



National River Conservation Directorate
Ministry of Jal Shakti,
Department of Water Resources,
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Government of India

Water Demand and Supply Report

Periyar River Basin



June 2025



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This report is a comprehensive outcome of the project jointly executed by IIT Palakkad (Lead Institute) and NIT Calicut (Fellow Institute) under the supervision of cGanga at IIT Kanpur. It was submitted to the National River Conservation Directorate (NRCD) in 2024. We gratefully acknowledge the individuals who provided information and photographs for this report.

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Preface

Water plays a fundamental role in sustaining life, supporting livelihoods, driving economic development, and maintaining ecological balance. In the context of the Periyar River Basin—one of Kerala’s most vital and heavily relied upon water systems—understanding the intricate patterns of water demand and supply is crucial for informed planning and sustainable management. As the basin experiences increasing pressure from population growth, rapid urbanization, agricultural intensification, and climate variability, the challenge of ensuring equitable, efficient, and long-term access to water resources becomes ever more pressing.

This report presents a comprehensive assessment of the water demand and supply dynamics within the Periyar River Basin, with a focus on domestic, agricultural, industrial, and environmental needs. Drawing on a combination of empirical data, spatial analysis, and stakeholder engagement, the study identifies critical supply-demand mismatches, assesses sectoral water use patterns, and projects future scenarios under varying conditions. Based on this integrated approach, the report proposes practical and policy-oriented recommendations aimed at strengthening water resource governance, improving infrastructure planning, and enhancing adaptive capacity at both regional and local levels.

We gratefully acknowledge the contributions of the many researchers, institutions, field experts, and community stakeholders who have supported the development of this report. Their collaborative insights and commitment to water sustainability have been instrumental in shaping a resource that is both technically robust and contextually grounded. As we look to the future, it is our hope that this report will serve not only as a knowledge base but also as a call to action—encouraging collective efforts toward the preservation, equitable use, and effective management of water resources in the Periyar River Basin for generations to come.

Centres for Periyar River Basin

Management Studies (cPeriyar)

IIT Palakkad & NIT Calicut

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1. Introduction

1.1 Background

Periyar River, the longest river in Kerala, originates from the Sivagiri hills of the Western Ghats in the Idukki district and flows westward for about 244 km before merging into the Vembanad Lake. The Periyar River Basin spans a diverse geographical area covering parts of Idukki, Ernakulam and Thrissur districts, encompassing forested highlands, agricultural midlands, and densely populated urban and industrial lowlands. Hydrologically, the basin receives substantial rainfall during the southwest monsoon but also experiences spatial and seasonal variability, influencing river flows and groundwater recharge. The basin is supported by several major reservoirs, including Idukki and Idamalayar, and is crucial for hydropower generation, irrigation, drinking water supply, and industrial use. The growing demands from expanding urban centres such as Kochi, emerging industrial corridors, and intensive agricultural areas have increased pressure on the region's water resources. Demographically, the basin includes both urban and rural populations with varying levels of water access and usage patterns. Major industrial zones, such as the Eloor-Edayar belt, further contribute to the complexity of water management in the region.

Population growth, urbanization, and climate change are aggravating water scarcity and water quality issues, threatening health, ecosystem conservation, and sustainability of economic development. Public intervention, particularly through demand management policies such as pricing, is necessary to moderate pressures on water resources and foster more efficient usage (Renteria & Barberan, 2021). In order to understand these pressures in the Periyar Basin more clearly, it is important to examine the different categories of water demand. Accurate water requirement/ demand estimates are very crucial for planning water supply schemes for various purposes in any area (Eigenplus, 2025). Water demand has traditionally been categorised into residential, commercial, industrial, agricultural, recreational and environmental. Domestic demand includes household activities such as cooking, washing and gardening. Agriculture demand includes water required for irrigation and livestock. Industrial demand encompasses water demand for cooling, manufacturing, and power generation. The water demand of warehouses, restaurants, business establishments, hotels etc. are grouped under commercial water demand. Recreational and environmental demand pertains to the water demand arising out of utility provision to consumers. Accurate estimation of water demand across these sectors is crucial for policymakers and researchers, especially while facing challenges posed by

projected climate change, conflicts over water resources, as well as for sustainable water management (Worthington, 2010). Water demand management is crucial for ensuring sustainable use of water resources, and requires a comprehensive approach to manage usage, reduce waste, and promote conservation for future generations (Number Analytics, 2025). In this context, a clear understanding of sector-wise water demands, available supply sources, and existing infrastructure is essential for sustainable and equitable water resource management.

1.2 Objectives

The objective of this report is to comprehensively assess the sector-wise water demand and supply scenario in the Periyar River Basin, covering domestic, industrial, and agricultural needs along with available water sources and infrastructure, to support sustainable water resource planning and management.

This includes:

1. Assess sector-wise water demand in the Periyar River Basin, covering domestic, industrial, and agricultural needs based on usage patterns and regulatory context.
2. Identify and evaluate major water supply sources, including surface and groundwater, across administrative boundaries.
3. Review existing water infrastructure, such as reservoirs, pumping stations, and treatment plants, to assess supply capacity and operational efficiency

2. Domestic Water Demand

Domestic water demand in the Periyar River Basin is influenced by population size, settlement patterns, lifestyle, and access to water infrastructure. It varies significantly between urban and rural areas due to differences in consumption behaviour, infrastructure coverage, and service levels. Understanding these variations is essential for developing equitable and sustainable water management strategies across the basin.

2.1 Population and Water Usage Patterns

Periyar River Basin, one of Kerala's most vital river systems, supports a large and demographically diverse population distributed across both urban and rural settlements. Domestic water demand within the basin is significantly shaped by factors such as population growth, urbanization, improvements in living standards, and evolving socio-economic conditions. This demand has been estimated for various administrative units, including Grama Panchayats (GP), Municipalities (M), and Corporations (C), reflecting the varied infrastructure and consumption patterns across the basin.

Population projections for the year 2025 were derived using the exponential growth method, with the 2011 Census as the baseline and growth rates specific to each district and settlement type (<http://censusindia.gov.in/>). These projections formed the basis for calculating domestic water demand by applying the standard per capita water supply norms prescribed in the Central Public Health & Environmental Engineering Organisation (CPHEEO) Manual on Water Supply and Treatment (Ministry of Housing and Urban Affairs, Government of India (Ministry of Housing and Urban Affairs, 2019)).

2.1.1 Gram Panchayat-Wise Domestic Water Demand- Idukki District

The population projections for the 40 Grama Panchayats in the Idukki district for the year 2025 were estimated using the exponential growth method, with the 2011 Census data as the base, shown in Table 1. A compound annual growth rate of -0.193% was applied, reflecting a steady annual decline in population. This approach provides a more realistic and demographically appropriate estimate of future population trends in the district. Based on the projected population, the domestic water demand for each Grama Panchayat was assessed using per capita water supply norms as outlined in the CPHEEO Manual on Water Supply and Treatment (Ministry of Housing and Urban Affairs, Government of India). A standard value of 70 litres per capita per day (LPCD) was used for rural Panchayats, while higher service levels of 135

LPCD were applied to semi-urban and tourism-focused areas such as Munnar, Kumily, and Devikulam. This classification ensures that water demand estimations are aligned with local infrastructure conditions and settlement characteristics. The domestic water demand across the 40 Grama Panchayats in Idukki district shows considerable variation. The highest demand is observed in Nedumkandam (5.516 MLD), followed by Vandiperiyar (5.362 MLD) and Kumily (4.719 MLD), all of which are semi-urban or tourism-heavy areas. In contrast, the lowest demand is in Edamalakudy (0.152 MLD), a sparsely populated tribal settlement. This results in a range of domestic water demand from 0.152 MLD to 5.516 MLD, reflecting diverse population densities and service level classifications across the district.

Table 1 GP-wise Projected Population-Based Domestic Water Demand- Idukki district

Sl. No.	Grama Panchayats	Total Population (2011)	Projected Population 2025 (Nos.)	Domestic Water Demand (MLD)
1	Adimali	40484	39404	2.758
2	Ayyappancoil	15611	15194	1.064
3	Baisonvally	13941	13569	0.95
4	Chakkupallam	21936	21351	1.495
5	Chinnakanal	11553	11245	0.787
6	Devikulam	23709	23076	3.115
7	Edamalakudy	2236	2176	0.152
8	Elappara	23666	23035	1.612
9	Erattayar	19097	18587	1.301
10	Idukki-Kanjikuzhi	26809	26094	1.827
11	Kamakshy	19762	19235	1.346
12	Kanchiyar	22513	21912	1.534
13	Kanthalloor	10963	10670	0.747
14	Karimannoor	19675	19150	1.341
15	Karunapuram	26637	25926	1.815
16	Konnathady	29902	29104	2.037
17	Kumaramangalam	14865	14468	1.013
18	Kumily	35915	34957	4.719
19	Mankulam	9557	9302	0.651
20	Marayoor	12399	12068	0.845
21	Mariyapuram	12071	11749	0.822

22	Munnar	32029	31174	4.208
23	Nedumkandam	41980	40860	5.516
24	Pallivasal	17044	16589	1.161
25	Pampadumpara	21172	20607	1.442
26	Peerumade	21712	21133	1.479
27	Rajakkad	15198	14792	1.035
28	Rajakumari	16086	15657	1.096
29	Santhanpara	15632	15215	1.065
30	Senapathy	12529	12195	0.854
31	Udumbanchola	14059	13684	0.958
32	Udumbannoor	23859	23222	1.626
33	Upputhara	26326	25624	1.794
34	Vandammedu	30567	29751	2.083
35	Vandiperiyar	40809	39720	5.362
36	Vannapuram	28900	28129	1.969
37	Vathikudy	27670	26932	1.885
38	Vattavada	5697	5545	0.388
39	Vazhathope	19723	19197	1.344
40	Vellathuval	25701	25015	1.751

2.1.2 Gram panchayat Wise Domestic Water Demand- Ernakulam District

The population projections for the year 2025 in the Grama Panchayats of Ernakulam district were carried out using the exponential growth method, tabulated in Table 2 with the 2011 Census data as the base. A compound annual growth rate of 0.517%, derived from the district's decadal growth rate of 5.17% between 2001 and 2011, was applied over 14 years. This approach assumes a steady annual increase and provides a realistic estimate of future population trends. Using the projected population figures, domestic water demand for each Grama Panchayat was estimated based on a standard norm of 70 LPCD, as recommended by the CPHEEO guidelines for rural areas. The demand was expressed in MLD.

The estimated domestic water demand varies notably across the 51 Grama Panchayats in the district. The highest water demand is projected for Elamkunnappuzha (3.816 MLD), followed closely by Vengola (3.798 MLD) and Vazhakulam (3.124 MLD), all of which are among the more densely populated or peri-urban panchayats. Conversely, the lowest demand is recorded

in Kuzhuppilly (0.913 MLD) and Keerampara (0.942 MLD), reflecting their relatively smaller population sizes. The range of domestic water demand spans from 0.913 MLD to 3.816 MLD, highlighting the spatial variation in population density and water service needs across the district.

Table 2 GP wise Projected Population-Based Domestic Water Demand- Ernakulam district

SL. No	Grama Panchayats	Population (2011)	Projected Population (2025)	Domestic Water Demand (MLD)
1	Alangad	41251	44339	3.10373
2	Asamannoor	19311	20757	1.45299
3	Ayyampuzha	14211	15275	1.06925
4	Chendamangalam	29326	31521	2.20647
5	Chengamanad	27978	30073	2.10511
6	Cheranallur	30594	32884	2.30188
7	Chittattukara	31303	33646	2.35522
8	Choornikkara	32746	35197	2.46379
9	Edathala	44204	47513	3.32591
10	Edavanakkad	21787	23418	1.63926
11	Elamkunnappuzha	50714	54511	3.81577
12	Ezhikkara	18019	19368	1.35576
13	Kadamakkudy	16295	17515	1.22605
14	Kadungalloor	41827	44958	3.14706
15	Kalady	28279	30396	2.12772
16	Kanjoor	22541	24228	1.69596
17	Karukutty	28118	30223	2.11561
18	Karumalloor	36078	38779	2.71453
19	Kavalangad	29727	31952	2.23664
20	Keerampara	12525	13463	0.94241
21	Keezhmad	35061	37686	2.63802
22	Kizhakkambalam	33363	35861	2.51027
23	Koovappady	36241	38954	2.72678
24	Kottappady	17903	19243	1.34701
25	Kottuvally	42852	46060	3.2242

26	Kunnukara	21765	23394	1.63758
27	Kuttampuzha	24451	26281	1.83967
28	Kuzhuppilly	12137	13046	0.91322
29	Malayattoor- Neeleswaram	25485	27393	1.91751
30	Manjapra	16011	17210	1.2047
31	Mazhuvannoor	34083	36635	2.56445
32	Mulavukad	21833	23467	1.64269
33	Nayarambalam	24127	25933	1.81531
34	Nedumbassery	31304	33648	2.35536
35	Nellikuzhi	41181	44264	3.09848
36	Njarackal	23760	25539	1.78773
37	Okkal	24166	25975	1.81825
38	Pallippuram	44042	47339	3.31373
39	Parakkadavu	30752	33054	2.31378
40	Pindimana	16519	17756	1.24292
41	Puthenvelikkara	28227	30340	2.1238
42	Rayamangalam	36722	39471	2.76297
43	Sreemoolanagaram	25708	27633	1.93431
44	Thuravoor	21468	23075	1.61525
45	Vadakkekara	32745	35196	2.46372
46	Valakam	18308	19679	1.37753
47	Varappetty	16529	17766	1.24362
48	Varappuzha	26570	28559	1.99913
49	Vazhakulam	41521	44629	3.12403
50	Vengola	50476	54255	3.79785
51	Vengoor	21937	23579	1.65053

2.1.3 Gram panchayat Wise Domestic Water Demand- Thrissur District

The 2025 population projections for the Grama Panchayats in Thrissur district were prepared using the exponential growth method, with the 2011 Census data as the base year, shown in Table 3. A compound annual growth rate of 0.458%, derived from the district's decadal growth rate of 4.58% during 2001–2011, was applied over 14 years. This approach assumes steady

population growth and provides a consistent and realistic estimate of future demographic trends. Based on the projected population, the domestic water demand for each Grama Panchayat was estimated using a standard norm of 70 LPCD, as recommended by the CPHEEO guidelines for rural areas. The demand was expressed in MLD.

2.1.4 Domestic Water Demand- Municipality and Corporation-wise

The 2025 population projections for municipalities and corporations within the Periyar River Basin were derived using the exponential growth method, with the 2011 Census population as the base, shown in Table 4. District-specific annual growth rates 0.517% for Ernakulam, - 0.193% for Idukki, and 0.458% for Thrissur were applied to reflect regional demographic trends. This method assumes a steady compound annual growth rate over the 14 years from 2011 to 2025, enabling realistic forecasting of urban population growth. Based on the projected populations, domestic water demand was estimated using the CPHEEO-recommended norm of 135 LPCD for urban areas. The demand was calculated by multiplying the projected population by the LPCD value and converting the result into MLD.

Table 3 GP-wise Projected Population-Based Domestic Water Demand- Thrissur district

Sl. No	Grama Panchayats	Total Population (2011)	Projected Population (2025)	Domestic Water Demand (MLD)
1	Alur	43488	46361	3.24527
2	Annamanada	30289	32290	2.2603
3	Athirappally	9153	9758	0.68306
4	Edathiruthy	29325	31262	2.18834
5	Edavilangu	20363	21708	1.51956
6	Eriyad	46213	49266	3.44862
7	Kaipamangalam	35626	37980	2.6586
8	Karalam	21315	22723	1.59061
9	Kattur	18017	19207	1.34449
10	Koratty	32523	34672	2.42704
11	Kuzhur	19916	21232	1.48624
12	Mala	34371	36642	2.56494
13	Mathilakam	27833	29672	2.07704
14	Muriyad	27059	28847	2.01929

15	Padiyur	17645	18811	1.31677
16	Perinjanam	21012	22400	1.568
17	Poomangalam	12541	13370	0.9359
18	Poyya	22490	23976	1.67832
19	Puthenchira	21416	22831	1.59817
20	Valappad	35237	37565	2.62955
21	Vellangallur	38243	40769	2.85383

Table 4 Municipality & Corporation-wise Domestic Water Demand

Sl. No.	District	Municipality/ Corporation	Population (2011)	Projected Population (2025)	Domestic Water Demand (MLD)
1	Ernakulam	Kodungallur	33,935	36,475	4.92
2	Ernakulam	Angamaly	33,465	35,970	4.86
3	Ernakulam	Perumbavoor	28,110	30,214	4.08
4	Ernakulam	Aluva	22,428	24,107	3.25
5	Ernakulam	Paravur	31,503	33,861	4.57
6	Ernakulam	Eloor	31,468	33,824	4.57
7	Ernakulam	Kalamassery	70,776	76,075	10.27
8	Ernakulam	Thrikkakara	77,319	83,107	11.21
9	Idukki	Kattappana	42,646	41,508	5.60
10	Thrissur	Kodungallur	33,935	36,177	4.88
Corporation					
1	Ernakulam	Kochi	677,381	728,092	98.33

2.2 Urban and Rural Water Demands

Water demand across the Periyar River Basin has distinct urban and rural patterns based on district-level data shown in Figures 1 and 2. In Ernakulam, urban demands are led by irrigation (198 MLD) and groundwater recharge (145 MLD), with significant use for domestic (38 MLD) and religious (29 MLD) purposes. Idukki, being more rural, has a higher demand for domestic use (55 MLD) and irrigation (64 MLD), with minimal industrial or recreational needs. Thrissur exhibits a balanced profile with substantial demand for irrigation (137 MLD), domestic use (97 MLD), and groundwater recharge (154 MLD), along with notable recreational

(35 MLD) and religious (67 MLD) usage. These variations highlight the need for tailored water management strategies within the basin.

2.3 Trends in Domestic Water Consumption

Estimated domestic water demand across the Idukki, Ernakulam, and Thrissur districts shows significant regional variation. In Idukki, the total demand is driven by hilly and rural panchayats like Nedumkandam (5.52 MLD), Vandiperiyar (5.36 MLD), and Kumily (4.72 MLD), indicating growing needs in highland areas. In Ernakulam, which includes both rural and urbanized grama panchayats, high demands are observed in Vengola (3.80 MLD), Elamkunnappuzha (3.82 MLD), and Edathala (3.33 MLD), reflecting urban expansion. Thrissur's panchayats such as Eriyad (3.45 MLD) and Vellangallur (2.85 MLD) also show rising needs. Among municipalities, Thrikkakara (11.21 MLD) and Kochi Corporation (98.33 MLD) have the highest water demands, highlighting intense urban pressure in coastal regions.

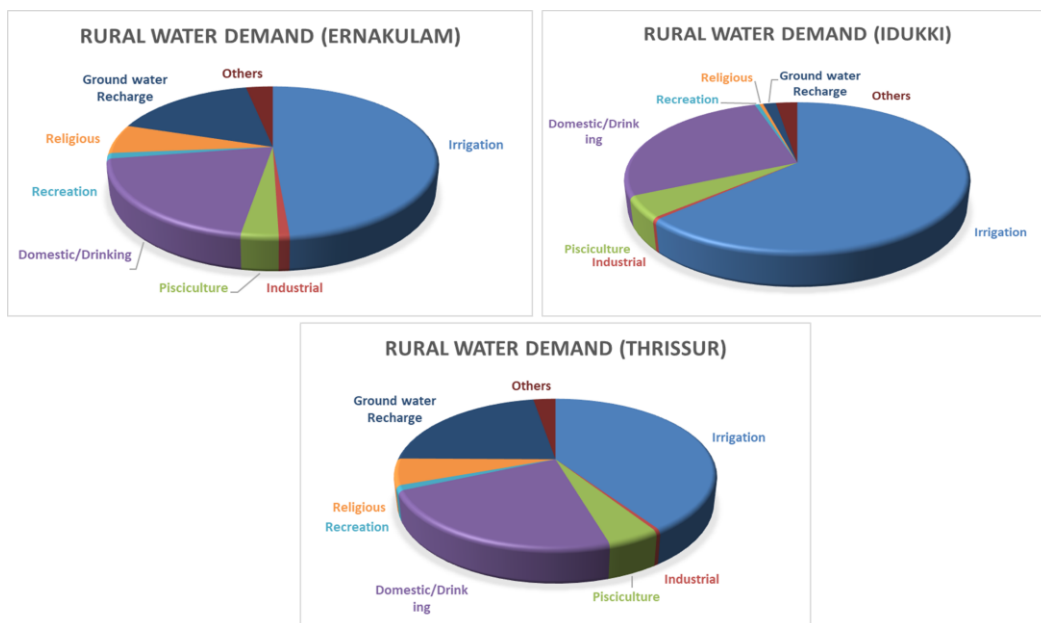


Figure 1 District-wise Rural Water Demand Statistics (KWA Ernakulam, Idukki and Thrissur)

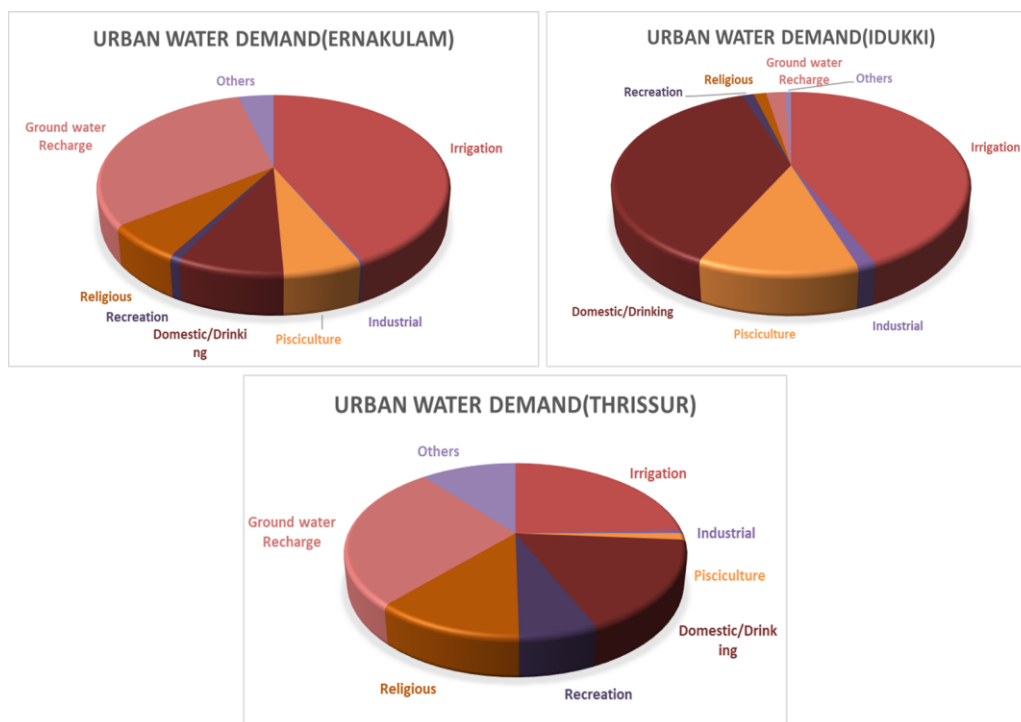


Figure 2 District-wise Urban Water Demand Statistics (KWA Ernakulam, Idukki and Thrissur)

3. Industrial Water Demand

3.1 Industrial Water Requirement

Water plays a crucial role in industrial development as an essential input in a number of industries, including manufacturing, metallurgy, textiles, food processing, and power generation. It supports diverse operations including cooling, cleaning, chemical reactions, material transportation, sanitation, and fire safety. Industrial water demand is directly related to many vital operations such as energy production, waste management, industrial processes etc (Worthington, 2010). Beyond its operational significance, water is crucial for economic growth, sustainable industrialization, environmental management, infrastructure planning, policy and regulation, and climate resilience.

Periyar River supports one of the most important industrial zones in the State of Kerala. Nearly 25% of the industries in the State are situated along its banks and are dependent on the river for their water requirements. The Eloor-Edayar (Udyogamandal) region in Ernakulam District, about 10 km north of the Kochi Harbour, is an area where there is high concentration of industries, within 5 km radius. This region hosts over 2,500 small-scale industries and 50 large and medium- scale industries. In the Greater Kochi area, there are about 83 red-category industries (these include chemical, petrochemical, metal processing, and other hazardous industries that require strict environmental monitoring and compliance), of which 79 are

located in the Eloor-Edayar and Ambalamugal industrial clusters, which cover an area of about 17.40 km², accounting for 2.8% of the geographical area of Greater Kochi (Room for River Report,2022).

This section presents a comparative analysis of Block-wise industrial water requirements for the Ernakulam, Idukki and Thrissur Districts, within the Periyar River Basin based on the District Irrigation Plan (2017) prepared under the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY). The data includes the number of industries, water demand in the year 2017, projected industrial water demand for 2020, existing water potential, and the additional water potential required to meet future industrial needs.

3.1.1 Industrial Water Demand in Ernakulam district within the Periyar River Basin

The estimated water demand in various Blocks in Ernakulam District (within the Periyar RiverBasin) for the year 2020, projected based on the data for 2017, are presented in Table 5. Among the Blocks, Alangad Block (0.921 Million Cubic Metres (MCM)) has the highest water demand in 2020 and Vazhakulam (0.103 MCM) has the lowest demand. The total industrial water demand of Ernakulam District in 2020 is 3.214 MCM, the water potential already in place being about 3.893 MCM. About 4.698 MCM of water is needed to meet future demands. Figure 3 presents the projected industrial water demand for the year 2020 across various blocks in Ernakulam district.

Table 5 Industrial Water Demand in Ernakulam District within the Periyar River Basin

(Source: District Irrigation Plan, Ernakulam, 2017)

Name of Block	No. of Industries	Existing water Potential - 2017 (MCM)	Water demand in 2020 (MCM)	Water potential to be created (MCM)
Vypin	638	0.208	0.258	0.049
Paravoor	874	0.245	0.306	0.61
Kothamangalam	126	0.9	0.128	0.18
Edappally	2864	0.113	0.139	0.265
Alangad	2018	0.746	0.921	0.857
Angamaly	1716	0.545	0.719	0.678
Parakkadavu	716	0.195	0.284	0.89
Koovappady	1752	0.107	0.356	0.249
Vazhakulam	2386	0.834	0.103	0.92
Total	13090	3.893	3.214	4.698

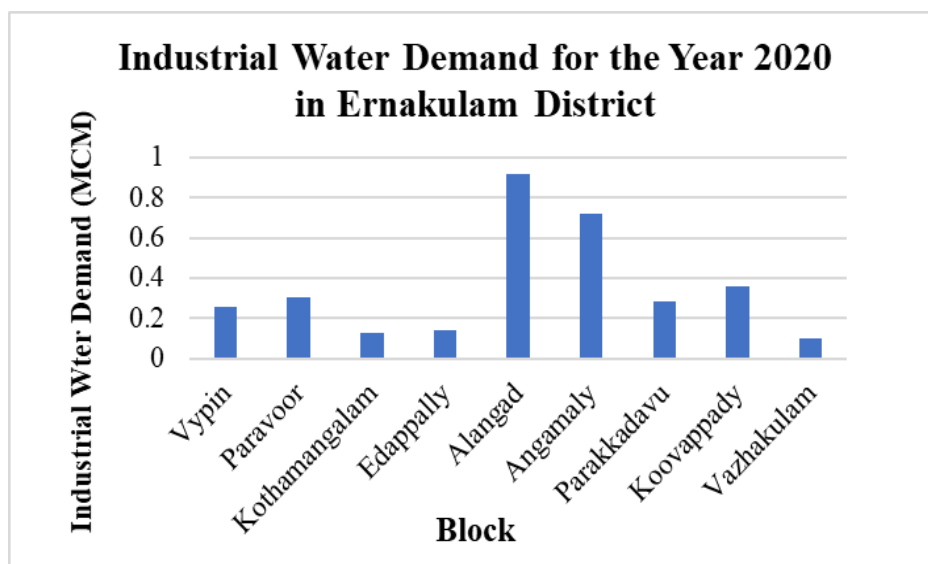


Figure 3 Projected industrial water demand for the year 2020 (based on 2017 data) across various blocks in Ernakulam district.

3.1.2 Industrial Water Demand in Thrissur district within the Periyar River Basin

In Thrissur District, there are various industries such as ice plants, soft drinks, cement products, etc. covering 7 Blocks within the Periyar River Basin. With a total industrial water demand of 16.01 MCM in 2020, Irinjalakuda has the highest water demand whereas Vellangallur, with a total demand of 2.6 MCM, has the lowest industrial water demand in 2020. An overview of the water demand of Thrissur district for the year 2020, projected based on the data for 2017, is presented in Table 6. The projected industrial water demand for the year 2020 across various Blocks in Thrissur District is presented in Fig. 4.

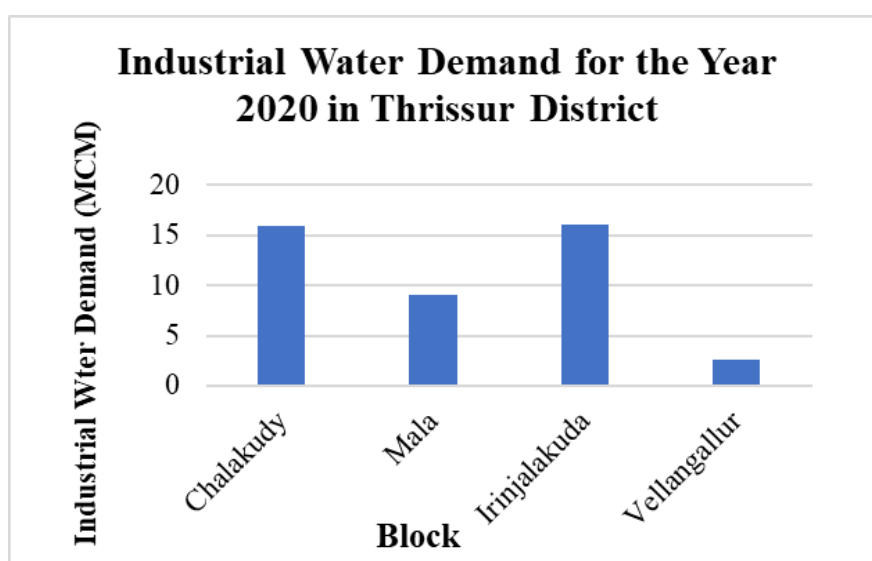


Fig. 4 Projected industrial water demand for the year 2020 across various blocks in Thrissur district.

Table 6 Industrial Water Demand in Thrissur District within the Periyar River Basin(Source: District Irrigation Plan, Thrissur, 2017)

Name of Block	Name of Industry	Existing Water Potential - 2017 (MCM)	Water Demand in 2020 (MCM)	Water Potential to be Created (MCM)
Chalakydy	Cements Products	1	1.8	8
	Packaged Drinking Water	3.21	6.24	3.2
	Plastics	2	3	1
	Food Products	1.4	1.48	1.08
	Others	1.54	3.44	1.3
	Sub total	9.2	15.96	14.58
Mala	Cements Products	0.36	1.44	1.24
	Food Products	0.28	1.12	0.5
	Crusher / M-Sand	0.76	3.04	1.5
	Others	0.862	3.448	1.52
	Sub total	2.262	9.048	4.76
Irinjalakuda	Cements Products	0.38	1.52	0.81
	Plastics	0.36	1.44	7.3
	Food Products	0.24	0.96	0.44
	Others	0.76	3.04	1.03
	Sub total	4.002	16.01	14.34
Vellangallur	Cements Products	0.09	0.36	0.18
	Food Products	0.1	0.4	0.2
	Others	0.46	1.84	0.93
	Sub total	0.65	2.6	1.31

3.1.3 Industrial Water Demand in Idukki district within the Periyar River Basin

Idukki has relatively fewer industries, and hence the industrial water demand is relatively less. Both groundwater and surface waters are the primary water sources for the industrial sector. However, in recent years, groundwater has become a crucial resource for industries to meet their water needs. The cost of water from the source and the availability of an adequate and consistent supply determines the choice of water source. The estimated net water demand for

industries in the district for 2017 and the projected industrial water demand for the year 2020 are presented in Table 7.

Table 7 Industrial Water Demand in Idukki District within the Periyar River Basin(Source: District Irrigation Plan, Idukki, 2017)

Name of Industry	Water demand Current (2017)	Water demand in 2020
Nagarjuna Ayurvedic	10000 Litre/day	20000 Litre/day
Marco Industries	2000 Litre/day	4000 Litre/day
Soorya Industries	9000 Litre/day	18000 Litre/day
Total	21000 Litre/day	42000 Litre/day

4. Agricultural Water Requirement

At the global scale, agricultural water demand is projected to rise due to increasing population, economic growth, and dietary shifts (Fraiture and Wichelns, 2010). Simultaneously, irrigation water supply and demand are expected to be increasingly affected by changing hydrological regimes through variations in precipitation, evaporation, and runoff at the watershed and river basin scales (Rosenzweig et al., 2004). As the pressure from a growing population, impacts of projected climate change, and limited water availability for irrigation increase, understanding and managing the agricultural water requirement becomes crucial (Agele et al., 2021).

Prior to independence, irrigation in the form that we practice it today was not widely practised in the agricultural sector in the State. A well-organised irrigation system was established in many of the commands in the post-independence era in response to the growing demand for food and the realization that conservation and storage of rainwater during the monsoon were essential to enhance cropping intensity and productivity. Kerala receives about 90% of the annual rainfall during the south-west monsoon (June to August) and north-east monsoon (October to November), the remaining months being mostly dry. However, due to the topography, rainwater drains quickly to the sea, limiting natural water storage. This makes irrigation a must for supplementing the water supply to crops for effective cultivation. As a result, the Government of Kerala initiated several irrigation projects. The first attempt to supply water on a controlled basis was through a Lift Irrigation Scheme in 1942. The scheme involved pumping water from the Periyar River using electric power and feeding it through channels for paddy cultivation (Irrigation Department, Kerala, 2025). The Periyar River Basin mainly covers parts of Ernakulam, Idukki, and Thrissur Districts and supports a wide range of food

crops and cash crops, including paddy, coconut, banana, cardamom, rubber, and spices (Agricultural Statistics, 2023). In this section, the crop water requirements and livestock water requirements of the parts of Ernakulam, Idukki, and Thrissur Districts in Kerala lying within the Periyar River Basin are presented.

4.1 Crop Water Requirement

Crop water requirement is the water needed for plant survival and growth. Crop water requirements are generally calculated by following the guidelines for computing crop water requirements outlined in FAO Irrigation and Drainage Paper 56. One of the most commonly used methods for this purpose, recommended in FAO (1998), is the Penman-Monteith method. This method is used to compute the reference crop evapotranspiration (ET_0). ET_0 is calculated using CROPWAT8, a decision support software developed by FAO. The crop evapotranspiration (ET_{crop}) is calculated by multiplying ET_0 by the crop coefficient K_c . Knowing ET_{crop} , the crop water requirement is calculated by taking other water requirements such as cultural water requirements in the case of paddy, conveyance losses etc. Crop water requirement for different agro-ecological zones and units in Idukki, Ernakulam, and Thrissur Districts are computed taking into account several factors including type of crops, slope, rainfall, soil depth, and growing period. Values of the crop coefficient values and effective rainfall are obtained from published data (District Irrigation Plan, Idukki, 2017).

4.1.1 Crop Water Requirement in Ernakulam District

It has been reported that in Ernakulam District, Angamaly (138 MCM), Kothamangalam (134.5 MCM) and Koovappady (119.5 MCM) Blocks had the highest water potential requirements for the year 2017. The anticipated demands for 2020 are much higher. Among the Blocks, Vypin (10.8 MCM), Edappally (12.2 MCM) and Paravoor (13.8 MCM), had the lowest anticipated water demand for the year 2020. Blocks like Alangad, Parakkadavu, and Vazhakulam had moderate water demand. Overall, total water demand across all Blocks in 2017 was 642 MCM, whereas the total demand for 2020 was 706.2 MCM. District-level agricultural water demand is expected to increase in the future, as evidenced by this increase. Table 8 presents an overview of crop water requirements and projected water demand of areas in Ernakulam District within the Periyar River Basin. Fig. 5 represents the projected crop water demand for the year 2020 across various Blocks in Ernakulam district.

Table 8 Crop Water Requirement in Ernakulam District within the Periyar River Basin

(Source: District Irrigation Plan, Ernakulam, 2017)

Block	Water potential required - 2017 (MCM)	Projected Demand - 2020 (MCM)
Vypin	9.8	10.8
Paravoor	12.6	13.8
Kothamangalam	134.5	147.9
Edappally	11.1	12.2
Alangad	41.2	45.3
Angamaly	138	151.8
Parakkadavu	63	69.3
Koovappady	119.5	131.5
Vazhakulam	112.3	123.6
Total	642	706.2

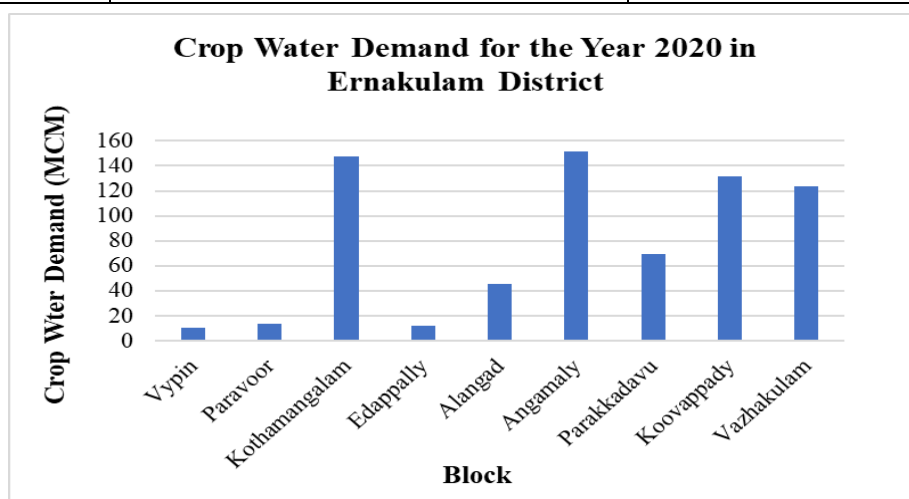


Figure 5 Projected crop water demand for the year 2020 across various blocks in Ernakulam district.

4.1.2 Crop Water Requirement in Idukki district within the Periyar River Basin

Table 9 presents the crop water requirement for seven Blocks in Idukki District, comparing actual demand (2015) and the projected demand for 2020. Among the Blocks, Kattappana had the highest water demand, rising from 275.9 MCM in 2015 to 413.9 MCM in 2020. The corresponding figures for Devikulam and Nedumkandam were similar (240.5 MCM in 2015 and 360.8 MCM - projected demand in 2020), indicating similar agricultural and land use patterns. Overall, the total water requirement in Idukki District increased from 1374.4 MCM

in 2015 to 2061.9 MCM in 2020. Fig. 6 presents the projected crop water demand for the year 2020 across various Blocks in Idukki district.

Table 9 Crop Water Requirement in Idukki District within the Periyar River Basin

(Source: District Irrigation Plan, Idukki, 2017)

Block	Water potential required – 2015 (MCM)	Projected Demand - 2020 (MCM)
Adimali	157.5	236.3
Azhutha	212.3	318.5
Devikulam	240.5	360.8
Elamdesam	122.8	184.2
Idukki	124.9	187.4
Kattappana	275.9	413.9
Nedumkandam	240.5	360.8
Total	1374.4	2061.9

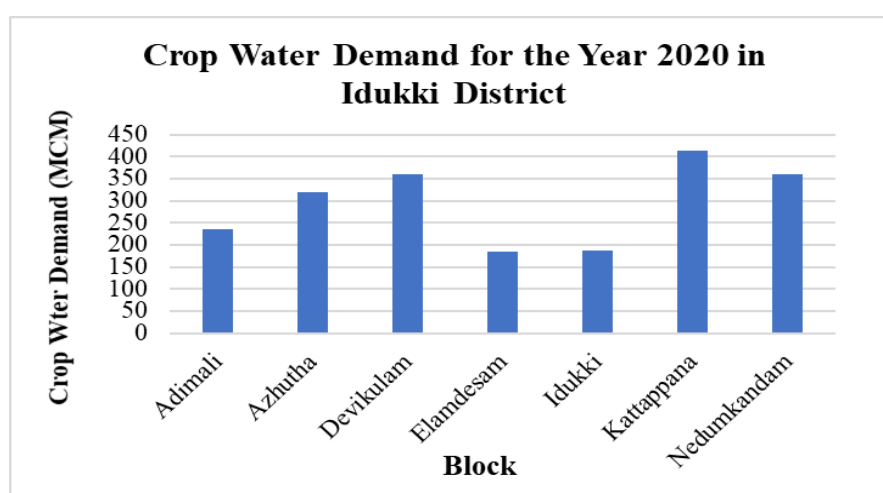


Figure 6 Projected crop water demand for the year 2020 across various blocks in Idukki district

4.1.3 Crop Water Requirement in Thrissur District within the Periyar River Basin

Irinjalakuda Block has the largest crop water demand - about 58.8 MCM in 2017 and 88 MCM by 2020. Mala Block is also not far behind, with the crop water demand increasing from 55.9 MCM to 84.4 MCM. These numbers show that these Blocks have a high demand for irrigation. In Chalakudy, crop water requirement rose from 32.8 MCM in 2017 to 53.9 MCM (anticipated) in 2020. Vellangallur, and Mathilakam needed relatively less water. The water demand in Vellangallur increased from 29.3 MCM to 43.8 MCM, and that in Mathilakam from 28.1 MCM

to 46.2 MCM. Irrigation demands clearly showed an upward trend, with the total water potential required in 2017 being 258.7 MCM and expected to reach 404.8 MCM in 2020. An overview of Crop water requirement in Thrissur District within the Periyar River Basin is presented in Table 10. Fig. 7 presents the projected crop water demand for the year 2020 across various Blocks in Thrissur district

Table 10 Crop Water Requirement in Thrissur District within the Periyar River Basin

(Source: District Irrigation Plan, Thrissur, 2017)

Block	Water potential required - 2017 (MCM)	Projected Demand - 2020 (MCM)
Chalakkudy	32.8	53.9
Irinjalakuda	58.8	88
Mala	55.9	84.4
Mathilakam	28.1	46.2
Vellangallur	29.3	43.8
Total	258.7	404.8

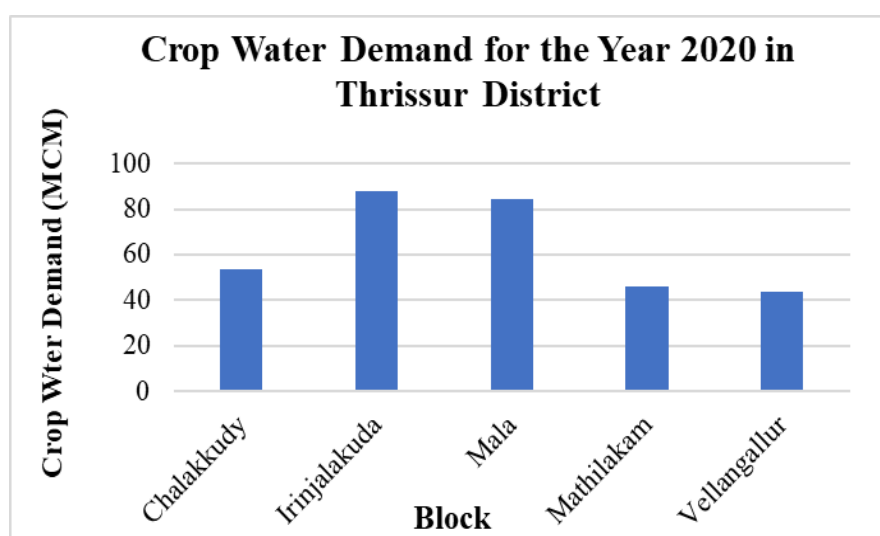


Figure 7 Projected crop water demand for the year 2020 across various blocks in Thrissur district

4.2 Livestock water requirement

Livestock plays a vital role in supporting rural livelihoods, food production, and the agricultural economy in the Periyar River Basin, which spans across Ernakulam, Idukki, and Thrissur Districts. Like humans, livestock species depend heavily on water for drinking, cleaning, and maintaining overall health, directly linking animal husbandry to regional water demand. The availability of adequate and reliable water resources from the Periyar River and its tributaries

helps sustain livestock population and related activities in the river basin. Efficient planning of livestock water requirements is essential to ensure the sustainability of water resources while meeting the growing demands of both agriculture and animal husbandry in these Districts.

4.2.1 Livestock Water Requirement in Ernakulam District within the Periyar River Basin

In Ernakulam district, livestock water demand is projected to increase from approximately 1.3006 MCM in 2017 to 1.429 MCM in 2020, with blocks like Koovappady (0.315 MCM), followed by Alangad (0.241 MCM) having the highest water demand. Table 11 presents an overview of Livestock Water Requirement and projected demand in Ernakulam District within the Periyar River Basin. The livestock water demand for the year 2020 across various blocks in Ernakulam district is presented in Fig. 8.

Table 11 Livestock Water Requirement in Ernakulam District within the Periyar River Basin

(Source: District Irrigation Plan, Ernakulam, 2017)

Block	Total number of live stock	Water demand /year - 2017 (MCM)	Water demand /year in 2020 (MCM)	Existing water potential (MCM)	Water potential to be created (MCM)
Alangad	74251	0.219	0.241	0.219	0.021
Angamaly	70110	0.152	0.167	0.152	0.015
Edappally	104264	0.091	0.1	0.091	0.009
Vazhakulam	33395	0.08	0.088	0.08	0.008
Kothamangalam	41204	0.136	0.149	0.136	0.013
Vypin	31148	0.054	0.059	0.054	0.0054
Parakkadavu	40686	0.165	0.182	0.165	0.016
Paravur	54762	0.117	0.128	0.117	0.011
Koovappady	72539	0.2866	0.315	0.286	0.028
TOTAL	522359	1.3006	1.429	1.3	0.1264

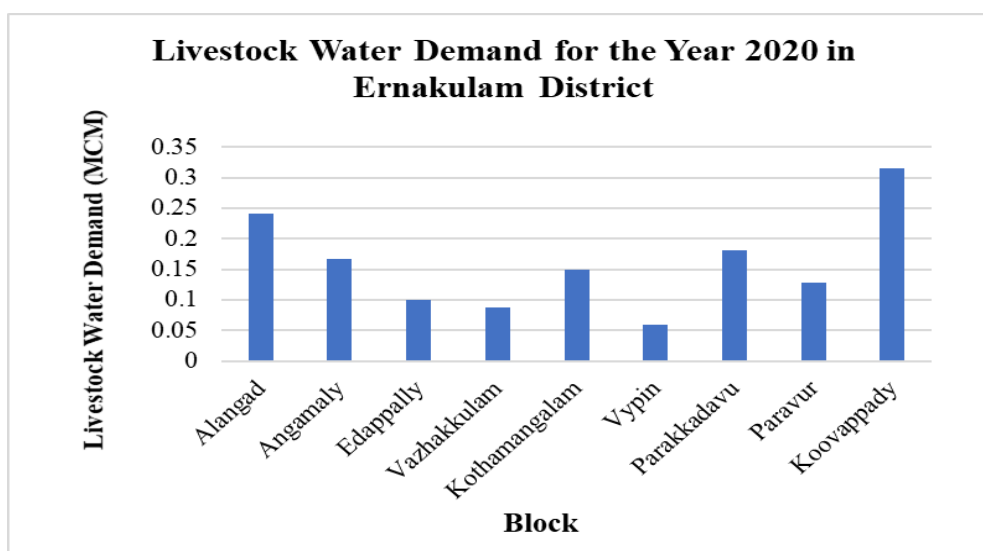


Figure 8 Livestock water demand for the year 2020 across various blocks in Ernakulam district.

4.2.2 Livestock Water Requirement in Idukki District within the Periyar River Basin

Idukki District has a relatively lower livestock water requirement, as the livestock population is comparatively low, increasing from 0.49 MCM in 2017 to 0.53 MCM by 2020. Devikulam (0.15 MCM), followed by Elamdesom (0.11 MCM), have the highest water demand among the Blocks. Idukki, Kattappana, and Nedumkandam had moderate water demand (0.06 MCM) whereas Adimali (0.04 MCM) and Azhutha (0.05 MCM) had the lowest water demand. Table 12 presents an overview of livestock water demand in a part of Idukki District within the Periyar River Basin. Figure 9 presents the livestock water demand for the year 2020 across various blocks in Idukki district.

Table 12 Livestock Water Requirement in Idukki District within the Periyar River Basin
(Source: District Irrigation Plan, Idukki, 2017)

Block	Total number of live stock	Water demand - 2017 (MCM)	Water demand in 2020 (MCM)
Adimali	23248	0.04	0.04
Azhutha	248623	0.05	0.05
Devikulam	98974	0.14	0.15
Elamdesom	88439	0.1	0.11
Idukki	60314	0.06	0.06
Kattappana	70677	0.05	0.06
Nedumkandam	33372	0.05	0.06
TOTAL	623647	0.49	0.53

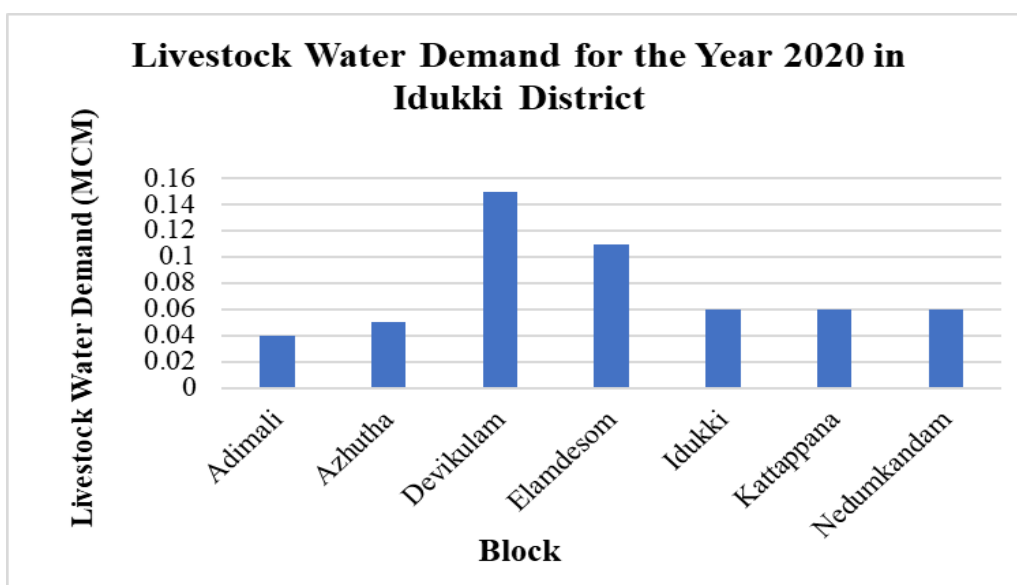


Figure 9 Livestock water demand for the year 2020 across various blocks in Idukki district.

4.2.3 Livestock Water Requirement in Thrissur District within the Periyar River Basin

In Thrissur district, livestock water demand is projected to increase from approximately 7.727 MCM in 2017 to 8.478 MCM in 2020. Mathilakam, Mala, and Chalakkudy Blocks account for the largest share of the district's livestock water consumption. Table 13 presents an overview of livestock water requirement and projected demand in parts of Thrissur District within the Periyar River Basin. Fig. 10 represents the livestock water demand for the year 2020 across various blocks in Thrissur district.

Table 13 Livestock Water Requirement in Thrissur District within the Periyar River Basin
(District Irrigation Plan, Thrissur, 2017)

Block	Total number of live stock	Water demand/year - 2017 (MCM)	Water demand /year in 2020 (MCM)	Existing water potential (MCM)	Water potential to be created (MCM)
Chalakkudy	111098	1.272	1.397	1.272	0.125
Irinjalakuda	47476	0.671	0.737	0.671	0.065
Mala	110409	1.406	1.543	1.406	0.137
Mathilakam	128236	1.476	1.619	1.476	0.143
Vellangallur	87526	1.125	1.234	1.125	0.109
TOTAL	631846	7.727	8.478	7.727	0.751

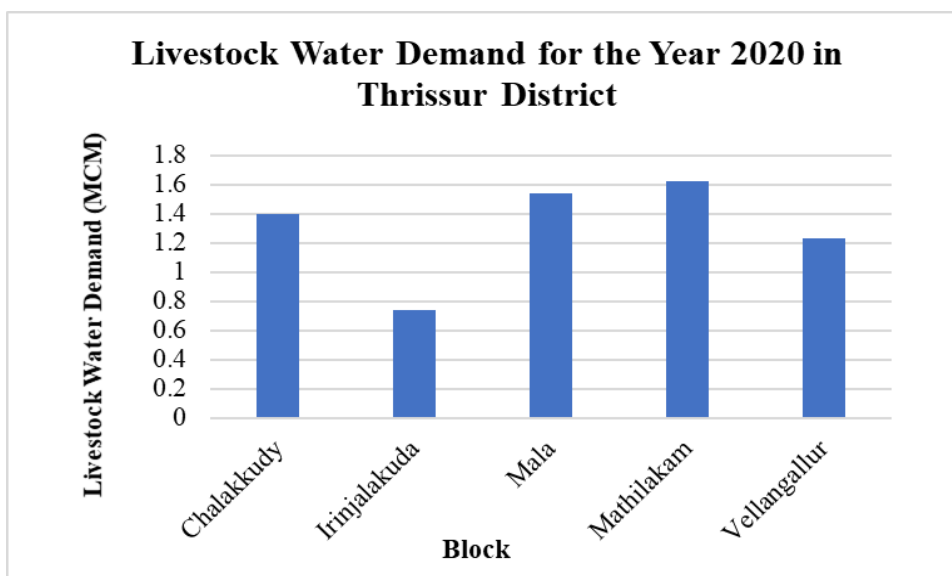


Figure 10 Livestock water demand for the year 2020 across various blocks in Thrissur district.

5. Sources of water supply within delineated administrative and natural boundaries

This section presents a comprehensive overview of the various water sources that support the Periyar river basin, categorized within both administrative and natural boundaries

5.1 Water Supply Sources

Periyar river basin depends on a mix of surface water and groundwater sources to fulfil its water supply needs. The primary source is the Periyar River and its tributaries, which provide surface water for domestic, agricultural, and industrial purposes throughout the basin. Major reservoirs such as the Idukki and Idamalayar dams play a key role in storing and regulating river flows, supporting both hydroelectric power and water supply schemes. Groundwater from wells and bore wells supplements the supply, particularly in the midland and lowland regions, though its availability is limited in the steep, rocky terrain of the upper basin in Idukki. In the highland areas, natural springs and small ponds also serve as important localized water sources for rural communities. Rainwater harvesting is being increasingly adopted across the basin to augment water availability, given the region's high rainfall. Together, these sources form the foundation for ongoing and future water supply projects aimed at meeting the basin's growing demand.

5.1.1 Identification of Major Water Supply Sources

The identified number of water supply sources in the Periyar River Basin is shown in the Figure 11. Besides the main sources, other water sources include streams, springs, and brooks. Additionally, there are six rainwater harvesting structures in Thrissur and seven in Idukki, contributing to the overall water availability in the basin.

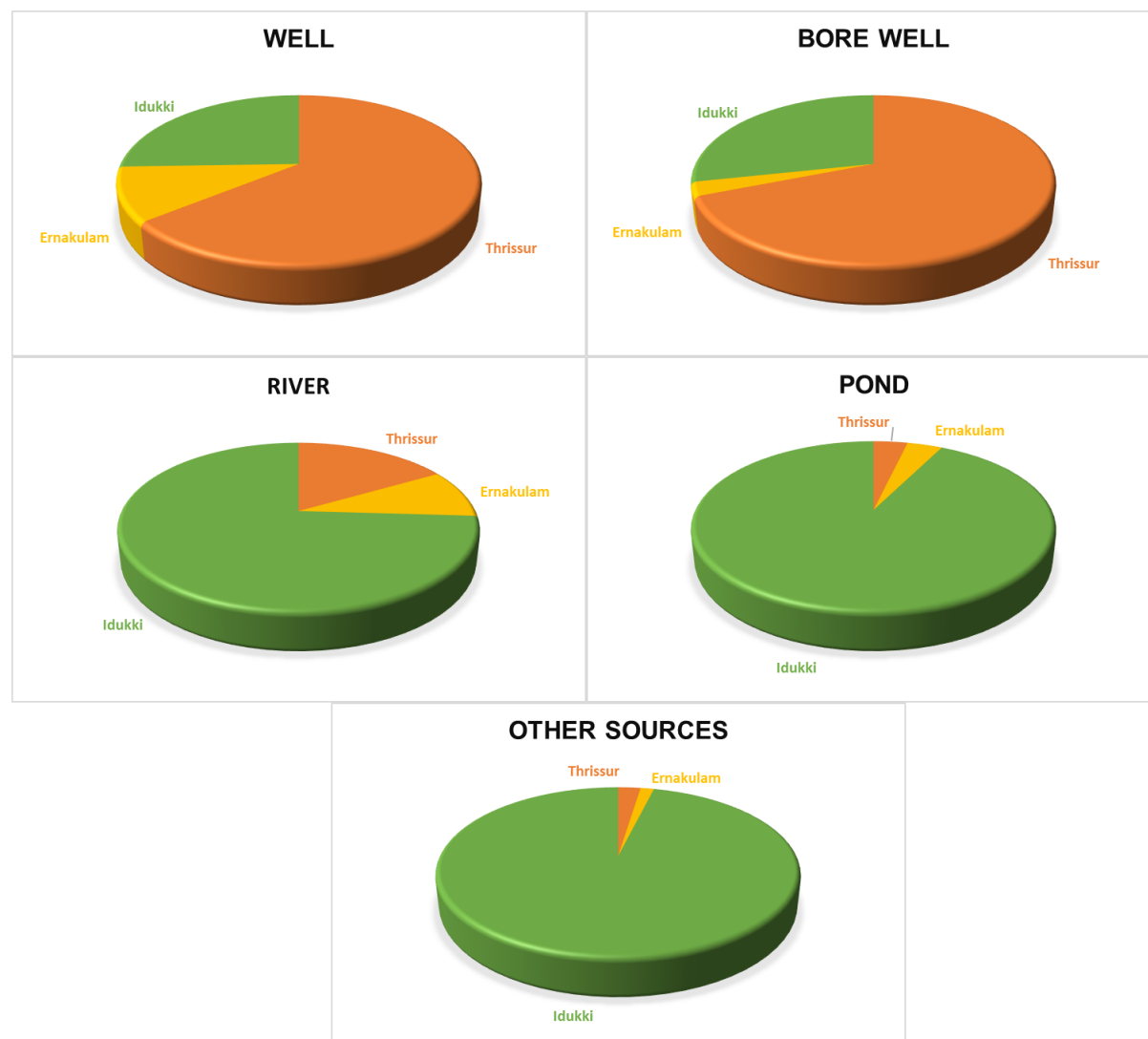


Figure 11 District-wise water supply sources in Periyar River Basin (Directorate of Economics & Statistics., 2015)

5.1.2 Distribution of Sources Across Administrative Boundaries

The water supply system in the Periyar River Basin consists of pumping water supply schemes, borewells with hand pumps, public wells, and gravity schemes. The distribution of tube wells, bore wells, and non-domestic water connections across various panchayats and blocks in the Periyar River Basin significant spatial variability in water infrastructure. Tube wells are most

prevalent in Angamaly Block (40), Vazhakkulam Block (49), and Karukutty (12), with moderate presence in Alangad Block (7), Mookkannur (9), Koovappady Block (24), and Asamannur (6). Bore wells, though less widespread, are notably concentrated in Kothamangalam Block (86), Kunnathunad (58), and Kuttampuzha (12), with smaller numbers observed in Angamaly Block (7), Koovappady Block (4), Keerampara (3), and other scattered locations such as Edavanakkad, Kuzhuppilly, Nayarambalam, and Pallippuram.

In terms of non-domestic water connections, which indicate commercial or institutional usage, significant concentrations are reported in Vazhakkulam Block (668), Paravur Block (527), and Angamaly Block (383). Panchayats like Malayattoor-Neeleswaram (43), Manjapra (46), Mookkannur (9), Thuravoor (16), and Koovappady Block (9) also register some non-domestic connections. However, a large number of areas, including Alangad, Kodungallur, Perumbavoor, Rayamangalam, Vengoor, and many coastal panchayats such as Ezhikkara and Vypin Block report no such connections, reflecting either limited commercial activity or unavailability of metered connections for non-domestic use. GP wise water supply sources collected from the respective block panchayat are tabulated in Table 14.

Table 14 Water Supply Sources -Panchayat wise (Ernakulam)

SI. No.	Name of Panchayat	Wells (Nos)	Tanks (Nos)	Taps (Nos)	House with Water Connection
1	Alangad	76	5	424	6000
2	Kodungallur	30	3	200	-
3	Perumbavoor	112	3	80	-
4	Karukutty	16	7	79	269
5	Malayattoor-Neeleswaram	25	8	351	1303
6	Manjapra	30	17	204	845
7	Mookkannur	16	11	176	357
9	Asamannur	40	-	434	876
10	Koovappady	7	-	559	1642
11	Rayamangalam	8	8	295	1358
12	Vengoor	-	-	555	1081
13	Keerampara	6	3	202	974

14	Kottapady	12	10	354	1318
15	Kuttampuzha	35	22	-	-
16	Pindimana	7	-	299	1019
17	Ezhikkara	26	2	102	-
18	Kunnathunad	-	-	465	794
19	Vazhakulam	79	38	597	885
20	Edavanakkad	-	238	2706	-
21	Kuzhuppilly	1	176	1713	-
22	Nayarambalam	-	321	3052	-
23	Pallippuram	-	448	5967	-
24	Vypin Block	49	2	1493	17025

The list of block panchayat-wise water supply sources collected from the respective block panchayat is tabulated in Table 15.

Table 15 Water Supply Sources -Block Panchayat wise (Ernakulam) (Block panchayath in the basin)

Sl. No.	Name of Block	Wells (Nos)	Tanks (Nos)	Taps (Nos)	House with Water Connection
1	Alangad Block	240	16	1255	6000
2	Angamaly Block	180	103	1716	5966
3	Koovappady Block	86	316	2330	5574
4	Kothamangalam Block	142	62	2697	10209
5	Vazhakkulam Block	241	118	2859	14636
6	Paravur Block	213	25	1721	-

The list of municipality and corporation-wise water supply sources collected from the respective block panchayat is tabulated in Table 16.

Table 16 Water Supply Sources -Municipality and Corporation-wise (Ernakulam)

SI. No.	Name of Municipality/Corporation	Wells (Nos)	Tanks (Nos)	Taps (Nos)	House with Water Connection
31	Aluva (M)	1	-	72	5527
32	Angamaly (M)	14	13	321	3225
34	Kalamassery (M)	3	524	311	9436
35	Kothamangalam (M)	23	5	233	5278
37	Perumbavoor (M)	-	307	2887	-
39	Kochi Corporation	-	-	3077	35448

List of grama panchayat wise water supply sources collected from the respective block panchayat is tabulated in Table 17.

Table 17 Water Supply Sources -Panchayat wise (Idukki)

SI. No.	Panchayat	Water Body/Pond Location	Pond	Tank	Taps	Houses with Water Connection	Others
1	Adimali	Kallar	1	1	155	122	22
2	Konnathadi	Mathira	1	1	16	10	-
3	Bysonvally	Kamacherry	1	1	23	-	-
4	Vellathuval	Dobypalam	1	1	14	-	-
5	Pallivasal	Pallivasal Dam Top	1	1	70	63	4
6	Marayoor	Marayoor	1	1	153	375	6
7	Munnar	Munnar Head work	1	1	46	181	30
8	Kanthaloor	Kathaloor	1	1	56	-	-
9	Vattavada	Vattavada Irrigation Pond	1	1	14	-	-
10	Santhanpara	Panchayath Pond	1	1	10	31	5
11	Chinnakkanal	Periyakanal	1	1	8	-	-
12	Devikulam	Chinnakkanal	1	1	14	49	2

13	Pampadumpara	Mannakudy Dam	1	1	28	1	-
		Alliyar Water Supply Scheme	1	1	-	-	-
		Pond	1	1	-	-	-
16	Senapthy	Chalakudy mettu Senapathy Pond	1	1	-	-	-
17	Karunapuram	Parakadavu, Manjakuzhi, Cumbemmettu pond	1	1	51	108	17
18	Rajakakkad	Shoolapara, Paliyakamdham	1	1	19	16	4
19	Nedumkandam	Shankarakana, Nedumkandam panchayat pond	1	1	107	152	-
20	Kanjirapara	Myladumpara ICAR pond	1	1	144	447	14
21	Murikumthothi	Rajakumari pond	1	1	109	113	6
22	Vannapuram	Vannapuram pond	1	1	80	117	4
23	Kalkulam	Chalorkan Marakombu pond	1	1	36	25	-
24	Kodikulam West	Purapuzha pond	1	1	184	571	12
25	Alancode	Kochukudy pond	1	1	59	285	33
26	Cheppukulam	Poomala pond	1	1	54	483	37
27	Karimannur	Cheenikuzhy pond	1	1	206	37	1

28	Kudayathoor	Muvattupuzha irrigation canal pond	1	1	-	-	12
29	Arakulam	Kulamav KSEB check dam	1	-	113	1258	103
30	Kamashi	Thankamany drinking water project	1	-	-	-	-
31	Vazhathope	Cheruthoni check dam	-	60	106	322	16
32	Mariyapuram	Mariyapuram panchayat check dam	-	75	65	95	8
33	Upputhara	Kakkathodu Valakode	1	1	20	0	0
34	Vandanmedu	Kochupurakal	-	-	0	0	
35	Kanchiyar	Padykulam	-	-	248	222	9
36	Erattayar	Velsseri pady Mackappathail	-	-	-	-	-
37	Chellarkoil	Pandikuzhi	-	-	248	222	9
38	Kumaramangalam	Perumkandam kulam	-	30	129	699	6
39	Muttom	Muttom panchayat pond,		20	174	664	90
		Thunjakadu pond	-	40	174	664	90
40	Edavetty	Muvattupuzha irrigation canal, Perumkandam	-	540	102	292	3
41	Karimkunnam	Myladumchira,	-	40	158	859	24
		Mundakamattam Kullam		30	158	859	24

42	Mannakad	Keerikkodukulam	-	20	217	1147	-
		Weeumkattukulam		30	217	1147	-
		Thuruthummel		30	217	1147	-
		Manakkad pond		40	217	1147	-
		Chirayilkulam		30	217	1147	-
43	Purapuzha	Ambattukulam	-	30	80	802	34
		Karikombu		10	80	802	34
		Chethikkottu		20	80	802	34
		Kannadikandam		20	80	802	34
		Madathikulam		20	80	802	34
		Chalamkodu		30	80	802	34
44	Peruvanthanam	Mepuzha,	-	30	249	396	11
		Melooram		60	249	396	11
45	Kumily	Rosapookandam		20	74	695	33
		Tribal colony	-	40	74	695	33
46	Kokkayar	Mukkulam top	-	75	37	36	1
47	Peerumedu	Azhutha diversion	-	300	216	43	36
48	Elappara	Vagamon check dam		150	101	271	15
		Hailiburiya check dam,	-	150	101	271	15
49	Vandipeiyar	Thattahikanam		305	79	403	37
		GRAMPY check dam	-	305	79	403	37
50	Thodupuzha Municipality	Kanjiramattam pond	-	20	536	5913	705

The list of block panchayat-wise water supply sources collected from the respective block panchayat is tabulated in Table 18

Table 18 Water Supply Sources -Block Panchayat wise (Thrissur)

SI.No.	Name of Panchayat/ Block	Tube wells	Borewells	Wells	Tanks/ Ponds	Taps	No. of Houses with Water Connections
1	Mathilakam	32	15	337	1126	23	-
2	Eriyad	-	5	446	1093	-	-
3	Mathilakam	89	24	2227	9254	179	-
4	Mala	3	77	28	254	-	-
5	Mala Block	6	251	107	773	527	17
6	Irinjalakuda	4	112	34	235	241	3000
7	Pariyaram	-	5	6	379	-	-
8	Chalakudy	10	6	142	52	576	602

5.1.3 Dependency on Surface and Groundwater

The region exhibits significant dependency on both surface and groundwater sources to meet its water demands for domestic, agricultural, and industrial use. While surface water is primarily utilized through rivers, canals, and reservoirs, groundwater serves as a crucial supplementary source, especially during dry seasons or in areas with limited surface water access. Surface water and groundwater dependency of Idukki district collected from the respective block panchayat is shown in Table 19 and 20.

Table 19 Surface Water Supply Infrastructure in Idukki District(Block-wise)

Block	Panchayat Ponds	Irrigation Tanks	Public Taps	No. of Houses Having Water Connections	Others
Adimali	5	5	278	195	26
Azhutha	7	7	301	636	43
Devikulam	15	15	666	2041	106
Elam Desom	11	11	580	895	51
Idukki	2	-	322	416	27
Kattappana	-	-	423	1404	120
Nedumkandam	-	-	756	2235	133
Thodupuzha	-	-	860	4463	157
Total	40	38	4186	12285	663

Table 20 Groundwater Availability and Utilization Status in Idukki District (Blocks wise)

Assessment Unit (Blocks)	Annual Extractable Ground Water Recharge of Unconfined Aquifer (MCM)	In-storage Ground Water Resources of Unconfined Aquifer (MCM)	Ground Water Resources – Phreatic Aquifer-I (MCM)	Ground Water Resources – Fracture Aquifer-II (MCM)	Total Ground Water Resources (MCM)
Adimaly	30.27	22.9	53.17	31.8	84.97
Azhutha	28.04	19.2	47.24	21.09	68.33
Devikulam	22.08	17.33	39.41	24.06	63.47
Elam Desom	17.85	24.71	42.56	27.15	69.71
Idukki	25.64	15.64	41.28	20.22	61.5
Kattappana	22.93	12.14	35.07	16.86	51.93
Nedumkandam	20.73	13.17	33.9	18.29	52.19
Thodupuzha	18.59	13.41	32	15.19	47.19
Total (MCM)	186.14	138.48	324.62	174.65	499.27

5.2 Water Supply Schemes in the Administrative Boundary

The administrative boundary hosts several water supply schemes aimed at ensuring reliable and equitable access to potable water for both rural and urban populations. These schemes are implemented through various government initiatives and focus on improving infrastructure, coverage, and sustainability of water distribution systems. Details of each scheme collected from the respective block panchayat is documented below.

5.2.1 Jala Jeevan Mission (JJM) Water Supply Schemes (WSS) of KWA in the Thrissur, Ernakulam and Idukki District

THRISSUR

1. Jal Jeevan Mission (JJM)-2021-24 WSS to Desamangalam, Varavoor, Erumapetty, Kadangode, Velur , Choondal, Kandanassery, Mullurkara Part (W-1,2,3,4, half of 5 and 14) Panchayaths -Clear Water Pumping main from proposed sump to Desamangalam master Tank and CWGM from Desamangalam master tank to Velur, varavoor, Kadanassery, Kadangode, Erumapetty, Choondal, Mullakkkara and Elavally Tanks-General Civil Work

JJM project titled WSS to Desamangalam, Varavoor, Erumapetty, Kadangode, Velur, Choondal, Kandanassery, Mullurkara Part Panchayaths is a main water supply scheme implemented under the funding of JJM for the period 2021–2024. It involves general civil works, specifically the construction of a Clear Water Pumping Main (CWPM) from the proposed sump to the Desamangalam master tank and a Clear Water Gravity Main (CWGM) from the master tank to various panchayats including Velur and Varavoor. The project is currently on-going and is executed by the Nattika Project Division in Thrissur District. This project is designed to benefit a population of 32,483 people with a capacity of 40.00 MLD. The pipeline coverage includes 3344 meters of CWPM comprising 800mm Ductile Iron (DI) – 3040m, 150mm DI–190m, and 400mm DI–114m. The CWGM covers a total length of 56,684 meters, which includes various diameter DI pipes such as 900mm–6185m, 800mm–8750m, 600mm–13525m, 450mm–105m, 400mm–5520m, 350mm–11590m, 300mm–7630m, 250mm–1724m, 200mm–215m, and 150mm–1440m.

2. Jal Jeevan Mission (JJM)-JJM PHASE 2- 2021-22 WSS to Desamangalam, Varavoor, Erumapetty, Kadangode, Velur , Choondal, Kandanassery, Mullurkara Part (W-1,2,3,4, half of 5 and 14) Panchayaths & Wadakkanchery Municipality -Package I --Construction of 12m Dia intake well at Kondayur -General Civil Work-

The JJM Phase 2 – 2021–22 WSS for Desamangalam, Varavoor, Erumapetty, Kadangode, Velur, Choondal, Kandanassery, Mullurkara Part Panchayaths, and Wadakkanchery Municipality – Package I is a main project under the JJM. The project involves the construction of a 12-meter diameter Intake Well at Kondayur and is executed by the Nattika Project Division in Thrissur District. Designed to serve a population of 32,483, the project has a water supply capacity of 40.00 MLD. The intake well at Kondayur forms a critical component of the scheme, supporting the water extraction infrastructure necessary for reliable water delivery to the target panchayats and the municipality included in the package.

3. JJM - JJM PHASE 2- 2021-24 WSS to Desamangalam, Varavoor, Erumapetty, Kadangode, Velur , Mulloorkara part, Choondal, Kandanassery and Elavally Panchayaths in Thrissur District – Package - I - Construction of 40 MLD WTP at Desamangalam.

The JJM Phase 2 – 2021–24 WSS for Desamangalam, Varavoor, Erumapetty, Kadangode, Velur, Mulloorkara (part), Choondal, Kandanassery, and Elavally Panchayaths – Package I is a main project under the JJM . identified by the project code TCRJJM052215569. This project, focuses on the construction of a 40 MLD Water Treatment Plant (WTP) at Desamangalam. The scheme is currently on-going and is being implemented by the Nattika Project Division in the Thrissur District. With a design capacity of 40.00 MLD, the project is set to benefit a population of 32,483 across the specified panchayats. The construction of the WTP at Desamangalam is a crucial component aimed at ensuring the delivery of treated and safe drinking water to the covered areas including Desamangalam, Varavoor, Erumapetty, Kadangode, Velur, Choondal, and Kandanassery.

4. The JJM-2022-23-WSS to Puthur, Pananchery, and Madakkathara Panchayaths -Clear water pumping main and gravity main-General Civil Work.

The JJM – 2022–23 WSS for Puthur, Pananchery, and Madakkathara Panchayaths is a main project under the JJM initiative, identified by project code TCRJJM052215636. The project involves general civil works for the clear water pumping main and gravity main, aiming to improve water supply infrastructure to these panchayats. It is categorized under JJM This

ongoing, the project is executed by the Nattika Project Division in Thrissur District, focusing on delivering treated water efficiently through the installation of pumping and gravity mains.

5. *JJM- WSS to Chelakkara, Mullurkara and Panjal Panchayaths- Production components.*
- Clear water pumping main- General Civil Work

JJM– WSS for Chelakkara, Mullurkara, and Panjal Panchayaths is a main project under the JJM initiative. . This project focuses on the production components, including the clear water pumping main, as part of the general civil works aimed at strengthening the region’s water supply infrastructure. The project is currently ongoing and is being implemented by the Nattika Project Division in Thrissur District. It is being carried out to the broader objective of providing reliable and safe drinking water to rural households in the targeted panchayats.

6. *JJM- WSS to Chelakkara, Mullurkara and Panjal Panchayaths- Production components.*
-Construction of 15 MLD WTP at Mechrkunnu-General Civil Work

JJM WSS for Chelakkara, Mullurkara, and Panjal Panchayaths includes a main project focused on the construction of a 15 MLD WTP at Mechrkunnu. . The project is currently ongoing and is executed by the Nattika Project Division in Thrissur District. The Water Treatment Plant is designed with a capacity of 15.00 MLD, contributing significantly to meeting the potable water needs of the region.

7. *JJM WSS to Chelakkara, Mullurkara and Panjal Panchayaths- Production components.*
-Supplying, Laying, Testing and Commissioning RWPM from intake well to WTP and Road restoration works-Pipeline Work

The JJM – WSS for Chelakkara, Mullurkara, and Panjal Panchayaths includes a main project involving the supplying, laying, testing, and commissioning of the Raw Water Pumping Main (RWPM) from the intake well to the WTP. This pipeline work project , is part of the production components under JJM . The work involves installing a 600 mm diameter DI pipeline over a stretch of 2100 meters, along with associated road restoration activities. The project is currently on-going and is being implemented by the Nattika Project Division in Thrissur District, contributing to the seamless conveyance of raw water for treatment, which is critical for ensuring safe and reliable drinking water supply in the target panchayats.

8. KIIFB-WSS to Thrissur Corporation and adjoining panchayaths

The KIIFB-funded WSS to Thrissur Corporation and adjoining panchayaths is a major infrastructure initiative aimed at enhancing urban and peri-urban water supply systems in Thrissur District. Implemented under Phase I, this main project falls under the KIIFB scheme category and is executed by the Nattika Project Division. The project is currently on-going and is designed to serve a substantial beneficiary population of 7,81,878 people with a planned water supply capacity of 100.00 MLD. The scheme covers a wide geographical area, including Thrissur Corporation, and the panchayaths of Vallachira, Cherpu, Avinissery, Paralam, Nenmanikkara, Parappukkara, Vengidangu, Arimbur, Manalur, Avanur, Mulamkunnathukavu, Kolazhy, Adatt, Puthur, Nadathara, Marathakkara, Panancheri, and the Government Medical College, Thrissur. This comprehensive water supply project aims to ensure sustainable and safe drinking water access across both urban and rural segments of the district.

9. JJM- WSS to Mattathur, Varandarappilly, Kodakara (Part 2) and Alagappanagar (Part) - Panchayaths in Thrissur District - Production Components-Construction of 9m dia Intake well cum Pump House-General Civil Work-I

JJM project titled WSS to Mattathur, Varandarappilly, Kodakara (Part 2), and Alagappanagar (Part) in Thrissur District focuses on key production components under the water supply initiative. The project involves the construction of a 9-meter diameter intake well cum pump house as part of general civil works. This main project, categorized under the JJM, is currently on-going and is being executed by the Nattika Project Division. It aims to support the water supply needs of the aforementioned panchayaths by establishing crucial intake infrastructure. Once completed, the intake well and pump house will serve as essential components in the broader water distribution network for the region.

10. JJM - WSS to Irinjalakuda Municipality and Muriyad and Velookara Panchayaths in Thrissur District.

The JJM project titled WSS to Irinjalakuda Municipality and Muriyad and Velookara Panchayaths in Thrissur District is a major water supply initiative. The project is currently on-going and is being executed by the Nattika Project Division. This project aims to provide a sustainable and adequate drinking water supply to a population of approximately 1,43,082 through a system designed with a capacity of 12 MLD. The coverage includes Irinjalakuda Municipality and the Muriyad and Velookara Panchayaths, strengthening the water infrastructure in these regions under the broader JJM framework.

11. JJM - WSS to Aloor and Kodakara (Part I) Panchayaths in Thrissur District

JJM project titled WSS to Aloor and Kodakara (Part I) Panchayaths is a comprehensive water supply initiative in Thrissur District. The project is currently on-going and is being executed by the Nattika Project Division. This scheme involves the development of distribution networks, street main extensions, and service connections, including the provision of 7,550 Functional Household Tap Connections (FHTCs). It also includes KWA deposit charges for domestic water connections, road restoration, and railway crossing works. With a planned supply capacity of 7.43 MLD, the project is expected to benefit approximately 43,488 people, primarily covering the Aloor Panchayath.

12. JJM-2022-2023 WSS to Pananchery, Puthur and Madakkathara Panchayaths-Providing distribution network and FHTC to Puthur Panchayath

JJM project titled WSS to Pananchery, Puthur, and Madakkathara Panchayaths – Providing distribution network and FHTC to Puthur Panchayath is an on-going water supply scheme funded by JJM and executed by the Nattika Project Division in Thrissur District. This project focuses on establishing a robust distribution network and providing Functional Household Tap Connections (FHTCs) specifically for Puthur Panchayath, aiming to ensure reliable and safe drinking water access. The scheme has a designed supply capacity of 14.50 MLD and is expected to benefit a population of approximately 49,234 residents.

13. JJM-2022-23 WSS to Madakkathara Panchayath -Providing Distribution Network and FHTC to Pananchery Panchayath

JJM project titled WSS to Madakkathara Panchayath – Providing Distribution Network and FHTC to Pananchery Panchayath is an on-going water supply scheme. It is funded by JJM and implemented by the Nattika Project Division in Thrissur District. This initiative aims to develop the pipeline infrastructure and provide Functional Household Tap Connections (FHTCs) to households in Pananchery Panchayath. The scheme is designed to deliver a water supply of 14.50 MLD, benefiting a population of approximately 45,963 residents.

ERNAKULAM

1. AMRUT 2.0-UWSS to Muvattupuzha-Providing FHTC to all Households in Muvattupuzha Municipality-Pipeline Work

The AMRUT 2.0 project for Urban Water Supply and Sewerage (UWSS) in Muvattupuzha focuses on providing FHTC to all households within the Muvattupuzha Municipality. This main water supply scheme, is currently ongoing and is funded under the AMRUT 2.0 initiative. The project is being executed by the Muvattupuzha PH Division in Ernakulam district. It has a capacity of 0.20 MLD and aims to benefit a population of approximately 1,000 people. The project primarily involves pipeline work to ensure efficient water supply coverage throughout the municipality.

2. JJM-WSS to Kanjoor, Sreemoolanagaram, Chengamanadu, Nedumbassery, and Parakkadavu Panchayaths

This ongoing water supply project under the JJM includes the development of production components, pumping mains, distribution networks, and provision of FHTCs. It covers the Kanjoor, Sreemoolanagaram, Chengamanadu, Nedumbassery, and Parakkadavu panchayaths, aiming to benefit a large population with a total capacity of 20 MLD. The project is executed by the Perumbavoor Project Division in Ernakulam district.

3. Water supply scheme to Puthencruz, Thiruvaniyoor, Poothrikka and Chottanikkara Panchayaths

This ongoing JJM water supply scheme serves the panchayaths of Puthencruz, Thiruvaniyoor, Poothrikka, and Chottanikkara. It includes the installation of production components, pumping mains, distribution networks, and FHTCs. The project is implemented by the Kochi Project Division with a capacity of 17 MLD.

4. Construction of 5 MLD capacity STP with Cotreatment units at Elamkulam for Kochi Corporation under AMRUT 2.0

This project involves the design, construction, and commissioning of a 5 MLD Sewage Treatment Plant (STP) with cotreatment facilities based on Moving Bed Biofilm Reactor (MBBR) technology. The work includes all mechanical and electrical components and covers a 5-year operation and maintenance period. The project is currently ongoing under AMRUT 2.0 and executed by the PPD & Sewerage Circle - Kochi.

5. JJM-WSS To Aikkaranadu, Mazhuvannoor & Kunnathunadu Panchayaths

An ongoing water supply project under JJM, this scheme involves providing distribution networks and FHTCs to the panchayaths of Aikkaranadu, Mazhuvannoor, and Kunnathunadu. The Perumbavoor Project Division is responsible for execution.

6. JJM-WSS To Vengola & Rayamangalam Panchayaths

This ongoing Jal Jeevan Mission water supply scheme serves Vengola and Rayamangalam panchayaths with production components, pumping mains, distribution systems, and FHTCs. The project has a total capacity of 28 MLD and is managed by the Perumbavoor Project Division.

7. JJM - WSS to Vengoor, Asamannoor & Mudakkuzha Panchayaths

This ongoing water supply scheme includes the construction of production components, pumping mains, distribution systems, and FHTCs for the panchayaths of Vengoor, Asamannoor, and Mudakkuzha. The project capacity is 10 MLD with new FHTCs proposed and some existing ones to be shifted. The Perumbavoor Project Division is executing the project.

8. State Plan - Interim Augmentation of WSS to Kochi City & adjoining areas - 143 MLD Water treatment plant

This ongoing state plan project aims to augment the water supply system for Kochi city and adjoining areas through a 143 MLD capacity water treatment plant. It covers Cochin Corporation, Kalamassery, Thrikkakara, Eloor, Maradu, Aluva Municipalities, and several nearby panchayaths. The project is executed by the Aluva PH Division.

9. JJM-WSS to Amballoor, Edakkattuvayal, Maneed, Mulamthuruthy Panchayaths in Ernakulam District

This ongoing project provides FHTCs in all households within the panchayaths of Amballoor, Edakkattuvayal, Maneed, and Mulamthuruthy. The Perumbavoor Project Division is responsible for execution.

10. JJM-WSS to Ramamangalam, Marady and Pampakuda

This ongoing water supply scheme serves Ramamangalam, Marady, and Pampakuda panchayaths. The project includes water supply infrastructure with a capacity of 12.25 MLD and is executed by the Perumbavoor Project Division.

IDUKKI

1. JJM-CWSS to Idukki- Kanjikuzhi, Vazhathope, Mariyapuram, Kamakshi, Vathikudy and Vannapuram (Part) Panchayaths in Idukki District

The JJM-CWSS project in Idukki, covering the Panchayaths of Kanjikuzhi, Vazhathope, Mariyapuram, Kamakshi, Vathikudy, and part of Vannapuram (Project Code: IDKJJM052210880), is a main water supply scheme funded by the JJM and executed by the Kattappana Project Division in the Idukki district. The project features booster pump houses, including a 0.4 LL booster with a diameter of 5.305 meters and a PH measuring 11 by 5 meters. Storage facilities consist of GLSRs at Calvary Church (3.15 LL), Calvary Mount (6.25 LL GLSR plus PH), and Kuttankavala (3.5 LL GLSR with a diameter of 15.015 meters), alongside the Pushpagirimedu location. The project benefits a population of 98,362 with a total capacity of 35 million liters per day (MLD). Coverage through FHTCs includes 6,992 in Kanjikuzhi, 2,900 in Vannapuram, 1,807 in Mariyapuram, 5,015 in Kamakshi, and 5,683 in Vathikudy.

2. JJM - WSS TO Nedumkandam, Pampadumpara, Upputhara Elappara (Part) And Arakulam (Part) Panchayaths in Idukki District

The JJM Water Supply Scheme to Nedumkandam, Pampadumpara, Upputhara, and parts of Elappara and Arakulam Panchayaths in Idukki District is a major initiative under the JJM, aimed at ensuring household-level water security at 100 litres per capita per day (LPCD). Executed by the Kattappana Project Division and the project is currently ongoing. It is designed with a high capacity of 35.00 MLD targeting a total population of 1,000 (as per project record, though the sum of individual panchayat FHTCs suggests a much larger actual beneficiary count). FHTC coverage includes 5,930 in Nedumkandam, 4,996 in Pampadumpara, 6,809 in Upputhara, and 500 and 600 in the parts of Elappara and Arakulam Panchayaths, respectively. The actual project completion date has not been specified.

3. JJM: Providing Fhtcs to Chakkupallam, Vandanmedu, Karunapuram And Vandiperiyar Panchayats In Idukki District

The JJM project for providing FHTCs to the panchayats of Chakkupallam, Vandanmedu, Karunapuram, and Vandiperiyar in Idukki District is a major water supply initiative under the JJM. Executed by the Kattappana Project Division this comprehensive water supply scheme aims to ensure 100 litres per capita per day (LPCDM) for all households in the targeted panchayats. With a designed capacity of 25.00 MLD, the project is set to benefit a total population of 115,541. The number of FHTCs to be provided includes 10,429 in Vandiperiyar, 3,705 in Chakkupallam, 6,774 in Vandanmedu, and 6,866 in Karunapuram. The project is currently ongoing.

4. JJM-WSS to Konnathady and Udumbanchola Panchayaths in Idukki District

The JJM WSS to Konnathady and Udumbanchola Panchayaths in Idukki District is a main project under the JJM,executed by the Kattappana Project Division .This ongoing project aims to ensure safe and adequate water supply to the residents of Konnathady and Udumbanchola Panchayaths. With a total capacity of 12.00 MLD, the scheme is expected to benefit a population of 43,151. It includes the provision of 7,863 FHTCs in Konnathady Panchayath and 4,208 FHTCs in Udumbanchola Panchayath.

5. JJM -WSS to Rajakkad, Bisonvally, Rajakumary (Part) and Senapathy (Part) Panchayath in Idukki District

The JJM Water Supply Scheme to Rajakkad, Bisonvally, part of Rajakumary, and part of Senapathy Panchayaths in Idukki District is a comprehensive main project funded by the JJM and implemented by the Kattappana Project Division. This ongoing initiative aims to improve access to clean and reliable water for a population of 40,618, with a designed capacity of 10.00 MLD. FHTCs under the project include 2,812 in Rajakkad, 2,423 in Bisonvally, 2,000 in Rajakumary, and 1,515 in Senapathy. The project is currently in progress, with the completion date yet to be specified.

6. JJM WSS to Mankulam Adimaly and Pallivasal (Part) Panchayath in Idukki District

JJM Water Supply Scheme to Mankulam, Adimaly, and part of Pallivasal Panchayaths in Idukki District is a main project funded by the Jal Jeevan Mission (JJM) and executed by the Kattappana Project Division. Designed with a capacity of 11.00 MLD, the scheme is expected

to benefit a population of 56,545. While the project is currently in progress, the completion date has not yet been specified.

7. JJM - WSS to Devikulam and Chinnakanal Panchayath in Idukki District

The JJM-WSS project to Devikulam and Chinnakanal Panchayaths in Idukki is a main water supply initiative funded by the JJM and implemented by the Kattappana Project Division. This ongoing project is designed to provide improved water supply to the residents of Devikulam and Chinnakanal. With a total capacity of 11.00 MLD, the project is expected to benefit a population of 30,132, enhancing access to safe and adequate drinking water in the region.

8. JJM - RWSS to Munnar and Pallivasal Panchayath in Idukki District

The JJM-RWSS project for Munnar and Pallivasal Panchayaths in Idukki District is a main water supply scheme under the JJM, currently ongoing and executed by the Kattappana Project Division. Funded by JJM this project aims to enhance water supply infrastructure in the Munnar and Pallivasal Panchayaths. With a designed capacity of 11.00 (MLD), the scheme is set to benefit a population of approximately 40,000 residents across the covered panchayats.

9. KIIFB - Augmentation of Urban WSS to Thodupuzha Municipality Phase II,

The KIIFB-funded Augmentation of Urban WSS to Thodupuzha Municipality Phase II is an ongoing major project under the KIIFB Water Supply Scheme category. Executed by the Kattappana Project Division in Idukki district, the project primarily involves the supply and laying of a new distribution network within Thodupuzha Municipality. Designed with a water supply capacity of 20.00 MLD, it aims to meet the projected water demand of 19.39 MLD by the year 2049, catering to a design population of 80,075 (with a base year population of 58,143 in 2019). The scheme proposes to enhance the existing water supply level from 90 litres per capita per day (LPCD) to 150 LPCD. The actual project completion date has not been specified.

5.2.2 Other Supply Schemes of KWA in the Idukki, Ernakulam and Thrissur District

The districts of Idukki, Ernakulam, and Thrissur have different water supply sources with their respective schemes in the Periyar River basin. From the different sources of water, the KWA supplies water to the public. Data on the distribution of different water supply sources based

on the different schemes has been collected. Table 10 summarizes the major water supply sources and their schemes under the Idukki District. The Ernakulam & Thrissur District also has many water sources according to the different water supply schemes mentioned in Table 21, 22 and 23 respectively.

Table 21 Water Supply Sources for different schemes in Idukki District (KWA PH Circle Idukki District)

SI. No.	Name of The Scheme	Source
1	UWSS To Thodupuzha	Thodupuzha River
2	CRWSS to Alakode and Adjoining Villages (Alakodu, Karimannoor, Udumbannoor, Vannapuram, Kodikulam Panchayath).	Malankara Dam
3	WSS To Elappara and Adjoining Panchayaths	Periyar
4	CARWSS To Idukki Kamjikuzhi	Idukki Dam
5	WSS To Adimali and nearby Areas of Mannamkamdam Villages	Kallar River
6	WSS To Manakkad and Purappuzha Panchayath	Thodupuzha River
7	WSS To Edavetty Panchayath	
8	ARWSS To Velliyamattom	Malankara Dam
9	WSS To Vettimattom	Open Well
10	TWSS To Thenmary	Tube Well
11	WSS To Karimkunnam Azhakumpara	Thodupuzha River
12	RWSS To Karimkunnam	Malankara Dam
13	RWSS To Vadakkumury	Open Well
14	RWSS To Pachila Vannappuram	Kaliyar River
15	WSS To Mulapuram	Open Well
16	TWSS To Illichari	Bore Well
17	ARWSS To Muttom	Malankara Dam
18	WSS To Kannadippara	Open Well

19	CARWSS To Kumaramangalam	Well
20	WSS To Uriyarikkunnu	Tube Well
21	WSS To Ezhalloor	Open Well
22	WSS To Anchiri SC Colony	Open Well
23	ARWSS To Kudayathoor	Malankara Dam
24	RWSS To Arakkulam	Thodupuzha River
25	RWSS To Puthedom	Open Well
26	RWSS To Vattakkanny	Pond
27	RWSS To Kattappana	Bore Well
28	TWSS To Kattappana	
29	WSS To Kadamakkuzhy	Well
30	WSS To Valiyakandam	
31	WSS To Idukki-Kanjikuzhi Kulamavu Zone	
32	WSS To Perumkala	
33	WSS To Karimban-Maniara	
34	RWSS To Painavu Colony	
35	ARWSS To Rajakkadu and Rajakumari	Intake Well
36	WSS To Kunchithanni	Muthirappuzhayar
37	WSS To Devikulam	Devikulam Lake
38	RWSS Tomunnar	Muthirappuzhayar
39	WSS To Santhanpara	Santhanparariver
40	RWSS To Udumbanchola	Well
41	WSS To Kalkoonthal	River
42	WSS To Pampadumpara IHDP Colony	Stream
43	WSS To Nedumkandam-Pampadumpara	River
44	WSS To Chakkakkanam	Open Well
45	WSS To Puthukkadu - Kanchiyar	Stream
46	WSS To Marykulam	River

47	WSS To Chenninaickankudy	Stream
48	WSS To Puliyannmala	
49	WSS To Vandanmedu	
50	ARWSS To Kumily And Chakkupallam	Thekkady Canal
51	WSS To Mulamkunnu	Stream
52	RWSS To Mlappara	Azhutha River
53	WSS To Karnikkadu	Periyar River
54	CRWSS To Elappara and Adjoining Panchayath	Periyar
55	WSS To Pambanar	Tube Well
56	WSS To Kallarputhuval	
57	WSS To Lakshmikovil	
58	RWSS To Vandipperiyar	Periyar River
59	WSS To Upputhara	
60	WSS To Passuppara	Tube Well
61	WSS To Wagomon	Open Well

Table 22 Water Supply Sources for different schemes in Ernakulam District
(KWA PH Circle Ernakulam District)

Sl. No.	Name of Scheme	Source
1	JNNURM WSS to Kochi City Part 1	Muvattupuzha river
2	EKM WSS to Ernakulam Mattanchery	Periyar
WTP Schemes		
1	EMWSS (Ernakulam-Matanchery Water Supply Scheme)	Periyar river
2	UWSS To Angamaly	
3	ARWSS to Kothakulangara South and Manickamangalam Villages	
4	WSS to North Parur Municipality and adjoining panchayaths	

5	CRWSS to Sreemoolanagaram and Kanjoor Pt	
6	CWSS to Perumbavoor & Vengola	
7	CWSS to Rayamangalam	
8	RWSS to Koovapady	
9	RWSS to Okkal	
10	WSS to Vazhakulam-Kizhakkambalam-Kunnathunadu	
Non-Schemes		
1	RWSS to Ezhattumugham	Irrigation canal- Periyar
2	RWSS to Ayyampuzha, Manjapra, Malayattoor,	Periyar river
3	RWSS to Airapuram, Veetoor	Well,depend on PVIP canal
4	RWSS to Manchanad	Thodu - PVIP canal
5	RWSS to Thattamughal, Vilangu kavungaparambu	Chira - PVIP canal
6	RWSS to Ottathani	Periyar River- PVIP fed
7	ARWSS to Vengoor East & West	Periyar river
8	RWSS to Nellimolam, Kallil & Asamannoor	PVIP canal

Table 23 Water Supply Sources for different schemes in Thrissur District
(KWA, PH Circle Thrissur District)

SI. No.	Name of Scheme	Location	Source
1	CWSS to Chalakudy & RWSS to Aloor Thazhekkad (part)	Koodappuzha	Chalakudy river
2	AUWSS to Chalakudy	Koodappuzha	Chalakudy river
3	Aug of Thrikkur and Kallur villages	Ayyappakunnu	Manali River
4	RDWSS to Pudukad - Alagappanagar & Parappukkara .	Swamiyar kunnu	Kurumali River
5	ARWSS to Meloor & RWSS to Koratty	Devarajagirikunnu	Chalakudy river
6	IWSS to Irinjalakuda	Mangadikunnu	Karuvannur river

7	RDWSS to Kattur, Padiyur, Poomangalam and adjoining Villages	Karalam	Karuvannur river
8	WSS Urakam and Adj villages, UWSS to Ollur Edakunni & AUWSS to chevoor marathakara	Arattupuzha	Karuvannur river
9	WSS to Paralam	Karottumuri	Karuvannur river
10	CWSS to OVC (Cherpu, Vallachira), Avinissery	Pallisserykunnu	Karuvannur river
11	ARWSS to Avinissery	Pallisserykunnu	Karuvannur river
12	CWSS to KPCTA- Chazhoor, Thanniam, Anthikad	Perumbidikunnu Chazhoor	Karuvannur river
13	CWSS to Nattika Firka	Vellani	Karuvannur river
14	CWSS to Mala & Adj Panchayaths and KWSS to Kodungallur Municipality	Vynthala	Chalakudy river
15	CWSS to Methala Eriyad Edavilangu and Kadukutty Panchayaths	Vynthala	Chalakudy river
16	WSS to Koratty and Kadukutty panchayath	Parakoottam	Chalakudy river
17	Kodassery Pariyaram and Athirappilly	Athirappilly	Chalakudy river

6. Details of storage, public and private infrastructures, pumping, supply network and WTPs within delineated administrative and natural boundaries

Kerala is India's second most rapidly urbanizing state, home to an estimated 35 million people (Kerala Water Authority 2023, July). Protection of cities and towns through resilient spatial design, infrastructure development and service delivery are key aspects to be addressed as the State becomes more urbanized. Kerala has not yet been able to capitalize on the fast pace of urbanization nor transform its cities into important economic engines, despite its decentralized administration and governance structure, and advancements in social reforms (Kerala Water Authority, 2023). With respect to coverage of various urban services, including the availability of drinking water, Kerala falls short of acceptable standards. When it comes to providing its residents with a consistent, effective and sustainable piped water supply, the State has much more to do. Due to this, public health and well-being are being significantly impacted. The Kerala Water Authority (KWA) (formerly the Public Health Engineering Department (PHED))

was established on 1st April 1984 as an independent body with the responsibility of developing and regulating the water supply and wastewater sectors in the State. Enhancing operational effectiveness and cutting electricity and non-revenue water (NRW) expenses are necessary to make the systems financially viable (Kerala Water Authority, 2023).

Kerala Water Authority operates an extensive water supply system across multiple administrative divisions and natural boundaries, covering municipal corporations, municipalities and grama panchayats. The infrastructure for delivering treated water to the urban and rural population includes water treatment plants (WTPs), Overhead/ Ground Level Service Reservoirs (OHSR/ GLSR), sumps and pump houses. The Periyar River Basin is the source of water supply and supports the water supply infrastructure across several Divisions of the Kerala Water Authority, including Aluva, Painavu, Kattappana, Kochi, and Muvattupuzha. These divisions draw water from the river and treat it before supplying it to the public.

6.1 Water supply data: P.H. Division, Aluva

The total water demand in the geographical area under this Division is approximately 103.315 MLD. This is used for meeting domestic (86.473 MLD), commercial (11.25 MLD) and industrial (5.592 MLD) requirements. The Periyar River serves as the main water source across all the Divisions. In locations like Perumbavoor, people also rely on wells fed by the Periyar Valley Irrigation Project (PVIP). Each Subdivision within a Division (for e.g., Aluva, Angamaly, Vadakkekara, Perumbavoor and Head Works) has its own WTP, OHSR, GLSR and pumping stations. Sewerage network does not exist in the river basin, Household connections, interception & diversion system, and documented drain information are not available in any of the Subdivisions. There are many pumping stations, which are mainly used for pumping treated water to the respective localities for distribution. Table 24 provides water supply data for the P.H Division Aluva, located within the Periyar River Basin.

Table 24 Water Supply and Infrastructure Details – P.H. Division, Aluva

(Source: Kerala Water Authority)

Sub division	Water Supply Infrastructure Details: WTPs, Storage and Distribution (by Location)	Location of Pumping Stations & Status
Aluva	Aluva OH Tank = 16 LL (to Aluva Municipality)	Compapa & Kailas Colony Pump Houses
	Keezhmadu OH Tank = 22 LL (To Keezhmadu & Edathala Panchayat)	
	Kodikuthumala OH Tank = 22 LL (To Choornikkara & Edathala Panchayat)	
	Thevakkal OH Tank = 30,000 LL (To Edathala Panchayat)	
	Compapa sump = 22 LL (To Edathala Panchayat)	
	Kailas Colony sump = 1 LL (To Edathala Panchayat)	
	Supply to Choornikkara Panchayath directly from WTP Aluva	
Angamaly	WTP Angamaly 5.60 MLD - OHSR at Angamaly Office (16LL) - To Angamaly Municipality	Multiple (Angamaly, PothiyakkaraMarigiri, AmalapuramUppukallu , Thanikkode, Illithodu, Chowara etc.)
	WTP Pothiyakkara 3.60 MLD - OHSR 7.90 LL - To Thuravoor, Kalady, Malayattoor, Neeleswaram Panchayat (6 wards)	
	H.W Section Chowara 63 MLD - Paravur Municipality & Adjoining Panchayats	
	H.W Section Chowara 13.5 MLD - OHSR at Kaipra 7 LL - To Sreemoolanagaram, Kanjoor, Parakkadavu, Chengamanad, Kunnukara, Nedumbassery Panchayat	

	Kunthiri GLSR - 1.5 LL, Thanikkodu GLSR - 1.5 LL & 0.6 LL, Ambaalappara GLSR - 1 LL, Uppukallu SUMP - 2.5 LL Marigiri OHSR - 5 LL, Illithodu GLSR – 6.17 LL	
Vadakkekara	From Chowara 13.5MLD Plant Thiruvilamkunnu OHSR - 7 LL - Nedumbassery Panchayat Chengamad OHSR - 0.5 LL - Chengamadu Panchayat Malayikunnu OHSR - 3.5 LL - Kunnukara Panchayat Puliyankunnu OHSR - 45 LL - Parakadavu Panchayat From Chowara 63 MLD Plant Alamthuruth OHSR - 5 LL - Vadakkekara & Chittattukara Panchayat	Moozhiya, North Paravoor
Head Works Subdivision	Aluva 225 MLD WTP - Keezhamad & Choornikkara Panchayat	Aluva
Perumbavoor	Perumbavoor WTP 2.50 MLD - Peechanamugal tank 8 LL - To Rayamangalam Panchayat Kunnakkatumala WTP 6 MLD - To Okkal Panchayat Cheranallor WTP 7.50 MLD - Mayoorapuram OHSR 14 LL & Kaiyyuthiyal GLSR 9LL - To Koovappady Panchayat Kanjirakkadu WTP 10 MLD - Chundamala tank 12.5 LL - To Vengola Panchayath & 10LL OHSR at Perumbavoor Office - To Perumbavoor Municipality	Nil

	Chembarky WTP 25 MLD - Poyyakunnam OHSR 24 LL, Chembarky OHSR 14.70 LL - To Vazhakkulam, Kizhakkambalam & Kunnathunadu Panchayat	
	Panamkuzhi Pump House - Vakuvally tank 4.5 LL - To Vengoor & Mudakkuzha Panchayath parts	

6.2 Water supply data: P.H. Division, Painavu

The two Subdivisions under this Division are Painavu and Peermade, which primarily rely on the Periyar River for their water supply. Painavu has a combined water demand of 5 MLD, the domestic requirement being 4.2 MLD and commercial requirement 0.8 MLD. The domestic water demand of Peermade is 18 MLD and there is no commercial and industrial demand reported in this Subdivision. Both Subdivisions lack sewerage networks and household connections, interception or diversion systems and no data is available regarding drainage or wastewater quality. Table 25 summarizes the key water supply infrastructure and service details under the P.H. Division, Painavu, in the Periyar River Basin region.

Table 25 Water Supply and Infrastructure Details - P.H. Division, Painavu

(Source: Kerala Water Authority)

Sub division	Water Supply Infrastructure Details: WTPs, Storage and Distribution (by Location)	Location of Pumping Stations & Status
Painavu	WTP old tank (1.8 LL) - Cheruthonni to Kesamuni, vellakkayam	Pumping stations are situated at the same locations as the listed WTPs and storage tanks and they are functionally integrated with the respective water supply infrastructure.
	WTP new tank (3.2 LL) - Cheruthonni to Paramavu, vellakkayam	
	Gandhi nagar Tank (1 LL) - Gandhinagar to Mariyapuram	
	Kurishumala sump (1.5 LL) - Painavu to paremavu, Tannikkandam	
	Microwave (2.5 LL) - Kuyilumala to Painavu	
	Kesamuni (2.23 LL) - Kesamuni to Vazhathope	
	Oxford (2.96 LL) - Oxford Kavala to Karimban	

	Vallikettikavala (3.9 LL) - Bhoomiyamkulam to Maniyarankudi	
Peermade	Puliyamala pump house - 0.19 MLD	
	Vandanmedu pump house - 0.21 MLD	
	Puliyamala pump house - 0.19 MLD	
	Vandanmedu pump house - 0.21 MLD	
	Kumily source pump house and plant - 4.75 MLD	
	Marykulam pump house - 0.70 MLD	
	Vandiperiyar pump house and plant - 1.75 MLD	
	Upputhara pump house - 0.43 MLD	
	Pasuppara pump house - 0.24 MLD	
	Haileburiya pump house and plant - 9.50 MLD	

6.3 Water supply data: Project Division, Kattappana

For the Kattappana Division, the domestic water demand is 116.5 MLD and there are no industrial and commercial water requirements. The main source of water is the Periyar River Basin. Despite the extensive water supply setup, there is no sewerage network, interception or diversion mechanisms, no data is available regarding drainage or wastewater quality. This indicates the need for future planning in the sanitation and wastewater management sectors. The water supply data related to the Project Division, Kattappana, within the Periyar River Basin are presented in Table 26

Table 26 Water Supply and Infrastructure Details - Project Division, Kattappana
(Source: Kerala Water Authority)

Subdivision	Water Supply Infrastructure Details: WTPs, Storage and Distribution (by Location)	Location of Pumping Stations & Status
Kattappana	Kumily source pump house and plant - 25 MLD	Pumping stations are situated at the same locations as the listed WTPs.
	Thonithadi WTP - 7MLD	
	Anchuruly Source and WTP - 35 MLD	

	Cheruthony Source and WTP - 35 MLD	
	Kulamav Low Level Zone - 3.5MLD	
	Muttom - 11MLD WTP	

6.4 Water supply data: W.S Division, Kochi

Under the W.S Division Kochi, in Paravoor Subdivision, the total water demand is 680.744 MLD including domestic (641.47 MLD), industrial (9.324 MLD) and commercial (29.95 MLD) requirements. The main source of water in the Division is the Periyar River. Infrastructure includes OHSRs and GLSRs ranging in capacity from 3 lakh litres to 50 lakh litres. Pump houses are located at various locations including Muppathadam, Elamkunnappuzha and Paravoor KWA Office Compound. The region has good domestic, non-domestic, and industrial water connection network but does not have any interception or diversion systems no data is available regarding drainage or wastewater quality. Table 27 summarizes the water supply infrastructure and service details under the W.S Division, Kochi, covering a part of the Periyar River Basin.

6.5 Water supply data: PH Division, Muvattupuzha

Under the P. H. Division Muvattupuzha (Kothamangalam Subdivision) there are several water supply schemes including ARWSS to Kuttamangalam - Neriya Mangalam, RWSS to Pindimana, RWSS to Kottappady and RWSS to Keerampara. These schemes draw water entirely from the Periyar River. The total water demand in each of these schemes varies from 1.5 MLD to 3.25 MLD; domestic, industrial and commercial water requirements are not specifically mentioned. Infrastructure includes water treatment plants, ground level tanks and underground sumps. However, data pertaining to interception, drainage, and wastewater remain unavailable. Household connections are robust with a number of industrial connections (about 101) and special connections (about 176) in Kottappady suggesting local industrial activity. The Table 28 presents water supply data pertaining to the P.H. Division, Muvattupuzha, within the Periyar River Basin.

Table 27 Water Supply and Infrastructure Details - W.S. Division, Kochi

(Source: Kerala Water Authority)

Sub division	Water Supply Infrastructure Details: WTPs, Storage and Distribution (by Location)	Location of Pumping Stations & Status	Number of Sewerage and Household Connections
Muppatha dam Section	Kunnel OH tank - 18LL - Alangadu, Karumaloor Panchayath	Pump house, section no:1 Muppathadam	Total Connections - 26583 (Domestic Connections - 25748, Non - Domestic Connections - 750, Industrial Connections - 85, Special Connections - 0)
	UC OH tank - 8LL - For Kaumaloor (Millupady, thadikkadavu)		
	Kadungalloor OH Tank - 8LL - For Kadungalloor		
	CWPH sump -10LL - For Karumalloor, Alangad, kadungalloor		
	GIDA Varappuzha - Kadamakudy - 3LL - For Varapuzha, kadamakudy panchayat		
Njarakkal Section	Edavanakkad Aniyil OHSR - 11.15 LL Capacity (Edavanakkad Panchayat)	Puthuvypu pump house in Elamkunnappuzha Panchayat, Nayarambalam pump house in Nayarambalam	Total Connections - 53067 (Domestic Connections - 50896, Non-Domestic Connections - 2114, Industrial Connections - 56, Special Connections - 1)
	Malippuram OHSR - 13.80 LL Capacity (Elamkunnappuzha & Njarakkal Panchayats)		

	Murikkumpadam OHSR - 11.80 LL Capacity (Elamkunnappuzha Panchayat)	Panchayat, Karithala pump house in Pallippuram Panchayat	
	Njarakkal OHSR - 17.90 LL Capacity (Njarakkal Panchayat)		
	Puthuvypu GLSR - 50 LL Capacity (Elamkunnappuzha & Njarakkal Panchayats)		
Paravoor Section	G L Sump - 28.9 LL for Paravur municipality, Ezhikkara Panchayath, Kottuvally Panchayath, Chendamangalam Panchayath	Pump House at North Paravoor KWA office Compound - for Paravoor Municipality, Ezhikkara, Kottuvally and Chendamangalam Panchayats and Vadakkekara section under Aluva P.H Division	Total Connections - 38149 (Domestic Connections - 37078, Non-Domestic Connections - 1054, Industrial Connections - 17, Special Connections - 0)
	G L sump - 16 LL For Paravur Municipality and adjoining Panchayath		
	OHSR - 14.4 LL at KWA office compound North Paravur for Paravur municipality		

Table 28 Water Supply and Infrastructure Details - PH Division, Muvattupuzha

(Source: Kerala Water Authority)

Water Supply Schemes	Water Supply Infrastructure Details: WTPs, Storage and Distribution (by Location)	Location of Pumping Stations & Status	Number of Sewerage and Household Connections	Total Water Demand (MLD)
ARWSS to Kuttamangalam - Neriyamangalam	2.2LL GL tank at Kottaramudy	Avolichal	Total Connections - 3716 (Domestic Connections-3536, Non-Domestic Connections-176, Industrial Connections-0, Special Connections-4)	3.25
	2.4LL GL tank at Villamchira			
	0.25LL GL tank at Neriyamangalam			
	3.25 MLD WTP at Avolichal			
RWSS to Pindimana	3.5 MLD plant at Malippara	Malippara	Total Connections - 3670 (Domestic Connections -3551, Non-Domestic Connections-111, Industrial Connections-0, Special Connections - 8)	3.5
	8LL Sump at Malippara			
	0.5LL GL tank at Malippara			
RWSS to Kottappady	2.95 MLD SSF at Kannakkada	Plamudy	Total Connections - 4172 (Domestic Connections - 3779, Non-Domestic Connections - 116, Industrial Connections - 101, Special Connections - 176)	2.5
	1.72 LL OH tank at kallumala			
RWSS to Keerampara	1.5 MLD SSF at Punnekkad	Thattekad	Total Connections - 2178 (Domestic Connections -2073, Non-Domestic Connections-101, Industrial Connections-0, Special Connections-4)	1.5
	1.75 LL GL tank at Punnekkad			

6.6 Details of Upcoming Schemes and Ongoing Schemes - Regional water infrastructure development under the Project Division, Perumbavoor

A total of 13 water supply schemes are planned and in progress covering 36 panchayats/ municipalities across Ernakulam and adjoining regions. These schemes 9 out of 13 benefitted panchayats draw water primarily from the Periyar River, 2 panchayats from Kaliyar River and 2 panchayats from Muvattupuzha River. Table 29 provides the summary of the regional water infrastructure development schemes under the Project Division, Perumbavoor.

Table 29 Details of upcoming Schemes and Ongoing Schemes
(Source: Kerala Water Authority)

Name of Scheme	Benefitted Panchayats	Source	Location of Pumping station	Capacity
WSS to Karumalloor and Kunnukara	Karumalloor, Kunnukara	Periyar	Thadikkakadavu - Kunnukara	20
WSS to Angamaly Municipality, Thuravoor and Manjapra panchayats	Angamaly Municipality, Thuravoor, Manjapra		Thoppilkadavu - Kanjoor Panchayath	17
WSS to Malayattoor Neeleeswaram and Ayyampuzha panchayaths	Malayattoor - Neeleeswaram, Ayyampuzha		Illithodu - Malayattoor Panchayat	8
WSS to Kanjoor, Sreemoolanagaram , Nedumbassery, Parakkadavu and Chengamanad Panchayat	Kanjoor, Sreemoolanagaram , Chengamanad, Parakkadavu, Nedumbassery		Chowara-Sreemoolanagaram Panchayat	20
WSS to Vengoor, Asamannoor and Mudakuzha Panchayat	Vengoor, Asamannoor, Mudakuzha		Panamkuzhi-Vengoor	10
WSS to Perumbavoor Municipality, Vengola and	Perumbavoor Municipality, Vengola, Rayamangalam		Vallam-Perumbavoor Municipality	28

Rayamangalam Panchayat				
WSS to Paingottoor Panchayat	Paingottoor	Kaliyar	Panamkara-Paingottoor Panchayat	4
WSS to Kavalangad Panchayat	Kavalangad	Periyar	Avolichal-Kavalangad	3.55
WSS to Keerampara	Keerampara		Kalakkadavu-Keerampara	3.5
WSS to Kothamangalam Municipality and Nellikuzhi panchayath	Kothamangalam Municipality, Nellikuzhi		Kalakkadavu-Keerampara	8
WSS to Pothanickad and Pallarimangalam Panchayat	Pothanickad, Pallarimangalam	Kaliyar	Chelakkadavu-Pothanickad	5
WSS to Maneed, Mulamthuruthy, Edakkattuvayal and Amballoor Panchayat	Maneed, Mulamthuruthy, Edakkattuvayal, Amballoor	Muvattupuzha	Nerkuzhi kadavu- Maneed	15.5
WSS to Ramamangalam, Pampakuda and Marady Panchayat	Ramamangalam, Marady, Pampakuda		Methipara-Ramamangalam Panchayat	12.25

6.7 Strengthening Urban Water Infrastructure in Kochi: KUWSIP's Role in Equitable and Sustainable Water Supply (2024–2037)

According to the Kerala Water Authority's internal report (2023), Kochi continues to face severe challenges in achieving equitable and sustainable water distribution. A significant portion of the city's population remains dependent on groundwater, with just over 60% having access to piped water through public standposts or household connections. Access is especially limited among vulnerable households, underscoring persistent service delivery gaps and the urgent need for inclusive infrastructure development. In response, the Government of Kerala, with support from the Asian Development Bank (ADB), launched the Kerala Urban Water Services Improvement Project (KUWSIP). Building on prior initiatives such as the Kerala

Sustainable Urban Development Project (KSUDP), KUWSIP is designed to improve service reliability and enhance the institutional capacity of the Kerala Water Authority (KWA). The core objectives of the Project include establishing a 24 x 7 water supply system, minimizing non-revenue water (NRW), fostering community participation through public consultation and strengthening the technical and managerial capabilities of the KWA. The project targets both infrastructure development and institutional strengthening. Works proposed to be taken up under the Project include rehabilitation of five existing water treatment plants (WTPs) and 15 pumping stations with a combined capacity of 325 MLD, and construction of a new 190 MLD WTP in Aluva. To reduce NRW and improve service delivery, 700 km of old pipelines will be replaced and 1,46,000 household water meters will be upgraded, with a focus on ensuring full coverage, especially for the vulnerable communities. The goal is to guarantee a daily supply of at least 135 liters per capita per day and bring down NRW to below 20%.

In Kochi, the scope of the project scope encompasses major civil works such as the rehabilitation of existing water treatment plants (WTPs), the construction of a new 190 MLD WTP in Aluva and the renewal of production pumping stations at Aluva and Maradu. Institutional improvements under KUWSIP include upgrading the laboratory information system, developing GIS-based maintenance management and customer contact platforms, enhancing billing through a mobile app and training over 80% of the technical staff of the KWA for effective operation and maintenance. Kudumbasree volunteers and community-based organizations will also play a key role in promoting household connections, conservation awareness and customer service. The project is being executed under a design-build-operate framework over a 13-year period (2024–2037), with civil works grouped into three major subprojects: distribution network rehabilitation, construction of the new WTP and restoration of existing WTPs and pump stations. Environmental considerations and safeguards for the KUWSIP subproject have been outlined in a dedicated Initial Environmental Examination (IEE). Fig. 12 summarizes the planned infrastructure upgrades and operational frameworks under the KUWSIP subproject.

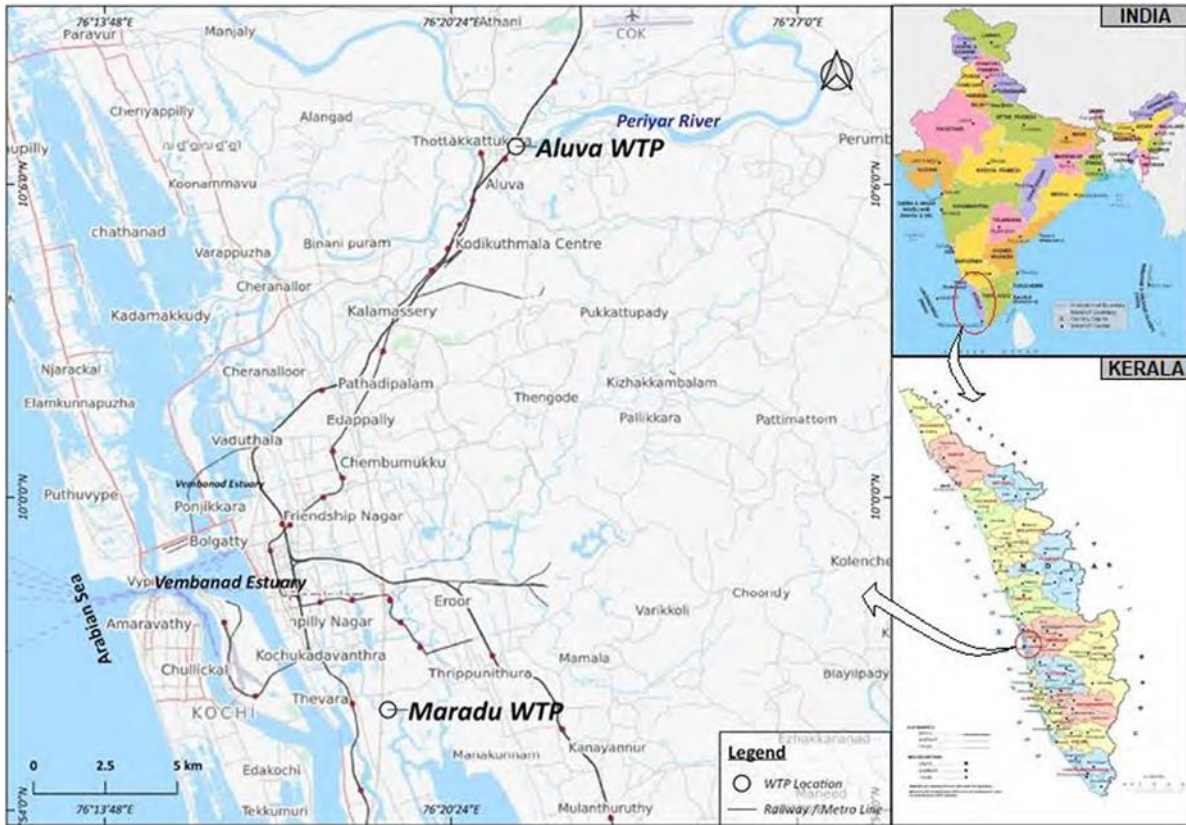


Figure 12 Location Map of the Subproject Area (KWA.,2023)

6.7.1 Existing Water Supply System of Kochi Municipal Corporation

As of 2017, the Kochi Municipal Corporation (KMC) covered an area of 95 km² with a population of 6,69,432 and a total of 1,46,564 water connections. During that year, 73.56 MCM of water was supplied, of which only 36.05 MCM were delivered, resulting in a non-revenue water (NRW) volume of approximately 37.51 MCM. Kochi's water supply is sourced from the Periyar and Muvattupuzha Rivers, both of which are perennial due to regulated discharges from upstream hydroelectric and irrigation dams. Five water treatment facilities with a combined capacity of 325 MLD - four located in Aluva and one in Maradu - supply water to the KMC. Raw water is extracted from the Periyar River at Aluva and treated at four water treatment plants (WTPs) located adjacent to the intake. The treated water is then conveyed through a 12 km long dedicated transmission main to Kochi City, where it is stored in ground-level reservoirs. From there, booster pumping stations distribute the treated water across the city's water supply network. Figure 13 illustrates the layout and functioning of Kochi's existing water supply system from the intake to distribution. Information about the WTPs that services the KMC region is provided in Table 30. Pumping stations for raw water and treated water is located in the water treatment facilities at Aluva and Maradu. The raw water and product water

pumping stations are listed in Table 31. This subproject deals with the manufacturing system, whereas another subproject deals with the distribution system.

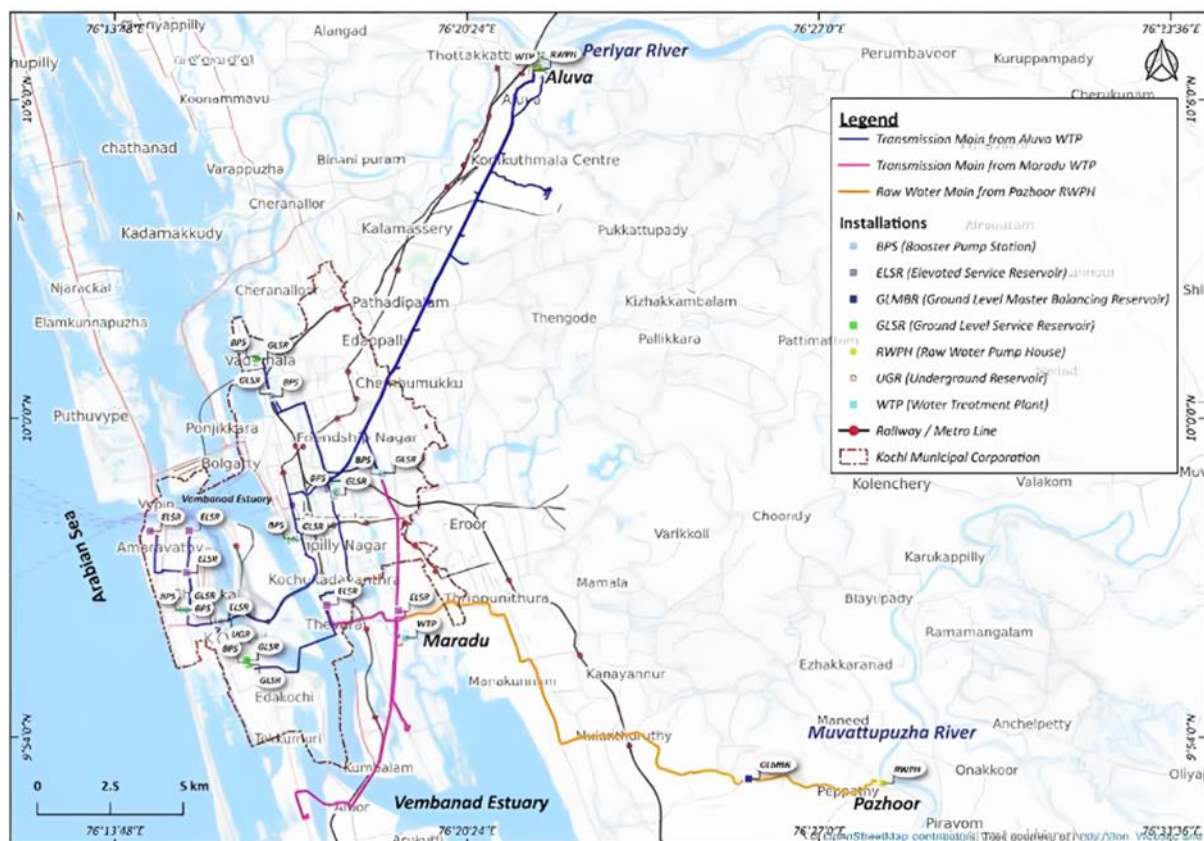


Figure 13 Existing Water Supply System of Kochi Municipal Corporation (KWA., 2023)

Table 30 Details of WTPs Supplying Kochi Municipal Corporation Area (KWA., 2023)

Location	Capacity (MLD)	Year of Establishment	Source of Water
Maradu	100	2016	Muvattupuzha River
Aluva I	48	1965	Periyar River
Aluva II	72	1975	
Aluva III	70	1992	
Aluva IV	35	2002	
Total	325	1993	(Weighted Age) (Average effective age of all the WTPs supplying the KMC area, calculated based on their individual

			capacities and years of establishment)
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Table 31 Details of Raw Water and Product Water Pump Stations at WTPs for Kochi
(KWA., 2023)

Raw Water Pump Stations		WTP	Product Water Pump Stations	
No.	Capacity (MLD)		No.	Capacity (MLD)
KPS01	48	Aluva I	KPS05	48
KPS02	72	Aluva II	KPS06	72
KPS03	105	Aluva III	KPS07	105
		Aluva IV		
KPS08	100	Maradu	KPS09	100

Besides the areal extent of the Kochi Municipal Corporation, the four existing WTPs at Aluva and the one at Maradu supply water to five Municipalities, namely, Aluva, Thrikkakara, Kalamassery, Eloor and Maradu and thirteen Grama Panchayats, namely, Kumbalam, Kumbalangi, Chellanam, Varappuzha, Cheranelloor, Kadamakkudi, Mulavukad, Elamkunnappuzha, Njarakkal, Nayarambalam, Keezhmad, Edathala and Choornikkara located in and around Kochi city. Fig.14 depicts the area covered by the water distribution system mentioned above.

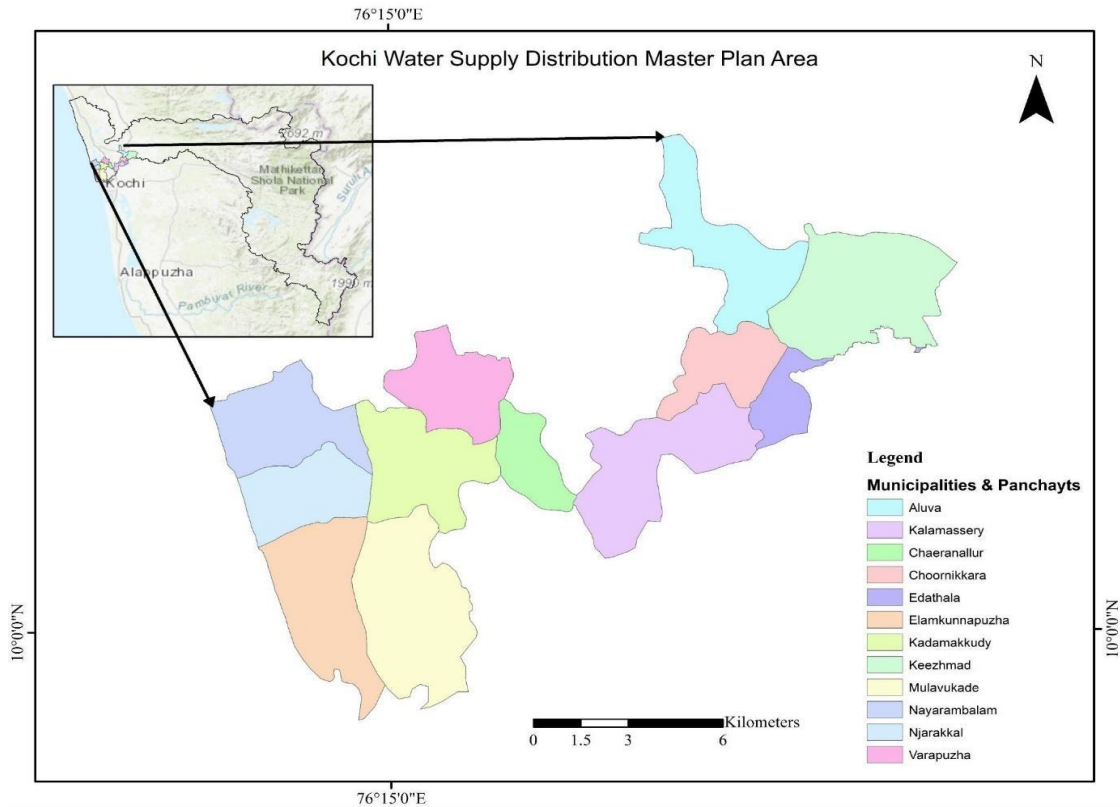


Figure 14 Water supply distribution areas in Kochi - Municipalities and Grama Panchayats

7. Findings and Future Direction

Assessment of water demand and supply across the Periyar River Basin highlights the growing pressures on water resources due to increasing domestic, industrial, and agricultural requirements. As the basin continues to experience rapid urbanization, expanding industrial activity, and intensified agricultural practices, a more integrated and forward-looking approach to water management is essential. Future efforts must focus on developing a comprehensive basin-level water management strategy that brings together data from Jal Nigam, Municipal Corporations, State Pollution Control Boards, and the Irrigation Department to enable efficient planning and allocation. Enhancing sector-wise water use efficiency, particularly in agriculture, which remains the dominant consumer through technologies such as micro-irrigation and regulated canal systems can significantly reduce wastage. Simultaneously, modernization of water infrastructure, including treatment plants, pumping stations, and storage systems, is critical to meet rising demand and prevent losses. The establishment of a centralized digital platform that integrates spatial and temporal datasets from usage to source distribution and infrastructure mapping will support real-time monitoring and evidence-based decision-making. Furthermore, scenario-based demand forecasting using climate and land-use projections will

be vital in building resilience to future variability in rainfall and water availability. Active engagement of local communities, industries, and municipal bodies in water conservation initiatives, along with policy frameworks that promote equitable distribution and accountability, will ensure that water resources in the Periyar River Basin are managed sustainably and remain reliable for future generations.

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Annexure

1. Water Supply Network Plan: <https://drive.google.com/drive/folders/1pSDWoNEfk-w1WPtKmlshYVDAjX713OIQ?usp=sharing>



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