL	**1034**	**1006**	**2034.4932**	**162295**

c. Kerala Water Summit: Jalasangamam (29th - 31st May 2019)

"Navakeralam Karma Padhathi (action to build a new Kerala)", comes as an array of comprehensive development programmes addressing four key areas of human life. The four Missions include Haritha Keralam, LIFE, AARDRAM and Public Education Improvement Yagnam.

Haritha Keralam Mission includes activities related to waste management, rejuvenation of agriculture and water resources. These three sectors are selected as sub-missions since they are closely interlinked. Aim of the sub-mission water resources is to rejuvenate the water bodies in the State to ensure water availability during summer and to keep them free from pollution. The Mission has drawn up plans based on micro watershed approach under the local self-government institutions. The Mission has initiated cleaning and rejuvenation of rivers, ponds and streams with public participation winning national awards. There are successful models in water conservation across the country and within the State. Showcasing successful models and addressing sustainability challenges was the aim of this summit

3.2. Irrigation Department

It was decided to take necessary action for achieving effective and scientific planning and utilization of the water resource, for collecting data regarding the water resource availability in different regions and to prepare the water budget. To determine the water storage capacity and its utilization in ponds and lakes for which restoration is undertaken by the Irrigation Department, the installation of water level scales were decided.

a. Minor irrigation Class 1 and Class 2

Minor Irrigation schemes are divided into Class-I and Class-II depending on the ayacut served. Schemes serving above 50Ha up to 2000Ha are classified as MI Class-I. Lift irrigation schemes are also Minor irrigation schemes serving at least 40Ha.

MI Class-I schemes: Minor works like improvements to tanks and rivulet, construction of check dams, sluices, regulators, bunds, vented crossbars, salt water barriers, layout of channels and drainage structures, etc., are usually undertaken under MI Class-I schemes.

MI Class-II schemes: Minor irrigation works including construction of vented cross bars, canals, improvements to natural drains, etc., are taken up under this scheme.

b. Renovation of tanks and Ponds

Ponds and tanks are the local source of water in many villages of the state. Kerala acquire 18681 number of public ponds. Irrigation department has been taking up renovation of ponds and water bodies in Kerala through de silting, repairing of sluices and constructing retaining structures, its inlet and outlet arrangements. Projects with financial support in the State budget are grouped in this category. Maintenance of projects and works taken up with budget support under Lump sum provisions for routine works are not included in this category.

Ponds are recognized as having at least four functions in irrigation-agriculture-water conservation, flood control and protection of ecology of the surrounding area. Renovation of ponds is proposed to improve ground water storage capacity, improvement in agricultural production, livestock, fisheries and human use.

3.3. Department of Soil Survey and Soil Conservation

a. Soil and Water Conservation on Watershed Basis – RIDF (NABARD assisted)

The Department has been implementing infrastructure development projects availing assistance under the Rural Infrastructure Development Fund of NABARD with a view to create required infrastructure backup for land development under various projects. Watershed based projects and projects for drainage protection and flood control are taken up under this sector. The main objective of the scheme is to bring improved and sustainable agricultural

productivity in identified watershed area by adopting scientific soil and water conservation activities.

Currently, the Department is implementing two types of Projects viz. Soil and Water Conservation Projects on Watershed basis and Drainage and Flood Prone Area Protection Schemes. Stone pitched Contour bunds, Graded bunds, Moisture Conservation Pits, Contour/ Staggered/ Bit Trenches for rain water harvesting, Side pitching, Water Harvesting Structures, Farm ponds, Dug out Ponds Retaining Wall, Check Dams, Agrostology measures, Live Fencing, Agro forestry etc are the major Soil and Water Conservation interventions taken up under the Watershed Projects. Proper blends of these measures are adopted for achieving aforesaid objectives pertaining to individual Projects.

b. Rashtriya Krishi Vikas Yogana (RKVY)

The State Level Sanctioning Committee of RKVY for 2014-15 had approved the projects for Mitigation of drought in Mullankolly and Pulpally panchayat in Wayanad District for an amount of Rs.200.40 lakhs and that of Poothadi panchayat in Wayanad District for Rs.123.70 lakhs as per NMSA norms. The interventions proposed under the project is construction of water harvesting structures and farm ponds. The Department has completed construction of 40 farm ponds and 18 water harvesting structures utilizing the fund of Rs. 168.23 lakhs released to the department.

c. Soil Conservation activities under Kuttanad Package

In order to mitigate agrarian distress in the fragile ecosystems of Kuttanad, Upper Kuttanad and Onattukara region and to sustain and restore ecological stability, this programme was introduced as a part of the Kuttanad Package funded by 13th Finance Commission of GOI. The Project gives emphasis for various water conservation activities aimed at ensuring potable

water for domestic use and irrigation purposes. The various activities devised under the programme include renovation of wells , ponds , well curbing planting of vettiver, supply of medicinal and horticultural plants, etc.

Administrative sanction was received for an amount of Rs.15.25 crore as the 1st phase and for an amount of Rs.25.20 crore as the 2nd phase. An additional amount of Rs. 1.52 crore was also sanctioned to the Department for implementing the ongoing eco-restoration activities. Out of the administrative sanction of Rs 41.97 crore, only an amount of Rs. 29.48 crore was released for implementation of the project.

Utilizing the fund received, the Department has implemented various activities aimed for the mitigation of agrarian distress in the region through eco-restoration in the districts of Alappuzha, Kottayam and Pathanamthitta. Renovation of 204 ponds has been carried out in the districts which have augmented ground water regime. 3258 number of wells have been renovated by constructing parapet walls that has helped in ensuring hygienic water for domestic use and irrigation purpose. 24728 meter of vettiver planting has been undertaken and 71601 nos of seedlings of medicinal plants and fruit trees have been distributed to the beneficiaries in the project area as part of eco restoration.

3.4. Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)

Renovation of traditional Water Bodies including desilting of irrigation tanks and other water bodies is a permissible activity under the Mahatma Gandhi NREG Act. During the Financial Year 2018-19 16354 works were undertaken under this category and an amount of Rs.12594 lakh has been expended. During the Financial Year 2019-20 12426 works has been undertaken till now and an amount of Rs. 5688 lakh is expended. The District

wise details of Public Works relating to Traditional Water Bodies under taken under Mahatma Gandhi NREGS during 2018-19 & 2019-20 is furnished below.

Renovation of traditional water bodies 2018-19					
Sl. No.	District	Nos. & Expenditure (In Lakhs)			
		Completed works	Expenditure	Ongoing works	Expenditure
1	ALAPPUZHA	785	751.57	879	1007.96
2	ERNAKULAM	869	677.41	942	502.25
3	IDUKKI	255	163.99	616	509.13
4	KANNUR	229	137.83	450	252.68
5	KASARGOD	125	157.32	231	74.71
6	KOLLAM	245	145.21	379	337.18
7	KOTTAYAM	411	401.16	1014	723.56
8	KOZHIKODE	133	196.54	344	209.11
9	MALAPPURAM	281	300.99	800	491.63
10	PALAKKAD	1094	959.58	1776	1201.9
11	PATHANAMTHITTA	278	290.64	601	377.5
12	THIRUVANANTHAPURAM	960	590.41	848	685.12
13	THRISSUR	509	405.69	935	779.43
14	WAYANAD	36	16.08	299	247.4
	Total	6210	5194.42	10114	7399.56

Renovation of traditional water bodies 2019-20					
Sl. No.	District	Nos. & Expenditure (In Lakhs)			
		Completed works	Expenditure	Ongoing works	Expenditure
1	ALAPPUZHA	90	22.96	1056	671.35
2	ERNAKULAM	144	52.97	1045	364.08
3	IDUKKI	130	14.64	570	155.58
4	KANNUR	29	12.31	572	228.95
5	KASARGOD	61	9.16	342	150.38
6	KOLLAM	30	6.26	430	174.49
7	KOTTAYAM	209	40.09	919	482.28
8	KOZHIKODE	55	20.13	354	184.29
9	MALAPPURAM	108	36.46	962	559.08
10	PALAKKAD	375	124.13	1565	983.98
11	PATHANAMTHITTA	104	12.56	589	198.99

12	THIRUVANANTHAPURAM	209	54.06	940	412.74
13	THRISSUR	93	16.77	928	253.35
14	WAYANAD	5	0	512	445.63
	Total	1642	422.5	10784	5265.17

3.5 Ayyankali Urban Employment Guarantee Scheme

Like MGNREGS, Ayyankali Urban Employment Guarantee Scheme is being implemented successfully for the preservation of water bodies in Urban Local Bodies in Kerala .

Under AUEGS , Urban Local Bodies are permitted to undertake the works like preservation of pond, renovation of canals , cleaning of water bodies , rain water harvesting, minor irrigation , gully plugging , rain water pit , well recharging etc.

The details of renovation of water bodies in Kerala under AUEGS in the last 4 years are as following

AYYANKALI URBAN EMPLOYMENT GUARANTEE SCHEME-

WATER CONSERVATION DETAILS FROM 2016-17 TO 2019-20

	Streams		Ponds		Canals	
	Number	Amount	Number	Amount	Number	Amount

		in lakh		in lakh		in lakh
2019-20	2549	308.60	625	166.62	133	47.33
2018-19	1089	61.06	241	324.13	265	94.66
2017-18	2178	1221.25	482	648.26	530	189.32
2016-17	622	407.08	657	64.82	119	45.21
TOTAL	**6438**	**2547.58**	**2005**	**1203.84**	**1047**	**376.51**

3.6 KERALA LAND DEVELOPMENT CORPORATION

KLDC was incorporated under the administrative control off the Agriculture Department in 1972 with the objectives of promoting, undertaking and executing infrastructural development works in Kerala for land development, flood control, drainage, irrigation, prevention of salt water intrusion and water logging etc.

The Corporation has ongoing projects under RIDF aided by NABARD, RKVY, Plan fund works of Agriculture Department, RKI, NRHM, Social Justice Department, works entrusted by Schedule Cast Department, Department of Museum & Zoo, Tourism Department, MP&MLA local area development scheme etc. At present the Corporation has projects costing around Rs.500 crore including ongoing and newly sanctioned project.

Renovation of Ponds

The Corporation's new "Sahasra Sarovar Project" which means thousand pond renovation projects not only facilitates irrigation but also serve to the growing needs of fresh water preservation, ground water recharge, and moreover conserving the culture of the society. Many ponds as big as 14 acres or more were completed through this project. About 80 no. of ponds are renovated and renovations of 30 nos. are in progress. All the ponds are well maintained after the completion of the project by the beneficiaries and local bodies through the Department of Agriculture.

Major Projects

1. **Thrissur Ponnai Kole Development Project**

   This is a three phased project spanning area 13500 hectare of kole fields of Thrissur and Malappuram district with an outlay of 22,000 lakh. Paddy cultivation has enhanced from the previous 3 to 4 t/ha to 7 to 8 t/ha through this project. This project will also conserve the Biodiversity of the kole, enhance the ground water availability and conservation of water.

2. **Onattukara Drainage and flood protection**

   Onattukara in Kuttanadu is a major rice producing area of Kerala. This project will benefit an area of 5194 hectare and 5400 farmers. Total outlay for the project is 22.18 crores.

3. **Improvement works of Nooradithodu Canal and Valiathodu**

   The project will benefit an area of 4560 hectare and the total outlay is 54.37 crores, The project will improve the drainage facility of the area prevent flooding and increase ground water recharge.

KLDC has several project in major granaries of the state ie. Kuttanad, Palakkad, Kole lands of Thrissur and Ponnani, Pokkali, Kaipad etc. In addition to this KLDC is executing projects in other major padasekharams in the state. The projects not only increase agriculture production but also are useful for ground water recharge, water conservation, prevention of salt water instruction, flood control, pollution control and conserve the Biodiversity and Ecosystem.

The state has 44 rivers, 27 backwaters (mostly in the form of lakes and ocean inlets) and 41036 ponds. Field survey is envisaged with the participation of all concerned departments/ agencies and check whether they have been included in the already rejuvenated ponds/lakes by different departments. If it is not included, immediate action will be initiated to rejuvenate by incorporating the concerned Departments. It may kindly be noted that different departments are already engaged in restoration of water bodies at their own level, a line of action in co-ordination & unique identification of ponds/lakes which are abundant in the state of Kerala is needed. Sampling is proposed to check the quality of pond water. As per the analysis report under NWMP of 3 fresh water lake stations and 8 estuarine lake stations, the quality of water is in class A, B, C and below E and that of 2 ponds is in class B.

Alappuzha

76°12'0"E
76°24'0"E
76°36'0"E
9°50'0"N
9°40'0"N
9°30'0"N
9°20'0"N
9°10'0"N

N

Aroor
Arukutty
Kumbalangy
Perumpalam
Ezhupunna
Chellanam
Ezhupunna Pazhayally
Kodamthuruthu
Kuthiyathodu
Thaikattussery
Thuravoor
Chennam Pallipuram
Rattanakkeri
Vayalar
Kadakkarapalli
Cherthala (M)
Kannoermukkam
Cherthala South
Mararikulam North
Kanjikkuzhi
Muhamma
Mannancherry
Mararikulam South
Aryad
Kumarakom
Kainakari Kumarakom
Kainakari Kavalam
Kainakari
Alappuzha(M)
Kainakari
Punnapra North
Punnapra South
Nedumudi
Ambalappuzha North
Ambalappuzha South
Thakazhi
Purakkad
Cheruthana
Karuvatta
Veeyapuram
Mannar
Harippad(M)
Chennithala Thripperumthura
Thrikkunnapuzha
Kumarapuram
Pallipad
Karthikapally
Chingoli
Cheppad
Muthukulam
Arattupuzha
Pathiyoor
Arattupuzha
Karuvallor
Kayamkulam(M)
Devikulangara
Krishnapuram
Alappad
Clappana
Kulasekharapuram
Thazhava
Niranam
Kavalam
Neelamperoor
Pulinkunnu
Veliyanad
Ramankari
Champakkulam
Muttar
Edathwa
Thalavadi
Kadapra
Thiruvanvandoor
Pandanadu
Chengannur(M)
Budhannur
Puliyoor
Cheriyanad
Ala
Mezhuveli
Mulakuzha
Kulanada
Venmony
Mavelikkara(M)
Thazhakkara
Pandalam(M)
Mavelikkara Thekkekara
Chettikulangara
Nooranadu
Chunakkara
Bharanikavu
Palamel
Mavelikkara Thamarakulam
Pallikkal
Vallikunnam
Ochira
Thazhava
Sooranadu North

Legend

- Location of Ponds

0 2.25 4.5 9 13.5 18
Kilometers

Ernakulam

76°12'0"E 76°24'0"E 76°36'0"E 76°48'0"E

10°10'0"N 10°0'0"N 9°50'0"N

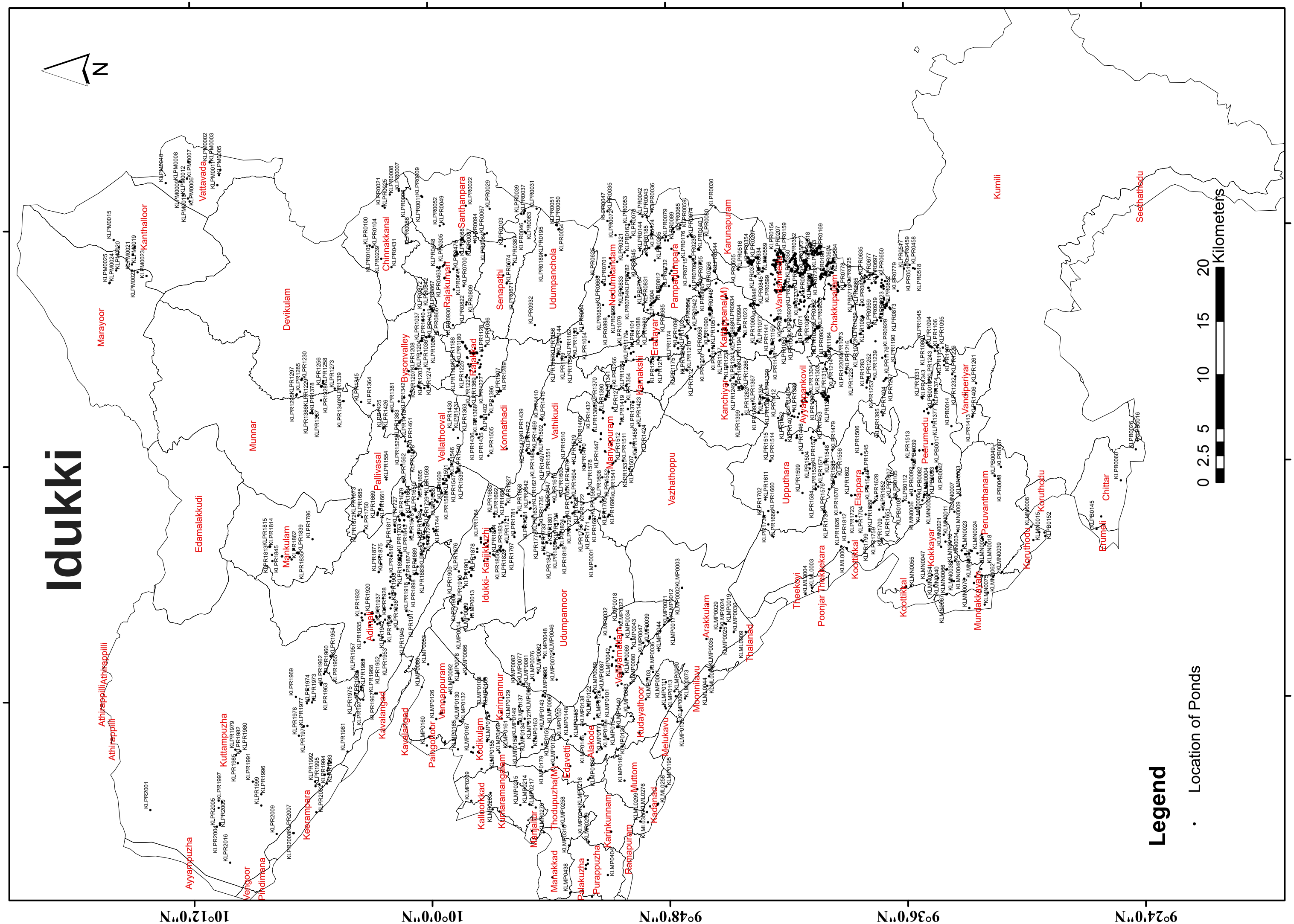
Meloor
Koratty
Koratty
Karukutty
Koratty
Mookkannoor
Ayyampuzha
Annamanada
Manjapra
Malayattoor Neeleeswaram
Parakkadavu
Thuravoor
Kodungalloor(M)
Kuzhur
Angamali(M)
Kalady
Eriyad
Vadakkekara
Puthenvelikara
Kuzhur
Chendamangalam
Koovappady
Nedumbassery
Chittattukara
Kunnukara
Okkal
Vengoor
Pallippuram
North Paravoor(M)
Kanjoor
Mudakkuzha
Karumaloor
Chengamanadu
Sreemoolanagaram
Kottappady
Kuzhuppilly
Ezhikkara
Kottuvally
Perumbavoor(M)
Pindimana
Alangad
Aluva(M)
Vazhakkulam
Kadungalloor
Keezhmadu
Keerampara
Asamannoor
Edavanad
Rayamangalam
Choornikkara
Vengola
Kothamangalam(M)
Varapuzha
Eloor(M)
Edathala
Nellikuzhy
Nayarambalam
Cheranalloor
Kalamasseri(M)
Kizhakkambalam
Kavalangad
Kadamakkudy
Thrikkakkara(M)
Kunnathunad
Mazhuvannur
Payipra
Varapetty
Njarakkal
Pallarimangalam
Vannappuram
Idukki- Kanjikkuzhi
Mulavukadu
Mulavukadu
Pothanikkad
Paingottoor
Elamkunnapuzha
Mulavukadu
Kochi(C)
Vadavucode Puthenkurisu
Aikkaranadu
Muvattupuzha(M)
Ayavana
Kodikulam
Valakom
Kunnarmangalam
Thripunithura(M)
Pothrika
Kalloorkkad
Avoly
Kochi(C)
Thiruvaniyoor
Marady
Manjallur
Marad(M)
Ramamangalam
Arakkuzha
Kochi(C)
Chottanikkara
Pampakkuda
Manakkad
Kumbalam
Kumbalam
Maheedu
Thirumaradi
Mulanthuruthy
Udayamperoor
Palakuzha
Kuttamassery
Piravom(M)
Koothattukulam(M)
Edakkattuvayal
Chellanam
Velliyanmoor
Amballur
Perumpalam
Velloor
Mulakulam
Elanji
Velliyannoor
Chempu
Chempu
Velloor
Uzhavoor
Njeezhoor

Legend

- Location of Ponds

0 1.75 3.5 7 10.5 14 Kilometers

Idukki


N
Kilometers
0 2.5 5 10 15 20
Legend
Location of Ponds
77°0'0"E
77°12'0"E
76°48'0"E
9°24'0"N
9°36'0"N
9°48'0"N
10°0'0"N
10°12'0"N
Marayoor
Devikulam
Munnar
Edamalakkudi
Vattavada
Kanthalloor
Chinnakkanal
Santhanpara
Rajakumari
Rajakkad
Senapathi
Udumpanchola
Nedumkandam
Pampadumpara
Karunapuram
Vandanmedu
Kamakshi
Eraiyar
Kanchiyar
Kattappanai(M)
Ayyappankovil
Chakkupallam
Vathikudi
Konnathadi
Vellathooval
Bysonvalley
Pallivasal
Marippuram
Kumili
Seethathodu
Elappara
Peerumedu
Kokkayar
Peruvanthanam
Kuttampuzha
Kesrampara
Vengoor
Pindimana
Ayyampuzha
Athirappilli
Kavalangad
Pampakkuda
Vengalloor
Kalloorkkad
Kurumaramangalam
Karimannur
Kodikulam
Manjallor
Thodupuzha(M)
Edayavetti
Alakode
Purappuzha
Karinkunnam
Manakkad
Palakuzha
Ranapuram
Muttom
Kadanad
Melukavu
Moonnilavu
Udayathoor
Udumpannoor
Idukki- Kanjikuzhi
Vazhathoppu
Arakkulam
Thalanad
Theekoyi
Poonjar Thekkekara
Upputhara
Kodithookal
Kodithokkal
Koruthodu
Mundakkayam
Erumeli
Chittar

75°15'0"E
75°30'0"E
75°45'0"E
76°0'0"E
12°15'0"N
12°0'0"N
11°45'0"N

KANNUR

N

East Eleri
Cherupuzha
Kayyur-Chimeni
Udayagiri
Peringom-Vayakkara
Karivellur-Peralam
Kankole Alapadamba
Pilicode
Alakode
Eramam-Kuttoor
Thrikkaripur
Naduvil
Payyannur(M)
Chapparapadavu
Kadannapalli-Panapuzha
Eruvessi
Payyavoor
Ulikkal
Kunjimangalam
Pariyaram
Cheruthazham
Chengalayi
Sreekandapuram(M)
Ayyankunnu
Valiyaparamba
Ramanthali
Kurumathur
Ezhome
Madayi
Thaliparambu(M)
Pattuvam
Malapattom
Payam
Padiyoor
Cherukunnu
Irikkur
Anthoor(M)
Mayyil
Kannapuram
Matool
Kalyasseri
Kuttiatoor
Koodali
Koracheri
Pappinisseri
Neruvil
Irritty(M)
Aralam
Muzhakkunnu
Mattannoor(M)
Thillankeri
Valapattanam
Azheekkode
Chirakkal
Munderi
Keezhalloor
Peravoor
Malur
Anjarakandi
Kelakom
Kottiyoor
Kannur(S)
Chembilod
Mangattidam
Kanichar
Thavinjal
Vengad
Ghittariparambu
Peralasseri
Kolayad
Kadamboor
Muthuparambu(M)
Kottayam
Pattiom
Thondernadu
Vanimal
Pinarayi
Muzhuppilangad
Dharmadom
Eranjoli
Kathiroor
Mokeri
Thriprangottur
Thalassery(M)
Kunnothuparambu
Cheekkyad
Panniyannoor
Panoor(M)
Thalasseri(M)
Mahe
Chokli
Edacheri
New Mahe
Azhiyur
Eramala

Legend

- Location of Ponds

0 2.25 4.5 9 13.5 18
Kilometers

Kasargod

75°0'0"E

75°15'0"E

12°45'0"N

12°30'0"N

12°15'0"N

12°0'0"N

Vorkady

Manjeswaram

Meencha

Paivalike

Mangalpady

Puthige

Kumbala

Enmakaje

Badiyaduka

Kumbadaje

Karaduka

Madhur

Mogral Puthur

Chengala

Delampadi

Muliyar

Kasaragod(M)

Chemmanad

Bedadka

Kuttikol

Uduma

Pallikkara

Pullur-Periya

Kallar

Pananthadi

Balal

Ajanur

Kodom-Belur

Beloor

West Eleri

East Eleri

Madikai

Kinanur-Karindalam

Kanjangad(M)

Nileswaram(M)

Kayyur-Chimeni

Peringom-Vayakkara

Cherupuzha

Cheruvathur

Kankole Alapadamba

Karivalloor-Peralam

Pilicode

Valiyaparampa

Padanna

Thrikkaripur

Legend

- Location of Ponds

0 2.25 4.5 9 13.5 18 Kilometers

76°36'0"E 76°48'0"E 77°0'0"E 77°12'0"E

9°30'0"N 9°20'0"N 9°10'0"N 9°0'0"N 8°50'0"N 8°40'0"N 8°30'0"N

N

Kollam

Clappana
Thazhava
Sooranadu North
Kunnathur
Pattazhi Vadakkekkara
Pathanapuram
Piravanthoor
Pattazhi
Thalavoor
Kulakkada
Mylam
Sasthamkotta
Thenmala
Aryankavu
Panmana
West Kallada
Neduvathoor
Punaloor(M)
Thevalakkara
East Kallada
Melila
Muntrothuruthu
Kottarakkara(M)
Karavaloor
Anchal
Panayam
Perayam
Kundara
Perinadu
Umayanmoor
Chavara
Kareepra
Eroor
Thekkumbhagam
Neendakara
Thrikkaruva
Veliyam
Edamulakkal
Rooyappalli
Alayamon
Ittiva
Kulathupuzha
Kollam(C)
Velinalloor
Chadayamangalam
Mayyanad
Adichanalloor
Nilamel
Pallikkal
Paravoor(M)
Madavoor
Chithara
Kummil
Kalluvathukkal
Poothakulam
Elakamon
Pazhayakunnummel

Legend

· Location of Ponds

0 2.5 5 10 15 20
Kilometers

Kottayam

76°24'0"E
76°36'0"E
76°48'0"E
77°0'0"E
9°50'0"N
9°40'0"N
9°30'0"N

Piravom(M)
Kootheattukulam(M)
Edakkattuvayal
Ambalur
Elanji
Veliyannoor
Velloor
Chempu
Mulakulam
Elanji
Uzhavoor
Ramapuram
Muttom
Maravanthuruth
Nieezhoor
Kadanad
Udayanapuram
Thalayolaparambu
Marangattupilly
Melukavu
Chennam Pallipuram
Kaduthuruthy
Moonnilavu
Vaikom(M)
Kuravilangad
Karoor
Bharananganam
Manjoor
Kadaplamattam
Thalanad
Vaikam
Thalayazham
Kallara (Vaikom)
Pala(M)
Thalappalam
Kanakari
Theekoyi
Mutholi
Erattupetta(M)
Kidangoor
Meenachil
Neendoor
Athirampuzha
Ettumanoor(M)
Kozhuvanal
Poonjar
Poonjar Thekkekara
Arpookkara
Thidanad
Ayarkunnam
Akalakunnam
Koottikkal
Kokkayar
Aymanam
Elikkulam
Kumarakom
Kooroppada
Pallikkathodu
Parathodu
Thiruvarppu
Kottayam(M)
Pampadi
Kanjirapally
Kavalam
Puthupalli
Meenadam
Vazhoor
Chirakkadav
Panachikkad
Kavalam
Kavalam
Mundakkayam
Vakathanam
Kangazha
Nedumkunnam
Peruvanthanam
Kurichi
Karukachal
Vellavoor
Koruthodu
Neelamperoor
Madapally
Anikkad
Manimala
Erumeli
Kunnumthanam
Vazhappally
Kunnumthanam
Kunnumthanam
Kottangal
Kottangal
Ramni Angadi
Kuruli
Chittar
Changanassery(M)
Thrikodithanam
Kottanadu
Vechuchira
Kottanadu
Veliyanad
Payippad
Ramankari
Peringara
Thiruvalla(M)
Muttar
Vijayapuram
Manarkadu
Chittar

0 1.753.5 7 10.5 14
Kilometers

Legend

- Location of Ponds

75°45'0"E

76°0'0"E

11°45'0"N

11°30'0"N

11°15'0"N

Kozhikode

N

Kolayad
Thriprangottur
Thondernadu
Vanimal
Chekkyad
Valayam
Narippatta
New Mahe
Mahe
Thuneri
Panoor(M)
Kayakkodi
Kavilumpara
Padinjarathara
Azhiyur
Nadapuram
Kunnumma
Edacheri
Purameri
Onchiyam
Eramala
Kuttyadi
Maruthonkara
Ayancheri
Cherode
Vadakara(M)
Thiruvallur
Koothali
Cheruvannur
Perambra
Villiyappally
Velom
Changaroth
Chakkittapara
Maniyur
Koorachundu
Payyoli(M)
Meppayur
Nochad
Kayanna
Vythiri
Thikkodi
Keezhariyur
Arikkulam
Naduvannur
Kottur
Puthuppadi
Moodadi
Panangad
Kattipara
Koyilandi(M)
Ulliyeri
Balussery
Kodancheri
Unnikkulam
Chengottukavu
Nanmanda
Thamarassery
Chungathara
Atholi
Narikkuni
Kizhakkoth
Thiruvambadi
Chemancherry
Kakkur
Omassery
Thalakkulathur
Chelannur
Koduvalli(M)
Koodaranji
Madavoor
Kakkodi
Kuruvattur
Mukkam(M)
Karassery
Kunnamangalam
Chathamangalam
Urangattiri
Kodiyathur
Mavoor
Keezhuparambu
Kozhikkode(C)
Kunnamangalam
Peruvayal
Vazhakkad
Perumanna
Vazhayoor
Olavanna
Vazhayoor
Vazhayoor
Ramanattukara(M)
Feroke(M)
Chelambra
Kadalundi
Valiyangadi

Legend

- Location of Ponds

0 2.25 4.5 9 13.5 18

Kilometers

Malappuram

76°0'0"E
76°15'0"E
76°30'0"E
11°30'0"N
11°15'0"N
11°0'0"N
10°45'0"N

N

Munnainad
Meppadi
Meppadi
Pothukallu
Thiruvambadi
Chungathara
Edakkara
Vazhikkadavu
Chaliyar
Koodaranji
Mootheedam
Karulayi
Nilambur(M)
Kodiyathur
Mambadu
Urangattiri
Amarambalam
Kodiyathur
Mavoor
Keezhuparambu
Peruvayal
Vazhakkad
Perumanna
Areekkod
Edavanna
Chokkadu
Olavanna
Vazhayoor
Cheekkod
Wandoor
Puthur
Thiruvaali
Pulikkal
Kavanoor
Cherukavu
Muthuvallur
Kizhisseri
Ramanattukara(M)
Kalikavu
Feroke(M)
Thrikkalangod
Poroor
Chelambra
Pulpatta
Kadalundi
Kondotty(M)
Karuvarakundu
Kadalundi
Pallikkal
Morayoor
Thuvvoor
Vallikunnu
Thenjippalam
Manjeri(M)
Pandikkadu
Puthur
Pookkottur
Peruvalloor
Alanalloor
Kannamangalam
Munniyoor
Anakkayam
ARNagar
Oorakam
Malappuram(M)
Edappatta
Vengara
Kottilangadi
Keezhattur
Melattur
Alanalloor
Parappanangadi(M)
Thirurangadi(M)
Mankada
Parappur
Othukungal
Kodoor
Makkaraparambu
Vettathur
Nannambra
Thennala
Edarikkod
Pomala
Kuruva
Angadippuram
Thanur(M)
Perumannakkari
Kottakkal(M)
Puzhakkattiri
Thazhekkod
Thachanattukara
Ozhur
Perinthalmanna(M)
Pookkottumuri
Marakkara
Thanalur
Kalpakamcherry
Cheriyamundam
Pulamanthol
Aliparambu
Niramaruthoor
Valavannoor
Edayoor
Moorkanad
Nellaya
Thirur(M)
Athavanad
Elamkulam
Cherppulassery (M)
Vilayoor
Thalakkad
Valancherri(M)
Kulukkalloor
Thiruvengappura
Vettom
Thirunavaya
Thiruvengappura
Kimbiliyam
Kuttippuram
Thiruvengappura
Thriprangod
Thavanoor
Mangalam
Anakkara
Panthoor
Purathur
Kalady
Ponnani(M)
Edappal
Vattamkulam
Naranchery
Ananikod
Nanmanmukku
Kadavalloor
Kadavalloor
Perumpadappu
Kattakambal
Punnayoorkkulam
Punnayoorkkulam

Legend

- Location of Ponds

0 2.5 5 10 15 20
Kilometers

Palakkad

76°0'0"E 76°15'0"E 76°30'0"E 76°45'0"E 77°0'0"E

11°15'0"N 11°0'0"N 10°45'0"N 10°30'0"N

N

Legend

- Location of Ponds

0 3.5 7 14 21 28 Kilometers

Pathanamthitta

76°36'0"E
76°48'0"E
77°0'0"E
77°12'0"E
9°24'0"N
9°12'0"N
9°0'0"N

Kumili
Seethathodu
Chittar
Ranni Perunnadu
Erumeli
Ranni
Ranni Pazhavangadi
Ranni Angadi
Naranammoozhi
Vechuchira
Marayamala
Kottanadu
Ezhumattoor
Kallooppara
Mallappally
Kottangal
Kunnamthanam
Thrikodithanam
Payippad
Payippad
Kaviyoor
Puramattom
Peringara
Muttar
Thiruvalla(M)
Kuttoor
Kadapra
Niranam
Edathiwa
Thiruvanvandoor
Chengannur(M)
Mannar
Veeyapuram
Elanthoor
Mezhuveli
Mulakuzha
Venmony
Kurianad
Mulakuzha
Chenneerkara
Pathanamthitta(M)
Malayalappuzha
Mylapra
Naranganam
Malappuzhassery
Arannula
Vadasserikkara
Cherukol
Kozhenchery
Koipram
Thottapuzhassery
Aranmula
Pandalam
Pallikkode
Thumpamon
Pandanam(M)
Nooranadu
Pandalam Thekkekara
Palamel
Kodumon
Adoor(M)
Pallikkal
Enadimangalam
Ezhamkulam
Erathu
Sooranadu North
Poruvazhy
Kadampanadu
Kunnathur
Kulakkada
Pattazhi Vadakkekkara
Pathanapuram
Piravanthoor
Kalanjoor
Konni
Thannithode
Aruvappulam
Thenmala
Aryankavu

Legend

- Location of Ponds

0 2.25 4.5 9 13.5 18
Kilometers

76°0'0"E
76°12'0"E
76°24'0"E
76°36'0"E
76°48'0"E
10°36'0"N
10°24'0"N
10°12'0"N

Thrissur

N

Thirumittakode
Desamangalam
Vaniyamkulam
Alamkod
Nagalasseri
Kadavallur
Vallathol Nagar
Thirumittakode
Varavoor
Panjal
Thiruvilwamala
Peringottukurissi
Kondazhy
Perumpadappu
Kattakambal
Erumapetty
Mullookkara
Cherpukara
Mayur
Punnayurkkulam
Pookkulam
Kadangode
Vadakkancheri(M)
Chowannoor
Kunnamkulam(M)
Velloor
Puthuvakode
Punnayoor
Choondal
Thekkumkara
Pazhayannoor
Guruvayur(M)
Avanoor
Kannambra
Chavakkad(M)
Kandanasseri
Mullankunnathukavu
Thiloor
Kaiparambu
Kolazhy
Elavally
Madakkathara
Orumanayur
Kadappuram
Adat
Murasseri
Panancheri
Vadakkangu
Thrissur(C)
Nadathara
Engandiyoor
Manalpor
Arimpoor
Puttoor
Vadanappally
Avittissery
Thrikoor
Anthikkad
Paralam
Nellikkunnu
Thalikkulam
Nemmanikkara
Ollagappa Nagar
Varantharappilli
Chazhoor
Cherpu
Vellachira
Nattika
Thanniyam
Puthukkad
Valappad
Karalam
Irinjalakkuda(M)
Mattathoor
Kattur
Edathirutty
Muringad
Kodakara
Nelliyampathi
Kodassery
Kaipamangalam
Padiyoor
Aloor
Athirappilli
Velookkara
Chalakkudi(M)
Pariyaram
Poomangalam
Mathilakam
Vellangallur
Meloor
Karukutty
Ayyampuzha
Kuttampuzha
Kuttampuzha
Kuttampuzha
Kodungallur(M)
Kadukutty
Kuratty
Sreenarayanapuram
Mala
Puthenchira
Ayyanthole
Parakkadavu
Eriyad
Porkka
Kuzhur
Parakkadavu
Vadakkekara
Puthenvelikkara
Kunnukara

Legend

- Location of Ponds

0 2.25 4.5 9 13.5 18 Kilometers

76°48'0"E 77°0'0"E 77°12'0"E

9°0'0"N 8°50'0"N 8°40'0"N 8°30'0"N 8°20'0"N 8°10'0"N

N

Thiruvananthapuram

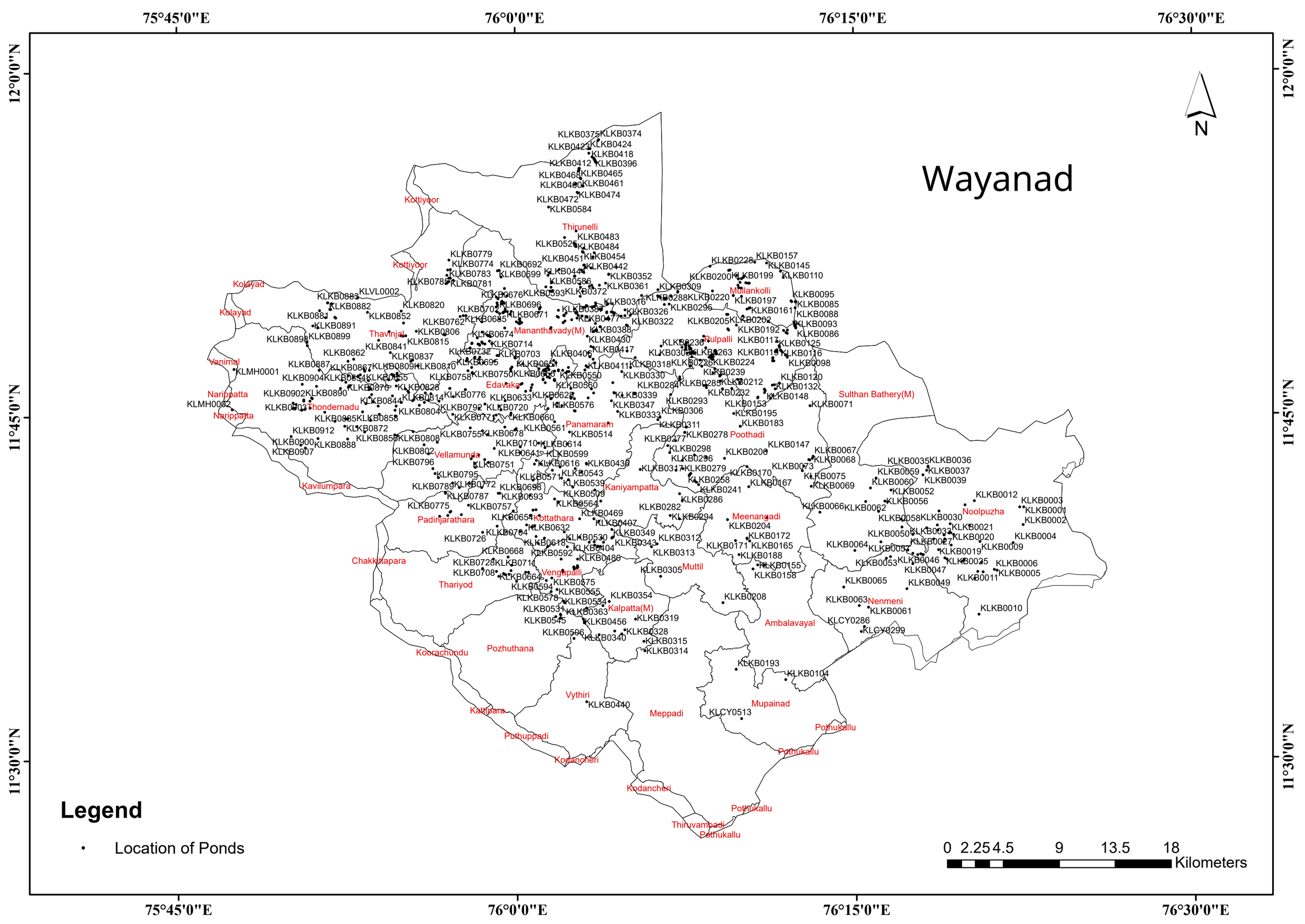
Pallikkal
Madavoor
Kalluvathukkal
Elakamon
Edava
Varkala(M)
Vettoor
Cherunniyoor
Manampoor
Vakkam
Anchuthengu
Mudakkal
Kadakkavoor
Chirayinkeezhu
Azhoor
Mangalapuram
Pothencodu
Andoorkonam
Kadinamkulam
Kilimanoor
Pazhayakunnummel
Pulimathu
Pangod
Ottoor
Vamanpuram
Kallara
Nellanadu
Pullampara
Manikkal
Vembayam
Aruvikkara
Vilappil
Thiruvananthapuram(C)
Malayinkeezhu
Maranalloor
Palichal
Kalliyoor
Balaramapuram
Kottukal
Neyyattinkara(M)
Kanjiramkulam
Poovar
Karumkulam
Kulathoor
Karode
Kunnathukal
Perumkadavila
Aryancodu
Vellarada
Amboori
Ottasekharamangalam
Poovachal
Kallikkad
Kuttichal
Aryanad
Uzhamalakkal
Nedumangad(M)
Vithura
Tholikkodu
Anad
Nanniyodu
Panavoor
Peringammala

Type your text

Legend

- Location of Ponds
- Trivandrum

0 2.25 4.5 9 13.5 18
Kilometers


75°45'0"E
76°0'0"E
76°15'0"E
76°30'0"E
12°0'0"N
11°45'0"N
11°30'0"N
N
Wayanad
Kottiyoor
Thirunelli
Kottiyoor
Kolayad
Kolayad
Mullankolli
Thavinjal
Mananthavady(M)
Pulpalli
Vanimal
Narippatta
Narippatta
Thondernadu
Edavaka
Sulthan Bathery(M)
Panamaram
Poothadi
Vellamunda
Kaniyampatta
Kavilumpara
Padinjarathara
Kottathara
Meenangadi
Noolpuzha
Chakkittapara
Vengapalli
Muttil
Thariyod
Kalpatta(M)
Nenmeni
Ambalavayal
Pozhuthana
Koorachundu
Vythiri
Mupainad
Meppadi
Kattipara
Puthuppadi
Pothukallu
Kodancheri
Kodancheri
Pothukallu
Pothukallu
Thiruvambadi
Pothukallu
Legend
Location of Ponds
0 2.25 4.5 9 13.5 18
Kilometers